VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Affiliated to JNTUH, Approved by AICTE, Accredited by NAAC and ISO 9001:2008 Certified

Shamshabad - 501 218, Hyderabad, Telangana State, India.

www.vardhaman.org

BACHELOR OF TECHNOLOGY
INFORMATION TECHNOLOGY
(Accredited by NBA)

ACADEMIC REGULATIONS (VCE-R15)
COURSE STRUCTURE AND SYLLABI

CHOICE BASED CREDIT SYSTEM

B. Tech. - Regular Four Year Degree Program
(For batches admitted from the Academic Year 2015 - 2016)
&
B. Tech. - Lateral Entry Scheme
(For batches admitted from the Academic Year 2016 - 2017)

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ➤ "Autonomous Institution / College" means an institution / college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.

- ➤ "Academic Autonomy" means freedom to a College in all aspects of conducting its academic programs, granted by the University for promoting excellence.

- ➤ "Commission" means University Grants Commission.

- ➤ "AICTE" means All India Council for Technical Education.

- ➤ "University" the Jawaharlal Nehru Technological University Hyderabad.

- ➤ "College" means Vardhaman College of Engineering, Hyderabad unless indicated otherwise by the context.

- ➤ "Program" means:
  Bachelor of Technology (B. Tech.) Degree program
  UG Degree Program: B. Tech.

- ➤ "Branch" means specialization in a program like B. Tech. Degree program in Civil Engineering, B. Tech. Degree program in Computer Science and Engineering etc.

- ➤ "Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester. For example, A3001: Mathematics - I, A3501: Computer Programming, etc.

Table1: Course Code Description

First Digit	Second Digit	Third Digit	Fourth and Fifth Digits
Indicates Program	**Indicates Regulation**	**Indicates Department**	**Indicates Course Number**
A : B. Tech. **B** : M. Tech. **C** : MBA	**1** : R11 **2** : R14 **3** : R15	**0** : H&S/MBA **1** : Civil **2** : EEE **3** : MECH **4** : ECE **5** : CSE **6** : IT	01 02 .. ..

- ➤ T – Tutorial, P – Practical, D – Drawing, L - Theory, C - Credits

FOREWORD

The autonomy is conferred on Vardhaman College of Engineering by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the norms set by the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards Degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own **curriculum, examination system and monitoring mechanism**, independent of the affiliating University but under its observance.

Vardhaman College of Engineering is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, if not improving upon the standards and ethics for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Board of Studies are constituted under the guidance of the Governing Body of the College and recommendations of the JNTUH to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after a prolonged and detailed interaction with several expertise solicited from academics, industry and research, in accordance with the vision and mission of the college in order to produce quality engineering graduates for the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought, at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the college and brighter prospects of engineering graduates.

PRINCIPAL
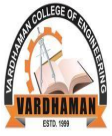
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VISION OF THE COLLEGE:

To be a pioneer institute and leader in engineering education to address societal needs through education and practice.

MISSION OF THE COLLEGE:

The mission of the college is
- To adopt innovative student centric learning methods
- To enhance professional and entrepreneurial skills through industry institute interaction
- To train the students to meet dynamic needs of the society
- To promote research and continuing education.

QUALITY POLICY:

We at Vardhaman college of Engineering endeavor to uphold excellence in all spheres by adopting best practices in effort and effect.

GOALS:

1. To initiate strategic planning process to review its present plans and goals in identifying thrust areas.

2. To tie up with national and international premier organizations for the purpose of exchange of research and innovation through the students and faculty of the Institution.

3. To develop consultancy in all disciplines through alliances with research organizations, government establishments, industries and alumni.

4. To attain status as the provider of quality education and independent research center.

5. To evolve as a Deemed University offering programs of relevance in emerging areas of technology.

6. To achieve 100% placement for students.

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DEPARTMENT OF INFORMATION TECHNOLOGY
B. TECH. - INFORMATION TECHNOLOGY
(Accredited by NBA)

VISION OF IT

The vision of the Department of Information Technology is to evolve as a center of academic excellence with ethical values in the field of Information Technology to meet global needs..

MISSION OF IT

The mission of the Department of Information Technology is to

- *To mould young graduates to unleash their abilities for innovation and demands of the industry*
- *To train students to take up diverse career paths*
- *To develop interpersonal skills through participation in the process of technology transfer*
- *To inculcate innovative thinking through collaborative research.*

PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

PEO - I

Graduates will be able to excel as IT Professional with proficiency in understanding, applying, analyzing and designing solutions to Information Technology relevant problems.

PEO - II

Graduates will be able to pursue higher studies with good knowledge in core areas of Information Technology and promote collaborative research.

PEO - III

Graduates will be able to exhibit professionalism, teamwork, leadership skills and exposure to current needs.

PEO – IV

Graduates will be able to excel as an entrepreneur with potential knowledge to design software based solutions for societal needs.

PROGRAMME OUTCOMES (POS)

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES(PSOs)

PSO1: Competent in Emerging Trends: Apply software design and development practices to develop software applications in emerging areas such as Cloud and High performance computing, Data analytics and Cyber security.

PSO2: Successful Career and Entrepreneurship: The ability to employ modern computer languages, environments and platforms in creating innovative career paths to be an entrepreneur and a zest for higher studies.

VARDHAMAN COLLEGE OF ENGINEERING
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ACADEMIC REGULATIONS

B. Tech. - Regular Four Year Degree Program
(For batches admitted from the Academic Year 2015 - 2016)
&
B. Tech. - Lateral Entry Scheme
(For batches admitted from the Academic Year 2016 - 2017)

For pursuing four year undergraduate Bachelor Degree Program of study in Engineering (B. Tech.) offered by Vardhaman College of Engineering under Autonomous status and herein after referred to as VCE:

1. APPLICABILITY

All the rules specified herein, approved by the Academic Council, will be in force and applicable to students admitted from the academic year 2015-2016 onwards. Any reference to "College" in these rules and regulations stands for Vardhaman College of Engineering.

2. EXTENT

All the rules and regulations, specified hereinafter shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman of Academic Council is final. As per the requirements of statutory bodies, Principal, Vardhaman College of Engineering shall be the Chairman of the Academic Council.

3. ADMISSION

3.1. Admission into first year of four year B. Tech. Degree Program of study in Engineering:

3.1.1. Eligibility:

A candidate seeking admission into the first year of four year B. Tech. Degree Program should have

(i) Passed either Intermediate Public Examination (I.P.E) conducted by the Board of Intermediate Education, Telangana, with Mathematics, Physics and Chemistry as optional subjects or any equivalent examination recognized by Board of Intermediate Education, Telangana or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Telangana or equivalent Diploma recognized by Board of Technical Education for admission as per the guidelines of Telangana State Council for Higher Education (TSCHE).

(ii) Secured a rank in the EAMCET examination conducted by TSCHE for allotment of a seat by the Convener, EAMCET, for admission into the program offered by the Institution.

3.1.2. Admission Procedure:

Admissions are made into the first year of four year B. Tech. Degree Program as per the stipulations of TSCHE.

(a) Category A seats are filled by the Convener, EAMCET.

(b) Category B seats are filled by the Management.

3.2. Admission into the second year of four year B. Tech. Degree Program in Engineering

3.2.1. Eligibility:

A candidate seeking admission under lateral entry into the III semester B. Tech. Degree Program should have passed the qualifying exam (B.Sc. Mathematics & Diploma holders), based on the rank secured by the candidate at Engineering Common Entrance Test ECET (FDH) in accordance with the instructions received from the Convener, ECET and Government of Telangana.

3.2.2. Admission Procedure:

Admissions are made into the II year of four year B. Tech. Degree Program through Convener, ECET (FDH) against the sanctioned strength in each Program of study under lateral entry scheme.

4. PROGRAMS OFFERED

Vardhaman College of Engineering, an autonomous college affiliated to JNTUH, offers the following B. Tech. Programs of study leading to the award of B. Tech. Degree under the autonomous status.

1) B. Tech. (Civil Engineering)

2) B. Tech. (Electrical and Electronics Engineering)

3) B. Tech. (Mechanical Engineering)

4) B. Tech. (Electronics and Communication Engineering)

5) B. Tech. (Computer Science and Engineering)

6) B. Tech. (Information Technology)

5. MEDIUM OF INSTRUCTION

The medium of instruction and examination is English for all the courses.

6. DURATION OF THE PROGRAMS

6.1 Normal Duration

6.1.1 B. Tech. Degree program extends over a period of four academic years leading to the Degree of Bachelor of Technology (B. Tech.) of the Jawaharlal Nehru Technology University Hyderabad.

6.1.2 For students admitted under lateral entry scheme, B. Tech. Degree program extends over a period of three academic years leading to the Degree of Bachelor of Technology (B. Tech.) of the Jawaharlal Nehru Technology University Hyderabad.

6.2 Maximum Duration

6.2.1 The maximum period within which a student must complete a full-time academic program is 8 years for B. Tech. However, if a student fails to complete the academic program within the maximum duration as specified above, he will be required to withdraw from the program.

6.2.2 For students admitted under lateral entry scheme in B. Tech. Degree program, the maximum period within which a student must complete a full-time academic program is 6 years. However, if a student fails to complete the academic program within the maximum duration as specified above, he will be required to withdraw from the program.

6.2.3 The period is reckoned with the academic year in which the student is admitted first time into the Degree Program.

7. SEMESTER STRUCTURE

The College shall follow semester system. An academic year shall consist of a first semester and a second semester and the summer term follows in sequence. The duration of each semester shall be of 23 weeks spell which includes time for course work, preparation and examinations. Each semester shall have a minimum of 90 working days for conducting classes. The academic calendar as shown in Table 2 is declared at the beginning of the semester.

The first and second semesters shall have the duration to accommodate a minimum of 17 instructional weeks per semester.

Table 2: Academic Calendar

FIRST SEMESTER (23 weeks)	Instruction Period :17 weeks		19 weeks
	Mid Semester Tests :2 weeks		
	Preparation & Practical Examinations		2 weeks
	External Examinations		2 weeks
Semester Break			2 weeks
SECOND SEMESTER (23 weeks)	Instruction Period :17 weeks		19 weeks
	Mid Semester Tests :2 weeks		
	Preparation & Practical Examinations		2 weeks
	External Examinations		2 weeks
Summer Vacation			4 weeks

8. PROGRAM STRUCTURE

The Program of instruction consists of:

(i)   Humanities, Social Sciences and Management, Basic Sciences, Basic Engineering, and other Mandatory / Audit courses.

(ii)   Core Engineering courses impart skills among the students on the fundamentals of engineering in the branch concerned.

(iii)   Elective courses enabling the students to take up a group of professional and open courses of their interest.

In addition, a student has to carry out a mini project, project work and technical seminar.

Every course of the B. Tech. Program will be placed in one of the ten groups of courses with credits as listed in the Table 3.

Note: All components prescribed in the curriculum of any program of study shall be conducted and evaluated.

Table 3: Group of courses

S. NO	GROUP OF COURSES	CATEGORY	RANGE OF TOTAL CREDITS
1	Humanities, Social Sciences and Management	HS	5% to 10%
2	Basic Sciences	BS	15% to 20%
3	Basic Engineering	BE	15% to 20%
4	Core Engineering	CE	30% to 40%
5	Professional Elective	PE	10% to 15%
6	Open Elective	OE	5% to 10%
7	Audit Course	AC	0%
8	Mini Project	MP	10% to 15%
9	Technical Seminar	TS	
10	Project Work	PW	

9. CREDIT BASED SYSTEM

All the academic programs under autonomy are based on credit system. Credits are assigned based on the following norms:

9.1. The duration of each semester will normally be 23 weeks with 6 days a week (the second Saturday will be observed as holiday in a month). A working day shall have 6 lecture hours each of 60 minutes duration.

Table 4: Credit Representation

Lectures (hrs/wk/Sem.)	Tutorials (hrs/wk/Sem.)	Practical Work (hrs/wk/Sem.)	Credits (L: T: P)	Total Credits
3	0	0	3:0:0	3
3	1	0	3:0:0	3
3	2	0	3:1:0	4
4	0	0	4:0:0	4
4	1	0	4:0:0	4
0	2	4	0:1:2	3
0	0	3	0:0:2	2
0	0	2	0:0:1	1
0	0	20	0:0:12	12

9.2. The four year curriculum of any B. Tech. program of study shall have 192 credits in total. The exact requirements of credits for each course will be as recommended by the Board of Studies concerned and approved by the Academic Council.

In the case of lateral entry students, B. Tech. program for III, IV, V, VI VII and VIII semesters of study shall have a total 144 credits.

9.3. For courses like mini project / project work / technical seminar, where formal contact hours are not specified, credits are assigned based on the complexity of the work.

10. METHOD OF EVALUATION

The performance of a student in each semester shall be evaluated subject-wise with a maximum of 100 marks each for theory, practical / computer aided engineering drawing lab. In addition, mini-project and technical seminar work shall be evaluated for 100 marks each and project work shall be evaluated for 200 marks.

10.1 Theory Courses

The evaluation of the students in each course is a continuous process and is based on their performance in different examinations and attendance as mentioned below:

Table 5: Method of Evaluation

Continuous Internal Evaluation	Mid Semester Test	15 Marks
	Online Objective Test	05 Marks
	Attendance	05 Marks
External Evaluation	End Semester Examination	75 Marks

10.1.1. Mid Semester Test

There will be two Mid Semester Tests in theory courses for a maximum of 15 marks, to be answered in one and half hour duration. The first Mid Semester Test will be held in the 09th week as per the given schedule for the first half of the total syllabus. The second Mid Semester Test will be held in the 18th week as per the given schedule with the second half of the total syllabus. In case a student does not appear for Mid Semester Test or underperformance, makeup test will be conducted upon the recommendations of the standing committee, subject to payment of a prescribed fee for each examination missed.

10.1.2. Online Objective Test

There will be one Online Objective Test in Theory Courses for a maximum of 05 marks, to be answered in twenty minutes duration. The Online Objective Test will be held in the 18th week as per the schedule declared covering all the units of syllabus. In case a student does not appear for the Online Objective Test due to any reason whatsoever, no makeup test shall be conducted.

10.1.3. Attendance

Five marks shall be allocated subject wise for the percentage of attendance as mentioned in Table 6 at the end of the semester.

Table 6: Marks for attendance

Attendance Percentage	Marks Awarded
Below 75	0
75% to < 80%	1
80% to < 85%	2
85% to < 90%	3
90% to < 95%	4
95% to 100%	5

10.1.4. Mid Marks

The final marks of Mid Exam, is the average of Mid Semester Test 1 and Mid Semester Test 2 along with Online Objective Test marks and subject wise aggregate percentage of attendance.

10.1.5. End Semester Examination

The end semester examination question paper in theory courses will be for a maximum of 75 marks to be answered in three hours duration. There shall be two questions of descriptive type from each unit with internal choice. Each question carries 15 marks. Each theory course shall consist of five units of syllabus.

The question paper shall be set externally and evaluated both internally and externally. If the difference between the first and second valuation is less than 15 marks, the average of the two valuations shall be awarded, and if the difference between the first and second valuation is more than or equal to 15 marks, third evaluation will be conducted and the average marks given by all three examiners shall be awarded as final marks.

10.2 PRACTICALS

Practicals shall be evaluated for 100 marks, out of which 75 marks shall be for external examination and 25 marks for internal. The 25 internal marks are distributed as 15 marks for day-to-day evaluation and 10 marks for internal examination. The external end - examination shall be conducted by the teacher concerned and an external examiner from outside the college.

10.3. For Engineering Drawing-I, Engineering Drawing-II and Machine Drawing, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day evaluation and 10 marks for internal tests) and 75 marks for end examination. There shall be two internal evaluations in a semester and the average of the two internal evaluations is considered for the awarding internal marks.

10.4. The Computer Aided Engineering Drawing Lab wherever offered is to be treated as a practical subject. Evaluation method adopted for practical subjects shall be followed here as well.

10.5. Mini Project

The mini project in an industry shall be carried out during the summer break for a minimum of 4 weeks after the VI Semester and shall be completed before the start of the VII semester. A report has to be submitted for assessment to an internal evaluation committee comprising Head of the Department or his nominee and two faculty members of the department including the project supervisor for 100 marks. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits. The mini project and its report shall be evaluated in VII semester.

10.6 **Technical Seminar**

The seminar shall have two components; one chosen by the student from the course-work without repetition and another approved by the faculty supervisor. The other component is suggested by the supervisor and can be a reproduction of the concept in any standard research paper or an extension of concept from earlier course work. A hard copy of the information on seminar topic in the form of a report is to be submitted for evaluation along with presentation. The presentation of the seminar shall be made before an internal evaluation committee comprising the Head of the Department or his nominee, seminar supervisor and a senior faculty of the department. The two components of the seminar are distributed between two halves of the semester and are evaluated for 100 marks each. The average of the two components shall be taken as the final score. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

10.7. Project Work

The project work shall be evaluated for 200 marks of which 50 marks shall be for internal evaluation and 150 marks for end-semester evaluation. The project work shall be somewhat innovative in nature, exploring the research bent of mind of the student. A project batch shall comprise of not more than four students.

In VIII semester, a mid-course review is conducted by Head of the Department and the project supervisor on the progress of the project for 25 marks. On completion of the project, a second evaluation is conducted for award of internal marks for another 25 marks before the report is submitted making the total internal marks to be 50. The end semester examination shall be based on the report submitted and a viva-voce exam for 150 marks by committee comprising of the Head of the Department, project supervisor and an external examiner. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

11. ATTENDANCE REQUIREMENTS TO APPEAR FOR THE END SEMESTER EXAMINATION

11.1.   A student shall be eligible to appear for end semester examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.

11.2.   Condonation of shortage of attendance in aggregate upto 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

11.3.   Shortage of attendance that is below 65% in aggregate shall in no case be condoned.

11.4.   The shortage of attendance shall not be condoned more than four times during the entire course of study.

11.5.   Students whose shortage of attendance is not condoned in any semester are not eligible to take their end semester examination of that class and their registration shall stand cancelled.

11.6.   A student will not be promoted to the next semester unless he satisfies the attendance requirements of the current semester. The student may seek readmission for the semester when offered next. He will not be allowed to register for the subjects of the semester while he is in detention. A student detained due to shortage of attendance, will have to repeat that semester when offered next.

11.7.   A stipulated fee shall be payable towards condonation of shortage of attendance to the College.

11.8.   Attendance may also be condoned as per the recommendations of academic council for those who participate in prestigious sports, co-curricular and extra-curricular activities provided as per the Govt. of Telangana norms in vogue.

12. EVALUATION
Following procedure governs the evaluation.

12.1   Marks for components evaluated internally by the faculty for each course should be submitted to the Controller of Examinations one week before the commencement of the end semester examinations. The marks for the internal evaluation components will be added to the external evaluation marks secured in the end semester examinations, to arrive at total marks for any subject in that semester.

12.2. Performance in all the courses is tabulated course-wise and will be scrutinized by the Examination Committee. Moderation is applied, if needed, based on the recommendations of moderation committee and then course-wise marks lists are finalized.

12.3 Student-wise tabulation is done and grade sheet is generated which is issued to the student.

13.   RE-EVALUATION

Students shall be permitted for re-evaluation after the declaration of end semester examination results within a stipulated period by paying prescribed fee.

14.   SUPPLEMENTARY EXAMINATION

14.1.   SUPPLEMENTARY EXAMINATION:

Supplementary examinations for the odd semester shall be conducted with the regular examinations of even semester and vice versa, for those who appeared and failed in regular examinations. Such candidates writing supplementary examinations may have to write more than one examination per day.

14.2.   ADVANCED SUPPLEMENTARY EXAMINATION:

Advanced supplementary examinations will be conducted for VIII semester after announcement of regular results of VIII semester.

15.   ACADEMIC REQUIREMENTS FOR PROMOTION / COMPLETION OF REGULAR B. TECH. PROGRAM OF STUDY

The following academic requirements have to be satisfied in addition to the attendance requirements for promotion / completion of regular B. Tech. Program of study.

FOR STUDENTS ADMITTED INTO B. TECH. PROGRAM (BATCHES ADMITTED FROM 2015–2016)

i.   A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject and project, if he secures not less than 35% of marks in the end semester examination and a minimum of 40% of marks in the sum of the internal evaluation and end semester examination taken together.

ii.   In case of mini project and technical seminar, a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each of them, if he secures not less than 40% of marks.

iii.   In case of project work, a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted, if he secures not less than 40% of marks on the aggregate in the internal evaluation and external end-evaluation taken together.

iv.   A student shall be promoted from I Year to II Year program of study only if he fulfills the academic requirement of securing **24 out of 48** credits from the regular examinations held till the end of I year II semester including supplementary examinations.

v.   A student shall be promoted from II Year to III Year program of study only if he fulfills the academic requirement of securing **48 out of 96** credits from the regular examinations held till the end of II year II semester including supplementary examinations.

vi.   A student shall be promoted from III year to IV year program of study only if he fulfills the academic requirements of securing **72 out of 144** credits, from the regular examinations held till the end of III year II semester including supplementary examinations.

vii.   A student shall register for all 192 credits and has to earn all the 192 credits. Marks obtained in best 184 credits shall be considered for the award of the class based on aggregate of grades.

viii.   A student who fails to earn 192 credits as indicated in the course structure within **eight** academic years from the year of their admission shall forfeit his seat in the B. Tech. program and his admission stands cancelled.

FOR LATERAL ENTRY STUDENTS (BATCHES ADMITTED FROM 2016–2017)

i.   A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject or project, if he secures not less than 35% of marks in the end semester examination and a minimum of 40% of marks in the sum total of the internal evaluation and end semester examination taken together.

ii.   In case of mini project and technical seminar, a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each of them, if he secures not less than 40% of marks.

iii.   In case of project work, a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted, if he secures not less than 40% of marks on the aggregate in the internal evaluation and external end-evaluation taken together.

iv.   A student shall be promoted from II Year to III Year program of study only if he fulfills the academic requirement of securing **24 out of 48** credits from the regular examinations held till the end of II year II semester including supplementary examinations held till the end of II year II semester.

v.   A student shall be promoted from III year to IV year program of study only if he fulfills the academic requirements of securing **48 out of 96** credits, from the regular examinations held till the end of III year II semester including supplementary examinations held till the end of III year II semester.

vi.   A student shall register for all 144 credits and earn all the 144 credits. Marks obtained in best 136 credits shall be considered for the award of the class based on aggregate of grades.

vii. A student who fails to earn 144 credits as indicated in the course structure within **six** academic years from the year of his admission shall forfeit his seat in the B. Tech. Program and his admission stands cancelled.

16.   TRANSITORY REGULATIONS

Students who are detained for lack of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same (or) equivalent subjects as and when subjects are offered, and pursue the remaining course work with the academic regulations of the batch into which such students are readmitted. A regular student has to satisfy all the eligibility requirements within the maximum stipulated period of eight years, and a lateral entry student within six years, for the award of the B. Tech. Degree.

17.   TRANSFER OF STUDENTS FROM OTHER COLLEGES/UNIVERSITIES

Transfer of students from other colleges or universities are permitted subjected to the rules and regulations of TSCHE (TE Department) and JNTUH in vogue.

18.   TRANSCRIPTS

After successful completion of the entire Program of study, a transcript containing performance of all academic years will be issued as a final record. Transcripts will also be issued, if required, after payment of requisite fee.

19.   AWARD OF DEGREE

The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Hyderabad on the recommendations of the Chairman, Academic Council.

19.1   FOR STUDENTS ADMITTED INTO B. TECH. PROGRAM (BATCHES ADMITTED FROM 2015-2016)

Eligibility: A student shall be eligible for the award of B. Tech. Degree, if he fulfills all the following conditions:

• The candidate shall pursue a course of study for not less than four academic years and not more than eight academic years.

• The candidate shall register for 192 credits and has to secure all the 192 credits. Marks obtained in best 184 credits shall be considered for the award of the class based on aggregate of grades.

• The candidate has to obtain not less than 40% of marks (minimum requirement for

declaring as passed).

- The candidate has no dues to the college, hostel, and library etc. and to any other amenities provided by the College.

- The candidate has no disciplinary action pending against him.

19.2   FOR LATERAL ENTRY STUDENTS (BATCHES ADMITTED FROM 2016–2017)

Eligibility: A student shall be eligible for the award of B. Tech. Degree, if he fulfills all the following conditions:

- The candidate shall pursue a course of study for not less than three academic years and not more than six academic years.
- The candidate shall register for 144 credits and secure all 144 credits. Marks obtained in best 136 credits shall be considered for the award of the class based on aggregate of grades.
- The candidate has to obtain not less than 40% of marks (minimum requirement for declaring as passed).
- The candidate has no dues to the college, hostel, and library etc. and to any other amenities provided by the College.
- The candidate has no disciplinary action pending against him.

19.3   AWARD OF CLASS

After a student has satisfied the requirement prescribed for the completion of the Program and is eligible for the award of B. Tech. Degree, he shall be placed in one of the following four classes shown in Table 7:

Table 7: Declaration of Class based on CGPA (Cumulative Grade Point Average)

Class Awarded	Grades to be Secured	
First Class with Distinction	≥ 8.0 CGPA	From the aggregate marks secured from **184** Credits for Regular Students and **136** Credits for Lateral Entry Students.
First Class	6.5 to <8.0 CGPA	
Second Class	5.5 to <6.5 CGPA	
Pass Class	5.0 to <5.5 CGPA	
Fail	Below 5.0 CGPA	

19.4   LETTER GRADE AND GRADE POINT

It is necessary to provide equivalence of percentages and/or *Class* awarded with *Grade Point Average (GPA).* This shall be done by prescribing certain specific thresholds in averages for *Distinction, First Class and Second Class,* as mentioned in Table 8.

Table 8: Percentage Equivalence of *Grade Points* (For a 10-Point Scale)

Grade	Grade Points (GP)	Percentage of Marks
O	10	≥ 80 and above
A+	9	≥ 70 and < 80
A	8	≥ 60 and < 70
B+	7	≥ 55 and < 60
B	6	≥ 50 and < 55
C	5	≥ 45 and < 50
P	4	≥ 40 and < 45
F	0	Below 40
AB	0	

For calculating the final percentage of marks equivalent to the computed CGPA, the following formula may be used.

Percentage of marks = (CGPA-0.5) X 10

SEMESTER GRADE POINT AVERAGE (SGPA)

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$SGPA (S_i) = \sum (C_i \times G_i) / \sum C_i$$

Where C_i is the number of credits of the ith course and G_i is the grade point scored by student in the ith course.

CUMULATIVE GRADE POINT AVERAGE (CGPA)

The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.

$$CGPA = \sum (C_i \times S_i) / \sum C_i$$

Where S_i is the SGPA of the ith semester and C_i is the total number of credits in that semester.

20. ADDITIONAL ACADEMIC REGULATIONS

20.1. Courses like projects / mini projects / seminars can be repeated only by re-registering for all the components in that semester.

20.2. When a student is absent for any examination (internal or external), he is treated as to have obtained absent in that component (course) and aggregate of marks is done accordingly.

20.3. When a component is cancelled as a penalty, he is awarded zero marks in that component.

21. REGISTRATION

21.1. Each student has to compulsorily register for course work at the beginning of each semester as per the schedule mentioned in the Academic Calendar IN PERSON. It is absolutely compulsory for the student to register for courses in time. IN ABSENTIA registration will not be permitted under any circumstance.

21.2. Registration without fine: The courses prescribed for a semester can be registered on the date scheduled in the academic calendar. The registration is also permitted on the second day (which is the first working day of the semester) without fine.

21.3. Registration with fine: Late registration shall be permitted by the HOD concerned up to seven working days inclusive of the date of registration on payment of a late registration fee of stipulated amount.

21.4. **Procedure to get permission for late registration:** The student concerned shall apply with proper reason to the HOD concerned through the Academic Counselor to get the permission of the Dean (UG) for the late registration of the courses. Beyond the prescribed time limit, no student shall be permitted to register the courses for a particular semester.

22. TERMINATION FROM THE PROGRAM
The admission of a student to the program may be terminated and the student is asked to leave the college in the following circumstances:

i. If the student fails to satisfy the requirements of the program within the maximum period stipulated for that program.

ii. If the student fails to satisfy the norms of discipline specified by the Institute from time to time.

23. CURRICULUM

23.1   For each program being offered by the Institute, a Board of Studies (BOS) is constituted in accordance with AICTE / UGC / JNTUH statutes.

23.2   The BOS for a program is completely responsible for designing the curriculum at least once in two years for that program.

24. WITHHOLDING OF RESULTS

If the candidate has not paid any dues to the college / if any case of indiscipline / malpractice is pending against him, the results of the candidate will be withheld. The issue of the Degree is liable to be withheld in such cases.

25. GRIEVANCES REDRESSAL COMMITTEE

"Grievance and Redressal Committee" (General) constituted by the principal shall deal in all grievances pertaining to the academic / administrative / disciplinary matters. The composition of the complaints cum redressal committee shall be:

Headed by Senior Faculty member
Heads of all departments
A senior lady staff member from each department (if available)

The committee constituted shall submit a report to the principal of the college and the penalty to be imposed. The Principal upon receipt of the report from the committee shall, after giving an opportunity of being heard to the person complained against, submit the case with the committee's recommendation to the Governing Body of the college. The Governing Body shall confirm with or without modification the penalty recommended after duly following the prescribed procedure.

26. MALPRACTICE PREVENTION COMMITTEE

A malpractice prevention committee shall be constituted to examine and punish the student who involves in malpractice / behaves in an indisciplinary manner during the examination. The committee shall consist of:

Principal
Subject expert
Head of the department to which the student belongs to
The invigilator concerned
Controller of Examinations

The committee constituted shall conduct the meeting on the same day of examination or latest by next working day of the incident and punish the student as per the guidelines prescribed by the JNTUH from time to time.

Any action on the part of candidate at the examination like trying to get undue advantage in the performance at examinations, trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder. The involvement of the Staff who are in-charge of conducting examinations, evaluating examination papers and preparing / keeping records of documents relating to the examinations, in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and will be recommended for appropriate punishment after thorough enquiry.

27. AMENDMENTS TO REGULATIONS

The Academic Council of Vardhaman College of Engineering reserves the right to revise, amend, or change the regulations, scheme of examinations, and / or syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

28. STUDENTS' FEEDBACK

It is necessary for the College to obtain feedback from students on their course work and various academic activities conducted. For this purpose, suitable feedback forms shall be devised by the College and the feedback is obtained from the students regularly in confidence by administering the feedback form in print or on-line in electronic form.

The feedback received from the students shall be discussed at various levels of decision making at the College and the changes / improvements, if any, suggested shall be given due consideration for implementation.

29. GRADUATION DAY

The College shall have its own annual *Graduation Day* for the award of Degrees to students completing the prescribed academic requirements in each case, in consultation with the University and by following the provisions in the Statute.

The College shall institute Prizes and Awards to meritorious students, for being given away annually at the *Graduation Day.* This will greatly encourage the students to strive for excellence in their academic work.

30. AWARD OF A RANK UNDER AUTONOMOUS SCHEME

30.1   Merit Rank will be declared only for those students who have been directly admitted in VCE under Autonomous Regulations and complete the entire course in VCE only within the minimum possible prescribed time limit, i.e., 4 years for B. Tech. and 3 years for B. Tech. under lateral entry scheme.

30.2   A student shall be eligible for a merit rank at the time of award of Degree in each branch of Bachelor of Technology, provided, the student has passed all subjects prescribed for the particular Degree program in first attempt only.

31. CODE OF CONDUCT

31.1   Each student shall conduct himself in a manner befitting his association with VCE.

31.2   He is expected not to indulge in any activity, which is likely to bring disrepute to the college.

31.3   He should show due respect and courtesy to the teachers, administrators, officers and employees of the college and maintain cordial relationships with fellow students.

31.4   Lack of courtesy, decorum, indecorous behavior or untoward attitude both inside and outside the college premises is strictly prohibited. Willful damage or discard of Institute's property or the belongings of fellow students are not at all accepted. Creating disturbance in studies or adopting any unfair means during the examinations or breach of rules and regulations of the Institute or any such undesirable means and activities shall constitute violation of code of conduct for the student.

31.5   Ragging in any form is strictly prohibited and is considered a serious and punishable offence as per law. It will lead to the expulsion of the offender from the college.

31.6   Violation of code of conduct shall invite disciplinary action which may include punishment such as reprimand, disciplinary probation, debarring from the examination, withdrawal of placement services, withholding of grades / Degrees, cancellation of registration, etc., and even expulsion from the college.

31.7   Principal, based on the reports of the warden of Institute hostel, can reprimand, impose fine or take any other suitable measures against an inmate who violates either the code of conduct or rules and regulations pertaining to college hostel.

31.8   A student may be denied the award of Degree / certificate even though he has satisfactorily completed all the academic requirements if the student is found guilty of offences warranting such an action.

31.9   Attendance is not given to the student during the suspension period.

32. OTHER ISSUES

The quality and standard of engineering professionals are closely linked with the level of the technical education system. As it is now recognized that these features are essential to develop the intellectual skills and knowledge of these professionals for being able to contribute to the society through productive and satisfying careers as *innovators, decision makers and/or leaders* in the global economy of the 21st century, it becomes necessary that certain improvements are introduced at different stages of their education system. These include:

a.   Selective admission of students to a Program, so that merit and aptitude for the chosen technical branch or specialization are given due consideration.

b.   Faculty recruitment and orientation, so that qualified teachers trained in good teaching methods, technical leadership and students' motivation are available.

c.   Instructional/Laboratory facilities and related physical infrastructure, so that they are adequate and are at the contemporary level.

d.   Access to good library resources and Information & Communication Technology **(ICT)** facilities, to develop the student's aptitude effectively.

These requirements make it necessary for the College to introduce improvements like:

a.   Teaching-learning process on modern lines, to provide Add-On Courses for audit/credit in a number of peripheral areas useful for students' self development.

b.   Life-long learning opportunities for faculty, students and alumni, to facilitate their dynamic interaction with the society, industries and the world of work.

c.   Generous use of ICT and other modern technologies in everyday activities.

33.   GENERAL
Where the words "he", "him", "his", "himself" occur in the regulations, they include "she", "her", "herself".

Note: Failure to read and understand the regulations is not an excuse.

COURSE STRUCTURE

B. TECH. – INFORMATION TECHNOLOGY

I SEMESTER

Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3001	Mathematics – I	BS	4	1	0	4	25	75	100
A3004	Probability Theory and Numerical Methods	BS	3	1	0	3	25	75	100
A3005	Technical English	HS	3	0	0	3	25	75	100
A3201	Basic Electrical Engineering	BE	4	1	0	4	25	75	100
A3501	Computer Programming	BE	4	1	0	4	25	75	100
A3008	English Language Communication Skills Lab	HS	0	0	3	2	25	75	100
A3502	Computer Programming Through C Lab	BE	0	0	3	2	25	75	100
A3305	Engineering Workshop	BE	0	0	3	2	25	75	100
	TOTAL		18	04	09	24	200	600	800

II SEMESTER

Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3006	Mathematics – II	BS	4	1	0	4	25	75	100
A3002	Engineering Physics	BS	3	1	0	3	25	75	100
A3003	Engineering Chemistry	BS	3	0	0	3	25	75	100
A3401	Electronic Devices and Circuits	BE	4	1	0	4	25	75	100
A3503	Data Structures	BE	4	1	0	4	25	75	100
A3007	Engineering Physics and Engineering Chemistry Lab	BS	0	0	3	2	25	75	100
A3504	Data Structures Lab	BE	0	0	3	2	25	75	100
A3403	Electronic Devices and Circuits Lab	BE	0	0	3	2	25	75	100
	TOTAL		18	04	09	24	200	600	800

III SEMESTER

Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3011	Managerial Economics and Financial Analysis	HS	3	1	0	3	25	75	100
A3404	Digital Logic Design	BE	3	1	0	3	25	75	100
A3505	Discrete Mathematical Structures	BS	3	1	0	3	25	75	100
A3506	Design and Analysis of Algorithms	CE	4	0	0	4	25	75	100
A3516	Database Management Systems	CE	3	1	0	3	25	75	100
A3509	Object Oriented Programming	BE	4	1	0	4	25	75	100
A3511	Object Oriented Programming through Java Lab	BE	0	0	3	2	25	75	100
A3518	Database Management Systems Lab.	CE	0	0	3	2	25	75	100
A3021	Gender Sensitization	AC	0	3	0	0	25*	50*	75*
	TOTAL		20	08	06	24	200	600	800

B. TECH. - INFORMATION TECHNOLOGY

IV SEMESTER

Code	Course	Category	L	T	P	Credits	Internal	External	Total
			Periods per Week				**Scheme of Examination Maximum Marks**		
A3010	Environmental Science	BS	3	0	0	3	25	75	100
A3601	Web Technologies	CE	4	0	0	4	25	75	100
A3513	Formal Languages and Automata Theory	CE	3	1	0	3	25	75	100
A3508	Computer Organization and Architecture	CE	3	1	0	3	25	75	100
A3602	Computer Graphics	CE	3	1	0	3	25	75	100
A3515	Operating Systems	CE	4	1	0	4	25	75	100
A3603	Web Technologies Lab.	CE	0	0	3	2	25	75	100
A3517	Operating Systems Lab	CE	0	0	3	2	25	75	100
	TOTAL		**20**	**04**	**06**	**24**	**200**	**600**	**800**

V SEMESTER

Code	Course	Category	L	T	P	Credits	Internal	External	Total
			Periods per Week				**Scheme of Examination Maximum Marks**		
A3419	Microprocessors and Microcontrollers	CE	3	1	0	4	25	75	100
A3520	Compiler Design	CE	3	1	0	3	25	75	100
A3519	Computer Networks	CE	3	1	0	3	25	75	100
A3604	Open Source Technologies	CE	4	0	0	4	25	75	100
A3605	E-Commerce	CE	3	1	0	3	25	75	100
A3514	Software Engineering	CE	3	1	0	3	25	75	100
A3422	Microprocessors and Interfacing Lab	CE	0	0	3	2	25	75	100
A3606	Open Source Technologies Lab	CE	0	0	3	2	25	75	100
A3012	Professional Ethics and Human Values	AC	3	0	0	0	25*	75*	100*
	TOTAL		**23**	**04**	**06**	**24**	**200**	**600**	**800**

VI SEMESTER

Code	Course	Category	L	T	P	Credits	Internal	External	Total
			Periods per Week				**Scheme of Examination Maximum Marks**		
A3607	Object Oriented Analysis and Design	CE	3	1	0	3	25	75	100
A3522	Data Warehousing and Data Mining	CE	3	1	0	3	25	75	100
A3608	Information Security	CE	3	1	0	3	25	75	100
	Open Elective –I	OE	3	0	0	3	25	75	100
	Professional Elective – I	PE	4	0	0	4	25	75	100
	Professional Elective – II	PE	4	0	0	4	25	75	100
A3524	Data Warehousing and Data Mining Lab	CE	0	0	3	2	25	75	100
A3609	CASE Tools Lab	CE	0	0	3	2	25	75	100
A3013	Intellectual Property Rights	AC	3	0	0	0	25*	75*	100*
	TOTAL		**23**	**03**	**06**	**24**	**200**	**600**	**800**

*Marks awarded for audit courses will not be considered for calculating SGPA and CGPA

B. TECH. - INFORMATION TECHNOLOGY

VII SEMESTER

Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3610	Cloud Computing & Big Data	CE	3	1	0	3	25	75	100
A3611	Mobile Application Development	CE	3	1	0	3	25	75	100
A3612	Software Testing Methodologies	CE	3	1	0	3	25	75	100
	Open Elective – II	OE	3	0	0	3	25	75	100
	Professional Elective – III	PE	4	0	0	4	25	75	100
	Professional Elective – IV	PE	4	0	0	4	25	75	100
A3613	Cloud Computing & Big Data Lab	CE	0	0	2	1	25	75	100
A3614	Mobile Application Development Lab	CE	0	0	2	1	25	75	100
A3615	Mini Project	MP	0	0	0	2	100	0	100
	TOTAL		**20**	**03**	**04**	**24**	**300**	**600**	**900**

VIII SEMESTER

Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3014	Management Science	HS	3	1	0	3	25	75	100
	Open Elective – III	OE	3	0	0	3	25	75	100
	Professional Elective – V	PE	4	0	0	4	25	75	100
A3616	Technical Seminar	TS	0	0	3	2	100	0	100
A3617	Project Work	PW	0	0	20	12	50	150	200
	TOTAL		**10**	**1**	**23**	**24**	**225**	**375**	**600**

B. TECH. - INFORMATION TECHNOLOGY

Professional Elective - I			
Code	**Course**	**Code**	**Course**
A3651	Software Requirements Engineering	A3551	Advanced Computer Architecture
A3554	Image Processing	A3558	Distributed Operating Systems

Professional Elective - II			
Code	**Course**	**Code**	**Course**
A3652	Software Architecture	A3654	Web Services
A3653	C# .NET Framework	A3552	Distributed Databases
A3681	Python for Machine Learning		

Professional Elective - III			
Code	**Course**	**Code**	**Course**
A3655	Design Patterns	A3657	Storage Area Networks
A3656	Cyber Security	A3560	Ad-hoc Sensor Networks

Professional Elective - IV			
Code	**Course**	**Code**	**Course**
A3658	Software Metrics	A3659	Soft Computing
A3559	Information Retrieval System	A3660	Bioinformatics

Professional Elective - V			
Code	**Course**	**Code**	**Course**
A3661	Software Project Management	A3663	Geographical Information Systems
A3662	Web Mining	A3664	Multimedia and Application Development

Open Electives			
Code	**Course**	**Code**	**Course**
A3576	Fundamentals of Database Management Systems	A3577	Fundamentals of Image Processing
A3578	Operating System Fundamentals	A3579	JAVA Programming
A3676	Cyber Laws	A3677	E-Commerce Trends
A3678	Principles of Software Engineering	A3679	Scripting Languages
A3680	Python for Data Science	A3476	Digital Electronics
A3477	Principles of Analog and Digital Communications	A3478	Transducers and Measurements
A3479	Communication Networking Devices	A3276	Nano Technology Applications to Electrical Engineering
A3277	Industrial Electronics	A3278	Solar Energy and Applications
A3279	Energy Management and Audit	A3376	Elements of Mechanical Engineering
A3377	Basic Thermodynamics and Heat Transfer	A3378	Mechanical Measurements and Instrumentation
A3379	Engineering Optimization	A3176	Environmental pollution and management
A3177	Remote sensing and GIS	A3178	Disaster Management
A3179	Constructing planning and management	A3076	Entrepreneurship Development
A3077	Human Resource Management	A3078	Organization Behavior
A3079	Logistics and Supply Chain Management	A3080	National Service Scheme (NSS)

Course Categories

HS	–	Humanities and Social Sciences	**BS**	– Basic Sciences
BE	–	Basic Engineering	**CE**	– Core Engineering
AC*	–	Audit Course	**OE**	– Open Elective
PE	–	Professional Elective	**MP**	– Mini Project
TS	–	Technical Seminar	**PW**	– Project Work

Note: Open electives to be offered will be notified by each department at the time of registration.

SYLLABI FOR I, II, III & IV SEMESTERS

B. Tech. IT I SEMESTER

MATHEMATICS - I

Course Code: **A3001**

L	T	P	C
4	1	0	4

Course Overview:

This course develops the theory of differential equations and indicating its applications. This course deals with more advanced Engineering Mathematics topics which provide students with the relevant mathematical tools required in the analysis of problems in engineering and scientific professions. Topics include the differential equations of first order and their applications, higher order linear differential equations and their applications, Functions of single variable and multiple integrals, Laplace transforms, Vector integral theorems(Green's, Stoke's and Gauss's divergence theorems). The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program

Prerequisite(s): NIL

Course Objectives:

- I.   To explain mathematical modeling with the knowledge of differential equations.
- II.   To discuss higher order differential equations and its applications to solve engineering problems.
- III. To evaluate maxima and minima of function of several variables.
- IV. To solve differential equations using Laplace transforms.
- V.   To compute line, surface and volume integrals.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Solve basic engineering problems described by first order differential equations
2. Determine solutions to higher order linear homogeneous and non homogeneous differential equations with constant coefficients.
3. Define and locate the extremum of a function.
4. Evaluate multiple integrals.
5. Apply Laplace transform to solve differential equations.
6. Compute directional derivative and the gradient of functions of several variables.
7. Infer vector integral theorems to evaluate line, surface, double and triple integrals.

MATHEMATICS - I

Course Code: **A3001**

L	T	P	C
4	1	0	4

SYLLABUS

UNIT – I **(12 Lectures)**

DIFFERENTIAL EQUATIONS OF FIRST ORDER AND THEIR APPLICATIONS: Formation of a differential equation – Differential equations of first order and first degree – Linear equations, Bernoulli's equation, Exact equations and equations reducible to exact form - Applications of first order differential equations - Orthogonal trajectories - Newton's law of cooling - Law of natural growth and decay.

UNIT – II **(11 Lectures)**

HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS AND THEIR APPLICATIONS: Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type $Q(x) = e^{ax}, \sin ax, \cos ax, x^n, e^{ax}V(x), x^nV(x)$ - Equations reducible to linear equations with constant coefficients – Cauchy's homogeneous linear equation – Legendre's linear equation - Method of variation of parameters - Applications to L- C - R Circuits and Simple Harmonic Motion.

UNIT – III **(13 Lectures)**

FUNCTIONS OF SINGLE AND SEVERAL VARIABLES, MULTIPLE INTEGRALS: Mean Value Theorems **-** Rolle's Theorem - Lagrange's mean value theorem – Cauchy's mean value theorem - Generalized mean value theorem (all theorems statements and their verification). Functions of several variables - Functional dependence - Jacobian - Maxima and Minima of functions of two variables – Lagrange's method of undetermined multipliers. Multiple integrals - Double and triple integrals - Change of order of integration - Change of variables in double integrals.

UNIT – IV **(10 Lectures)**

LAPLACE TRANSFORM AND ITS APPLICATIONS TO ORDINARY DIFFERENTIAL EQUATIONS: Laplace transforms of elementary functions - First shifting theorem - Change of scale property - Multiplication by t^n - Division by t - Laplace transforms of derivatives and integrals - Unit step function - Second shifting theorem - Periodic function - Evaluation of integrals by Laplace transforms - Inverse Laplace transforms - Method of partial fractions - Other methods of finding inverse transforms - Convolution theorem - Applications of Laplace transforms to ordinary differential equations.

UNIT-V **(10 Lectures)**

VECTOR CALCULUS: Scalar and vector point functions - Gradient, divergence, curl and their related properties - Solenoidal and irrotational vector point functions - Scalar potential function - Laplacian operator - Line integral - work done - surface integrals - volume integral - Vector integral theorems - Green's theorem in a plane - Stoke's theorem - Gauss divergence theorem (all theorem statements and their verification).

TEXT BOOKS:

1. B S Grewal (2012), *Higher Engineering Mathematics*, 42nd Edition, New Delhi, Khanna Publishers.
2. B V Ramana (2010), *Engineering Mathematics*, New Delhi, Tata Mc Graw Hill Publishing Co. Ltd

REFERENCE BOOKS:

1. Kreyszig Ervin, *Advanced Engineering Mathematics,* 10th *Edition,* New Jersy, John *Wiley* & Sons
2. T K V Iyengar, B Krishna Gandhi & Others. (2011), *Engineering Mathematics Vol - I*, Tenth Revised Edition, New Delhi, S.Chand & Co.Ltd.
3. H K Dass, Er Rajnish Varma (2012), *Higher Engineering Mathematics*, Second Revised Edition, New Delhi, S Chand & Co. Ltd

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT I SEMESTER

PROBABILITY THEORY AND NUMERICAL METHODS

Course Code: **A3004**

L	T	P	C
3	1	0	3

Course Overview:

This course is a study of probability theory and numerical techniques used to model engineering systems. Topics in probability include: basic axioms of probability, Baye's Theorem, random variables, discrete and continuous probability distributions. It involves the development of mathematical models and the application of the computer to solve engineering problems using the following computational techniques: root-finding using bracketing and open methods, Interpolation, numerical differentiation, numerical integration, linear and polynomial curve fitting and the solution of differential equations using single step methods and multi -step methods.

Prerequisite(s): NIL

Course Objectives:

I. To explain fundamental concepts of probability theory.

II. To develop an understanding of the role of discrete and continuous probability distributions in science and engineering.

III. To formulate and apply numerical techniques for root finding, interpolation and curve fitting,

IV. To estimate definite integrals using Newton-Cotes quadrature formula.

V. To compute numerical solution of ordinary differential equations.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Recall the basics of permutations and combinations in probability.

2. Classify discrete and continuous distribution functions.

3. Determine numerical solution of Non Linear equations.

4. Demonstrate the use of curve fitting in correlation and regression analysis.

5. Explain numerical differentiation and integration.

6. Examine numerical interpolation and approximation of functions.

7. Compute numerical solutions of ordinary differential equations.

B. Tech. IT I SEMESTER

PROBABILITY THEORY AND NUMERICAL METHODS

Course Code: **A3004**

L	T	P	C
3	1	0	3

SYLLABUS

UNIT-I   **(8 Lectures)**
PROBABILITY: Sample space and events, probability- axioms of probability-some Elementary theorems-conditional probability.-Bayes Theorem.

UNIT-II   **(8 Lectures)**
RANDOM VARIABLES &DISTRIBUTIONS: Random variables. Discrete distribution – continuous distribution. Binomial distribution - Poisson distribution –Normal distribution-Related properties. Normal Approximation to binomial distribution

UNIT-III   **(12 Lectures)**
ALGEBRAIC AND TRANSCENDENTAL EQUATIONS, INTERPOLATION: Bisection method - Regula-falsi method - Iteration method – Newton - Raphson method.

INTERPOLATION: Finite differences: Forward, Backward and Central differences - Other difference operators and relations between them - Differences of a polynomial – Missing terms - Newton's forward interpolation, Newton's backward interpolation, Interpolation with unequal intervals – Lagrange's interpolation.

UNIT-IV   **(8 Lectures)**
NUMERICAL DIFFERENTIATION, INTEGRATION AND CURVE FITTING: Numerical differentiation: Derivatives using Newton's interpolation formulae. Numerical integration: Newton-cotes quadrature formula - Trapezoidal rule - Simpson's one-third rule - Simpson's three-eighth rule.
CURVE FITTING: Method of least squares - Fitting a straight line, second degree parabola and non-linear curves of the form by the method of least squares.

UNIT-V   **(8 Lectures)**
NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS: Single step methods: Taylor's series method - Euler's and modified Euler's Methods - Fourth order Runge-Kutta method for solving first order equations
MULTISTEP METHOD: Adam's bash forth Predictor and Corrector method.

TEXT BOOKS:

1. B S Grewal, (2012), *Higher Engineering Mathematics*, 42nd Edition, New Delhi, Khanna Publishers.

2. Richard Arnold Johnson, Irwin Miller,John E.Freund,(2011), *Probability and Statistics for Engineers*, Eighth Edition, New Delhi, Prentice Hall

REFERENCE BOOKS:

1. G S S Bhishma Rao (2011), *Probability and Statistics*, Fifth Edition, Hyderabad, Scitech Publications Pvt.Ltd.

2. N P Bali and N Ch Narayana Iyengar , (2004), *A Textbook of Engineering Mathematics*, Sixth Edition, New Delhi, Laxmi Publications.

3. S S Sastry ,(2005), *Introductory Methods of Numerical Analysis*, Fourth Edition, New Delhi, PHI Learning Pvt.Ltd.

4. Iyengar T.K.V., Krishna Gandhi B. & Others., (2013), Numerical Methods, Second Revised Edition, New Delhi, S.Chand & Co.Ltd.

B. Tech. IT I SEMESTER

TECHNICAL ENGLISH

Course Code: **A3005**

L	T	P	C
3	0	0	3

Course Overview:

The basic idea behind offering Technical English as a subject at the undergraduate level is to acquaint students with a language held by common consent to be the most popular language. The lessons included as part of syllabus, aim to take the nuances of English to students as it reveals its strengths and complexity when used to perform a variety of functions such as present technical seminars, prepare technical papers, abstracts, write effective business ,formal and job application letters , publish articles, etc. . For prospective engineers, nothing could be more useful or productive than being able to reach out to the world of technology and business through communication skills.

Prerequisite(s): NIL

Course Objectives:

I.   To integrate opportunity to learners to sample argumentative, narrative, descriptive and persuasive styles of writing.

II. To prioritize learners with the Indian scenario with vocabulary competency concerned and give them an inkling of Indian writings that rendered their fragrance to the development of creative and in addition to that they recognize the importance of humanity, love and service to mankind with reference to prescribed text.

III. To reconstruct the finer nuances of written communication in letter writing, report writing, with standard grammar, idioms and phrasal verbs.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Outline the use of grammar effectively (vocabulary, idioms and phrasal verbs and so on) through writing reports and reading passages, articles, essays, general discussion etc.

2. Paraphrase the importance of technology concerned and classify the lives of great people who rendered their services to the development of Technology.

3. Critique the importance of humanity, love and service to mankind with reference to prescribed texts and also summarize the message of innovation in R&D with regards to being proactive in introducing technology to the masses.

4. Illustrate narrative style of simple writing through prescribed text "*The Connoisseur*" and integrate the concept of narrative technique.

5. Classify the brief history of racism and discrimination and to justify ability to overcome it in global context.

TECHNICAL ENGLISH

Course Code: **A3005**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT – I   (8 Lectures)
Chapter entitled *Heaven's Gate* From *Enjoying Everyday English* published by Orient Black Swan, Hyderabad.
Chapter entitled **Mother Teresa** from *Inspiring speeches and lives* Published by Maruthi Publication, Hyderabad.

Grammar   : Articles – Prepositions
Vocabulary   : Word formation with Prefixes and Suffixes – Synonyms and Antonyms –Homonyms, Homophones and Homographs – Idiomatic Expressions –Phrasal Verbs.
Writing   : Paragraph Writing.

UNIT - II   (8 Lectures)
Chapter entitled *The Connoisseur* From *Enjoying Everyday English* published by Orient Black Swan, Hyderabad.
Chapter entitled **Sam Pitroda** from *Inspiring speeches and lives* Published by Maruthi Publication, Hyderabad.

Grammar   : Concord (Subject verb Agreement) - Adjectives and Degrees of Comparisons
Vocabulary   : Word formation with Prefixes and Suffixes- Synonyms and Antonyms-Collocations- One word substitutes
Writing   : Letter Writing: Types of letters, Styles of letters, Parts of letters, Letter of Apology and reply, Letter of Complaint and Reply.

UNIT - III   (8 Lectures)
Chapter entitled *The Odds Against Us* From *Enjoying Everyday English* published by Orient Black Swan, Hyderabad.
Chapter entitled **I have a Dream** by Martin Luther King from *Inspiring speeches and lives* Published by Maruthi Publication, Hyderabad.

Grammar   : Tenses, Question Tags
Vocabulary   : Technical Vocabulary, Word formation with Prefixes and Suffixes- Synonyms and Antonyms Morphemes
Writing   : Speech Writing, Dialogue and Speech Writing, Writing Technical Articles

UNIT - IV   (8 Lectures)
Chapter entitled *The Cuddalore Experience* From *Enjoying Everyday English* published by Orient Black Swan, Hyderabad.

Grammar   : Active and Passive Voice
Vocabulary   : Synonyms and Antonyms, Words often confused / mis-spelt
Writing   : Letter of Application and Preparation of Resume

UNIT - V   (10 Lectures)
Chapter entitled *Obama* from *Inspiring speeches and lives* Published by Maruthi Publication, Hyderabad.

Grammar   : Simple, Compound and Complex - Direct and Indirect Speech
Vocabulary   : One word substitutes and Technical Vocabulary
Writing   : Report Writing –Types of reports, importance of Reports, Styles of Reports, Structure of Reports–Writing informational, Progress Reports and Analytical Reports in Technical Contexts.

TEXT BOOKS:

1. Ramakrishna Rao. A (2009). *Enjoying Every day English*. Hyderabad: Sangam Books.

2. Yadava Raju. B. & Muralikrishna .C (2009). *Inspiring Speeches and Lives.* Guntur: Maruthi Publications.

3. Meenakshi Raman & Sangeeta Sharma, (2009). *Technical Communication.* Oxford University Press.

REFERENCE BOOKS:

1. Ashraf Rizvi M, (2005). *Effective Technical Communication*. New Delhi: Tata Mc Graw Hill.

2. Raymond Murphy, (2004). *Murphy's English Grammar with CD.* 3rd edition. Cambridge University Press.

3. Wren & Martin (1936), revised by N.D.V.Prasad Rao(1999), *English Grammar and Composition*, S. Chand Publications

4. Mario Rinvolucri &Paul Davis (2005), *More Grammar Games*. Cambridge University Press.

5. Edgar Thorpe & Showick Thorpe., (2008). *Basic Vocabulary for Competitive Examination.* Pearson Education.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT I SEMESTER

BASIC ELECTRICAL ENGINEERING

Course Code: **A3201**

L	T	P	C
4	1	0	4

Course Overview:

This is a basic course for all Engineering students of first Year. The objective is to make them familiar with basic principles of Electrical Engineering. The course addresses the underlying concepts & methods behind Electrical Engineering. The course is present a problem oriented introductory knowledge of the Fundamentals of Electrical Engineering and to focus on the study of basic electrical parameters, basic principles, different types of electrical circuit and methods to solve electrical circuit.

Course Objectives:

I. Describe basic fundamentals of Electric Circuits, their components and the mathematical tools used to represent and analyze Electrical circuits.

II. Develop fundamentals, including Ohm's law, Kirchoff's laws and be able to solve for currents, voltages and power in complex circuits.

III. Demonstrate to write and solve loop current and node voltage equations for arbitrary DC, AC networks including resistors, capacitors, inductors, dependent and independent sources.

IV. Extrapolate the concept of magnetic circuit, Faraday's laws and analyze the series and parallel magnetic circuits.

V. Summarize various two port network parameters and their relations and develop the design and analysis of basic DC and AC circuits with network topologies.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Define basic electrical concepts, including electric charge, current, electrical potential, electrical Power and energy.

2. Distinguish the relationship of voltage and current in resistors, capacitors, inductors, and mutual Inductors.

3. Differentiate circuits with ideal, independent, and controlled voltage and current sources and able to apply Kirchhoff's voltage and current laws to the analysis of electric circuits.

4. Illustrate to apply concepts of electric network topology, nodes, branches, and loops to solve circuit problems, including the use of computer simulation.

5. Emphasize on basic laws and techniques to develop a working knowledge of the methods of analysis used.

6. Interpret to solve series and parallel magnetic circuits.

7. Design various two port network parameters and relations between them.

B. Tech. IT I SEMESTER

BASIC ELECTRICAL ENGINEERING

Course Code: **A3201**

L	T	P	C
4	1	0	4

SYLLABUS

UNIT - I (11 Lectures)

INTRODUCTION TO ELECTRICAL CIRCUITS: Concept of Circuit, R-L-C parameters, voltage and current sources, Independent and dependent sources, source transformation, voltage - current relationship for passive elements, Kirchhoff's laws, network reduction techniques, series, parallel and compound circuits.

UNIT – II (11 Lectures)

ANALYSIS OF ELECTRICAL CIRCUITS: Mesh analysis: mesh equations by inspection method, super mesh analysis.

NODAL ANALYSIS: nodal equations by inspection method, supernode analysis, star-to-delta or delta-to-star transformation.

NETWORK TOPOLOGY: Definitions, graph, tree, basic tieset and basic cutset matrices for planar networks duality & dual networks.

UNIT – III (11 Lectures)

SINGLE PHASE AC CIRCUITS: R.M.S, average values and form factor for different periodic wave forms, steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance. Concepts of phase and phase difference.

POWER AND POWER FACTOR: Concept of power factor, real and reactive powers, J notation, complex and polar forms of representation, complex power.

UNIT – IV (12 Lectures)

NETWORK THEOREMS: Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Millman's, Tellegen's, and Compensation theorems for DC and AC excitations

UNIT – V (11 Lectures)

NETWORK PARAMETERS: Two port network parameters, Z, Y, ABCD, Inverse ABCD, hybrid parameters and Inverse hybrid and their relations.

TEXT BOOKS:
1. William H. Hayt, Jack E. Kemmerly, Steven M. Durbin (2006), *Engineering Circuits Analysis*, 7th Edition, Mc Graw Hill, New Delhi.
2. Joseph Edminister (2001), *Electric Circuits*, 6th Edition Schaum's Outlines, Tata Mc Graw Hill, New Delhi.

REFERENCE BOOKS:
1. Van Valkenburg, M. E. (1974), *Network Analysis*, 3rd Edition, Prentice Hall of India, New Delhi.
2. Wadhwa C. L (2009), *Electric Circuits Analysis,* New Age International Publications, New Delhi.
3. Sudhakar, Shyammohan S. Palli (2003), *Electrical Circuits*, 2nd Edition, Tata Mc Graw Hill, New Delhi.
4. Chakrabarthy (2005), Circuit Theory, 4th Edition, Dhanpat Rai & Sons Publications, New Delhi.

B. Tech. IT I SEMESTER

COMPUTER PROGRAMMING

Course Code: **A3501**

L	T	P	C
4	1	0	4

Course Overview:

The course is a Basic Engineering course for all computing aspiring students. It is designed to provide a comprehensive study of the C programming language that covers the fundamental principles of computer programming, with an emphasis on problem solving strategies using structured programming techniques. The syntax and constructs of data types, control statements, arrays, functions and pointers are elaborated. The derived data types like structures, union and enumerations is also importantly discussed. The console and file I/O systems are explained with the wide variety of examples and applications. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable and reusable code to solve mathematical, engineering and simple data processing problems.

Course Objectives:

I. To provide students with core competence in structured oriented C programming language necessary to formulate, analyze and develop solutions for real world problems.

II. To impart students with profound knowledge of computer programming concepts like Operators, Statements, Arrays, Strings, Functions and Pointers and Structures to develop elegant and manageable C programs.

III. To inculcate in students how and when to apply Structures, Unions and Enumerations in developing both Console and File I/O systems.

IV. To prepare students to develop interest and lay foundation to learn Data Structures and Java programming languages and excel as a professional programmer.

Course Outcomes:

Upon completion of the course, the students will be able to:

1. Exhibit profound knowledge to create, debug, execute and document C programs to cater the needs of computer hardware and software problems.

2. Define the programming syntax and constructs of Control Statements, Arrays, Strings, Functions and Pointers to develop elegant, legible and reusable codes.

3. Differentiate among various derived data types like Structures, Unions and Enumerations and identify the potential benefits of each one over the other.

4. Distinguish between Console and File I/O and apply them as per needs and specifications of the problem statements.

5. Demonstrate an ability to design and develop C based novel products.

6. Comprehend the habit of intelligent reading to learn data structures and java programming, to participate and succeed in competitive exams and prosper in professional career path.

COMPUTER PROGRAMMING

Course Code: **A3501**

L	T	P	C
4	1	0	4

SYLLABUS

UNIT – I (13 Lectures)

INTRODUCTION TO COMPUTERS: Computer systems, Computing environments, Computer languages, Creating and Running Programs, System Development - Algorithm, Pseudo Code, Flow Charting.

INTRODUCTION TO THE C LANGUAGE: Background, C Programs, Identifiers, Types, Variables, Constants, Formatted and Unformatted Console I/O Functions.

OPERATORS AND EXPRESSIONS: Arithmetic, Relational and Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operator, Bitwise Operators, Special Operators, Expressions, Precedence and Associativity, Side Effects, Type Conversion

UNIT – II (13 Lectures)

STATEMENTS: Null, Expression, Return, Compound, Selection, Iteration, Jump Statements.

ARRAYS: Using Arrays in C, Two-Dimensional Arrays, Multidimensional Arrays,

STRINGS: String Concepts, C Strings, String Input/Output Functions, Array of Strings, String Manipulation Functions.

UNIT – III (12 Lectures)

FUNCTIONS: User-Defined Functions, Inter-Function Communication, Standard Functions, Storage Classes, Recursion, Preprocessor Commands.

POINTERS: Introduction, Pointers for Inter-Function Communication, Pointers to Pointers, Arrays and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Array of Pointers, Pointers to Void and to Functions, Memory Allocation Functions, Command-Line Arguments.

UNIT – IV (09 Lectures)

STRUCTURES, UNIONS, ENUMERATIONS AND TYPEDEF: Structure Definition, Initialization, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Passing Structures through Pointers, Self-referential Structures, Unions, Bit-Fields, typedef, Enumerations.

UNIT – V (08 Lectures)

FILE I/O: Streams, Files, File Operations, File Opening Modes, Formatted File I/O Functions, Unformatted File I/O Functions, File Status Functions, File Positioning Functions.

TEXT BOOKS:

1. B. A. Fouruzan and R. F. Gilberg (2014), *C Programming & Data Structures,* 3rd Edition, CENGAGE Learning, India.

REFERENCE BOOKS:

1. Herbert Schildt (2013), *C: The Complete Reference*, 4th Edition, Mc Graw Hill Education (India) Pvt Ltd.

2. B. W. Kerninghan, Dennis M. Ritche (1988), *The C Programming Language*, 2nd edition, Prentice Hall Software Series, India.

3. Stephen G. Kochan (2014), *Programming in C*, 4th Edition, Addison-Wesley Professional.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT I SEMESTER

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Course Code: **A3008**

L	T	P	C
0	0	3	2

Course Overview:

The basic idea behind offering English as a practical subject at the undergraduate level is to acquaint the students with a language that enjoys currently as a lingua franca of the globe. In the ELCS lab the students are trained in Communicative English Skills: phonetics, word accent, word stress, rhythm and intonation, making effective oral presentations- both extempore and Prepared- seminars, group discussions, presenting techniques of writing, role play, telephonic skills, asking and giving directions, information transfer, debates, description of person, place, objects etc. The lab encourages students to work in a group, engage in peer-reviews and inculcate team spirit through various exercises on grammar, vocabulary, listening and pronunciation games, etc.

Prerequisite(s): NIL

Course Objectives:

I. To take part in computer-aided multi-media instruction enabling individualized and independent language learning.

II. To appraise a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking.

III. To train students to use language appropriately for interviews, group discussion and public speaking.

Course Outcomes:

Upon successful completion of the course, the students will be able to:

1. Perceive how to pronounce words using the rules of word stress and intonation

2. Minimize the stage fear and make presentations with proper body language

3. Determine to use right words and phrases in formal and informal speech through role-plays, interviews keeping with the demands of occasion.

4. Appraise the art of debating and group dissuasion using different styles.

5. Rule on phrases and idioms while making the telephone conversation.

B. Tech. IT I SEMESTER

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Course Code: **A3008**

L	T	P	C
0	0	3	2

SYLLABUS

a. **Computer Assisted Language Learning (CALL) Lab**
b. **Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the **English Language Communication Skills Lab**

Exercise – I
CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants
ICS Lab: Ice-Breaking activity and JAM session Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise – II
CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.
ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette - Concord (Subject in agreement with verb) and Words often mis-spelt-confused/misused.

Exercise - III
CALL Lab: Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.
ICS Lab: Descriptions- Narrations- Giving Directions and guidelines - Sequence of Tenses, Question Tags and One word substitutes.

Exercise – IV
CALL Lab: Intonation and Common errors in Pronunciation.
ICS Lab: Extempore- Public Speaking Active and Passive Voice – Common Errors in English, Idioms and Phrases

Exercise – V
CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice
ICS Lab: Information Transfer- Oral Presentation Skills - Reading Comprehension and Job Application with Resume preparation.

Suggested Softwares:
- Cambridge advanced learners' English dictionary with CD.
- The Rosetta stone English library.
- Clarity pronunciation power –part I.
- Oxford advanced learner's compass, 7th Edition.
- Learning to speak English -4 CDs.
- Vocabulary in use, Michael McCarthy, felicity o'den, Cambridge.
- Murphy's English grammar, Cambridge with CD.

REFERENCE BOOKS:
1. Suresh Kumar. E. & Sreehari P.A (2007), Handbook for English Language Laboratories,
2. Cambridge University Press India Pvt. Ltd, New Delhi.
3. Mandal S. K (2006), Effective Communication & Public Speaking, Jaico Publishing House, New Delhi.
4. Grant Taylor (2004), English Conversation Practice, Tata McGraw Hill, New Delhi.
5. Balasubramanian .T (2000), A text book of English Phonetics for Indian Student, MacMillan Publishers, India.
6. Kamalesh Sadanand, Susheela Punitha (2008), Spoken English: A foundation Course: Parts 1 & 2, New Delhi, Orient Longman Pvt. Ltd

VARDHAMAN COLLEGE OF ENGINEERING
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B. Tech. IT I SEMESTER

COMPUTER PROGRAMMING THROUGH C LAB

Course Code: **A3502**

L	T	P	C
0	0	3	2

Course Overview:

This hands-on course provides a comprehensive introduction to the ANSI C language, emphasizing portability and structured design. Students are introduced to all major language elements including data types, control statements and preprocessor directives. Thorough treatment is given to the topics of arrays, functions and pointers. The course elucidates the use of structures, unions, and enumerations. Emphasis is given to the processing of command line arguments and file systems, so as to write flexible, user-friendly programs. Comprehensive hands on exercises are integrated throughout to reinforce learning and develop real competency. It is used to program desktop applications, compilers, tools and utilities and even hardware devices.

Course Objectives:

I. To provide students to gain hands-on experience to design and develop C Programming solutions to real-time problems.

II. To train students with good breadth of computer programming syntax and constructs like Operators, Statements, Arrays, Strings, Functions, Pointers and Structures to translate descriptive problem statements into sophisticated executable C programs.

III. To inculcate in students to maintain high programming standards and to work as individual or as a member in developing C based novel products.

IV. To prepare students to apply their computer programming skills to continue implementing advanced and diverse projects, and excel as a professional programmer.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Demonstrate the programming skills to create, debug, execute and document C programs to cater the needs of computer hardware and software problems.

2. Implement the programs using the constructs such as Control Statements, Arrays, Strings, Functions and Pointers without major syntax errors, ensuring that the developed code is elegant, legible and reusable.

3. Differentiate among Structures, Unions and Enumerations and appropriately use them in developing C based novel products.

4. Design, Implement programs distinguishing Console I/O and File I/O.

5. Demonstrate an interest towards subsequent programming concepts like data structures and java programming so as to succeed in academics and professional career path.

COMPUTER PROGRAMMING THROUGH C LAB

Course Code: **A3502**

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

Week – 1 (Operators)

1. Write C programs for the following:
   a) Swapping of two numbers without using a third variable.
   b) Check whether the given number is odd or even using conditional operator.
   c) Read two integers and shift the first integer by two bits to the left and second integer by one bit to the right.

Week – 2 (if and switch statements)

2. Write C programs for the following:
   a) Check whether the input alphabet is a vowel or not.
   b) Find the roots of a quadratic equation.
   c) Which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Week – 3 (Loops)

3. Write C programs for the following:
   a) Print Armstrong numbers between 1 to n where n value is entered by the user. An Armstrong number is defined as the sum of the cubes of the individual digits of the given number. (e.g. $371 = 3^3 + 7^3 + 1^3$)
   b) Generate the first n terms of the Fibonacci sequence.
   c) Calculate the following sum:
      Sum=$1 + x^2/2! + X^4/4! +$ ------------------------- up to given 'n' terms.

Week – 4 (Loops)

4. Write C programs for the following:
   a) Generate all the prime numbers between 1 and n, where n value is supplied by the user.
   b) Print first n lines of the Pascal's Triangle. Pascal's Triangle is a triangular array of the binomial coefficients.

   ```
               1
           1       1
       1       2       1
   1       3       3       1
   ```

   c) Print first n lines of Floyd's Triangle. 1

   ```
   2   3
   4   5   6
   7   8   9   10
   11  12  13 14 15
   ```

Week – 5 (Arrays)

5. Write C programs for the following:
   a) Find the largest and smallest number among a list of integers.
   b) Read a list of elements into an array 45, 14, 78, 36, 64, 9, 25, 99, 11 and find weather a particular element is present in the list or not using linear search.
   c) Read two matrices and find the addition and multiplication of two matrices.

Week – 6 (Strings)

6. Write C programs for the following:
   a) Check whether the given string is palindrome or not with and without using string functions.
   b) Insert a sub-string in to given main string from a given position.
   c) Count the number of lines, words and characters in a given string.

Week – 7 (Functions)

7. Write C programs that uses both recursive and non-recursive functions:
   a) Find the factorial of a given number.
   b) Find the Nth Fibonacci number.
   c) Find the reverse of a number.

Week – 8 (Pointers)

8. Write C programs for the following:
   a) Reverse a string using pointers.
   b) Read a list of elements into an array. Find the sum of array elements using pointers.
   c) Read an array of integers whose size will be specified interactively at rum time.

Week – 9 (Command line arguments)

9. Write C programs for the following:
   a) Pass n number of arguments at the command line and display total number of arguments and their names.
   b) Add two numbers using command line arguments.

Week – 10 (Structure and Union)

10. Write C programs for the following:
    a) Read the full name and date of birth of a person and display the same using nested structure.
    b) Create a Student structure containing name, rollNo and grade as structure members. Display the name, rollNo and grade of n students by using array of structures concept.
    c) Create a union named Item that contains, itemName, itemPrice and itemQuantity as members and find the size of the union and number of bytes reserved for it.

Week – 11 (Enumerated Data Types, Typedef, Bit Fields, Pre-processor Directives)

11. Write C programs for the following:
    a) Create enumerated data type for 7 days of a week. Display their values in integer constants.
    b) Find the biggest number among two numbers using a parameterized macro.
    c) Create a Student structure using typedef containing id, name and age as structure members. Declare a bit field of width 3 for age and display the student details.

Week – 12 (Files)

12. Write C programs for the following:
    a) Copy the contents of one file to another.
    b) Merge the contents of two files and store it in a third file.
    c) Reverse the contents of a file.

Week – 13 (Additional Programs)

13. Write C programs for the following:
    a) Read the student marks in five courses and based on the calculated average display the grade of the student.
    b) Read two strings and compare these two strings character by character. Display the similar characters found in both the strings.
    c) Read name and marks of N students' records from user and store them in a file.

REFERENCE BOOKS:

1. Yashawanth Kanethkar (2014), *Let us C*, 13th Edition, BPB Publications, India.

2. E. Balaguruswamy (2014), *Computer Programming*, 1st Edition, McGraw-Hill, India

3. Pradip Dey, Ghosh Manas (2009), *Programming in C*, Oxford University Press, USA.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT I SEMESTER

ENGINEERING WORKSHOP

Course Code: **A3305**

L	T	P	C
0	0	3	2

Course Overview:

This course provides comprehensive knowledge of the various trades and tools used in an Engineering workshop. It emphasizes on the use of various workshop tools with safety aspects. The essence of this lab is also to make the students know about identifying hardware devices in PC, hardware assembling and disassembling, and internet capabilities and understand the usage different software's like MS Office.

Course Objectives:

I.   To enable the students identify the tools used in various engineering workshop trades.

II. To cultivate the safety aspects in handling of tools and equipment used in engineering workshop.

III. To make the students practice Fitting, Carpentry, Foundry, Black-Smithy and Tin-Smithy trades

IV. To make the students practice house wiring for connecting and controlling home appliances.

V.   To demonstrate the metal joining arc welding process, Plumbing, and power tools.

VI. To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations

VII. To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system

VIII. To learn about Networking of computers and use Internet facility for Browsing and Searching.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Identify the tools used in various engineering workshop trades

2. Make use of tools used in various engineering workshop trades

3. Perform operations in Fitting, Carpentry, Foundry, Black-Smithy and Tin-Smithy trades.

4. Make the electric connections for operating home appliances.

5. Explain the arc welding process and plumbing operations.

6. Disassemble and Assemble a Personal Computer and prepare the computer ready to use.

7. Prepare the Documents using Word processors, Excel and Latex.

8. Prepare Slide presentations using the presentation tool.

9. Interconnect two or more computers for information sharing.

10. Access the Internet and Browse it to obtain the required information.

11. Install single or dual operating systems on computer.

ENGINEERING WORKSHOP

Course Code: **A3305**

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

PART – A

1. TRADES FOR PRACTICE:

Note: At least four trades have to be practiced from Part-A.

a. Carpentry

b. Fitting

c. House Wiring

d. Tin-Smithy

e. Foundry

PART-B

2. DEMONSTRATION TRADES:

a. Black Smithy

b. Welding

c. Plumbing

PART-C

Note: At least four tasks have to be carried out from Part-C

Task 1

 Introduction to Computer: block diagram of the CPU along with the configuration of each peripheral component and its functions. Practice to disassemble and assemble the components of a PC to working condition.

Task 2

 Installation of operating systems: like MS Windows, Linux and different packages on a PC. Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic hardware & software troubleshooting steps, PC diagnostic tools.

Task 3

 Introduction to Network: types of Networks, types of network topologies, types of network protocols, drivers loading and configuration settings, mapping of IP addresses, configuration of internet and Wi-Fi , bookmarks, search toolbars and pop up blockers.

Task 4

Introduction to Search Engines and Cyber Hygiene: types of search engines and how to use search engines, awareness of various threats on internet, types of attacks and how to overcome. Installation of antivirus software, configuration of personal firewall and windows update on computers.

Task 5

Introduction to Word: importance of word as word processor, overview of toolbars, Saving, accessing files, using help and resources.

Creating project Certificate: Abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs.

Creating Time Table: Abstract Features to be covered:-Formatting Styles, Inserting table.

Task 6

Introduction to Power Point: Utilities, Overview of toolbars, PPT Orientation, slide layouts, Types of views.

Creating Front page of The presentation: Create a power point presentation using the features - slide layouts, inserting text, word art, formatting text, bullets and numbering, auto shapes, lines and arrows, hyperlinks, inserting –images, clip art, audio, video, objects, tables and charts.

Task 7

Introduction to Excel: Overview of toolbars, accessing, Saving excel files, Using help and resources. Create a excel using the features - gridlines, format cells, summation, auto fill, formatting text, cell referencing, formulae in excel – average, standard deviation, charts, renaming and inserting worksheets, hyper linking, count function, sorting, conditional formatting.

Creating a Scheduler: Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 8

Introduction to latex: importance of LaTeX, Details of LaTeX word accessing, overview of toolbars, saving files and using help and resources, features to be covered in LaTeX word and LaTeX power point.

Creating project Certificate: **A**bstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs

TEXT BOOKS:

1. H. S. Bawa (2007), *Workshop Practice*, Tata McGraw-Hill Publishing Company Limited, NewDelhi.

2. A. Rajendra Prasad & P. M. M. S. Sarma (2002), *Workshop Practice*, SreeSai Publication, NewDelhi.

REFERENCE BOOKS:

1. K. Jeyachandran, S. Natarajan, S. Balasubramanian (2007), *A Primer on Engineering Practices Laboratory*, Anuradha Publications, New Delhi.

2. T. Jeyapoovan, M. Saravanapandian, S. Pranitha (2006), *Engineering Practices Lab Manual*, Vikas Publishing House Private Limited, New Delhi

3. W.A.J. Chapman, *Workshop Technology*, Part 1, Viva Low Priced Student Edition.

4. *Introduction to Information Technology*, ITL Education Solutions limited, Pearson Education.

5. *IT Essentials PC Hardware and Software Companion Guide* 3rd Edition by David Anfinson and Ken.

6. Quamme. – CISCO Press, Pearson Education.

7. Kate J. Chase, *PC Hardware and A+Handbook*, PHI (Microsoft)

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT II SEMESTER

MATHEMATICS – II

Course Code: **A3006**

L	T	P	C
4	1	0	4

Course Overview:

This course focus on basic areas of theory and more advanced Engineering Mathematics topics which provide students with the relevant mathematical tools required in the analysis of problems in engineering and scientific professions. Topics to be covered in this course include: solution for linear systems, Eigen values & Eigen vectors, linear transformations, partial differential equations, Fourier series, Fourier transforms & Z - transforms. The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program.

Prerequisite(s):

- Mathematics – I (A3001)

Course Objectives:

I. To explain the concepts of matrix algebra and methods of solving system of linear equations.

II. To compute eigen values and eigen vectors of real and complex matrices.

III. To apply properties of partial differential equations to obtain solution for science and engineering problems.

IV. To determine the Fourier coefficients of a given function.

V. To analyze the characteristics and properties of Fourier transforms and Z – transforms.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Apply elementary transformations to reduce matrices to echelon form, normal form and hence find their rank.

2. Solve the system of linear equations.

3. Reduce the quadratic form to canonical form using orthogonal transformation.

4. Apply partial differential equations to solve engineering problems.

5. Construct Fourier series expansion of periodic functions.

6. Determine Fourier transform, Fourier sine and cosine transform of a function.

7. Apply Z transforms to solve difference equations and analyze linear time-invariant systems.

MATHEMATICS – II

Course Code: **A3006**

L	T	P	C
4	1	0	4

SYLLABUS

UNIT – I   (11 Lectures)

THEORY OF MATRICES: Real matrices: Symmetric, skew – symmetric and orthogonal matrices - Complex matrices: Hermitian, Skew - Hermitian and Unitary matrices - Elementary row and column transformations - Elementary matrix - Finding rank of a matrix by reducing to Echelon form and Normal form - Finding the inverse of a matrix using elementary row/column transformations (Gauss-Jordan method) - Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix - Solving $m \times n$ and $n \times n$ linear system of equations by Gauss elimination - Cayley-Hamilton Theorem (Statement and Verification) - Finding inverse and powers of a matrix by Cayley-Hamilton theorem.

UNIT – II   (12 Lectures)

LINEAR TRANSFORMATIONS: Linear dependence and independence of vectors - Linear Transformation, Orthogonal Transformation - Eigen values and eigen vectors of a matrix – Properties of eigen values and eigen vectors of real and complex matrices - Diagonalization of a matrix. Quadratic forms up to three variables - Rank, Index, Signature and Nature of quadratic form - Reduction of a quadratic form to canonical form using linear and orthogonal transformations.

UNIT – III   (10 Lectures)

PARTIAL DIFFERENTIAL EQUATIONS: Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions - Solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations - Equations reducible to standard forms - Method of separation of variables for second order equations.

UNIT – IV   (10 Lectures)

FOURIER SERIES: Determination of Fourier coefficients - Fourier series in an arbitrary interval - Fourier series of even and odd functions - Half-range Fourier sine and cosine expansions.

UNIT – V   (13 Lectures)

FOURIER TRANSFORMS & Z - TRANSFORMS: Fourier integral theorem (statement) - Fourier sine and cosine integrals - Fourier transforms - Fourier sine and cosine transforms - Properties - Inverse transforms - Finite Fourier transforms.

Z-transforms: Definition - Some standard Z-transforms - Damping rule - Shifting rule - Multiplication by n - Initial and final value theorems - Inverse Z-transforms using partial fractions - Convolution theorem - Solution of difference equations by Z - transforms.

TEXT BOOKS:
1. B S Grewal (2012), *Higher Engineering Mathematics*, 42nd Edition, New Delhi, Khanna Publishers.
2. B V Ramana (2010), *Engineering Mathematics*, New Delhi, Tata Mc Graw Hill Publishing Co. Ltd

REFERENCE BOOKS:
1. Ervin Kreyszig, *Advanced Engineering Mathematics,* 10th *Edition,* New Jersy, John *Wiley* & Sons
2. T K V Iyengar, B Krishna Gandhi & Others. (2011), *Mathematical Methods*, Tenth Revised Edition New Delhi, S.Chand & Co. Ltd.
3. H K Dass, Er Rajnish Varma (2012), *Higher Engineering Mathematics*, Second Revised Edition, New Delhi, S.Chand & Co. Ltd.

VARDHAMAN COLLEGE OF ENGINEERING
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B. Tech. IT II SEMESTER

ENGINEERING PHYSICS

Course Code: **A3002**

L	T	P	C
3	1	0	3

Course Overview:

Engineering physics is the study of the combined disciplines of physics, engineering and mathematics in order to develop an understanding of the interrelationships of these three disciplines. Fundamental physics is combined with problem solving and engineering skills, which then has broad applications. Career paths for Engineering physics are usually "engineering, applied science or applied physics through research, teaching or entrepreneurial engineering". This interdisciplinary knowledge is designed for the continuous innovation occurring with technology.

Prerequisite(s): NIL

Course Objectives:

I. To discover crystal structures in terms of atom positions, unit cell, cell parameters and to observe them using x-ray diffraction.

II. To discuss the principles of nanotechnology, characterization and synthesize of nano structured materials.

III. To summarize quantum mechanics, explain semiconductors and apply the knowledge to electronic devices.

IV. To explain dielectrics, magnetism and superconductivity.

V. To illustrate working of Lasers and Optical fibers.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Discover crystals and estimate their packing fractions.

2. Explain crystal planes, compute their Miller Indices and develop problem solving skills.

3. Interpret crystal structure with the help of X-Ray Diffraction.

4. Classify Nanomaterials, discuss synthesis and react to environmental concerns due to nanotechnology.

5. Relate quantum mechanics to classification of solids.

6. Classify dielectrics, magnetic materials and summarize their role in science and technology.

7. Apply magnetism to explain superconductivity.

8. Illustrate working of a laser and develop communication systems using optical fibers.

ENGINEERING PHYSICS

Course Code: **A3002**

L	T	P	C
3	1	0	3

SYLLABUS

UNIT - I   (10 Lectures)

INTRODUCTION TO CRYSTALLOGRAPHY: Space lattice, Unit cell, lattice parameters, Atomic radius, co-ordination number and packing factor of SC, BCC, FCC, and diamond, Miller indices, Crystal planes and directions, Interplanar spacing of orthogonal crystal systems.

X-Ray Diffraction: Basic principles of X-ray diffraction, Bragg's law, Laue method, Rotating Crystal Method, Powder method, applications of X-ray diffraction.

UNIT - II   (8 Lectures)

PRINCIPLES OF QUANTUM MECHANICS: Waves and particles, De Broglie hypothesis, matter waves, Davisson and Germer experiment, G. P. Thomson experiment, Schrödinger's time independent wave equation, Application of Schrodinger equation (particle in one dimensional potential box).

SEMICONDUCTOR PHYSICS: Intrinsic and Extrinsic Semiconductors, p-n junction diode, Forward and reverse bias, V-I characteristics, Fermi level in Intrinsic and Extrinsic semiconductors (qualitative), Applications of Semiconductors (LED).

UNIT - III   (8 Lectures)

NANO SCIENCE: Origin of Nano science, Nano scale, surface to volume ratio, Bottom-up and Top-down approaches; Synthesis: Sol-gel, Chemical vapour deposition, physical vapour deposition, pulsed laser vapour deposition methods; Applications of Nanomaterials.

DIELECTRIC PROPERTIES: Electric dipole moment, dielectric constant, Types of polarization (qualitative), Local Field, Clausius – Mossotti Equation, Piezoelectricity and Ferroelectricity and their applications.

UNIT - IV   (8 Lectures)

MAGNETIC PROPERTIES: Magnetic moment, classification of magnetic materials, Weiss theory of ferromagnetism, hysteresis curve, soft and hard magnetic materials and their applications.

SUPERCONDUCTORS: Meissner effect, BCS Theory, Type-I and Type-II Superconductors, High temperature Superconductors, applications of superconductors.

UNIT - V   (8 Lectures)

LASERS: Characteristics of lasers, spontaneous and stimulated emission of radiation, population inversion, Einstein's coefficients, Pumping mechanisms, Ruby laser, Helium-Neon laser, semiconductor diode laser, applications of lasers.

FIBER OPTICS: Principle of optical fiber, acceptance angle, Numerical aperture, types of optical fibers, attenuation of signal in optical fibers, Functioning of Optical Fiber communication system, applications of optical fibers.

TEXT BOOKS:

1. Pillai, S.O. (2007), *Engineering Physics*, New Age International.

2. Arumugam.M (2005), *Engineering Physics*, Anuradha Publishers.

REFERENCE BOOKS:

1. Rajendran.V and Marikani.A(2004), *Engineering Physics,* Tata Mc Graw Hill Publications Ltd, 3rd Edition

2. H K Dass, Er Rajnish Varma (2012), *HigherEngineering Mathematics,* Second Revised Edition, S. Chand & Co. Ltd, New Delhi.

3. P.Sarah and M. Geetha (2012), *Engineering Physics and Engineering Chemistry*, VGS Booklinks, Hyderbad

4. M. Ratner, D. Ratner (2003), *Nanotechnology,* Pearson Edition, India.

VARDHAMAN COLLEGE OF ENGINEERING
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B. Tech. IT II SEMESTER

ENGINEERING CHEMISTRY

Course Code: **A3003**

L	T	P	C
3	0	0	3

Course Overview:

This course will involve minimum lecturing, content will be delivered through assigned reading and reinforced with large and small group discussions, as well as assigned in class (and occasional out of class) group activities. Water and its treatment for various purposes, engineering materials such as plastics, composites, ceramic, abrasives, their preparation, properties and applications, conventional and non-conventional energy sources, nuclear, solar, various batteries, combustion calculations, corrosion and control of metallic materials.

Prerequisite(s): NIL

Course Objectives:

I. To discover the importance of electrical energy originated from chemical reactions.

II. To examine the role of water as an engineering material in steam and power generation.

III. To outline the utility of polymers in chemical, hardware industries and inculcate knowledge of basic construction materials.

IV. To list out the applications of fuels in everyday life.

V. To analyze the concept of colloids and discuss their applications in industry.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Utilize the knowledge of cell, electrode, cathode, anode, electrolysis, electromotive force and reference electrode including corrosion of metals.

2. Appraise the quality and utility of suitable water for industrial as well as domestic applications

3. Rephrase the engineering applications of polymeric materials, cement, lubricants and refractories

4. Interpret the vitality of fuels in industries.

5. Summarize the applications of colloids and nanoparticles on industry level in controlling pollution.

ENGINEERING CHEMISTRY

Course Code: **A3003**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT – I (11 Lectures)

ELECTROCHEMISTRY: Introduction, Conductance-Specific, Equivalent and Molar conductance, effect of dilution on electrolytic conductance. EMF: Galvanic Cells, Nernst equation, numerical problems. Concept of concentration cells, electro chemical series-applications.

BATTERIES: Primary and secondary cells, (Lechlanche cell, Lead-Acid cell, Ni- Cd cell, Lithium cells). Applications of batteries, Fuel cells: Hydrogen – Oxygen fuel cell, advantages of fuel cells.

CORROSION AND ITS CONTROL: Introduction, causes of corrosion, theories of corrosion – Chemical, Electrochemical corrosion. Corrosion control methods – Cathodic protection, sacrificial anode, impressed current cathode. Surface coatings – electroplating, metal cladding. Galvanizing.

UNIT – II (8 Lectures)

WATER TREATMENT: Introduction to Hardness, causes, expression of hardness, units. Types of hardness, numerical problems. Treatment of water: Internal treatment, types & External treatment: Zeolite process, Ion exchange process and Lime- soda process. Numerical problems on lime- soda and Zeolite process. Treatment of brackish water: Reverse osmosis and Electro dialysis.

UNIT – III (10 Lectures)

ENGINEERING MATERIALS:

HIGH POLYMERS: Introduction, Types of Polymerization. Plastics: Thermoplastic resins & Thermosetting resins, preparation, properties and engineering applications of plastics: polyethylene, Poly vinyl chloride, Teflon, Nylon. Rubbers: Natural rubber and vulcanization. Synthetic rubbers: Buna-S, Buna-N. Fibers: Polyester- applications. Conducting Polymers: Classification, doping and applications.

MATERIAL CHEMISTRY: Cement- Composition and manufacture of Port land Cement. Lubricants: Criteria of a good lubricant, classification. Refractory: Criteria of a good refractory, classification. Insulators & conductors: Classification of insulators. Characteristics of thermal & electrical insulators, Superconductors: Applications of Superconductors.

UNIT – IV (7 Lectures)

ENERGY SOURCES: Fuels: Classification -Conventional fuels: solid, liquid, gaseous fuels- comparison. Solid fuels: Coal- analysis- proximate and ultimate analysis, significance. Liquid fuels: Petroleum –origin, refining of petroleum. Synthetic petrol: Fischer Tropsch's and Bergius process. Gaseous fuels: Natural gas, Flue gas: Analysis of Flue gas by Orsat's method. Combustion: problems (calculation of amount and volume of oxygen for combustion).

UNIT – V (7 Lectures)

PHASE RULE: Gibb's phase rule expression, terms involved: Phase, Component and Degree of Freedom. Significance and limitations of phase rule. Phase diagrams: One component system- Water system. Two component system- Silver- lead system.

SURFACE CHEMISTRY: Adsorption: Types of adsorption. Adsorption isotherm: Langmuir adsorption isotherm, applications of adsorption. Colloid: Classification of colloids. Properties of colloid: Electrical & optical properties. Applications of colloids: Natural and industrial applications.
Nanomaterials: Introduction, preparation and applications of nanomaterial.

TEXT BOOKS:
1. S.S Dara & Mukkanti, (2006). Engineering Chemistry, S. Chand & Co. New Delhi.

REFERENCE BOOKS:
1. PC Jain & Monica Jain, (2008). Engineering Chemistry, Dhanpatrai Publishing Company.
2. K.N Mishra, R.P Mani &B. Rama Devi(2009). Chemistry of Engineering Materials, CENGAGE.
3. J.C Kuriacase & J Raja ram (2004), Engineering Chemistry, Tata McGraw Hills Co. New Del.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT II SEMESTER

ELECTRONIC DEVICES AND CIRCUITS

Course Code: **A3401**

L	T	P	C
4	1	0	4

Course Overview:

This course covers fundamental topics that are common to a wide variety of electronic devices, circuits and systems. The topics include right from the inception of evolution of semiconductor devices to their real time applications. This course starts with basics of semiconductors, review the operation and characteristics of semiconductor devices (namely, semiconductor diodes, BJTs, JFETs and MOSFETs), and build-up to more advanced topics in analog circuit designs. This course provides a basis for students to continue education by undertaking advanced study and research in the variety of different branches of semiconductor device applications.

Prerequisite(s):

- Engineering Physics (A3002)
- Basic Electrical Engineering(A3201)

Course Objectives:

I. To explore the construction, operation and characteristics of various electronic devices like diodes and transistors (BJTs and FETs).

II. To construct simple electronic circuits like regulated power supply making use of rectifiers, filters and regulators.

III. To provide the comprehensive understanding of various biasing circuits used to design amplifier circuits.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Analyze quantitatively and qualitatively the physical behavior of diodes and transistors.

2. Design regulated power supply using various rectifiers and filter circuit.

3. Examine the construction, operation and characteristics of BJT, JFET and MOSFET which can be used in the design of amplifiers.

4. Apply various stabilization and compensation techniques to the transistors to get the stable operating point.

5. Use small signal low frequency model of a transistor to build amplifier circuits in various transistor configurations.

ELECTRONIC DEVICES AND CIRCUITS

Course Code: **A3401**   **L T P C**
                                                                                                          4 1 0 4

SYLLABUS

UNIT - I   **(11 Lectures)**
SEMICONDUCTOR DIODE CHARACTERISTICS: Review of semiconductors, Continuity Equation, Hall Effect, and Open- circuited p-n junction, Energy band diagrams, the current components in p-n diode, Diode current equation, Volt-ampere characteristics, Ideal versus practical diodes, static and dynamic resistances, equivalent circuits, Temperature dependence, Transition and Diffusion capacitances.

UNIT – II   **(12 Lectures)**
SPECIAL PURPOSE DIODES: Breakdown Mechanisms in Semiconductor diodes, Zener diode characteristics, Zener diode as voltage regulator, Principle of operation and Characteristics of Tunnel Diode (With the help of Energy band diagrams) and Varactor Diode.

RECTIFIERS AND FILTER: The P-N junction as a rectifier – Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Ripple Factor, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π- section Filters.

UNIT - III   **(10 Lectures)**
BIPOLAR JUNCTION TRANSISTOR (BJT) - Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

FIELD EFFECT TRANSISTOR (FET): JFET **-** Construction, Principle of Operation, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and JFET. MOSFET - Depletion and Enhancement type MOSFETs, operation and volt-ampere characteristics.

UNIT - IV   **(11 Lectures)**
BJT BIASING: Need for biasing, operating point, load line analysis, biasing and stabilization techniques: fixed bias, collector to base bias, voltage divider bias, Stabilization against variations in I_{CO}, V_{BE} and β, bias compensation techniques, thermal runaway, heat sink and thermal stability.

JFET BIASING: Biasing techniques: Fixed bias, Self-bias and Voltage divider bias**.**

UNIT - V   **(12 Lectures)**
SINGLE STAGE AMPLIFIERS: Transistor as an amplifier, Classification of amplifiers, Transistor hybrid model, the h-parameters, analysis of a transistor amplifier circuit (CE, CB, CC) using h-parameters, simplified Common Emitter hybrid model.

JFET AMPLIFIERS: Small signal JFET model, common source amplifier, common drain amplifier, common gate amplifier.

TEXT BOOKS:
1. J. Millman, C. C. Halkias, and Satyabratha Jit (2011), Electronic Devices and Circuits, 3rd Edition, Tata McGraw Hill, New Delhi.

2. R.L. Boylestad and Louis Nashelsky (2006), Electronic Devices and Circuits, 9th Edition, Pearson/Prentice Hall.

REFERENCE BOOKS:
1. S. Salivahanan, N. Suresh Kumar, A. Vallavaraj (2008), Electronic Devices and Circuits, 2nd edition, Tata McGraw Hill, New Delhi.

2. Rober T. Paynter (2003), Introduction to Electronic Devices and Circuits, 6th edition, Pearson Education, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT II SEMESTER

DATA STRUCTURES

Course Code: **A3503**

L	T	P	C
4	1	0	4

Course Overview:

Data Structures is a subject of primary importance to the discipline of Computer Science and Engineering. It is a logical and mathematical model of sorting and organizing data in a particular way in a computer, required for designing and implementing efficient algorithms and program development. Different kinds of data structures like arrays, linked lists, stacks, queues, etc, are suited to different kinds of applications. Some specific data structures are essential ingredients of many efficient algorithms, and make possible the management of huge amounts of data, such as large databases and internet indexing services. Nowadays, various programming languages like C, C++ and Java are used to implement the concepts of Data Structures, of which C remains the language of choice for programmers across the world.

Prerequisite(s):
- Computer Programming (A3501)

Course Objectives:

I. To provide students with strong foundation for implementing C programming language to formulate, analyze and develop solutions related to various data structures problems.

II. To teach students to compute the computational complexity of a given algorithm, and apply appropriate searching and sorting techniques for the given data.

III. To make the students gain experience in implementing linear data structures like stacks, queues and linked lists and nonlinear data structures like trees and graphs to solve problems pertaining to both structured and unstructured data.

IV. To prepare students to apply their knowledge of data structures to learn advanced computing courses and excel as a professional software developer.

Course Outcomes:

Upon completion of this course, students will be able to:

1. Solve computer software problems by using recursive, non-recursive techniques and, analyze various algorithms with respect to time and space complexity.

2. Ability to exhibit knowledge of various searching and sorting techniques and identify the potential benefits of each one over the other and propose appropriate technique to solve programming problems.

3. Illustrate, how about linked list based stack and queue usage to design and build C based real-time applications.

4. Create novel solutions for non-linear data structures by applying Trees and Graphs traversal techniques.

5. Develop the habit of intelligent reading to learn advanced courses like Design and Analysis of Algorithms, to participate and succeed in competitive exams and prosper in professional career path.

DATA STRUCTURES

Course Code: **A3503**

L	T	P	C
4	1	0	4

SYLLABUS

UNIT – I (11 Lectures)

INTRODUCTION TO DATA STRUCTURES AND ALGORITHMS: Basic Terminology, Classification of Data Structures, Operations on Data Structures, Algorithms, Different Approaches to Design an Algorithm, Control Structures used in Algorithms, Time and Space Complexity, Asymptotic Notations, Linear and Binary Recursion, Fibonacci sequence, Towers of Hanoi.

SEARCHING: Basic Terminologies, Linear Search, Binary Search, and Fibonacci Search.

UNIT – II (11 Lectures)

SORTING TECHNIQUES: Introduction To Sorting, Sorting Techniques: Bubble Sort, Selection Sort, Insertion Sort, Shell Sort, Merge Sort, Quick Sort, Radix Sort, Comparison of Sorting Algorithms.

UNIT – III (10 Lectures)

LINEAR DATA STRUCTURES - STACKS: Introduction to Stacks, Array Representation of Stacks, Operations on a Stack, Applications of Stacks-Infix-to-Postfix Transformation, evaluating Postfix Expressions.

QUEUES: Introduction to Queues, Array Representation of Queues, Operations on a Queue, Types of Queues-DeQueue, Circular Queue, Applications of Queues-Round Robin Algorithm.

UNIT – IV (12 Lectures)

LINKED LISTS: Introduction, Singly Linked List, Representation of a Linked List in Memory, Operations on a Single Linked List, Applications of Linked Lists - Polynomial Representation and Sparse Matrix Manipulation, Circular Linked Lists, Doubly Linked Lists, Linked List Representation and Operations of Stack, Linked List Representation and Operations of Queue.

UNIT – V (12 Lectures)

NON LINEAR DATA STRUCTURES - TREES: Basic Terminologies, Definition and Concepts of Binary Trees, Representations of a Binary Tree using Arrays and Linked Lists, Operations on a Binary Tree-Insertion, Deletion, Traversals, Heap Sort, Types of Binary Trees- Expression Trees, Binary Search Trees, Threaded Binary Trees.

GRAPHS: Introduction, Graph Terminologies, Representation of Graphs- Set, Linked, Matrix, Graph Traversals- Breadth First Search (BFS) and Depth First Search (DFS), Minimum Spanning Trees.

TEXT BOOKS:
1. Reema Thareja (2014), *Data Structures Using C*, 2nd Edition, Oxford University Press India.
2. Samanta Debasis (2012), *Classic Data Structures*, 2nd Edition, Prentice Hall of India.

REFERENCE BOOKS:
1. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan (2008), *Fundamentals of Data Structure in C*, 2nd Edition, University Press, India.
2. Richard F. Gilberg, Behrouz A. Forouzan (2012), *Data Structures: A Pseudo code approach with C*, 2nd Edition, CENGAGE Learning, India.
3. G. A. V. Pai (2008), *Data Structures and Algorithms: Concepts, Techniques and Applications*, McGraw-Hill Education, India.

B. Tech. IT II SEMESTER

ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LAB

Course Code: **A3007**

L	T	P	C
0	0	3	2

ENGINEERING PHYSICS LAB

Course Overview:

Engineering physics laboratory course includes the experimental methods for the determination of mechanical property (Rigidity modulus of a given material), frequency of an AC signal, basic electronic circuits (LED, RC circuit), and to study characteristics of LASERS & Optical fiber (LASER wavelength, divergence, Numerical aperture of fiber, Losses in fibers). This interdisciplinary knowledge is designed for the continuous innovation occurring with technology.

Prerequisite(s): NIL

Course Objectives:

- I. To determine mechanical properties of different materials.
- II. To design basic Electronic Circuits.
- III. To examine Optical Fiber characteristics.
- IV. To analyze Laser Beam characteristics.
- V. To demonstrate optical properties of Prism.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Determine the rigidity modulus of the material of the given wire.
2. Interpret the frequency of AC mains.
3. Estimate V-I characteristics of LED.
4. Examine the decay of Current in RC circuit.
5. Analyze the numerical aperture of an Optical Fiber.
6. Experiment with diffraction pattern using plane grating and divergence of laser beam.
7. Demonstrate the dispersive power of a prism.

ENGINEERING CHEMISTRY LAB

Course Overview:

Although engineers are not expected to carry out chemical analysis by themselves it is absolutely essential for them to have appreciation regarding the principles, applications, merits and limitations of the modern techniques of instrumental chemical analysis. The objective of few instrumental techniques, namely, pH metry, potentiometry, conductometry is to inculcate the knowledge of engineering chemistry discipline. The experiments on ion selective electrodes are proved to be vital in engineering applications on industrial level.

Prerequisite(s): NIL

Course Objectives:

- I. To analyze the strength of a solution by conductometric and potentiometric titrations.
- II. To estimate the hardness of water.
- III. To determine the surface tension and viscosity of liquids.
- IV. To synthesize an organic compound-Aspirin.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. List out the advantages of conductometry and potentiometry.

2. Compare the impurities of water with hardness.

3. Analyze the importance of temperature for viscosity and surface tension.

4. Perform organic synthesis by maintaining different reaction conditions to get maximum yield.

Course Outcomes:

Upon successful completion of this course, student will be able to:

ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LAB

Course Code: **A3007**

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS (ENGINEERING PHYSICS LAB):

1. Determination of Rigidity modulus (η) of the material of the given wire using a Torsional pendulum.
2. Determination of Frequency (n) of an AC supply using sonometer.
3. Study of V-I characteristics of light emitting diode and determination of the Threshold voltage of LED.
4. Study of exponential decay of charge in a R.C. Circuit and determination of time constant of R.C circuit
5. Determination of numerical aperture of a given optical fiber.
6. Determination of wavelength of a given source of laser light using a plane transmission grating by normal incidence method.
7. Determination of angular divergence of the laser beam.
8. Determination of Losses in optical fibers.
9. Determination of Dispersive power of material of a prism (Demonstration Experiment).

LIST OF EXPERIMENTS (ENGINEERING CHEMISTRY LAB):

INSTRUMENTAL METHODS:

1. **Conductometry:**
   a. Conductometric titration of strong acid Vs strong base.
   b. Conductometric titration of mixture of acids Vs strong base.

2. **Potentiometry:**
   a. Potentiometric titration of strong acid Vs strong base.
   b. Potentiometric titration of weak acid Vs strong base.

3. **Complexometry:**
   a. Estimation of hardness of water by EDTA method.

4. **Physical Properties:**
   a. Determination of viscosity of sample oil by Ostwald's viscometer
   b. Determination Surface Tension of lubricants.

5. **Organic Synthesis:**
   a. Preparation of organic compounds Aspirin

DEMONSTRATION EXPERIMENTS

1. Preparation of Thiokol rubber

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT II SEMESTER

DATA STRUCTURES LAB

Course Code: **A3504**

L	T	P	C
0	0	3	2

Course Overview:

This Laboratory is meant to make the students to learn efficient data structures and algorithms that use them, designing and writing large programs. This laboratory emphasizes on how to choose appropriate data structures for solving real world problems with best efficiency and performance.

Course Objectives:

I.   To provide students the state-of-art environment for implementing C programming language to formulate, analyze and develop solutions related to various data structures problems.
II. To teach students to apply appropriate searching techniques and sorting techniques to arrange given data in a particular order.
III. To train students with good breadth of computer programming syntax and constructs like Operators, Statements, Arrays, Strings, Functions, Pointers and Structures to translate descriptive problem statements into sophisticated executable C programs.
IV. To inculcate in students to maintain high programming standards and to work as individual or as a member in developing C based novel products.
V.   To prepare students to apply their computer programming skills to continue advanced topics learning and excel as a professional programmer.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Solve computer hardware and software problems by using recursive, non-recursive or both techniques and to Apply asymptotic notations to evaluate the performance of an algorithm.
2. Familiarize and define the programming syntax and constructs of data structures to develop elegant, legible and reusable codes.
3. Analyze and implement various searching techniques suitable to resolve data searching problems.
4. Demonstrate ability to exhibit knowledge of various sorting techniques and identify the potential benefits of each one over the other.
5. Illustrate about linear data structures like stacks and queues representations and operations and apply them to design and build C based real-time applications.
6. Create novel solutions for non-linear data structures by applying Trees and Graphs traversals.
7. Comprehend the habit of intelligent reading to participate and succeed in competitive exams and prosper in professional career path.

B. Tech. IT II SEMESTER

DATA STRUCTURES LAB

Course Code: **A3504**

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

Week- 1: (Recursion function)
1. Write recursive C programs for the following:
   a) Calculation of Factorial of an integer.
   b) Calculation of GCD (n, m).
   a) For Towers of Hanoi: N disks are to be transferred from peg S to peg D with Peg I as the intermediate peg.

Week- 2: (Searching Techniques)
2. Write C programs that use both recursive and non-recursive functions to perform for the following:
   a) Searching operations for a key value in a given list of integers by using linear search technique.
   b) Searching operations for a key value in a given list of integers by using binary search technique.
   c) Searching operations for a key value in a given list of integers by using Fibonacci search technique.

Week-3: (Sorting Techniques)
3. Write C programs for the following:
   a) Implement Bubble sort, to sort a given list of integers in descending order.
   b) Implement Selection sort, to sort a given list of integers in ascending order.
   c) Implement Insertion sort, to sort a given list of integers in descending order.

Week-4: (Sorting Techniques)
4. Write C programs for the following:
   a) Implement Shell sort, to sort a given list of integers in descending order.
   b) Implement Merge sort, to sort a given list of integers in ascending order.

Week-5: (Sorting Techniques)
5. Write C programs for the following:
   a) Implement Quick sort, to sort a given list of integers in ascending order.
   b) Implement radix sort, to sort a given list of integers in ascending order.

Week- 6: (Linked List)
6. Write C programs for the following:
   a) Uses functions to perform the following operations on single linked list.
      (i) Creation   (ii) insertion   (iii) deletion   (iv) traversal
   b) To store a polynomial expression in memory using linked list.
   c) To represent the given sparse matrix using linked list

Week-7: (Linked List)
7. Write C programs for the following:
   a) Uses functions to perform the following operations on Circular linked list.
      (i) Creation   (ii) insertion   (iii) deletion   (iv) traversal
   b) Uses functions to perform the following operations on double linked list.
      (i) Creation   (ii) insertion   (iii) deletion   (iv) traversal in both ways.

Week- 8: (Stack)
8. Write C programs for the following:
   a) Implement Stack operations using array.
   b) Implement Stack operations using linked list.

c) Write a function called copystack() that copies those contents of one stack into another. The algorithm passes two stacks, the source stack and the destination stack. The order of the stack must be identical. (Hint: Use a temporary stack to preserve the order).

Week-9: (Stack)

9. Write C programs for the following:
    a) Uses Stack operations to convert infix expression into postfix expression.
    b) Uses Stack operations for evaluating the postfix expression.

Week-10: (Queue)

10. Write C programs for the following:
    a) Implement Queue operations using array.
    b) Implement Queue operations using linked list.

Week-11: (Trees)

11. Write C programs for the following:
    a) To create a Binary Tree of integers.
    b) Uses Recursion for traversing a binary tree in preorder, in-order and post-order.
    c) Write a C program to implement the following operations on Binary Search Tree.
       (i) insert   (ii) delete   (iii) search   (iv) traverse

Week-12: (Graphs)

12. Write C programs for the following:
    a) Implement the Breadth First Search Graph Traversal.
    b) Implement the Depth First Search Graph Traversal.

Week-13: (Additional Programs)

13. Write C programs for the following:
    a) Consider the motor racing game in which there are 7 participants. Out of 7, one quits the race due to bad vehicle condition. Others completed the race and their scores are as follows: p1 (56 points), p2 (96 points), p3 (40 points), p4 (89 points), p5 (66 points), p6 (22 points). Now write a program for sorting the positions of players in ascending order based on points scored using merge sort and print the highest score.
    b) Implement heap sort, to sort a given list of integers in ascending order.
    c) Reverse elements of a single linked list.
    d) Non-recursion for traversing a binary tree in preorder, in-order and post-order.

REFERENCE BOOKS:

1. Reema Thareja (2014), *Data Structures Using C*, 2nd Edition, Oxford University Press India.
2. Debasis, Samanta (2012), *Classic Data Structures*, 2nd Edition, Prentice Hall of India.
3. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan (2008), *Fundamentals of Data Structure in C*, 2nd Edition, University Press, India.
4. Richard F. Gilberg, Behrouz A. Forouzan (2012), *Data Structures: A Pseudo code approach with C*, 2nd Edition, CENGAGE Learning, India.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT II SEMESTER

ELECTRONIC DEVICES AND CIRCUITS LAB

Course Code: **A3403**

L	T	P	C
0	0	3	2

Course Overview:

The electronic devices and circuits lab is one of the first electronics and communication engineering lab course that a student will undergo. The students become familiar with laboratory test and measuring instruments such as CRO, dual regulated power supply, function generator and multimeter. The exposure of the students to these instruments and the knowledge about basic electronic components will enable them to design, construct and test the basic electronic circuits such as power supplies and amplifiers.

Course Objectives:

I. To expose the students to various electronic components, test and measuring instruments such as CRO, function generator, dual regulated power supply, digital multimeters, and etc.

II. To measure the characteristics of diodes and transistors to realize the applications like rectification, regulation and amplification.

III. To design and construct various electronic circuits such as amplifiers and to measure operating point, stability factor, gain and bandwidth parameters from DC and AC analysis.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Identify and use various electronic components, test and measuring instruments that are frequently used in experimentation of various circuits.

2. Interpret the V - I characteristics of PN junction diode, Zener diode and Bipolar Junction Transistor so as to realize the applications like switching, regulation and etc,.

3. Design a simple regulated power supply by making use of rectifiers, filters and regulators.

4. Apply various biasing techniques to fix the operating point and stabilize given electronic device like BJT and FET.

5. Use of various amplifiers that are frequently used in the construction of real time applications.

ELECTRONIC DEVICES AND CIRCUITS LAB

Course Code: **A3403**

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

PART - A: ELECTRONIC WORKSHOP PRACTICE

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Relays, Bread Boards, PCB's.

2. Identification, Specifications and Testing of Active Devices: Diodes, BJTs, JFETs, MOSFETs, Power Transistors, LED's, LCD's, SCR, UJT.

3. Study and operation of

   - Multimeters (Analog and Digital)

   - Function Generator

   - Regulated Power Supply (RPS)

   - CRO

PART - B:

1. Forward and Reverse Bias Characteristics of PN junction diode.

2. Zener Diode Characteristics.

3. Zener diode as voltage regulator.

4. Half wave rectifier with and without filters.

5. Full wave rectifier with and without filters.

6. Input & output characteristics of transistor in CB configuration.

7. Input & output characteristics of transistor in CE configuration.

8. Input & output characteristics of transistor in CC configuration

9. Drain and Transfer characteristics of JFET.

10. Voltage divider bias using BJT.

11. Gain and frequency response of CE amplifier.

12. Gain and frequency response of CS amplifier.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT III SEMESTER

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Code: **A3011**

L	T	P	C
3	1	0	3

Course Overview:

This course addresses the concepts, principles and techniques of Managerial Economics and Financial Analysis. It covers the fundamentals of Managerial Economics and its various techniques such as demand, elasticity of demand, demand forecasting, production laws, cost concepts, price determination in various type of markets and pricing strategies. Apart from Capital budgeting and its techniques, Financial Analysis gives clear idea about concepts and conventions of accounting, accounting procedures like journal, ledger, trial balance, balance sheet and interpretation of financial statements through ratios.

Course objectives:

I. The objective of this course is to inculcate the basic knowledge to students related to concepts of Economics & Accounting and to make them effective business decision makers.

II. To make the students to understand fundamentals of Economics, which is an important social science subject helps to engineers to take certain business decisions in the processes of optimum utilization of resources.

III. To give an overview on investment appraisal methods to promote the students to learn how to start new enterprises.

IV. To provide fundamental skills about accounting and to explain the process of preparing accounting statements & analysis for effective business decisions.

Course outcomes:

Upon successful completion of this course, the students will be able to:

1. Capable of analyzing fundamentals of economics such as demand, production, price, supply concepts etc., which helps in effective business administration.

2. Analyze how to invest adequate amount of capital in order to get maximum return from selected business activity.

3. Prepare and analyze accounting statements like income & expenditure statement, balance sheet apart from the fundamental knowledge, to understand financial performance of the business and to initiate the appropriate decisions to run the business profitably.

B. Tech. IT III SEMESTER

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Code: **A3011**

L	T	P	C
3	1	0	3

SYLLABUS

UNIT – I (12 Lectures)

INTRODUCTION TO MANAGERIAL ECONOMICS & DEMAND: Managerial Economics - Definition, Nature and Scope of Managerial Economics, –Demand Analysis: Demand- Types, Demand Determinants, Law of Demand and its exceptions.

ELASTICITY OF DEMAND: Types, Measurement and Significance, Demand Forecasting: Meaning, methods of demand forecasting.

UNIT – II (10 Lectures)

THEORY OF PRODUCTION: Production function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs. Laws of Production, Internal and External Economies of Scale.

COST & BREAK EVEN ANALYSIS: Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEA.

UNIT – III (8 Lectures)

INTRODUCTION TO MARKETS: Market structures- Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition, oligopoly - Price-Output Determination in case of Perfect Competition, Monopoly.

PRICING: Objectives and Policies of Pricing- Methods of Pricing**:** Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

UNIT – IV (10 Lectures)

CAPITAL AND CAPITAL BUDGETING: Capital and its significance, Types of Capital, Components of working capital & Factors determining the need of working capital. Methods and sources of raising finance.

CAPITAL BUDGETING: Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR), Net Present Value Method, Profitability Index, Internal rate of return (simple problems).

UNIT – V (12 Lectures)

INTRODUCTION TO FINANCIAL ACCOUNTING: Accounting Principles - Concepts, Conventions, Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts with simple adjustments.

FINANCIAL ANALYSIS THROUGH RATIOS: Importance, types: Liquidity Ratios, Activity Ratios, Turnover Ratios and Profitability ratios. (simple problems).

TEXT BOOK:

1. A.R. Aryasri (2011), *Managerial Economics and Financial Analysis*, TMH, India.

REFERENCE BOOKS:

1. Varshney & Maheswari (2003), *Managerial Economics*, Sultan Chand.
2. Ambrish Gupta (2011), *Financial Accounting for Management: An Analytical Perspective*, 4th Edition, Pearson Education, New Delhi.
3. Richard Lipsey and Alec Chrystal (2012), *Economics*, Oxford University Press.
4. Domnick Salvatore: *Managerial Economics in a Global Economy*, 4th Edition, Thomson.

VARDHAMAN COLLEGE OF ENGINEERING
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B. Tech. IT III SEMESTER

DIGITAL LOGIC DESIGN

Course Code: **A3404**

L	T	P	C
3	1	0	3

Course Overview:

This course provides a modern introduction to logic design and the basic building blocks used in digital systems, in particular digital computers. It starts with a discussion of information representation and number systems, Boolean algebra, logic gates and minimization techniques. The second part of the course deals with combinational and sequential logic, where in the procedures to analyze and design the same will be discussed. State machines will then be discussed and illustrated through case studies of complex systems. The course has an accompanying lab that integrates hands-on experience with LabVIEW software including logic simulation, implementation and verification of all the combinational and sequential circuits. Moreover, this course forms the basis for the study of advanced subjects like Computer Architecture and Organization, Microprocessors and Interfacing and Embedded systems.

Course Objectives:

I.   To apply principles of Boolean algebra to minimize logic expressions using minimization techniques.

II.   To outline the formal procedures to design the combinational and sequential circuits of desired functionality.

III. To illustrate minimization techniques of completely specified and incompletely specified sequential machines.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1. Perform arithmetic operations on different number systems and to apply the principles of Boolean algebra to minimize logic expressions.

2. Use K-map and Tabulation method to minimize and optimize two-level logic functions up to five variables.

3. Analyze some basic components used in digital systems such as adder and subtractor, decoder, encoder, multiplexer, flip-flops, registers and counters.

4. Design various combinational PLDs such as ROMs, PALs, PALs and PROMs.

5. Minimize the finite state machines and to construct special flow charts called ASM charts to define digital hardware algorithms.

B. Tech. IT III SEMESTER

DIGITAL LOGIC DESIGN

Course Code: **A3404**

L	T	P	C
3	1	0	3

SYLLABUS

UNIT-I (10 Lectures)

DIGITAL SYSTEMS AND BINARY NUMBERS: Digital systems, binary numbers, number base conversions, octal and hexadecimal numbers, complements, signed binary numbers, binary codes.

BOOLEAN ALGEBRA AND LOGIC GATES: Basic definitions, axiomatic definition of Boolean algebra, basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, digital logic gates.

UNIT-II (9 Lectures)

GATE LEVEL MINIMIZATION: The k-map method, four-variable map, five-Variable map, Sum of Products and Product of Sums simplification, don't-care conditions, NAND and NOR implementation, AND-OR-INVERT,OR-AND-INVERT implementations, exclusive – OR function, The tabulation (Quine Mccluskey) method, determination and selection of Prime implicants.

UNIT-III (10 Lectures)

COMBINATIONAL LOGIC: Introduction, combinational circuits, analysis procedure, design procedure, binary adder, binary subtractor, BCD adder, binary multiplier, Magnitude comparator, decoder, encoders, multiplexers.

SEQUENTIAL LOGIC: Classification of Sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), latches, Flip-Flops, analysis of clocked sequential circuits, state reduction and assignment, design procedure.

UNIT-IV (10 Lectures)

REGISTERS AND COUNTERS: Registers, shift registers, Ripple counters, synchronous counters, counter with unused states, ring counter, Johnson counter, LFSR counter.

MEMORY AND PROGRAMMABLE LOGIC: introduction, Random-access memory, memory decoding, error detection and correction, read only memory, programmable logic array, programmable array logic, sequential programmable devices

UNIT-V (11 Lectures)

FINITE STATE MACHINES (FSM): Finite State Machine - Capabilities and limitations, Mealy and Moore models minimization of completely specified sequential machines, Partition techniques, incompletely specified sequential machines using merger table.

ALGORITHMIC STATE MACHINES (ASM): Salient features of ASM chart, Simple examples, System design using data path and control sub-systems – Control implementations – Examples of weighing machine and Binary multiplier.

TEXT BOOKS:

T1. M. Morris Mano, Michael D. Ciletti (2008), *Digital Design*, 4th edition, Pearson Education/PHI, India.
T2. Thomas L. Floyd (2006), *Digital fundamentals*, 9th edition, Pearson Education International.

REFERENCE BOOKS:

1. Zvi. Kohavi (2004), *Switching and Finite Automata Theory*, Tata McGraw Hill, India.
2. C.V.S. Rao (2009), *Switching and Logic Design*, 3rd edition, Pearson Education, India.
3. Donald D.Givone (2002), *Digital Principles and Design*, Tata McGraw Hill, India.

VARDHAMAN COLLEGE OF ENGINEERING
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B. Tech. IT III SEMESTER

DISCRETE MATHEMATICAL STRUCTURES

Course Code: **A3505**

L	T	P	C
3	1	0	3

Course Overview: This course is an elementary discrete mathematics oriented towards applications in Computer Science and Engineering. It emphasizes mathematical definitions and proofs as well as applicable methods. Topics include formal logic notation, proof methods; induction, well-ordering; sets, relations; growth of functions; permutations and combinations, counting principles. Further selected topics may also be covered, such as recursive definition, recurrences; generating functions.

Prerequisite(s): Mathematics-1 (A3001)

Course Objectives:

  I.   Is to ensure that the students get the notation of discrete and continuous mathematical structures

  II. Is to induce the student with the basic concepts of relations functions and graphs.

  III. Is to make the students, Learn the concept of groups and group homomorphism

  IV. To make the students, solve problems using counting techniques and combinatorics in the context of discrete probability

  V.   To make the students, apply principles of Recurrence Relations to calculate generating functions and solve the recurrence relations.

Course Outcomes:

Upon completion of this course, students will be able to

  1. Simplify logic statements including implications using truth tables and express logic statements in terms of predicates, quantifiers, and logical connectives.
  2. Understand relations, functions and determine their properties.
  3. Apply elementary counting techniques such as permutations, combinations and binomial expansion to solve counting problems.
  4. Solve recurrence relations to analyze problems such as finding Fibonacci numbers, merge sort and Towers of Hanoi.
  5. Distinguish, identify and prove the properties of groups and subgroups.
  6. Demonstrate graph theory concept such as Euler path, Hamiltonian Cycle, Chromatic number etc.

DISCRETE MATHEMATICAL STRUCTURES

Course Code: **A3505**

	L	T	P	C
	3	1	0	3

SYLLABUS

UNIT - I (10 Lectures)

MATHEMATICAL LOGIC: Statements and Notations, Connectives, Statement Formulas and Truth Tables, Well-formed formulas, Tautologies, Equivalence of Formulas, Normal Forms, Rules of Inference, Consistency of Premises and Indirect Method of Proof

PREDICATES: The Predicate calculus, Variables and Quantifiers, Free and Bound Variables, Inference theory of predicate calculus. (T1: Chapter-1)

UNIT - II (10 Lectures)

RELATIONS AND ORDERING: Relations, Properties of Binary Relations in a Set, Equivalence Relations, Compatibility Relations, and Partial Ordering.

FUNCTIONS: Composition of Functions, Inverse Functions. (T1: Chapter-2- 2.3 & 2.4)

ALGEBRAIC STRUCTURES: Algebraic Systems: Examples and General Properties. Semi groups and Monoids. Groups: Definitions and Examples, Subgroups and Homomorphisms. (T1: Chapter-3- 3.1, 3.2 & 3.5)

UNIT - III (9 Lectures)

LATTICES: Lattices as Partially Ordered Sets - Definition and Examples, Properties of Lattices, Lattices as Algebraic Systems, Sub lattices, Direct Product and Homomorphism, Some Special Lattices. (T1: Chapter-4.1)

GRAPH THEORY: Representation of Graph, Planar graphs, Isomorphism and Sub graphs, Euler circuits, Hamiltonian graphs, Chromatic Number (T2: Chapter-5)

UNIT - IV (8 Lectures)

ELEMENTARY COMBINATORICS: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion- Exclusion. (T2: Chapter-2)

UNIT - V (8 Lectures)

RECURRENCE RELATIONS:

Solving Recurrence Relations by Substitution and Generating Functions, The Method of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relations. (T2: Ch 3)

TEXT BOOKS:
T1. J. P. Trembly, R. Manohar (2012), *Discrete Mathematical Structures with Applications to Computer Science*, Tata McGraw Hill, India.
T2. Joe L. Mott, Abraham Kandel, Theodore P. Baker (2011), *Discrete Mathematics for Computer Scientists and Mathematicians*, 2nd edition, Prentice Hall of India Learning Private Limited, New Delhi, India.

REFERENCE BOOKS:
1. R1. Kenneth H. Rosen (2007), *Discrete Mathematics and its Applications*, 7th Edition, Tata McGraw Hill, India.
2. R2. C.L. Liu, D.P. Mohapatra (2009), *Elements of Discrete Mathematics*, 3rd Edition, McGraw Hill, India.
3. R3. Ralph P. Grimaldi, B.V.Ramana (2008), *Discrete and Combinatorial Mathematics - An Applied Introduction*, 5th Edition, Pearson Education, India.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT III SEMESTER

DESIGN AND ANALYSIS OF ALGORITHMS

Course Code: **A3506**

L	T	P	C
4	0	0	4

Course Overview:

This course is to introduce the topic of algorithms as a precise mathematical concept, and study how to design algorithms, establish their correctness, also study their efficiency and memory needs. The course offers a strong mathematical component in addition to the design of various algorithms.

Prerequisite(s):

Computer Programming (A3501), Data Structures (A3503)

Course Objectives:

I. Induce the students with the fundamental concepts of various algorithm design techniques
II. Make the students familiar to conduct performance evaluation of algorithms.
III. Expertise the students with the various existing algorithm design techniques
IV. Motivate the students to design a new algorithms for various problems.
V. Introduce the concepts of NP-Hard problems to the students.

Course Outcomes:

Upon completion of the course the student will be able to:

1. Demonstrate the importance of various algorithmic notations and their usage to give asymptotic upper, lower bounds on time and space complexity of algorithms.
2. Apply divide and conquer strategy to solve various computing problems.
3. Estimate all feasible solutions using greedy strategy and recite an algorithm that employs this strategy.
4. Construct algorithms for solving real world problems using dynamic programming.
5. Apply fundamental graph traversal techniques to solve various applications using backtracking.
6. Analyze Branch and Bound techniques and explain the significance of NP Completeness.

DESIGN AND ANALYSIS OF ALGORITHMS

Course Code: **A3506**

L	T	P	C
4	0	0	4

SYLLABUS

UNIT - I   **(11 Lectures)**

INTRODUCTION - Algorithm definition, Pseudo code Specifications, Performance Analysis-Space Complexity, Time Complexity, Asymptotic Notations-Big-Oh, Omega, Theta, little-oh, Recurrences- Iteration Method, Master's Method. Disjoint set Operations' and algorithms-Find, Union

DIVIDE AND CONQUER - General Method, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick sort, Strassen's Matrix Multiplication.

UNIT - II   **(8 Lectures)**

THE GREEDY METHOD - General Method, Real Knapsack Problem, Job sequencing with deadlines, Minimum-cost spanning trees- Prim's Algorithm and Kruskal's algorithm, Optimal storage on tapes, Optimal merge pattern, Single source shortest Path

UNIT - III   **(9 Lectures)**

DYNAMIC PROGRAMMING - General method, All pairs shortest path, Matrix Chain Multiplication, Optimal Binary search trees, 0/1 Knapsack, the traveling salesman problem, Reliability design, String Editing

UNIT - IV   **(9 Lectures)**

GRAPHS - Breadth first search, depth first search, connected and bi connected components, articulation points.

BACK TRACKING - The General Method, The n-Queens Problem, Sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack Problem

UNIT - V   **(8 Lectures)**

BRANCH AND BOUND - General method, applications - Travelling sales person problem,0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

NP-HARD AND NP-COMPLETE PROBLEMS - Basic concepts, Non-deterministic algorithms,NP-Hard and NP-Complete Classes, Cook's Theorem

TEXT BOOK:

1. Ellis Horowitz, Sartaj Sahni (2013), *Fundamentals of Computer Algorithms*, Galgotia Pubications, India.

REFERENCE BOOKS:

1. T.H. Cormen, C.E.Leiserson, R.L.Rivest,and C.Stein, *Introduction to Algorithms*, 2nd Edition, PHI Pvt.Ltd. / Pearson Education.
2. R.C.T.Lee, S.S.Tseng, R.C.Changand T.Tsai, *Introduction to Design and Analysis of Algorithms A strategic approach*, McGraw-Hill, India.
3. Allen Weiss, *Data structures and Algorithm Analysis in C++,* 2nd Edition, Pearson Education.
4. Richard Johnson baugh and Marcus Schaefer, *Algorithms,* Pearson Education**.**
5. Thomos H Corman, *Introduction To Algorithms*, PHI Pvt.Ltd.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT III SEMESTER

DATABASE MANAGEMENT SYSTEMS

Course Code: **A3516**

L	T	P	C
3	1	0	3

Course Overview:

This course introduces the core principles and techniques required in the design and implementation of database systems. This course focus on relational database management systems, including database design theory: E-R modeling, data definition and manipulation languages, database security and administration. It also covers essential DBMS concepts such as: Transaction Processing, Concurrency Control and Recovery and various types of databases like distributed database, and intelligent database, Client/Server. Students undertake a semester project to design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS. It also provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications.

Prerequisite(s):

1. Computer Programming (A3501)

Course Objectives:

I. To make the students comprehend the nature and purpose of Database Management system in the organization.
II. To make the students apply fundamental concepts like database design and database languages in managing data.
III. To make the students to identify the role of normalization in database management systems besides orienting them to structured Query Language(SQL) for implementation of Databases access
IV. To present the students with the knowledge of Transaction, concurrency and recovery strategies of DBMS.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Apply the concepts to the real world applications to design and development of database application systems.
2. Analyze the relational database theory, and be able to write relational algebra expressions for queries.
3. Generate a set of relational schemas that allows us to store information without redundancy.
4. Apply structure query language to construct queries.
5. Manage the concurrent execution of transaction by using query evaluation techniques.
6. Organize the file of data records using indexes

DATABASE MANAGEMENT SYSTEMS

Course Code: **A3516**

L	T	P	C
3	1	0	3

SYLLABUS

UNIT – I (13 Lectures)

INTRODUCTION: History of database systems, introduction to database management systems, database system applications, database systems versus file systems, view of data, data models, database languages-DDL & DML commands and examples of basic SQL queries, database users and administrators, transaction management, database system structure. (T2: Ch-1)

DATABASE DESIGN: Introduction to database design and E-R diagrams, entities, attributes and entity sets, relationships and relationship sets, additional features of the E-R model, conceptual design with the E-R model, conceptual design for large enterprises. (T1: Ch-2)

UNIT – II (13 Lectures)

THE RELATIONAL MODEL: Introduction to the relational model, integrity constraints over relations, enforcing integrity constraints, querying relational data, logical database design: E-R to relational, introduction to views, destroying/altering tables and views. (T1: Ch-3)

RELATIONAL ALGEBRA AND CALCULUS: Preliminaries, relational algebra operators, relational calculus - tuple and domain relational calculus. (T1: Ch-4)

SQL: Overview, the form of a basic SQL query, union, intersect and except operators, nested queries, aggregate operators, null values, complex integrity constraints in SQL, cursors, triggers and active databases ,designing active databases. Introduction to PL/SQL. (T1: Ch-5)

UNIT – III (10 Lectures)

SCHEMA REFINEMENT AND NORMAL FORMS: Introduction to schema refinement, functional dependencies, reasoning about FDs. Normal forms: 1NF, 2NF, 3NF, BCNF, properties of decompositions, normalization, schema refinement in database design, other kinds of dependencies: 4NF, 5NF, DKNF, case studies. (T1: Ch-19)

UNIT – IV (12 Lectures)

TRANSACTIONS MANAGEMENT: Transaction concept, transaction state, implementation of atomicity and durability, concurrent executions, Anomalies due to interleaved execution of transactions, serializability, recoverability, implementation of isolation. (T2: Ch-14)

CONCURRENCY CONTROL AND RECOVERY SYSTEM: Concurrency control - lock based protocols, time-stamp based protocols, validation based protocols, deadlock handling. (T2: Ch-15)
 Recovery system – failure classification, recovery and atomicity, log-based recovery, shadow paging, recovery with concurrent transactions, ARIES algorithm. (T2: Ch-16)

UNIT – V (8 Lectures)

OVERVIEW OF STORAGE AND INDEXING: Data on external storage, file organizations and indexing, index data structures, comparison of file organizations, RAID. (T1: Ch-8, 9)
Tree structured indexing - intuition for tree indexes, indexed sequential access method (ISAM), B+ Trees - a dynamic tree structure. (T1: Ch-10)

TEXT BOOKS:
   T1. Raghurama Krishnan, Johannes Gehrke (2007), *Database Management Systems*, 3rd Edition, Tata McGraw-Hill, New Delhi, India.
   T2. Abraham Silberschatz, Henry F. Korth, S. Sudarshan (2010), *Database System Concepts,* 6th Edition, McGraw- Hill, New Delhi, India.

REFERENCE BOOKS:
   1.   Elmasri Navate (2014), *Fundamentals of Database Systems*, Pearson Education, India.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

OBJECT ORIENTED PROGRAMMING

Course Code: **A3509**

L	T	P	C
4	1	0	4

Course Overview:

The Course provides a comprehensive coverage of conceptual and practical Java language, describing its syntax, keywords, and fundamental programming principles to become a proficient Java Programmer. The course is divided into five units, each focusing on a different aspect of core Java Environment suitable to write efficient, maintainable, and portable code. At the outset, the course ignites Object Oriented thinking and explores with the evolution of Java and its basics. It gives strong foundation on Inheritance, Packages and Interfaces and also discusses Exception Handling and Multithreaded mechanisms. The course examines java concepts such as Applets and Event handling. The course end up with nourishing AWT Controls and Swing concepts used for GUI applications. Overall, the knowledge of this course is essential to learn advanced Java and other OOP based languages and hence, stands as a pre-requisite for few fore coming courses like Struts and Spring Framework, Hibernate Framework. The course also plays a vital role in building front-end applications for Mini and Major Project Works in the final year.

Prerequisite(s):

- Computer Programming (A3501)

Course Objectives:

I. The course presents a conceptual and practical introduction to Object Oriented Programming, exemplified by Java.
II. Deliberate Extrapolate the basic principles of object oriented concepts.
III. Construct high speed, fault tolerant applications using multi-threading and exception handling concepts
IV. Develop any GUI application with event handling for any real time applications.
V. Exercise the core object oriented programming concepts, and associated class libraries, to develop any kind of robust application. For advance learning, teaching, research, and commercial software development.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Use various constructs of Object Oriented Programming language
2. Apply principles of Object Oriented Programming to model/design real world problems
3. Use Exception Handling Mechanism to develop fault tolerant applications
4. Apply the concepts of Multithreaded Programming and Synchronization
5. Use GUI controls and Event handling mechanism to develop interactive Window/Desktop applications
6. Analyze need of Applets, Swings to develop simple web application

L	T	P	C
4	1	0	4

SYLLABUS

UNIT – I   **(13 Lectures)**

EVOLUTION OF JAVA: Object-Oriented Programming, Two Paradigms, The Three OOP Principles, Evolution of Java, Java Buzzwords, Java Program Structure, Implementing a Java Program, JVM Architecture, Data Types, Variables, Type Conversion and Casting, I/O Basics, Reading Console Input, Writing Console Output, Operators, Control Statements, Arrays.

CLASS, METHODS, OBJECTS AND CONSTRUCTORS: Introducing Classes, Objects, Methods, Constructors, Garbage Collection, finalize() method, Overloading Methods and Constructors, Argument Passing, Recursion, static and final Keywords, Nested and Inner classes, Exploring String and StringBuffer class, Command-Line Arguments.

UNIT – II   **(11 Lectures)**

INHERITANCE: Inheritance Basics, Member Access and Inheritance, this and super Keywords, Creating Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Abstract Classes, final keyword.

PACKAGES AND INTERFACES: Defining a Package, Finding Packages and CLASSPATH, Access Protection, Importing Packages, Defining an Interface, Implementing Interfaces, Variables in Interface, Interfaces can be extended.

UNIT – III   **(12 Lectures)**

EXCEPTION HANDLING: Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try, catch, throw, throws and finally Keywords, Built-in Exceptions, Creating Own Exception Subclasses, Chained Exceptions**.**

MULTITHREADED PROGRAMMING: Thread Life Cycle, Creating a Thread - Extending Thread Class and Implementing Runnable Interface, Creating Multiple Threads**,** Thread Priorities, Synchronization, Interthread Communication, Suspending, Resuming, and Stopping Threads.

FILE I/O: Streams, Stream Classes- Byte and Character, File Operations – Reading, Writing and Closing, exploring java.util package - ArrayList Class, Vector, Hashtable, StringTokenizer, and Date.

UNIT – IV   **(10 Lectures)**

AWT CONTROLS: AWT Classes, Window Fundamentals, Working with Frame Windows, Working with Graphics, Color, Fonts, Control Fundamentals, Labels, Buttons, Check Boxes, Checkbox Group, Choice Controls, Lists, Scroll Bars, TextArea, and Layout Managers.

EVENT HANDLING: Delegation Event Model, Event Classes, Sources of Events, Event Listener Interfaces, Handling Mouse and Keyboard Events, Adapter Classes, Inner Classes.

UNIT – V   **(10 Lectures)**

SWINGS: Introducing Swing, Features, Hierarchy of Swing, Top Level Containers - JFrame, JWindow, JApplet, Light Weight Containers - JPanel, Create a Swing Applet, Swing Components - JLabel and Image Icon, JTextField, JButton, JToggleButton, JCheckBox, JRadioButton, JComboBox, JTabbedPanes, JScrollPanel, JList, JTree, JTable.

APPLETS: Applet Basics, Applet Lifecycle, Applet Skeleton, Simple Applet Display Methods, the HTML APPLET Tag, Passing Parameters to Applets.

TEXT BOOK:

1. Herbert Schildt (2011), *Java: The Complete Reference*, 8th Edition, Tata McGraw-Hill Education, New Delhi.

REFERENCE BOOKS:

1. Michael Ernest (2013), *Java SE 7 Programming Essentials*, John Wiley & Sons Inc.
2. Y. Daniel Liang (2014), *Introduction to Java Programming, Comprehensive Version*, 10th Edition, Pearson Education, India.
3. Kathy Sierra, Bert Bates (2014), *OCA/OCP Java SE 7 Programmer I & II Study Guide* (Exams 1Z0-803 & 1Z0-804), 1st Edition, McGraw-Hill Education Publisher, USA.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT III SEMESTER

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Course Code: **A3511**

L	T	P	C
0	0	3	2

Course Overview:

The hands-on course provides a comprehensive coverage of practical Java language, describing its syntax, keywords, and fundamental programming principles to become a proficient Java Programmer. The course stress on the strengths of Java to write efficient, maintainable, and portable code. The course focuses on a different aspect of core Java Environment suitable for advance learning, teaching, research, and commercial software development. At the outset it revise the control statements and then explores with the concepts of Inheritance and Interfaces. Exception Handling, Multithreaded mechanisms and File I/O is also been practiced. The concepts such as AWT Controls, Event handling, Applets and Swings are deeply Practiced to build GUI based applications. Overall, the knowledge of this course is essential to learn other similar OOP based technologies and advanced Java and hence stands as a pre-requisite for few fore coming courses like Struts and Spring Framework, Hibernate Framework, and to build Mini and Major Project Work applications

Course Objectives:

I. To prepare students to become familiar with the Standard Java technologies of J2SE

II. To prepare students to excel in Object Oriented programming and to succeed as a Java Developer through global rigorous education.

III. To provide Students with a solid foundation in OOP fundamentals required to solve programming problems and also to learn Advanced Java topics like J2ME, J2EE, JSP, JavaScript

IV. To train Students with good OOP programming breadth so as to comprehend, analyze, design and create novel products and solutions for the real life problems.

V. To inculcate in students professional and ethical attitude, multidisciplinary approach and an ability to relate java programming issues to broader application context.

VI. To provide student with an academic environment aware of excellence, written ethical codes and guidelines and lifelong learning needed for a successful professional career.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Identify classes, objects, members of a class and the relationships among them needed for solving a specific problem.
2. Illustrate how to achieve reusability using inheritance, interfaces and packages.
3. Implement concurrent applications using multithreading.
4. Apply exception handling mechanism to overcome run time errors.
5. Design interactive GUI applications using AWT classes.
6. Design web applications using applets.

B. Tech. IT III SEMESTER

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Course Code: **A3511**

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

Week – 1 (Selection statements)

1. Write Java programs for the following:
   a) Prints all roots of the quadratic equation $ax^2 + bx + c = 0$ based on the discriminate b^2-4ac. Read in a, b, c and use the quadratic formula.
   b) The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 0 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non-recursive functions to print the nth value in the Fibonacci sequence. Read two integers and shift the first integer by two bits to the left and second integer by one bit to the right.
   c) Three friends Rahul, Anil and Anita planned to go for dinner. Rahul has Rs.500, Anil has Rs.600 and Anita has Rs.400. Rahul will order rice but the bill should be in the range of Rs.100 to Rs.300. Anil should order Desserts and the bill should be less than Rs.200. Anita should order Soup but the bill must be for Rs.300.
      - Calculate the total amount spent by the three.
      - Check whether any two bill amounts are same.
      - Calculate the remaining amount with them.

Week – 2 (Control statements)

2. Write Java programs for the following:
   a. Prompts the user for an integer and then prints out all prime numbers up to that integer.
   b. Read the order and elements of two matrices. Check the condition for matrix multiplication and display the result.
   c. Read a line of integers, and then display each integer, and the sum of all the integers (Use String Tokenizer class of java.util).

Week – 3 (Strings)

3. Write Java programs for the following:
   a. Check whether a given string is a Palindrome or not. Ex: MADAM is a palindrome.
   b. Sort a given list of names in ascending order
   c. Display the frequency count of words in a given text

Week – 4 (Strings)

4. Write Java programs for the following:
   a. Consider a company requires the details of an employee identity card such as firstname, middlename, lastname. Convert each character from the entered name into uppercase and display the names.
   b. Display the names of n members of a team whose name starts with 's' or 'S' and ends with 's' or 'S'.

Week – 5 (Class, Method, Object, Constructor)

5. Write Java programs for the following:
   a. Declare a class called Employee having employee _id and employee_name as members. Extend class Employee to have a subclass called Salary having designation and monthly_salary as members. Define following:
      - Required constructor
      - A method to find and display all details of employees drawing salary more than Rs.20000/-
      - main() method to create an array that sorts these details.

b. A software company is maintaining an Employee list of java_platform, dotNet_platform and RAD_platform. Each employee should have employee_name, and platform_name. Print the following
  - Display all java_platform employee list.
  - Display all .Net Employee List.
  - Display all RAD EmployeeList.

c. Create a class Account with two overloaded constructors. The first constructor is used to initialize the details of the account holder like account_name, account_number and initial_amount. The second constructor is used to initializeaccount_name, account_number, address, account_type and current_balance. The Account class is having methods Deposit(), Withdraw(), and GetBalance(). Make the necessary assumptions for data members and return types of the methods. Create objects of Account class and use them.

Week – 6 (Method Overloading)

6. Write Java programs for the following:

a. Create an overloaded methods named void calc_volume( ), that has been overloaded to perform the following functions. Execute the overloaded methods and display the volume in the respective functions:
  - Volume of Sphere
  - Volume of Cylinder
  - Volume of Cone

b. Create an abstract class named Shape that contains an empty method named numberOfSides().Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides( ) that shows the number of sides in the given geometrical figures.

Week – 7 (Interface)

7. Write Java programs for the following:

a. Implementan interface Student which has two methods displayGrade() and attendance() for PG_Student and UG_Student with necessary inputs of data.PG_Student and UG_Student are two different classes.

b. Create an abstract base class Shape with two members base and height, a member function for initialization and a function to compute shapeArea(). Derive two specific classes Triangle and Rectangle which override the function shapeArea(). Use these classes in a main function and display the area of the triangle and the rectangle.

Week – 8 (Exception Handling)

8. Write Java programs for the following:

a. Creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 andNum2 is displayed in the Result field when the Div- id button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 is Zero, the program would throw an ArithmeticException. Display the exception in a message dialog box.

b. In the CustomExceptionTest class, the age is expected to be a positive number. It would throw the user defined exception NegativeAgeException if the age is assigned a negative number.

Week – 9 (Threads)

9. Write Java programs for the following:

a. Illustrate creation of threads using Runnable class. (Start method starts each of the newly created thread. Inside the run method there is sleep () for suspend the thread for 500 milliseconds).

b. Create a multithreaded program by creating a subclass of Thread and then creating, initializing, and staring two Thread objects from your class. The threads will execute concurrently and display Java is object oriented, secure, and multithreaded in console window.

Week – 10 (Threads)

10. Write Java programs for the following:
    a. Creates three threads in which First thread displays "Good Morning" every one second, the Second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.
    b. Implement the concept of producer consumer problem.

Week – 11 (File Handling)

11. Write Java programs for the following:
    a. Read a file name from the user, and then display information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
    b. Reads a file and displays the file on the screen, with a line number before each line.
    c. Displays the number of characters, lines and words in a text file.

Week – 12 (Event Handling)

12. Write Java programs for the following:
    a. Create a simple calculator by using Grid Layout to arrange buttons for the digits and for the +,-,*, and % operations. Add a text field to display the result of the opeartions.
    b. To implement mouse handling events.
    c. To implement key handling events.

Week – 13 (AWT Controls)

13. Write Java programs for the following:
    a. Simulate a Traffic Light Signals in which the user selects one of three lights: Red, Yellow, Green. When a radio button is selected, the light is turned ON, and only one light can be ON at a time. Nolight is ON when the program starts.
    b. Write a Java program that allows the user to draw lines, rectangles and ovals.
    c. Develop an applet that displays a simple message in center of the screen

REFERENCE BOOKS:

1. T. Budd (2010), *An Introduction to Object Oriented Programming*, 3rd Edition, Pearson Education, India.
2. Y. Daniel Liang (2014), *Introduction to Java Programming, Comprehensive Version*, 10th Edition, Pearson Education, India.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT III SEMESTER

DATABASE MANAGEMENT SYSTEMS LAB

Course Code: **A3518**

L	T	P	C
0	0	3	2

Course overview:

This course introduces the core principles and techniques required in the design and implementation of database systems. This course focus on relational database management systems including data definition language, data manipulating languages. SQL is used to share and manage data, particularly the data that is found in relational database management systems - where the data is organized in tables, and where multiple files, each containing tables of data, may be related together by a common field. This course will cover the Oracle 10g PL/SQL programming language. Student will learn to control data sharing and learn to develop triggers, procedures, functions, cursors.

Course Objectives:

    I.   Is to make the student to apply fundamental concepts like database design, integrity constraints and database languages.

    II.   Is to make the student to identify the role of normalization in database management systems besides orienting them to structured Query Language(SQL) for implementation of Databases access

    III.   Is to present the students with the knowledge of PL/SQL programming language

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Understand, appreciate and effectively explain the underlying concepts of database technology.
2. Design and Implement a database scheme for a given problem domain
3. Apply Normalization to reduce redundancies.
4. Populate and query a database using SQL DML/DDL commands.
5. Declare and enforce integrity constraints on a database using a state of art of RDBMS

B.TECH IT III SEMESTER

DATABASE MANAGEMENT SYSTEMS LAB

Course Code: **A3518**

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

1. **CASE STUDY: EMPLOYEE AND DEPARTMENT DATABASE**:

The BlueX Company pvt.ltd has maintaining Employee information contains employee details .The company has four departments. Any employee working in the company belongs to any one of the department. An employee joined in company above 25 years only. The company may give commission for every employee if and only if more than 2 years experience. Construct the database design with that there is no redundancy.

Answer to the following Queries

1. Select the details of employee to get 3rd Maximum salaries?.
2. Update the employee name ='clark' to "james" and increase the salary by 10% with shifting him to cse department.
3. List all employees who have a salary greater than 15000 in the order of department number
4. Display first two employee who works in all departments and having salary greater than 30000
5. Display the total salary of a employee in deptno wise where more than 2 employees exist.
6. Display the average salary for each different job type within the department.
7. Display the average salary for all departments employing more than three people.
8. Display employees who earn more than the lowest salary in department with number 30.
9. Find all employees whose department is not in the DEPT table?
10. List employee details who earn a salary greater than the average for their department and sort records with respect to department number ?
11. Find employee name employee number, and their salary who were hired after 01/02/97.
12. Deleting duplicate record from a data base using group by clause

2. CASE STUDY: AIRLINE FLIGHT INFORMATION

The Employee relation describes pilots and other kinds of employees as well as every pilot certified for some aircraft, and only pilots are certified to fly. Write a CREATE TABLE statement for the FLIGHTS table. Choose data types appropriate for the DBMS used in your course. Flights table have flno, each flight have specific departure place , departure time and arrival place, arrival time. Distance is the numeric data travelled by flight. Price represents cost to travelled on specific flight. The currency symbols are not stored in the database. Write a CREATE TABLE statement for the AIRCRAFT table .Each aircraft have aid and a name and cruising range. The name column required (not null). Write a CREATE TABLE statement for the CERTIFIED *table* have employee number and aircraft id. Take appropriate data types for these columns. Write a CREATE TABLE statement for the EMPLOYEE table have employee number, ename and their salary. Understand above description and create primary key and foreign key for appropriate columns.

Answer for the following queries

1. Find the names of aircraft such that all pilots certified to operate them earn more than 80,000
2. For each pilot who is certified for more than three aircraft, find the eid and the maximum cruising range of the aircraft that he (or she) is certified for.
3. Find the names of pilots whose salary is less than the price of the cheapest route from Los Angeles to Honolulu.
4. For all aircraft with cruising range over 1,000 miles, find the name of the aircraft and the average salary of all pilots certified for this aircraft
5. Find the names of pilot's certi_ed for some Boeing aircraft?
6. Find the aids of all aircraft that can be used on routes from Los Angeles to Chicago.

7. Identify the flights that can be piloted by every pilot who makes more than $100,000.(Hint: The pilot must be certi_ed for at least one plane with a su_ciently large cruising range.)
8. Print the enames of pilots who can operate planes with cruising range greater than 3,000miles, but are not certi_ed on any Boeing aircraft.
9. A customer wants to travel from Madison to New York with no more than two changes of flight. List the choice of departure times from Madison if the customer wants to arrive in New York by 6 p.m
10. Compute the difference between the average salary of a pilot and the average salary of all employees (including pilots)..
11. Print the name and salary of every non pilot whose salary is more than the average salary for pilots

3. CASE STUDY : SAILORS, RESERVES, BOATS DATA BASE

In Database user has to maintain sailors information with sailors sid, sailor name and every sailor age is more than 25 years and has a rating i.e (rating >=10),the sailors reserved the boats for shipment of goods. Each boat identified by bid, name, color. Every sailors may reserve more than one boat. Reservation can notice based on the date.

Answer to the following Queries

1. Find the sid's , names of sailors who have reserved all boats and having age greater than 30.
2. Find the sids ,names of sailors who have reserved a red or a green boat
3. Find the sids of sailors with age over 20 who have not reserved a red boat
4. Compute increments for the rating of sailors who have sailed two different boats on the same day
5. Find the average age of sailors who are of voting age (i.e., at least 18 years old) for each rating level that has at least two sailors.
6. Find those ratings for which the average age of sailors is the minimum overall ratings
7. Find sailors whose rating is better than some sailor called "Horatio"
8. Find sailors whose rating is better than every sailor called "Horatio
9. Find the names of sailors who are older than the oldest sailor with a rating of 10
10. Find the average age of sailors for each rating level that has at least two sailors

4. CASE STUDY : BANK DATABASE

A bank has many branches and a large number of customers. A customer can open different kinds of accounts with the bank. The bank keeps track of a customer by his SSN, name, address, and phone number. Age is used as a factor to check whether he is a major. There are different type of loans, each identified by a loan number. A customer can take out more than one type of loan, and all branches can give loans. Loans have a duration and interest rate. The account holder can enquire about the balance in his account, create a data base design for the bank. Make any suitable assumptions .

Answer to the following Queries:

1. Give the name of the customer having maximum deposit among deposits ofcity "Harrison" for branch "Perry ridge".
2. Give the names of cities in which the maximum number of branches located.
3. Add amount "100" to the account of all those depositors who are having the highest deposit amount in their respective branches .
4. Transfer the amount "1000" from the account of_____to the account of _____id both are having the same branch.
5. Find the names ,street, addresses and cities of residence of all employees who work for First Bank Corporation and earn more than 10000/-
6. Give all loans numbers for a loan made at the Perryidge branch with loan amount greater than 1200
7. Find customer name, loan number, loan amount branch name for all loans
8. Find customer name, loan number , loan amount branch name for all loans given by "perryridge" branch

9. Find names of all branches that have asserts greater than all branches located in Brooklyn
10. Find names of all branches that have asserts greater than at least one branch located in Brooklyn.
11. Find average balance for each customer who lives in Harrison and has at least 2 accounts
12. Delete borrower of branches having the minimum number of customers.

5. CASE STUDY : INVENTORY MANAGEMENT SYSTEM DATA BASE

There are many items in a departmental store, which are sold to customer and purchased from supplier. An order is placed by the customer-required details, which are listed below:

- Item number
- Part number
- quantity

The order processing executes, look up the stock of each item(parts) is available or not then order fulfilled by the management of departmental store. The system periodically checks the stock of each item if it is found below the reorder level then purchase order placed to the supplier for that item, if the supplier is not able to supply whole order then rest of quantity supplied by the another supplier. After fulfilled the formalities, bill generated by the system and sent to the customer. Create a database design to maintained by the management for whole process is being done

Answer to the following Queries

1. Display supplier names for supplier who supply at least one part supplied by supplier s2
2. Get supplier names for supplier who supply all parts
3. Get supplier names for suppliers who do not supply part P2
4. Find supplier numbers for suppliers who supply at least all those parts supplied by supplier S2
5. Get a part numbers for parts that either weight more than 16 pounds, or are supplied by supplier S2, or both.
6. For each part , get the pat number and the total shipment quantity
7. For each supplier , get the supplier number and the total number of parts supplied
8. Get all Paris of supplier numbers such that the who suppliers are located in the same city
9. Get color and city for "non Paris" parts with weight greater than ten
10. Get part number for all parts supplied by more than one supplier
11. Get supplier numbers for supplier with less than the current maximum status in the "s" table
12. Get supplier names for supplier who supply at least one brown part

PL/SQL PROGRAMS

1. Write the PL/SQL program to retrieve the data from emp table?
2. The L& T Pvt.ltd Company has maintaining Employee information contains employee details .The company has four departments. Any employee working in the company belongs to any one of the department. Write a PL/SQL block to insert a record in emp table and update the salaries of Blake and Clark by 2000 and 1500.Thn check to see that the total salary does not exceed 20000 . If total
   >20000thn undo the updates made to salaries of Blake and clerk?
3. A table Product attributes pno, pname, sales price . A table old price attributes pno, old sales price. If the price of product pool1 is <4000 then change the price to 4000. The price change is to be recorded in the old price table with product number, date on which the price was last changed?

CURSORS
1. Write a PL/SQL block that will display the name, dept no ,salary of fist highest paid employees.
2. Update the balance –stock in the item master table each time a transaction takes place in the item transaction table. The change in item master table depends on the itemID is already present in the item master then update operation is performed to decrease the balance stock by the quantity

specified in the item transaction in case the itemid is not present in the item master table then the record is inserted in the item master table.

3. The table trans has the following structure acno, transtype, trans date. The table bank has acno, bal, minbal. Assuming that the same acno exists in both tables update the bank table. If trans.type='d' then Balance=bank.balance + trans.amount. if transtype='w' then balance = bank.balance-trans.amount . Take precaution in case of withdrawals.

4. Write a PL/SQL block that will display the name, dept no ,salary of fist highest paid employees**.**

5. Display sailors information using cursor. if the sailor is not available insert the sailors details

6. Create pl/sql program to insert and update record in customer table using cursors

FUNCTIONS AND PROCEDURES USING CONTROL STRUCTURES

1. Create a function to find the factorial of a given number and hence find NCR?

2. Write a PL/SQL block to pint prime Fibonacci series using local functions.

3. Create a procedure to find the lucky number of a given birth date?

Triggers

1. PL/SQL program for deletion of row from employee table using Triggers.

2. PL/SQL program to update a row from employee table using Triggers.

B. Tech. IT III SEMESTER

GENDER SENSITIZATION

Course Code: **A3021**

L T P C
0 3 0 0

Course Overview:

Gender Sensitization is one of the basic requirements for the normal development of an individual and primarily highlights the contribution of both the genders in creation and development of a well balanced society. A curriculum-based approach to bring a change is desired to inculcate sensitivity towards issues concerning the relationship between men and women, caste, declining sex ratio, struggles with discrimination, sexual harassment, new forums for justice, eve-teasing, etc., The need for this sensitivity has been felt and realized through times immemorial and in almost all kinds of human existence, across the globe.

Towards a World of Equals is a course that introduces you to different dimensions of the current discussion on gender issues through a variety of materials: academic studies, court cases, laws, theoretical analyses, newspaper reports, stories, poems, videos and autobiographical texts. The lessons critically scrutinize many commonly held assumptions about gender relations and demonstrate why they are unacceptable in a society committed to justice and equality.

Prerequisite(s): NIL

Course Objectives:

I. To provide participants with a better understanding of the socialization of men and women.

II. To examine notions of the nature, origin, extent and effects of gender and locating the invisibility of women in various academics and history.

III. To analyze the issue of sexual harassment at home and workplace and its effect on individual, organization and society.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Realize that Gender Sensitization is essential for creating sustainable development in the society.

2. Sensitize towards women's work, caste, gender binary, serious issues of domestic violence, sexual harassment and violence, declining sex ratio in our country and its causes and consequences.

3. Realize the fact about unethical orthodox beliefs and values pertaining to gender and experience invigorating beauty of togetherness.

4. Inspect male point of view that is taken as "objective" or "universal" in most disciplines and foster substantive gender equality in education and employment.

5. Adapt proper modification of behavior by raising awareness on gender equality.

GENDER SENSITIZATION

Course Code: **A3021**

L	T	P	C
0	3	0	0

SYLLABUS:

1. **Gender Sensitization: Why should we study it?**

2. **Socialization: Making Women, Making Men**
   Introduction
   Preparing for womanhood
   Growing up male
   First lessons in caste
   Different masculinities

3. **Just Relationships: Being Together as Equals**
   Mary Kom and Onler
   Love and Acid just do not mix
   Love letters
   Mothers and fathers
   Further Reading: Rosa Parks-The Brave heart

4. **Missing Women: Sex Selection and Its Consequences**
   Declining Sex Ratio
   Demographic Consequences

5. **Gender Spectrum: Beyond the Binary**
   Two or Many?
   Struggles with Discrimination

6. **Additional Reading: Our Bodies, Our Health**

7. **Housework: The Invisible Labour**
   "My Mother doesn't work"
   "Share the load"

8. **Women's Work: Its Politics and Economics**
   Fact and fiction
   Unrecognized and unaccounted work
   Further Reading: wages and conditions of work.

9. **Sexual Harassment: Say No!** Sexual
   harassment, not eve-teasing Coping
   with everyday harassment Further
   Reading: "Chupulu"

10. **Domestic Violence: Speaking Out**
    Is home a safe place?
    When women unite (Film)
    Rebuilding lives
    Further Reading: New Forums for justice.

11. Thinking about Sexual Violence

Blaming the Victim- " I Fought for my life…"

Further Reading: The caste face of violence.

12. Knowledge: Through the Lens of Gender

Point of view

Gender and the structure of knowledge

Further Reading: Unacknowledged women artists of Telangana

13. Whose History? Questions for Historians and Others

Reclaiming a Past

Writing other Histories

Further Reading: Missing pages from modern Telangana history

TEXT BOOK:

1. "Towards a World of Equals: A Bilingual Textbook on Gender". Telugu Akademi, Hyderabad, 2015

ADDITIONAL RESOURCES:

1. www.worldofequals.org.in

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT IV SEMESTER

ENVIRONMENTAL SCIENCE

Course Code: A3010

L	T	P	C
3	0	0	3

Course Overview:

Environmental study is interconnected; interrelated and interdependent subject. Hence, it is multidisciplinary in nature. The present course is framed by expert committee of UGC under the direction of Honorable Supreme Court to be as a core module syllabus for all branches of higher education and to be implemented in all universities over India. The course is designed to create environmental awareness and consciousness among the present generation to become environmental responsible citizens. The course description is: multidisciplinary nature of environmental studies, Natural Resources: Renewable and non-renewable resources; Ecosystems; Biodiversity and its conservation; Environmental Pollution; Social Issues and the Environment; pollution control acts .The course is divided into five chapters for convenience of academic teaching .

Prerequisite(s): NIL

Course Objectives:

I. To prioritize the base of natural resources for the sustainability of society through equitable maintenance of natural resources.

II. To relate various concepts of biodiversity like species, ecosystems, value and threats to biodiversity.

III. To identify, assess global environmental issues and create awareness about the international conventions for mitigating global environmental problems.

IV. To perceive green environmental issues which provides an opportunity to overcome the current global environmental issues.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Apply knowledge regarding environment ,natural resources and its components.

2. Analyze various ecosystems, their biodiversity and scientific methods to protect them.

3. Compare different types of pollutions and their control measures.

4. Maximize awareness about environmental laws and environmental impact assessment.

B. Tech. IT IV SEMESTER

<div align="center">

ENVIRONMENTAL SCIENCE

</div>

Course Code: **A3010**

L	T	P	C
3	0	0	3

<div align="center">

SYLLABUS

</div>

UNIT – I   **(7 Lectures)**

ENVIRONMENTAL SCIENCE INTRODUCTION: Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance .Need for Public Awareness.

NATURAL RESOURCES: Renewable and non-renewable resources .Natural resources and associated problems.

FOREST RESOURCES: Use and over – exploitation, deforestation, Timber extraction, Mining, dams and other effects on forest and tribal people.

WATER RESOURCES: Use and over utilization of surface and ground water, floods, drought, conflicts over water, dams – benefits and problems.

MINERAL RESOURCES: Use and exploitation, environmental effects of extracting and using mineral resources.

FOOD RESOURCES: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

ENERGY RESOURCES: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies.

LAND RESOURCES: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources.

UNIT- II   **(7 Lectures)**

ECOSYSTEMS: Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystems

BIODIVERSITY AND ITS CONSERVATION: Introduction .Definition: genetic, species and ecosystem diversity. Value of BIODIVERSITY: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a mega diversity nation .Hot-spots of biodiversity. Threats to biodiversity- habitat loss, poaching of wildlife, man -wildlife conflicts. Endangered and endemic species of India .Conservation of biodiversity- In-situ and Ex-situ conservation of biodiversity.

UNIT - III   **(12 Lectures)**

ENVIRONMENTAL POLLUTION: Definition, Cause, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution and nuclear hazards, Ill effects of fireworks.

SOLID WASTE MANAGEMENT: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies.

DISASTER MANAGEMENT: floods, earthquake, cyclone and landslides. E-waste and plastic waste- recycling and reuse

WATER CONSERVATION: rain water harvesting, watershed management .Resettlement and rehabilitation of people; its problems and concerns. Case Studies. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.

UNIT- IV   **(8 Lectures)**

GREEN ENVIRONMENTAL ISSUES: Clean development mechanism, carbon foot printing, carbon credits, and carbon sequestration polluter pay principle. Green building practices. Approaches to green computing and nanotechnology.IS014000. Role of information Technology in Environment and human health. Case Studies.

UNIT – V **(8 Lectures)**

ENVIRONMENTALETHICS: Environment Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. Public awareness.

ENVIRONMENTAL IMPACT ASSESSMENT: Conceptual facts of EIA, Baseline date acquisition, planning and management of impact studies, operational aspects of EIA, methods for impact identification, prediction of impacts (air, water, noise, soil, biological and socio- economics) .Environmental Management Plan. Role of NGOs in creating awareness among people regarding environmental issues.

TEXT BOOKS:

1. Erach Bharucha (2005), *Textbook of Environmental Studies for Undergraduate Courses*, Hyderabad, Universities Press.
2. Benny Joseph (2005), *Environmental Studies*, New Delhi, Tata McGraw Hill Publishing co. Ltd.

REFERENCE BOOKS:

1. Anubha Kaushik (2006), *Perspectives in Environmental Science*, 3rd Edition, New Delhi, New age international.
2. M Anji Reddy (2007), *Textbook of Environmental Sciences and Technology*, Hyderabad, BS Publications.

B. TECH IT IV SEMESTER

WEB TECHNOLOGIES

Course Code: **A3601**

L	T	P	C
4	0	0	4

Course Overview:

This course introduces students to fundamental web technologies such as HTTP, CSS, XML, PHP and Server-side scripting. The course teaches students how to use some of these technologies to develop static and dynamic web pages with an emphasis on client-side scripts. The course explains the differences between client-side and server-side Web development, and how to build simple applications using servlets, jsp and JDBC. The course also covers current Web "standards" and future W3C recommendations.

Prerequisite(s):

Computer Programming (A3501), Object Oriented Programming (A3509)

Course Objectives:

I.   To design a static web page using HTML with scripting language.
II.   How to implement client side validation for dynamic web page creation.
III. To create awareness on xml to data transfer between client and server, xml functionality and design.
IV.   To illustrate the need of reusable components and way of creating JavaBeans.
V.   To create web application using Apache Tomcat v6 and how to give the request and get the response from the web server with servlet and jsp using java library packages.
VI.   To create a database with MySQL server and perform crude operations using java.
VII. The insights of the Internet programming and how to design and implement complete applications over the web.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Apply various HTML tags used to design static web pages.
2. Apply CSS and JavaScript Constructs to perform Client side validation and designing of dynamic web pages.
3. Apply various PHP constructs to develop server side applications and also familiar of transporting data among applications using XML.
4. Understand how to configure Web servers and deployment of applications.
5. Design MVC based applications using Servlet, JSP and JDBC.
6. Implement more interactive web applications using AJAX programming by handling asynchronous requests.

WEB TECHNOLOGIES

Course Code: **A3601**

L	T	P	C
4	0	0	4

SYLLABUS

UNIT-I **(10 Lectures)**

INTRODUCTION TO WEB TECHNOLOGY: Web pages-types, plug-ins, tiers, introduction to HTML, common Tags, Lists, Tables, Images, Forms, Frames, Cascading Style Sheets
Java script: Objects in Java Script, Dynamic HTML with Java Script.

UNIT-II **(9   Lectures)**

Introducing PHP: Creating PHP script- Variables, Constants, Data types, Operators, Control Structures, Arrays, Functions. Working with forms and Database.
EXTENSIBLE MARKUP LANGUAGE: XML-Documents, DTD, XML schema, XSLT, XML parsers-DOM, SAX.

UNIT-III **(10 lectures)**

Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, and Java Beans API.
Web Servers and Servlets: Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, and Reading Initialization parameters. The javax.servlet, http package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues,Accessing a Database from Servlet.

UNIT-IV **(11 lectures)**

Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC.
JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Declaring Variables and Methods Error Handling and Debugging Sharing Data between JSP pages, Deploying JAVA Beans in a JSP Page, Accessing a Database from a JSP Page.

UNIT-V **(10 lectures)**

Database Access: Database Programming using JDBC, Studying Javax.sql.* package, Application – Specific Database Actions.
Introduction to AJAX: Improving web page performance using Ajax, Programming in Ajax.

TEXT BOOKS:

1. Web Technologies – Black Book,Kogent Learning solutions Inc sol. Dreamtech press.
2. The complete Reference Java 2, 7th Edition by Patrick Naughton and Herbert Schildt. TMH
3. Java Server Pages –Hans Bergsten, SPD O'Reilly
4. An Introduction to Web Design + Programming, Wang, Katila, CENGAGE

REFERENCE BOOKS:

1. Web Technologies, Uttam K Roy - Oxford
2. Head first Java – Kathy seirra -Orielly –
3. Core SERVLETS ANDJAVASERVER PAGES   VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson
4. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
5. Murach's beginning JAVA JDK 5, Murach, SPD
6. An Introduction to web Design and Programming –Wang-Thomson
7. Beginning Web Programming-Jon Duckett WROX.
8. Programming the World Wide Web – Robert W Sebesta. Pearson publications. Fourth edition.
9. Web Technologies. TCP/IP Architecture and Java programming- Godbole, Atul Kahate- 2nd ed, TMH
10. Web Technologies, A developer's Perspective, N P Gopalan, Akhilandeswari, PHI

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT IV SEMESTER

FORMAL LANGUAGES AND AUTOMATA THEORY

Course Code: **A3513**

L	T	P	C
3	1	0	3

Course Overview:

This course deals with the concepts of automata, formal languages, grammar, algorithms, computability, decidability, and complexity. The reasons to study this course are Automata Theory provides a simple, elegant view of the complex machine that we call a computer. Automata Theory possesses a high degree of permanence and stability, in contrast with the ever-changing paradigms of the technology, development, and management of computer systems. Further, parts of the Automata theory have direct bearing on practice, such as Automata on circuit design, compiler design, and search algorithms; Formal Languages and Grammars on compiler design; and Complexity on cryptography and optimization problems in manufacturing, business, and management.

Prerequisite(s):

Discrete Mathematics Structures (A3505)

Course Objectives:

I. Introduce concepts in automata theory and theory of computation
II. Identify different formal language classes and their relationships
III. Design grammars and recognizers for different formal languages
IV. Prove or disprove theorems in automata theory using its properties
V. Determine the decidability and intractability of computational problems

Course Outcomes:

Upon completion of the course the student will be able to:

1. Interpret the core concepts in automata theory and formal languages.
2. Prepare regular expressions for different formal languages
3. Apply context-free grammar for various programming constructs.
4. Identify membership properties for different formal languages.
5. Construct computational models including decidability and intractability

B.TECH IT IV SEMESTER

FORMAL LANGUAGES AND AUTOMATA THEORY

Course Code: **A3513**

L	T	P	C
3	1	0	3

SYLLABUS

UNIT - I (10 Lectures)

FINITE AUTOMATA (FA) - Introduction, model and behavior, Deterministic Finite Automata (DFA) -Formal definition, simpler notations (state transition diagram, transition table), language of a DFA. Nondeterministic Finite Automata (NFA)- definition of NFA, language of an NFA, Equivalence of Deterministic and Nondeterministic Finite Automata, Applications of Finite Automata, Finite Automata with Epsilon Transitions, Eliminating epsilon transitions, finite automata with output (Moore and Mealy machines).

UNIT - II (8 Lectures)

REGULAR EXPRESSIONS (RE) - Introduction, algebraic laws for Regular Expressions, Finite Automata and Regular Expressions- from DFA's to Regular Expressions, converting Regular Expressions to Automata, applications of Regular Expressions. Proving languages to be non-regular -Pumping lemma, applications. Closure properties of regular languages.

UNIT - III (10 Lectures)

CONTEXT FREE GRAMMARS (CFG) - Formal definition, sentential forms, leftmost and rightmost derivations, the language of a CFG. Derivation tree or parse tree, relationship between parse trees and derivations. Applications of Context Free Grammars, Ambiguous Grammar.

SIMPLIFICATION OF CFG - Removing useless symbols, Null (epsilon) - productions and unit productions. Normal forms -CNF. Proving that some languages are not context free -Pumping lemma for CFLs, applications. Some closure properties of CFLs, decision properties of CFLs, un decidable CFL problems. Minimization of Deterministic Finite Automata.

UNIT - IV (8 Lectures)

PUSHDOWN AUTOMATA (PDA) - Definition of the Pushdown Automata, the languages of PDA (acceptance by final state and empty stack), Equivalence of PDA's and CFG's, from Grammars to Pushdown Automata, Pushdown Automata to Grammars. Deterministic PDA -definition, DPDAs and regular languages, DPDAs and CFLs. Languages of DPDAs

UNIT - V (9 Lectures)

TURING MACHINES (TM) - Formal definition and behavior, languages of a TM, TM as accepters, TM as a computer of integer functions, Types of TMs.

RECURSIVE AND RECURSIVELY ENUMERABLE LANGUAGES (REL) - Some properties of recursive and recursively enumerable languages, universal Turing machine, the Halting problem, undecidable problems about TMs.

COMPUTABILITY THEORY - Context sensitive language and linear bounded automata (LBA), Chomsky hierarchy, The classes P and NP, post's correspondence problem (PCP).

TEXT BOOK:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2007), *Introduction to Automata Theory Languages and Computation*, 3rd Edition, Pearson Education, India.

REFERENCE BOOKS:

1. K.L.P Mishra, N. Chandrashekaran (2003), *Theory of Computer Science-Automata Languages and Computation*, 2nd edition, Prentice Hall of India.
2. John C. Martin (2003), *Introduction to Languages and the Theory of Computation*, 3rd Edition, McGraw-Hill, New Delhi.
3. Daniel I.A. Cohen (2007), *Introduction to Computer Theory*, 2nd Edition, John Wiley.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT IV SEMESTER

COMPUTER ORGANIZATION AND ARCHITECTURE

Course Code: **A3508**

L	T	P	C
3	1	0	3

Course Overview:

The computer organization is concerned with the structure and behavior of digital computers. The main objective of this subject is to understand the overall basic computer hardware structure, including the peripheral devices. In spite of variety and pace in the computer field, certain fundamental concepts apply consistently throughout. The application of these concepts depends upon the current state of technology and the price/performance objectives of the designer. The aim of the subject is to provide a thorough discussion of the fundamentals of computer organization and architecture and to relate these to contemporary design issues. A computer system is like any other system, consists of an inter-related set of components.

Prerequisite(s):

Digital Logic Design (A3404)

Course Objectives:

I. To have a thorough understanding of the basic structure and operation of a digital computer.
II. Analyze architectures and computational designs.
III. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division
IV. Design and synthesize new and better architectures.
V. To study the hierarchical memory system including cache memories and virtual memory

Course Outcomes:

Upon completion of the course the student will be able to:

1. Illustrates the basic organization of modern computer systems.
2. Apply the register transfer operations and instructions in program.
3. Analyze the micro program control formats and the computer arithmetic algorithms
4. Analyze the memory access operations and memory architecture
5. Apply the multiprocessing in different inter process structures.

B. Tech. IT IV SEMESTER

COMPUTER ORGANIZATION AND ARCHITECTURE

Course Code: **A3508**

L	T	P	C
3	1	0	3

SYLLABUS

UNIT – I   (10 Lectures)

STRUCTURE OF COMPUTERS: Computer types, functional units, basic operational concepts, Von-Neumann architecture, bus structures, software, performance, multiprocessors and multicomputer, data representation, fixed and floating point and error detecting codes.

REGISTER TRANSFER AND MICRO-OPERATIONS: Register transfer language, register transfer, bus and memory transfers, arithmetic micro-operations, logic micro-operations, shift micro-operations, arithmetic logic shift unit.

UNIT – II   (12 Lectures)

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, computer registers, computer instructions, instruction cycle, timing and control, memory-reference instructions, input-output and interrupt. Central processing unit: stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, Reduced Instruction Set Computer (RISC).

UNIT – III   (12 Lectures)

MICRO-PROGRAMMED CONTROL: Control memory, address sequencing, micro-program example, design of control unit.

COMPUTER ARITHMETIC: Addition and subtraction, multiplication and division algorithms, floating-point arithmetic operation, decimal arithmetic unit, decimal arithmetic operations.

UNIT – IV   (10 Lectures)

THE MEMORY SYSTEM: Basic concepts, semiconductor RAM types of read - only memory (ROM), cache memory, performance considerations, virtual memory, secondary storage, raid, direct memory access (DMA).

UNIT – V   (10 Lectures)

MULTIPROCESSORS: Characteristics of multiprocessors, interconnection structures, inter processor arbitration, inter processor communication and synchronization, cache coherence, shared memory multiprocessors.

Text Books:
1. M. Moris Mano (2006), Computer System Architecture, 3rd edition, Pearson/PHI, India.
2. Carl Hamacher, Zvonks Vranesic, SafeaZaky (2002), Computer Organization, 5th edition, McGraw Hill, New Delhi, India.

Reference Books:
1. William Stallings (2010), Computer Organization and Architecture- designing for performance, 8th edition, Prentice Hall, New Jersy.
2. Andrew S. Tanenbaum (2006), Structured Computer Organization, 5th edition, Pearson Education Inc, New Jersy.
3. Sivarama P. Dandamudi (2003), Fundamentals of Computer Organization and Design, Springer Int. Edition, USA.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. TECH IT IV SEMESTER

COMPUTER GRAPHICS

Course Code: **A3602**

L	T	P	C
3	1	0	3

Course Overview:

This course focuses on giving introduction about computer graphics and its wide range of application areas. It also gives information about the graphics hardware, working of hardware and software which are needed for producing graphics. This course gives information about basic algorithms for drawing basic shapes which includes lines, circles, ellipse, also for filling shapes with colors and applying 2D, 3D transformations on them. Different types of objects which are used for representing 2D-objects, 3D-objects in computer are mentioned here. Viewing mechanism of 2D-objects, 3D-objects is also taught and also focuses on Animation.

Prerequisite(s):

Computer Programming(A3501), Mathematics-I **(**A3001)

Course Objectives:

I.   To understand the importance of and describing the diversity of application areas of computer graphics and exploring basic features of graphics hardware components and software packages.
II.   to understand about output primitives (point, line, circle etc) and describing fundamental algorithms to display 2-D shapes.
III. To illustrate methods for filing of an object with colors.
IV.   to Explore the need of visible surface area detection .
V.   to give importance and need of animation in different fields, exploring the animation techniques.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Identify computer graphics applications, computer graphics Hardware and software.
2. Extend basic geometric primitives algorithms for producing custom shapes and Compute 2D or 3D transformations for doing manipulations on objects.
3. Combine basic transformations to produce composite transformations and compare the 2D, 3D viewing process and can select the appropriate clipping techniques for producing view of objects.
4. Analyze the curve generation techniques and Illustrate 3D rendering process, various types of projection methods available.
5. Utilize the efficient visible surface detection algorithms, projection concepts in rendering a view of scene of objects.
6. Interpret and Create the animation sequences of motion by using animation techniques like key frame animations, Interpolation techniques etc.

SYLLABUS

UNIT-I   (10 Lectures)
INTRODUCTION: Application areas of computer graphics, overview of graphics systems, video-display devices and raster-scan systems, random scan systems, graphics monitors, work stations and input devices, graphics standards.

UNIT-II   (10 Lectures)
OUTPUT PRIMITIVES: Points and lines, line drawing algorithms, midpoint circle and ellipse algorithms. Filled area primitives - scan line polygon fill algorithm, boundary fill and flood fill algorithms.

UNIT-III   (9 Lectures)
2D - GEOMETRICAL TRANSFORMS: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms transformations between coordinate systems.
2D - VIEWING: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland–Hodgeman polygon clipping algorithm.

UNIT-IV   (10 Lectures)
3D - GEOMETRIC TRANSFORMATIONS: Translation, rotation, scaling, reflection and shear transformations, composite transformations.
3D - VIEWING: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.
3D - OBJECT REPRESENTATION: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces.

UNIT-V   (11 Lectures)
VISIBLE SURFACE DETECTION METHODS: Classifications, back face detection, depth buffer, scan line and depth sorting.
COMPUTER ANIMATION: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

TEXT BOOKS:
1. Donald Hearn, M. Pauline Baker (2011), *Computer Graphics with Open GL,* 3rd edition, Pearson Education, India.

REFERENCE BOOKS:
1. David F. Rogers (1998), *Procedural elements for Computer Graphics*, 2nd edition, Tata Mc Graw Hill, New Delhi, India.
2. Steven Harrington (1987), *Computer Graphics*, 2nd edition, Tata Mc Graw Hill, New Delhi, India.
3. Zhigand xiang, Roy Plastock (2000), *Computer Graphics,* 2nd edition, Schaum's outlines, Tata

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT IV SEMESTER

OPERATING SYSTEMS

Course Code: **A3515**

L	T	P	C
4	1	0	4

Course Overview:

Operating Systems Course is intended as a general introduction to the techniques used to implement operating systems. The topics covered will be functions of operating systems, process management processor scheduling; deadlock prevention, avoidance, and recovery; main-memory management; virtual memory management ; control of disks and other input/output devices; file-system structure and implementation; and protection and security. The course also covers the related UNIX commands and system calls.

Prerequisite(s):

Computer Programming (A3501)

Course Objectives:

I. Comprehend the operation, implementation and performance of modern operating systems, and the relative merits and suitability of each for complex user applications.
II. Learn how to model, abstract, and implement efficient software solutions in a complex system environment.
III. Learn to compare, contrast, and evaluate the key trade-offs between multiple approaches to operating system design, and identifies appropriate design choices when solving real-world problems.
IV. Understand the working of UNIX architecture and file systems.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Understand the concepts of basic operating system, Process Management.
2. Apply Synchronization and Concurrency Control in inter process communication.
3. Use Deadlock handling methods and concepts of Memory Management techniques
4. Apply the File and Disk Management Schemes for effective Storage
5. Examine different Protection and Security principles associated with Operating Systems and fundamental commands in UNIX.

OPERATING SYSTEMS

Course Code: **A3515**

L	T	P	C
4	1	0	4

SYLLABUS

UNIT – I   **(10 Lectures)**

OPERATING SYSTEMS OVERVIEW: Introduction, operating system operations, process management, memory management, storage management, protection and security, distributed systems, special purpose systems. Operating system services and systems calls, system programs

UNIX ARCHITECTURE: UNIX commands-ls, cat, mkdir, rm, dir, mv,cp

UNIT – II   **(11 Lectures)**

PROCESS MANAGEMENT: Process concepts, operations on processes, IPC, Process Scheduling, Multithreaded programming. UNIX Commands- ps, wait, exec, fork, kill, & (background process), pipe.

CONCURRENCY AND SYNCHRONIZATION: Process synchronization, critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of synchronization, readers and writers problem, dining philosopher's problem, monitors.

UNIX SYSTEM CALLS- msgget(),msgsnd(), msgrcv(), msgctl(), shmget(), shmat(), shmctl(), semop(), semget(), semctl().

UNIT – III   **(11 Lectures)**

DEADLOCKS: System model, deadlock characterization, deadlock prevention, avoidance, detection and recovery from deadlock. **(**T1: Ch-7)

MEMORY MANAGEMENT: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement algorithms, allocation of frames, thrashing. (T1: Ch-8, 9)

UNIT – IV   **(11 Lectures)**

FILE SYSTEM: Concept of a file, access methods, directory structure, file system mounting, file sharing, protection. File system implementation: file system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance.

UNIX commands- grep, head, tail, sort, cut, find, file locking using fcntl.

I/O SYSTEM: Mass storage structure - overview of mass storage structure, disk structure, disk attachment, disk scheduling algorithms, swap space management, stable storage implementation, tertiary storage structure.

UNIX Redirections- >,<,>>,<<, du, df, ulimit.

UNIT – V   **(12 Lectures)**

PROTECTION: Goals of protection, principles of protection, domain of protection access matrix, implementation of access matrix, access control, revocation of access rights.

SECURITY: The security problem, program threats, system and network threats cryptography as a security tool, user authentication-strengthening of password using salt in UNIX, implementing security defenses, fire walling to protect systems(TB-1, ch 18). UNIX commands-chmod, access (), umask.

TEXT BOOKS:
1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2009), *Operating System Concepts*, 8th Edition, Wiley India Private Limited, New Delhi.
2. Sumitabha Das (2006), *UNIX Concepts and Applications*, 4th Edition, McGraw-Hill Education.

REFERENCE BOOKS:
1. Stallings(2006), *Operating Systems, Internals and Design Principles*, 5th Edition, Pearson Education, India.
2. Andrew S. Tanenbaum (2007), *Modern Operating Systems*, 2nd Edition, Prentice Hall of India, India.
3. Deitel & Deitel (2008), *Operating systems*, 3rd Edition, Pearson Education, India.
4. Dhamdhere (2008), *Operating Systems*, 2nd Edition, Tata Mc graw Hill, New Delhi.
5. Paul Love, Joe Merlino, Craig Zimmerman, Jeremy C. Reed, and Paul Weinstein (2005), *Beginning Unix*, Wiley Publishing, Inc.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. TECH IT IV SEMESTER

WEB TECHNOLOGIES LAB

Course Code: **A3603**

L	T	P	C
0	0	3	2

COURSE OVERVIEW:

Presenting information over the internet in form of web pages is the best way of reaching to all corners of world. This laboratory aims at giving knowledge about creating web pages and also about different web programming concepts, technologies.

Pre-requisites:

Computer Programming (A3501), Object Oriented Programming (A3509)

COURSE OBJECTIVES:

To make the student familiar with:

I. Creation of static web pages with HTML & dynamic web pages with HTML, JavaScript & CSS, XML, PHP.
II. Design and develop various types of websites using various client side , server side components using Servlets and JSP
III. Design and develop 3 tier applications and various web components and Database accessing with JDBC Concepts
IV. Have knowledge in Framework like struts & EJB's

COURSE OUTCOMES:

Upon the completion of web technologies practical course, the student will be able to

1. Analyze and create web pages using languages like HTML, DHTML, CSS, PHP and JavaScript.
2. Design a valid XML document by following the constructs of Schema and DTD.
3. Apply server side components like Servlets to build dynamic web applications.
4. Create web applications using server-side scripting languages like JSP.
5. Construct database and perform various operations on database using JDBC.

.

WEB TECHNOLOGIES LAB

Course Code: **A3603**

```
L   T   P   C
0   0   3   2
```

SYLLABUS

1. Design the following static web pages required for an online book store website

    (a)   Home Page

    (b)   Login Page

    (c)   Catalogue Page

2. Design the following static web pages required for an online book store website

    (a)   Cart Page

    (b)   Registration Page

3. Design a web page using CSS which includes the following styles

    (a)   Using different font styles

    (b)   Set a background image for both page and single elements on the page

    (c)   Control the background repetition of image with background-repeat property

    (d)   Define styles for links as visited, active, hover & link

    (e)   Work with layers

    (f)   Add a customized cursor

4. Write a JavaScript to validate the fields of registration page.

5. Create an XML document for maintaining a CD catalog.

    Display XML data using XSL

6. Write a program to create a Java Bean for user login management component.

7. Install Apache Tomcat Server and deploy a static website and access it.

8. Write a program to create a Servlet to AUTHENTICATE user details.

9. Write a program to implement session management concept in servlets.

10. Write a program to access database using JDBC and Servlets.

11. Write a program to print multiplication table for any number upto required level using JSP.

12. Write a program to display user credentials using useBean tag of JSP.

13. Write a program to validate the user form using PHP and database.

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OPERATING SYSTEMS LAB

Course Code: **A3517**

L	T	P	C
0	0	3	2

Course Overview:
This Laboratory covers the major methods of inter process communications (IPC), which is the basis of all client / server applications under UNIX, Linux utilities. There will be extensive Programming exercises in shell scripts. It also emphasizes various programming concepts in IPC, multithreaded programming and socket programming.

Prerequisites: Computer Programming (A3501)

Course Objectives:
Make the students to

    I.   Practice the basic UNIX commands.
    II.   Simulate process and inter process communication.
    III.   Simulate process scheduling, deadlock handling (Banker's Algorithm).
    IV.   Simulate page replacement techniques in memory management.

Course Outcomes:
Upon successful completion of this course, student will be able to:

1. Use file handling utilities / commands of UNIX operating system
2. Apply inter process communication mechanisms of UNIX
3. Compare various CPU scheduling algorithms performance
4. Analyze whether a system is in safe state or not using deadlock avoidance algorithm
5. Apply memory management strategies
6. Use file management system calls to simulate UNIX commands

Course Code: **A3517**   **L   T   P   C**
                                                                   0   0   3   2

LIST OF EXPERIMENTS

Week – 1 (UNIX Utilities)
1.   a) Study and Practice on various commands like man, cp, mv, ln, rm, unlink, mkdir, rmdir.

Week-2 (Inter process communication)
2.   a) Implement Two way process communication using pipes
     b) Implement Two way process communication using named pipes

Week – 3 (Inter process communication)
3.   a) Implement message queue form of IPC.
     b) Implement shared memory and semaphore form of IPC.

Week – 4 (Process Scheduling)
4.   Simulate the following CPU Scheduling Algorithms using C program:
     a) FCFS
     b) SJF

Week-5 (Process Scheduling)
5.   Simulate the following CPU Scheduling Algorithms using C program:
     a) Priority.
     b) Round Robin.

Week-6 (Dead lock Avoidance)
6.   Simulate Bankers algorithm for Deadlock Avoidance using C program.

Week-7 (Dead lock Detection)
7.   Simulate Bankers Algorithm for deadlock Prevention using C program.

Week -8 (Memory Management)
8.   Simulate all FIFO Page Replacement Algorithm using C program.

Week-9 (Memory Management)
9.   Simulate all LRU Page Replacement Algorithms using C program.

Week 10 (Memory Management)
10. Simulate Paging Technique of Memory Management using C program.

Week-11: (Unix Utilities)
11. Study and Practice on various commands like catnl, uniq, tee, pg, comm, cmp, diff, tr, tar, cpio.

Week-12: (Unix Utilities)
12. mount, umount, find,umask, ulimit, , tail, head , sort, grep, egrep,fgrep cut, paste, join, du, df , ps, who, w.

Week – 13 (Simulation of UNIX commands)
13. a) Simulate head command.
     b) Simulate tail command.

REFERENCE:
     1.Sumitabha Das (2007), Your Unix The Ultimate Guide , Tata Mc Graw Hill , New Delhi , India.

VARDHAMAN COLLEGE OF ENGINEERING
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B. TECH IT V SEMESTER

MICROPROCESSORS AND MICROCONTROLLERS

Course Code: **A3419**

L	T	P	C
3	1	-	3

Course Overview:

This course provides a comprehensive introduction to microprocessors, microcontrollers (8051) and their architectures with an emphasis on its interfacing with external devices. Focus is on 8086 microprocessor family which includes internal architecture, pin diagram, instruction set, register organization, addressing modes, operating modes, interrupt structure, assembly language programming etc. Various aspects of hardware design, such as interfacing of memory and different types of I/O devices will be covered in detail. It also emphasis on 8051 microcontroller, different interfaces and data transfer schemes. The course is accompanied by laboratory experiments directly linked to the lecture topics for hands-on learning of the material. This course will be useful to students as a first level course for embedded systems.

Prerequisite(s):

- Digital Logic Design (A3404)
- Computer Organization and Architecture (3508)

Course Objectives:

i. To explore the importance of evolution of microprocessors and study the internal architecture and organization of 8086 microprocessor in detail.
ii. To develop assembly language programs involving instructions from 8086 instruction set for practical applications.
iii. To design interfacing of various peripherals like keyboard, memory, display and serial data transfer involving 8251 USART to the microprocessor and microcontroller.

Course Outcomes:

Up on successful completion of this course, student will be able to:

1. Understand the fundamentals of 8086 microprocessor & 8051 microcontroller internal architecture, pin description, memory organization and instruction set.
2. Exhibit the knowledge of various addressing modes, data transfer instructions, stack, program counter, registers and their operations to enable writing assembly language programs.
3. Demonstrate assembly language programming proficiency, assemble into machine cross assembler utility and download and run their program on the training boards.
4. Design microprocessor based systems using chips like 8259, 8257 and 8254.
5. Acquire knowledge on both hardware and software aspects of a microprocessor/microcontroller -based system by implementing real time projects.

MICROPROCESSORS AND MICROCONTROLLERS

Course Code: **A3419**

L	T	P	C
3	1	-	3

UNIT - I   (11 Lectures)

INTRODUCTION TO 8086: Architecture of 8086 microprocessor, Register organization, 8086 flag register and its functions, addressing modes of 8086, Pin diagram of 8086, Minimum mode & Maximum mode system operation, Timing diagrams.

UNIT - II   (14 Lectures)

8086 ASSEMBLY LANGUAGE PROGRAMMING: 8086 Instruction Set, Simple programs, Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation, assembler directives, procedures and macros.

8086 MEMORY INTERFACING: 8086 addressing and address decoding, Interfacing RAM, ROM, EPROM to 8086, Interfacing and Refreshing Dynamic RAMs, Direct Memory Access (DMA) Data Transfer.

UNIT - III   (12 Lectures)

INTERRUPTS AND PROGRAMMABLE INTERRUPT CONTROLLERS: 8086 Interrupts and Interrupt Responses. Introduction to DOS and BIOS interrupts, 8259A Priority Interrupt Controller.

SERIAL DATA TRANSFER SCHEMES: Asynchronous and synchronous data transfer schemes, RS - 232C Serial data standard, USART, sample programs of serial data transfer.

UNIT - IV   (10 Lectures)

THE 8051 ARCHITECTURE: Introduction, 8051 micro controller hardware, external memory interfacing, Data transfer and logical instructions, arithmetic operations, decimal arithmetic, jump and call instructions and simple programs. The assembly language programming process, programming tools and techniques, counter and timers programming, interrupt programming.

UNIT – V   (10 Lectures)

I/O INTERFACES: 8255 programmable Peripheral Interface, various modes of operation and interfacing to 8086, 8051 interfacing with seven segment LED displays, stepper motor, D/A converter interfacing, Interfacing DC motor, Interfacing 4*4 Matrix Keypad, Interfacing to Alphanumeric Displays (LCD) & A/D converter interfacing.

Text Books:

1. Douglas V. Hall (2007), *Microprocessors and Interfacing*, 2nd edition, Tata McGraw Hill, New Delhi.
2. Kenneth J. Ayala (2008), *The 8051 Microcontroller*, 3rd edition, Cengage Learning, India.

Reference Books:

1. Walter A. Triebel, Avtar Singh (2003), *The 8088 and 8086 Microprocessors* 4th edition, Prentice Hall of India, New Delhi.
2. M. A. Mazidi J. G. Mazidi, Rolin D. McKinlay (2000), *The 8051 Microcontroller and Embedded System*, Prentice Hall of India, New Delhi.
3. Ajay V. Deshmukh (2004), *Microcontrollers Theory and applications*, Tata McGraw Hill Edition, New Delhi.

VARDHAMAN COLLEGE OF ENGINEERING
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B. TECH IT V SEMESTER

COMPILER DESIGN

Course Code: **A3520**

L	T	P	C
3	1	0	3

Course Overview:

This course deals with the theory and practice of compiler design Introduction to compiling, structure of simple one-step compilers: syntax and lexical analysis, parsing, introduction to type checking, intermediate code generation, introduction to code generation and optimization. Discussion about tools for compilers design (e.g. Lex and Yacc).

Pre-requisites:

Computer Programming (A3501), Formal Languages and Automata Theory (A3513)

Course Objectives:

I. Demonstrate a working understanding of the process of scanning through the identification of the tokens of a programming language, the construction of regular expressions to define tokens, the construction of finite state automata to recognize tokens, and the writing of a functioning scanner to automatically identify the tokens in a program.
II. Examine the process of Top-Down parsing and Bottom-up parsing and constructing the efficient parser.
III. Demonstrate a working understanding of the process of semantic analysis through the construction of semantic records based on parse trees.
IV. Explain machine independent and dependent optimization techniques.
V. Understand different code generation schemes.

Course Outcomes:

Upon completion of this course, students will get the knowledge about:

1. Design and implement lexical analyzer for a simple programming language.
2. Design and implement syntax analyzer using top down or bottom up techniques.
3. Analyze semantic analyzer for a simple programming language.
4. Compare different intermediate code generation forms.
5. Analyze machine dependent and independent code optimizer techniques

COMPILER DESIGN

Course Code: **A3520**   L   T   P   C
                                                                         3   1   0   3

Syllabus

UNIT –I   **(12 Lectures)**

INTRODUCTION TO COMPILERS: Definition of compiler, interpreter and its differences, the phases of a compiler, role of lexical analyzer, , pass and phases of translation, bootstrapping, LEX-lexical analyzer generator.

PARSING: Parsing, role of parser, context free grammar, derivations, parse trees, ambiguity, elimination of left recursion, left factoring, eliminating ambiguity from dangling-else grammar, top-down parsing– backtracking, recursive-descent parsing, predictive parsers, LL(1) grammars.

UNIT –II   **(12 Lectures)**

BOTTOM-UP PARSING: Definition of bottom-up parsing, handles, handle pruning, stack implementation of shift-reduce parsing, conflicts during shift-reduce parsing, LR grammars, LR parsers-simple LR, canonical LR and Look Ahead LR parsers, error recovery in parsing, parsing ambiguous grammars, YACC-automatic parser generator.

UNIT –III   **(12 Lectures)**

SYNTAX-DIRECTED TRANSLATION: Syntax directed definition, construction of syntax trees, S-attributed and L-attributed definitions, translation schemes, emitting a translation.

INTERMEDIATE CODE GENERATION: Intermediate forms of source programs– abstract syntax tree, polish notation and three address code, types of three address statements and its implementation, syntax directed translation into three-address code, translation of simple statements, Boolean expressions and flow-of-control statements.

UNIT –IV   **(12 Lectures)**

TYPE CHECKING: Definition of type checking, type expressions, type systems, static and dynamic checking of types, specification of a simple type checker, equivalence of type expressions, type conversions, overloading of functions and operators.

RUN TIME ENVIRONMENTS: Source language issues, Storage organization, storage-allocation strategies, access to nonlocal names, parameter passing, symbol tables, and language facilities for dynamic storage allocation.

UNIT-V   **(12 Lectures)**

CODE OPTIMIZATION: Organization of code optimizer, basic blocks and flow graphs, optimization of basic blocks, the principal sources of optimization, the dag representation of basic block, global data flow analysis.

CODE GENERATOR: Machine dependent code generation, object code forms, the target machine, a simple code generator, register allocation and assignment, peephole optimization.

Text Books:
1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman (2011), *Compilers–Principles, Techniques and Tools*, Low price edition, Pearson Education.

Reference Books:
1. Alfred V. Aho, Jeffrey D. Ullman (2001), *Principles of compiler design*, Indian student edition,Pearson Education.
2. Kenneth C. Louden, Thomson (1997), *Compiler Construction– Principles and Practice*, 1st edition, PWS Publishing.
3. K.L.P Mishra and N. Chandrashekaran (2003), *Theory of computer science- Automata Languages and computation*, 2nd edition, PHI.
4. Andrew W. Appel (2004), *Modern Compiler Implementation C*, Cambridge University Press.

VARDHAMAN COLLEGE OF ENGINEERING
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B. TECH IT V SEMESTER

COMPUTER NETWORKS

Course Code: **A3519**

L	T	P	C
3	1	0	3

Course Overview:

The growing importance of Internetworking in recent years and their use in every field has made Computer Networks a central issue for modern systems. The course introduces the basic concepts of networks. The main objective of the course is to enable students to know the functions of various layers of a network model. Topics covered in the course include Introduction to networks, Physical layer, Data link layer, Medium access sub layer, Network layer, Transport layer and Application layer.

Prerequisite(s):

Computer Organization and Architecture (A3508), Operating Systems (A3515).

Course Objectives:

I.   An ability to understand the basic concept of data communications and computer networks (e.g., different network types, applications, protocols, OSI layered architecture model, packet switching)
II. An ability to understand different models of networks.
III. An ability to understand various transmission media and different types of networks.
IV. An ability to understand functions of each layer in a network model.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1. Distinguish the terminology and concepts of OSI reference model and the TCP/IP reference model and functions of each layer.
2. Experiment the different types of network topologies, protocols, network devices and their functions within a network.
3. Compare the concepts of protocols, network interfaces and design/performance issues in LAN and WAN.
4. Understand and building the skills of sub netting and routing mechanisms, familiarity with basic protocols of computer networks and how they can be used to assist in network design and implementation.
5. Discriminate deficiencies in existing protocols and then go on to formulate new and better protocols.

Course Code: **A3519**

L	T	P	C
3	**1**	**0**	**3**

<p align="center">**SYLLABUS**</p>

UNIT-I   **(9 Lectures)**

INTRODUCTION: Network applications, network hardware, network software, reference models: OSI, TCP/IP, Internet, Connection oriented network - X.25, Frame Relay.

THE PHYSICAL LAYER: Theoretical basis for communication, guided transmission media, wireless transmission, mobile telephone system.

UNIT-II   **(11 Lectures)**

THE DATA LINK LAYER: Design issues, Error detection and correction, Elementary data link protocols, Sliding window protocols, example data link protocols - HDLC, the data link layer in the internet.

THE MEDIUM ACCESS SUBLAYER: Channel allocations problem, multiple access protocols, Ethernet.

UNIT-III   **(14 Lectures)**

THE NETWORK LAYER: Network layer design issues, Routing algorithms, Congestion control algorithms, Internetworking, The Network layer in the internet (IPv4 and IPv6), Quality of Service. (T1: Ch-5)

UNIT-IV   **(9 Lectures)**

THE TRANSPORT LAYER: Transport service, elements of transport protocol, Simple Transport Protocol, Internet transport layer protocols: UDP and TCP.

UNIT-V   **(9 Lectures)**

THE APPLICATION LAYER: Domain Name System, Electronic Mail, World Wide Web: Architectural overview, Dynamic web document and http.

APPLICATION LAYER PROTOCOLS: Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet**.**

TEXT BOOKS:

1. A.S. Tanenbaum, Computer Networks (2011), 5th edition, Pearson Education/ PHI. New Delhi, India.
2. Behrouz A. Forouzan (2006), Data communication and Networking, Tata McGraw-Hill, India.

REFERENCE BOOKS:

1. Michael A Gallo, Bill Hancock, (2001), Computer Communications and Networking Technologies, Thomson Fitz Gerald, Dennis (2009), Business Data Communications & Networking, 10th edition, John Willeysons, USA.
2. William Stallings (2006), Cryptography and network security, 4th edition, Pearson Education, India.

VARDHAMAN COLLEGE OF ENGINEERING
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OPEN SOURCE TECHNOLOGIES

Course Code: A3604

L	T	P	C
4	0	0	4

Course Overview:

This course will address the need for vertical open standards, domain knowledge and open source software skills for various industry verticals and drive to reduce the gap between industry requirement and availability of technical professionals for the same. This course provides the student with the insights into the world of open source software. Student will learn the Open source technologies like PHP, Jquery, Python, MySQL technologies which helps him in developing applications (software) as part of project work and makes him industry ready.

Pre-requisites:

Object Oriented Programming (A3509), Web Technologies (A3601), Database Management Systems (A3516)

Course Objectives:

I.	To provide students with core competence in open source programming languages necessary to formulate, analyze and develop solutions for real world problems
II.	To prepare students to develop interest and lay foundation to learn open source Programming.
III.	To prepare students to apply their computer programming skills to continue implementing advanced and diverse projects, and excel as a professional programmer.
IV.	To make students well versed with PHP, Python programming
V.	To inculcate in students to maintain high programming standards and to work as individual or as a member in developing web based novel products.

Course Outcomes:

Up on successful completion of this course, student will be able to:

1) Solve computer software problems by using PHP and MySQL.
2) Familiarize and define the programming syntax and constructs of different open source programming languages
3) Analyze and implement Scripting applications using Python.
4) Demonstrate ability to exhibit knowledge of developing applications using Python
5) Develop scripts using AngularJS and Jquery.

OPEN SOURCE TECHNOLOGIES

Course Code: A3604

L   T   P   C
4   0   0   4

SYLLABUS

Unit 1   **(12 Lectures)**
INTRODUCTION: Introduction to Open sources, Need for open Sources, Advantages of Open Sources, Applications of Open sources.
MySQL: Introduction, Setting up an account, Starting, Terminating and writing your own MySQL Programs, Data types in MySQL ,Record Selection Technology, Set operations and joins, Sorting Query Results, Generating Summary, Working with Strings, Date and Time, Working with Metadata, Using Sequences.

Unit 2   **(15 Lectures)**
PHP: Basic OOP concepts,String Manipulation and Regular Expressions, Form Validation.
Advanced Concepts: Include vs. Require, File Handling, Date and Time, Filters, Error Handling, Exception Handling, File Uploading, Sessions and Cookies, Sending and receiving emails, Constant arrays, Anonymous classes.

Unit 3   **(10 Lectures)**
PHP and MySQL database: PHP Connectivity ; Retrieving data from MySQL,Manipulating data in MySQL using PHP,MySQL Prepared Statement, calling stored procedures, Image uploading into MySQL database, Pagination PHP-AJAX: Retrieving from MySQL database.

Unit 4   **(13- Lectures)**
PYTHON: Introduction, variables, operators, Control structures, Strings, Lists and Tuples, Dictionaries, Functions, File Handling, Exception Handling, Python GUI programming using Tkinter, Python and MySQL DB access.

Unit 5   **(10- Lectures)**
JQuery: Introduction to JQuery, Events, Effects, and Functions related to HTML/CSS.
AngularJS: Introduction, Expressions, Directives, Controllers, Modules, Filters, tables, Forms, Form validations, Animations.

TEXT BOOKS:
1. Steve Surching , "MySQL Bible" , John Wiley, 2002
2. Steven Holzner, "PHP: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.

REFERENCE BOOKS:
1. Rasmus Lerdorf and Levin Tatroe, " Programming PHP", O'Reilly, 2002
2. Wesley J. Chun , " Core Python Programming", Prentice Hall, 2001
3. Vikram Vaswani, "MYSQL: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4. jQuery Community Experts,"JQuery CookBbook", 1st Edition, O'Reilly Media, Inc.,2010
5. Brad Green & Shyam Seshadri, "AngularJS", O'Reilly Media, Inc

VARDHAMAN COLLEGE OF ENGINEERING
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B.TECH IT V SEMESTER

E-COMMERCE

Course Code: **A3605**

L	T	P	C
3	1	0	3

Course Overview:

The tremendous growth of the Internet and World Wide Web is having great impact on businesses, governments and individuals throughout the world. In this course, we will attempt to understand the phenomena, technological, economic and social, behind these rapid changes, and how organizations successfully conduct Internet-based activities. We will also study some of the technology of the Internet. This course provides an overview of e-commerce from both technological and managerial perspectives. It introduces e-commerce frameworks, and technological foundations and examines basic concepts such as strategic formulation for e-commerce enterprises, management of their capital structures and public policy. It is particularly important that the student place a great deal of emphasis in understanding the different E-Commerce system design principles.

Pre-requisites: Nil

Course Objectives:
- I.   Identify the major categories and trends of e-commerce applications.
- II. Identify the essential processes of an e-commerce system.
- III. Identify several factors and web store requirements needed to succeed in e-commerce.
- IV. Discuss the benefits and trade-offs of various e-commerce clicks, marketing strategies for an online business and bricks alternatives.
- V.   Understand the main technologies behind e-commerce systems and how these technologies interact.
- VI. Define various electronic payment types and associated security risks and the ways to protect against them.

Course Outcomes:

Upon completion of the course the student will be able to:

1. Understand the components and roles of the e-commerce environment and basic electronic commerce functions.
2. Analyze E-Commerce payment systems, EFT and EDI.
3. Explain how business sell products and services on the web.
4. Explain how to meet the needs of web site visitors
5. Identify and reach customers on the web.
6. Evaluate web marketing approaches and elements of branding and legal and ethical issues related to E-commerce

SYLLABUS

UNIT - I   (10 Lectures)

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.
Electronic Commerce and World Wide Web (WWW) – Architectural Framework for E-Commerce, WWW as the architecture, Web Background, Technology behind the web, Security and the web.

UNIT - II   (10 Lectures)

Consumer Oriented Electronic commerce – Consumer Oriented Applications, Mercantile Process models.
Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

UNIT - III   (8 Lectures)

Inter Organizational Commerce and EDI, EDI Implementation, Value added networks.
Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT - IV   (10 Lectures)

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.

UNIT - V   (12 Lectures)

Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering.
Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing, Desktop video conferencing.

TEXT BOOK:
    1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

REFERENCE BOOKS:

    1.   E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
    2.   E-Commerce, S.Jaiswal – Galgotia.
    3.   E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
    4.   Electronic Commerce – Gary P.Schneider – Thomson .
    5.   E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT V SEMESTER

SOFTWARE ENGINEERING

Course Code: **A3514**

L	T	P	C
3	1	0	4

Course Overview:

This course acts as a foundation in the field of software engineering and is aimed at helping students develop an understanding of how software systems are developed from scratch, by guiding them through the development process, adopting the fundamental principles of system development. The course will orient the students to the different software process models, software requirements engineering process, systems analysis and design as a problem-solving activity, with focus on quality.

Prerequisite(s): Object Oriented Programming (A3509)

Course Objectives:

I. Is to introduces software engineering to students as a discipline, discuss stages of the software lifecycle, compare development models such as waterfall, prototyping and incremental/ iterative, agile process models.
II. Is to make the learner, model, design, implement, and test small to medium software products effectively.
III. Is to make students acquire skills related to software documentation, both internal and external, verification/validation, quality assurance and testing methods.

Course Outcomes:

Upon Completion of the coursework the Students will be able to:

1. Illustrate the right process model to develop the right software system.
2. Choose requirements and analyze them scientifically in order to develop the right product, besides authoring software requirements document.
3. Design as per functional and non-functional requirements using design principles.
4. Evaluate testing strategies for application being developed.
5. Classify right set of umbrella activities for quality management and assurance.

SOFTWARE ENGINEERING

Course Code:**A3514**

L	T	P	C
3	1	0	4

SYLLABUS

UNIT – I (9 Lectures)

INTRODUCTION TO SOFTWARE ENGINEERING: Nature of software, Software engineering, The Software Processes, Software Myths.

PROCESS MODELS: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialised Process models, The Unified Process, Personal and Team Process Models.

UNIT – II (8 Lectures)

AGILE DEVELOPMENT: What is Agility, Agility and the Cost of Change, Agile Process, Extreme Programming (XP), Other Agile Process Models: Adaptive Software Development (ASD), Scrum, Dynamic System Development Method (DSDM), Crystal.

UNIT – III (9 Lectures)

REQUIREMENTS ENGINEERING: Functional and Non-Functional Requirements, The Software requirements Document, Requirements Specification, requirements Engineering, Requirements Elicitation and Analysis, Requirement Validation, Requirement Management.

REQUIREMENTS MODELLING: Requirement Analysis, Scenario-Based Modelling, Data Modelling Concepts, Class-Based Modelling.

UNIT – IV (10 Lectures)

DESIGN CONCEPTS: The Design Process, Design Concepts, The Design Models, Architectural Design: Software Architecture, Architectural Genres, Architectural Styles. User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

IMPLEMENTATION: Structured coding Techniques, Coding Styles-Standards and Guidelines, Implementation Issues.

UNIT – V (9 Lectures)

SOFTWARE TESTING STRATEGIES: A Strategic approach to Software Testing, Strategic Issues and Test Strategies for Conventional Software, Validation Testing, System Testing, The Art of Debugging, White-Box Testing, Black Box Testing. **QUALITY MANAGEMENT & ASSURANCE:** Quality Concepts, Achieving software Quality, Review Techniques, Elements of Software Quality Assurance, the ISO 9000 Quality Standards.

TEXT BOOKS:
1. Roger S. Pressman (2010), *Software Engineering, A Practitioner's Approach*, 7th Edition, McGraw-Hill International Edition, India.
2. Ian Sommerville (2011), *Software Engineering,* 9th Edition, Pearson education, India.

REFERENCES BOOKS:
1. Pankaj Jalote (2010), *Software Engineering, A Precise Approach*, Wiley India.
2. Waman S. Jawadekar (2008), *Software Engineering: A Primer*, McGraw-Hill, India.
3. Hans Van Vilet (2008), *Software Engineering Principles and Practice*, 3rd Edition, John Wiley & Sons Ltd.
4. Rajib Mall (2005), *Fundamental of Software Engineering*, PHI.
5. Deepak Jain, *Software Engineering, Principles and Practices*, Oxford, University Press, india.
6. Yinhxu Wang (2008), *Software Engineering Foundations*, Auerbach Publications.
7. Ronald J. Leach (1999), *Introduction to Software Engineering*, CRC Press.

Course Code: **A3422**   **MICROPROCESSORS AND INTERFACING LAB** | L | T | P | C |

-	-	3	2

Course Overview:

The Microprocessor and Interfacing lab course is designed to train students to develop programs to be executed on 8086 microprocessor based system and design system hardware through experiments conducted individually on various interfacing components like ADC, DAC, Keyboard etc. In this course students will write all stand alone programs in assembly language compile and debug those programs using the assembler. All the interfacing experiments will be conducted using trainer kits and interfacing modules. This Lab provides students with the opportunity to gain experience in microprocessor-based system design, assembly language programming and I/O interfacing to microprocessors.

Prerequisite(s):

- Digital Logic Design (A3404)
- Computer Organization and Architecture (A3508)
- Microprocessors and Interfacing (A3419)

Course Objectives:

The objectives of this laboratory are:

i. To apply the assembly language instructions of 8086 microprocessor to describe the concept of programming and its applications to real world.

ii. To demonstrate the steps in executing an assembly language program using an assembler.

iii. To recognize the interaction for data transfer between CPU, memory and I/O ports in microprocessor based system with the help of various I/O devices to microprocessor.

Course Outcomes:

Up on successful completion of this course, student will be able to:

1. Describe the interaction between CPU, memory and I/O ports in various applications.
2. Master the assembly level programming language using 8086 instruction set.
3. Analyze how different I/O devices can be interfaced to processor and will explore several techniques of interfacing.
4. Design a simple microprocessor based system with functional requirements for hardware and software components for few input and output devices.
5. Completed a subsystem and integrate this with a complete system to perform a complex task involving networked, mobile, embedded systems.

MICROPROCESSORS AND INTERFACING LAB

Course Code: **A3422**

L	T	P	C
-	-	3	2

PART - A

MICROPROCESSOR 8086 PROGRAMMING USING ASSEMBLER:

1. Programs involving data Transfer Instructions.

2. Programs involving arithmetic and logical operations like addition and subtraction of multi-precision numbers.

3. Programs involving bit manipulation instructions like checking.

4. Programs involving Branch / Loop instructions.

5. Programs on String Manipulations like string transfer, string reversing, searching for a character in a string, palindrome etc.

6. Programs involving on Software Interrupts.

7. Programs to use DOS interrupt INT 21H Function calls.

PART – B

INTERFACING 8086 TO OTHER PERIPHERAL USING TRAINER KITS:

1. Experiments on interfacing 8086 with the following modules through 8255 PPI/ 8257 DMA / 8259 PIC

   a. A/D and D/A converters

   b. Matrix keyboard interface

   c. Seven segment display interface

   d. Logical controller interface

   e. Stepper motor interface

   f. Traffic signals by interfacing traffic controller to 8086

   g. Real time Clock using PIT 8253/8254

2. Interfacing a printer to an 8086 Microcomputer kit.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. TECH IT V SEMESTER

OPEN SOURCE TECHNOLOGIES LAB

Course Code: **A3606**

L	T	P	C
0	0	3	2

Course overview:

This Laboratory is meant to make the students to learn efficient open source programming languages. Open Source Technologies is a subject of primary importance to the discipline of Information Technology. Comprehensive hands on exercises are integrated throughout to reinforce learning and develop real competency. Students are introduced to all major Open Source Programming languages to develop various applications

Pre-requisites:

Object Oriented Programming (A3509), Web Technologies (A3601), Database Management Systems (A3516)

Course Objectives:

I.   To provide students to gain hands-on experience to design and develop different Programming solutions to real-time problems.

II. To inculcate in students to maintain high programming standards and to work as individual or as a member in developing PHP based novel products.

III. To prepare students to apply their programming skills to continue implementing advanced and diverse projects, and excel as a professional programmer

IV. To train students with good breadth of Open Source programming syntax and constructs to translate descriptive problem statements into sophisticated executable Python Programs

Course Outcomes:

1   Demonstrate an ability to design and develop Web based programs, analyze, and interpret object oriented data and report results.

2   Develop confidence for self-education and ability for life-long learning needed for other open source languages and can participate and succeed in competitive examinations like Engineering services, exit interviews etc.

3   Solve computer software problems by writing customized programs in an efficient way using python Language

4   Demonstrate an ability to design and develop PHP based novel products

5   Exhibit profound knowledge to create, debug, and execute scripting programs using JQuery, AngularJS.

Course Code: **A3606**

L	T	P	C
0	0	3	2

Syllabus

Experiments List

MySQL:

EXPERIMENT 1 :

a) Performing basic DML, DDL commands using MySQL

b) **STUDENT PROGRESS MONITORING SYSTEM:** A database is to be designed for a college to monitor students progress throughout their course of study. The students are reading for a degree (such as BA, BA (Hons) MSc, etc) within the framework of the modular system. The college provides a number of modules, each being characterized by its code, title, and credit value, module leader, teaching staff and the department they come from. A module is co-ordinated by a module leader who shares teaching duties with one or more lecturers. A lecturer may teach (and be a module leader for) more than one module. Students are free to choose any module they wish but the following rules must be observed: some modules require pre-requisites modules and some degree programmes have compulsory modules. The database is also to contain some information about students including their numbers, names, addresses, degrees they read for, and their past performance (i.e. modules taken and examination results). The college will provide the data given below

- College code
- College Name
- College Location
- Seat Distribution

Answer to the following Queries:

i.   Comprehend the data given in the case study by creating respective tables with primary keys and foreign keys wherever required.

ii.   Insert values into the tables created (Be vigilant about Master- Slave tables).

iii.   Display the Students who have taken M.Sc course.

iv.   Display the Module code and Number of Modules taught by each Lecturer.

v.   Retrieve the Lecturer names who are not Module Leaders.

vi.   Display the Department name which offers 'English' module.

vii.   Retrieve the Prerequisite Courses offered by every Department (with Department names).

viii.   Present the Lecturer ID and Name who teaches 'Mathematics'.

ix.   Discover the number of years a Module is taught.

x.   List out all the Faculties who work for 'Statistics' Department

EXPERIMENT 2:

a) **EMPLOYEE AND DEPARTMENT DATABASE**

The BlueX Company Pvt. Ltd. has maintaining Employee information contains employee details. The company has four departments. Any employee working in the company belongs to any one of the department. An employee joined in company above 25 years only. The company may give commission for every employee if and only if more than 2 years experience. Construct the database design with that there is no redundancy.

Answer to the following Queries:

i.   List Employee Details.

ii.   List the department Details.

iii.   Update emp table and change employee name, ADAMS to ADAM.

iv.   Update emp table and change sal, comm. To 2000 &500 to an employee no 7844.

v.   Select deptno, dname ,of deptno>10 and located in 'NEWYORK'.

vi.   List all employee details who belongs to deptno=10 and whose job is clerk.

vii.   Find the total number of clerks in department 10?

viii.   Find the average salary of employees?

ix.   List all employee of their average salaries.

x.   Find minimum salary paid employee and employee details with that salaries?

xi.   Find the name of employee which starts with 'A' and end with 'N'?

xii.   List all employees who have a salary greater than 15000 in the order of department number?

xiii.   List deptno , dname ,min(sal) for all departments?

xiv.   Display all employee names, number, deptname & location of all employees?

xv.   Find employee name employee number, their salary who were hired after 01/02/97

PHP:

EXPERIMENT 3:

a) Write a PHP program to validate form contents using regular expressions.
b) Write a PHP program to merge the contents of two files and store into another file.

EXPERIMENT 4:
a) Write a PHP program to create a ZIP file using PHP.
b) Write a PHP program to validate IP address, Integer and E-mail using filters.

EXPERIMENT 5:
a) Write a PHP program to retrieve the data from MySQL database.
b) Write a PHP program to implement sessions and cookies.

EXPERIMENT 6:
a) Write a PHP program to authenticate login credentials.
b) Write a PHP program to insert the contents of student registration form (Rno, name, branch, age, email, and phone) into MySQL database.
c) Write an AJAX script to perform search operation on MySQL database.

EXPERIMENT 7:
a) Write a PHP program to upload file into web server.
b) Write a PHP program to upload image into database.

PYTHON:
EXPERIMENT 8:
a) Write a Program to print the Fibonacci sequence using python.
b) Write a Program to display the Armstrong numbers between the specified ranges.
c) Write a Program to perform various operations on Tuples and Dictionaries.
d) Write a program to multiply two matrices using python.

EXPERIMENT 9:
a) Write a Program to make a simple calculator using python.
b) Write a program to find maximum element in the list using recursive functions.
c) Write a program to find GCD and LCM of two numbers using functions.

EXPERIMENT 10:
a) Write a Program to recursively calculate the sum of natural numbers using python.
b) Write a Program to sort words in alphabetic order using python.
c) Write a program to copy the contents from one file to another file.

EXPERIMENT 11:
a) Write a Program to handle Exceptions using python.
b) Write a Program to display Powers of 2 Using Anonymous Function using python.

EXPERIMENT 12:
a) Write a Program to create a form controls using tkinter.
b) Write a program to access MySQL DB using Python.

JQUERY:
EXPERIMENT 13
a) Write a JQuery Script to implement hide() and show() effects.
b) Write a JQuery Script to apply various sliding effects.

EXPERIMENT 14:
a) Write a JQuery script to animate the given image when ever user clicks on a button.
b) Write a JQuery script to apply various CSS effects.

AngularJS:
EXPERIMENT 15:
a) Write a program to apply various filters to transform data.
b) Write a program to display data in tables in various forms.
c) Write a program to apply animations.

TEXT BOOKS:
1. Rasmus Lerdorf and Levin Tatroe, " Programming PHP", O'Reilly, 2002
2. Vikram Vaswani, "MYSQL: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009

REFERENCE BOOKS:
1. Wesley J. Chun , " Core Python Programming", Prentice Hall, 2001
2. jQuery Community Experts,"JQuery CookBbook", 1st Edition, O'Reilly Media, Inc.,2010
3. Brad Green & Shyam Seshadri, "AngularJS", O'Reilly Media, Inc

VARDHAMAN COLLEGE OF ENGINEERING
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B. Tech. IT V SEMESTER

Professional Ethics and Human Values

Course Code: **A3012**

L	T	P	C
3	0	0	0

Course Overview:

The objective of this course on 'Professional Ethics and Human Values' are to understand the more l values that ought to guide the Engineering profession, resolve the moral issues in the profession, and justify the moral judgment concerning the profession. It is intended to develop a set of beliefs, attitudes, and habits that engineers should display concerning morality.

Prerequisite (s):   **NIL**

Course Objectives:

I.   To bring awareness among engineering graduates on ethics and human values.

II.   To understand the ethical theories and their application to work ethics.

III.   To understand the risk and safety measurements to be taken in various engineering areas.

IV.   To know various codes of ethics used by professional bodies.

V.   To learn about professional responsibility as an engineer.

Course Outcomes:

Upon successful completion of this course, student will be able to:
1. Develop awareness on ethics and human values.

2. Become morally and socially responsible.

3. Find engineering solutions from the ethical platform.

4. Motivate others on moral values.

PROFESSIONAL ETHICS & HUMAN VALUES
(Audit Course)

Course Code: A3012

L	T	P	C
3	0	0	-

UNIT – I (12 Lectures)
ETHICS: Senses of 'Engineering Ethics' -Variety of moral issues - Types of inquiry -Moral dilemmas Moral autonomy -Kohlberg's theory, Gilligan's theory -Consensus and controversy – Models of Professional Roles -Theories about right action- Self interest - Customs and religion -Uses of Ethical theories.

UNIT - II (12 Lectures)
HUMAN VALUES: Morals, Values and Ethics – Integrity – Work Ethic – Service Learning - Civic Virtue – Respect for Others – Living Peacefully – Caring – Sharing - Honesty – Courage– Valuing Time - Cooperation – Commitment – Empathy – Self Confidence – Character – Spirituality

UNIT – III (12 Lectures)
ENGINEERING AS SOCIAL EXPERIMENTATION: Engineering as experimentation - Engineering Projects VS. Standard Experiments **-** Engineers as responsible experimenters – Codes of ethics - Industrial Standards - A balanced outlook on law- The challenger case study.

UNIT – IV (12 Lectures)
SAFETY, RESPONSIBILITIES AND RIGHTS: Safety and risk- Assessment of safety and risk- Risk benefit analysis and reducing risk- Three Mile Island and Chernobyl case study - Collegiality and loyalty -Respect for authority - Collective bargaining – Confidentiality- Conflicts of interest - Occupational crime - Professional Rights- Employee rights- Intellectual Property Rights (IPR) discrimination.

UNIT - V (12 Lectures)
GLOBAL ISSUES: Multinational Corporation's -Environmental ethics-computer ethics -weapons development, Engineers as managers - consulting engineers-engineers as expert witnesses and advisors, Moral leadership - sample code of Ethics (Specific to a particular Engineering Discipline).

TEXT BOOKS
1. R.S.Nagarajan, a Textbook on "Professional Ethics and Human Values", New Age Publishers – 2006.
2. Mike Martin and Roland Schinzinger, "Ethics in engineering", McGraw Hill, New York 1996.

REFERENCES
1. Govindarajan M, Natarajan S, Senthil Kumar V. S, " Engineering Ethics", Prentice Hall of India, New Delhi, 2004.
2. Charles D. Fleddermann, "Engineering Ethics", Pearson Education/ Prentice Hall, New Jersey,2004 (Indian Reprint now available)
3. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000 (Indian Reprint now available).
4. John R Boatright, "Ethics and the conduct of business", Pearson Education, New Delhi,2003. dmund G Seebauer and Robert L Barry, "Fundamentals of ethics for scientists and engineers", Oxford University Press, Oxford, 2001.

Course Code: A3607

L	T	P	C
3	1	0	3

COURSE OVERVIEW:

This course teaches students the basic principles of object orientation and OO analysis and design. We will use the Unified Process and the Unified Modeling Language (UML) as tools.

Prerequisite(s):

Computer Programming (A3501), Object Oriented Programming (A3509), Software Engineering (A3514)

COURSE OBJECTIVES:

1. To teach the students a solid foundation on object-oriented principles.
2. To provide the importance of the software design process.
3. To assess the unified process and Unified Modeling Language.
4. Understanding the insight and knowledge into analyzing and designing software using different object-oriented modeling techniques

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Choose appropriate modeling concepts principles which can helps users to understand the software system.
2. Demonstrate understanding of ideas to design and develop software systems based on object-oriented thinking.
3. Apply knowledge of object-oriented analysis and design methods with a clear emphasis on UML to model software systems**.**
4. Analyze and explore the conceptual model into various scenarios and applications.
5. Design software systems to meet desired needs of user.

<p align="center">**OBJECT ORIENTED ANALYSIS AND DESIGN**</p>

Course Code: A3607
        L T P C
        3 1 0 3

UNIT – I   **(14 Lectures)**
INTRODUCTION TO UML: Importance of modeling, principles of modeling, object oriented modeling, Overview of UML, Conceptual model of the UML, Architecture, Software Development Life Cycle
BASIC STRUCTURAL MODELING : Classes, Relationships, common Mechanisms, Diagrams.

UNIT – II   **(13 Lectures)**
ADVANCED STRUCTURAL MODELING: Advanced classes, Advanced relationships, Interfaces, Packages.
Class Diagrams: Terms and Concepts, Common modeling techniques, **Object Diagrams:** Terms, concepts, Common modeling techniques.
BASIC BEHAVIORAL MODELING-I: Interactions, **Interaction Diagrams:** Terms, Concepts, Common modeling Techniques

UNIT – III   **(14 Lectures)**
BASIC BEHAVIORAL MODELING-II: Use cases, **Use case Diagrams:** Terms and Concepts, Common Modeling Techniques, **Activity Diagrams:** Terms and Concepts, Common Modeling Techniques.
ADVANCED BEHAVIORAL MODELING: Events and signals, State machines, Processes and Threads, Time and space, **State chart Diagrams:** Terms and Concepts, Common Modeling Techniques.

UNIT – IV   **(12 Lecture)**
ARCHITECTURAL MODELING: Components, Terms and Concepts, Common Modeling Techniques, **Component Diagrams:** Common Modeling Techniques, Deployment, Terms and Concepts, Common Modeling Techniques, **Deployment Diagrams:** Terms and Concepts, Common Modeling Techniques.

UNIT – V   **(10 Lectures)**
Systems and Models: Systems, subsystems, models, and views, Modeling the architecture of a system, Modeling systems of systems,
Case Study: The Unified Library application. Prepare a report on Unified Library Application with the following UML diagrams: Class, Object, Use Case, Interaction, State Chart, Activity, Component, and Deployment diagrams.

Text book:

1. Grady Booch, James Rumbaugh, Ivar Jacobson(1999), "The Unified Modeling Language user guide pearson edition.

Reference books:
1. Atul Kahate(2004) , "Object Oriented Analysis and Design"
2. Hans-Erikson, David Fado Wiley (2009), "UML 2 toolkit" Wiley Publishing, Inc.
3. Mellir Page-Jone (2004), "Fundamentals of Object Oriented design in UML".

VARDHAMAN COLLEGE OF ENGINEERING
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B.TECH IT VI SEMESTER

DATAWAREHOUSING AND DATAMINING

Course Code: A3522

L	T	P	C
3	1	0	3

Course Overview:

The course addresses the concepts, skills, methodologies, and models of data warehousing. The course addresses proper techniques for designing data warehouses for various business domains, and covers concepts for potential uses of the data warehouse and other data repositories in mining opportunities. Data mining, the extraction of hidden predictive information from large databases, is a powerful new technology with great potential to help companies focus on the most important information in their data warehouses. Data mining tools predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions.

Prerequisite(s): Database Management Systems (A3516)

Course Objectives:

   I.   Learn how to preprocess data before applying data mining techniques.
  II.   Understand mathematical foundations of data mining tools.
 III.   Acquiring, parsing, filtering, mining, representing, refining, visualization and interacting with data.
 IV.   Relate data mining issues to broader social, scientific and environmental context.
  V.   Develop skill in selecting the appropriate data mining algorithm for solving practical problems.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Apply preprocessing techniques on various data sets.

2. Develop data warehouse using various schemas for enterprise applications.

3. Apply supervised learning techniques on various data sets.

4. Apply unsupervised techniques on various data type.

5. Analyze various web mining techniques.

DATAWAREHOUSING AND DATAMINING

Course Code: A3522

L	T	P	C
3	1	0	3

SYLLABUS

UNIT – I   (15 Lectures)

INTRODUCTION TO DATA MINING: Motivation, Importance, Definition of Data Mining, Kind of Data, Data Mining Functionalities, Kinds of Patterns, Classification of Data Mining Systems, Data Mining Task Primitives, Integration of A Data Mining System With A Database or Data Warehouse System, Major Issues In Data Mining, Types of Data Sets and Attribute Values, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity. (T1, ch-1)

PREPROCESSING: Data Quality, Major Tasks in Data Preprocessing, Data Reduction, Data Transformation and Data Discretization, Data Cleaning and Data Integration. (T1, ch-1)

UNIT – II   (12 Lectures)

DATA WAREHOUSING AND ON-LINE ANALYTICAL PROCESSING: Data Warehouse basic concepts, Data Warehouse Modeling - Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute-Oriented Induction, Data Cube Computation.(T1,ch-3)

UNIT – III   (10 Lectures)

MINING FREQUENT PATTERNS, ASSOCIATIONS AND CORRELATIONS: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Are All the Pattern Interesting, Pattern Evaluation Methods, Applications of frequent pattern and associations.(T1,ch-5)

FREQUENT PATTERN AND ASSOCIATION MINING: A Road Map, Mining Various Kinds of Association Rules, Constraint-Based Frequent Pattern Mining, Extended Applications of Frequent Patterns. (T1, ch-5)

UNIT – IV   (10 Lectures)

CLASSIFICATION: Basic Concepts, Decision Tree Induction, Bayesian Classification Methods, Rule-Based Classification, Model Evaluation and Selection, Techniques to Improve Classification Accuracy: Ensemble Methods, Handling Different Kinds of Cases in Classification, Classification by Neural Networks, Support Vector Machines, Pattern-Based Classification, Lazy Learners (or Learning from Your Neighbors). (T1, ch-6)

UNIT – V   (8 Lectures)

CLUSTER ANALYSIS: Basic Concepts of Cluster Analysis, Clustering structures, Major Clustering Approaches, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Model-Based Clustering, Why outlier analysis, Identifying and handling of outliers, Outlier Detection Techniques.(T1,ch-7)

WEB MINING: Basic concepts of web mining, different types of web mining, PAGE RANK Algorithm, HITS Algorithm. (T1,ch-10)

TEXT BOOK(S):

1. Jiawei Han, Micheline Kamber, Jian Pei (2012), *Data Mining: Concepts and Techniques*, 3rd edition, Elsevier, United States of America.

REFERENCE BOOK(S):

1. Margaret H Dunham (2006), *Data Mining Introductory and Advanced Topics*, 2nd edition, Pearson Education, New Delhi, India.
2. Amitesh Sinha (2007), *Data Warehousing*, Thomson Learning, India.
3. Xingdong Wu, Vipin Kumar (2009), *the Top Ten Algorithms in Data Mining*, CRC Press, UK.

VARDHAMAN COLLEGE OF ENGINEERING
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B.TECH IT VI SEMESTER

INFORMATION SECURITY

Course Code: **A3608**

L	T	P	C
3	1	0	3

Course Overview:

The growing importance of information systems, and their use to support safety-critical applications, has made information security a central issue for modern systems. The course introduces the technical and policy foundations of information security. The main objective of the course is to enable students to reason about information systems from a security engineering perspective. Topics covered in the course include elementary cryptography; access control; common software vulnerabilities; common network vulnerabilities; digital rights management; policy and export control law; privacy; management and assurance; and special topics in information security. Hackers defense, attacks defense, systems and programs security, network and web security, worms and viruses, and other Internet secure applications.

Prerequisite(s):
Probability Theory and Numerical Methods (A3004), Computer Networks (A3519)

Course Objectives:
   I.   Understand various security attacks, mechanisms, services, conventional encryption algorithms, public encryption algorithms, authentication algorithms
   II.   Analyze existing conventional encryption algorithms, public encryption algorithms, authentication algorithms Message authentication, Hash function and Public-key encryption algorithms.
   III. Apply RSA encryption to generate key and encrypt message M, and diffie-Hellaman key exchange algorithm to private key exchange
   IV.   Investigate E-mail security, IP security, Web security schemes with current and next generation schemes

Course Outcomes:
Upon completion of the course the student will be able to:

   1. Analyze the different Security Attacks, Services, and Mechanisms work security models.
   2. Apply classical encryption algorithms (Substitution and Transposition ciphers) and DES algorithms to encrypt plaintext.
   3. Distinguish the modern Cryptography algorithm such as DES, AES, double DES, Triple DES, RC4 algorithm and analyze modern cryptanalysis techniques.
   4. Solve the problem on Number theory, public key cryptography techniques (RSA) and key management algorithms (Diffie-Hellman).
   5. Compare and contrast message authentication algorithms (SHA-512, MAC, HMAC), symmetric and asymmetric encryption and authentication standards and protocols.
   6. Examine the different network security protocols (IPSec, TLS/SSL, SET, S/MIME, PGP) and Firewall types and principles.

INFORMATION SECURITY

Course Code: **A3608**

L	T	P	C
3	1	0	3

SYLLABUS

UNIT-I (17 Lectures)

INTRODUCTION: computer security concepts, OSI security architecture, security attacks, security services, security mechanisms, a model for network security.

CLASSICAL ENCRYPTION TECHNIQUES: Symmetric Cipher Modes, Substitute Techniques, Transposition Techniques, Rotor Machines, Stenography.

BLOCK CIPHER AND DATA ENCRYPTION STANDARDS: Block Cipher Principles, Data Encryption Standards, the Strength of DES, Differential and Linear Cryptanalysis.

UNIT-II (14 Lectures)

ADVANCED ENCRYPTION STANDARDS: Evaluation Criteria for AES, the AES Cipher.

MORE ON SYMMETRIC CIPHERS: Triple DES, Block Cipher Modes of Operation, Stream Cipher and RC4.

INTRODUCTION TO NUMBER THEORY: Basic concepts, Prime Numbers, Fermat's and Euler's Theorem, Euclid's theorem and The Chinese Remainder Theorem

UNIT-III (13 Lectures)

PUBLIC-KEY CRYPTOGRAPHY AND RSA: Principles of Public key crypto Systems, RSA algorithm, Key Management, Diffie-Hellman Key Exchange.

MESSAGE AUTHENTICATION AND HASH FUNCTIONS: Authentication Requirement, Authentication Function, Message Authentication Code, HMAC, Hash Function, SHA-512.

UNIT-IV (13 Lectures)

DIGITAL SIGNATURE: Digital Signature, Authentication Protocols, Digital Signature Standard.

AUTHENTICATION APPLICATIONS: Kerberos, X.509 Authentication Service, Public Key Infrastructure.

EMAIL SECURITY: Pretty Good Privacy (PGP) and S/MIME.

IP SECURITY: Overview, IP Security Architecture and Services, Authentication Header, Encapsulating Security Payload.

UNIT-V (10 Lectures)

WEB SECURITY: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

FIREWALLS AND INTRUSION DETECTION: Firewall design Principles, Trusted Systems.

TEXT BOOKS:
1. William Stallings (2006), Cryptography and Network Security: Principles and Practice, 4th edition, Pearson Education, India.
2. Charlie Kaufman (2002), Network Security: Private Communication in a Public World, 2nd edition, Prentice Hall of India, New Delhi.

REFERENCE BOOKS:
1. William Stallings (2000), Network Security Essentials (Applications and Standards), Pearson Education, India.
2. Atul Kahate (2008), Cryptography and Network Security, 2nd edition, Tata Mc Grawhill, India.
3. Robert Bragg, Mark Rhodes (2004), Network Security: The complete reference, Tata Mc Grawhill, India.

VARDHAMAN COLLEGE OF ENGINEERING
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B.TECH IT VI SEMESTER

SOFTWARE REQUIREMENTS ENGINEERING
(Professional Elective – I)

Course Code:**A3651**

L	T	P	C
4	0	0	4

Course Overview:

This course deals with the Software Requirements Engineering and there practices. The list of topics to study in this course are Good practices for requirements engineering, the analyst role on agile projects. The course also discusses Requirements development such as Establishing the business requirements, Understanding user requirements, Documenting the requirements, Writing excellent requirements, Agile projects, Requirements management practices, Requirement attributes, Resolving requirements issues.

Prerequisite(s):

Software Engineering (A3514)

Course Objectives:

I.   Learn the concepts of software requirements.
II. Understand the stages of requirements engineering and features of management and implements the requirements engineering.
III. Know the techniques used for requirements development and modelling.
IV. Learn the requirements management process.

Course Outcomes:

Upon completion of the course the student will be able to:

1. Identify the importance of software requirements
2. Understand the stages of requirements engineering and different methods for gathering the requirements
3. Learn the requirements management process.
4. Identify and assess the quality attributes of Requirements Management.
5. Design and motivate for implementing requirements engineering for future projects.

SOFTWARE REQUIREMENTS ENGINEERING
(Professional Elective – I)

Course Code: A3651
                                                                    L T P C
                                                                    4 0 0 4

UNIT – I   (12 Lectures)

SOFTWARE REQUIREMENTS: WHAT, WHY, AND WHO:The essential software requirement, Requirements development and management, When bad requirements happen to good people, Requirements from the customer's perspective, Good practices for requirements engineering, The business analyst, The analyst role on agile projects.

UNIT – II   (12 Lectures)

REQUIREMENTS DEVELOPMENT: Establishing the business requirements, Finding the voice of the user, Requirements elicitation, Understanding user requirements, Documenting the requirements, Writing excellent requirements, Specifying data requirements, Beyond functionality, Risk reduction through prototyping, Validating the requirements, Requirements reuse, Beyond requirements development

UNIT – III   (12 Lectures)

REQUIREMENTS FOR SPECIFIC PROJECT CLASSES: Agile projects, Enhancement and replacement projects, packaged solution projects, Outsourced projects, Business process automation projects, Business analytics projects

UNIT – IV   (14 Lectures)

REQUIREMENTS MANAGEMENT: Requirements management practices, Change happens, Links in the requirements chain, Tools for requirements engineering, Requirements management tools, Selecting and implementing a requirements tool, A change control process description, Requirement attributes, Resolving requirements issues.

UNIT – V   (10 Lectures)

IMPLEMENTING REQUIREMENTS ENGINEERING: Improving your requirements processes, Requirements and various stakeholder groups, Fundamentals of software process improvement, the process improvement cycle, Requirements engineering process assets.

SOFTWARE REQUIREMENTS AND RISK MANAGEMENT: Fundamentals of software risk management, Elements of risk management, planning for risk management, Requirements-related risks: Elicitation, Analysis, Specification, Validation and Management.

TEXT BOOKS:

1. Karl Wiegers, Joy Beatty (2013), *Software Requirements, Best Practices,* Microsoft – 3rd Edition

REFERENCE BOOKS:

1. *Software Requirements and Estimation* by Rajesh Naik and Swapna Kishore, Tata McGraw Hill
2. *Managing Software Requirements*, Dean Leffingwell & Don Widrig, Pearson Education,2003.
3. *Mastering the requirements process*, second edition, Suzanne Robertson & James Robertson, Pearson Education, 2006.
4. *Estimating Software Costs*, Second edition, Capers Jones, Tata McGraw-Hill, 2007

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT VI SEMESTER

ADVANCED COMPUTER ARCHITECTURE
(Professional Elective – I)

Course Code:**A3551**

L	T	P	C
4	0	0	4

Course Overview:

This course will cover advanced topics in computer architectures, focusing on emerging multiprocessor architectures and multivector, implementation issues and high performance computing systems, Memory hierarchy design- caches and virtual memory. The advanced pipelining

Prerequisite(s):

Computer Organization and Architecture (A3508), Microprocessors and Interfacing (A3419)

Course Objectives:

Generally, the capabilities you will acquire include:

I. Technical competence in computer architecture and high performance computing.

II. Ability to describe the operation of modern and high performance computers.

III. Ability to undertake performance comparisons of modern and high performance computers.

IV. Ability to improve the performance of applications on modern and high performance computers.

V. Development of software to solve computationally intensive problems.

VI. Teamwork and leadership skills through the project.

VII. Ability to communicate effectively in writing (both textually and graphically).

VIII. Lifelong learning skills, in particular the ability to undertake self-directed study.

Course Outcomes:

On successful completion of this course you will be able to:

1. Understand the performance enhancements such as pipelines, dynamic scheduling, branch prediction, caches, virtual memory and vector processors.

2. Describe modern architectures such as RISC, Super Scalar, VLIW (very large instruction word), multi-core and multi-cpu systems.

3. Analyze application performance for different cpu architectures.

4. Develop applications for high performance computing systems.

ADVANCED COMPUTER ARCHITECTURE
(Professional Elective – I)

Course Code: **A3551**

L	T	P	C
4	0	0	4

UNIT – I   (12 Lectures)
Modern computers- Elements of modern computers-Evolution of computer Architecture – Fundamentals of Computer design- Technology trends- cost- measuring performance-system attributes to performance-quantitative principles of computer design.

UNIT – II   (10 Lectures)
Multiprocessors- Multiprocessor interconnects-Cache coherence and Synchronization mechanism Multivector and SIMD computers- vector processing principles- SIMD computer organization

UNIT-III   (12 Lectures)
Memory and Input-Output subsystems- Hierarchical memory architecture- Virtual memory system-Memory allocation and management- Cache memories and management- Input-Output subsystems

UNIT – IV   (14 Lectures)
Principles of Pipelining- An overlapped parallelism- Instruction and Arithmetic pipelines Principles of designing pipelined processor

UNIT - V   (12 Lectures)
Multiprocessors Architecture and Programming-Functional structures- Interconnection Networks- Parallel memory organization- Multiprocessor operating system-Exploiting concurrency per multiprocessing

TEXTBOOK:
1. Computer Architecture and parallel Processing" Kai Hwang and A.Briggs International Edition McGraw-Hill
2. Advanced Computer Architecture: Parallelism Scalability Programmability" Kai Hwang International Edition McGraw-Hill

REFERENCES:
1. Computer Architecture A quantitative approach 3rd edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elsevier)
2. Advanced Computer Architectures, Dezso Sima, Terence Fountain, Peter Kacsuk, and Pearson.
3. Parallel Computer Architecture, A Hardware / Software Approach, David E. Culler, Jaswinder Pal singh withAnoop Gupta, Elsevier

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT VI SEMESTER

IMAGE PROCESSING
(Professional Elective-I)

Course Code: **A3554**

L	T	P	C
4	0	0	4

Course Overview:

Visual information plays an important role in almost all areas of our life. Today, much of this information is represented and processed digitally. Digital image processing is ubiquitous, with applications ranging from television to tomography, from photography to printing, from robotics to remote sensing.

Pre-requisites:

Mathematics –II (A3006)

Course Objectives:

 I.   The objectives of this course are to cover the basic theory and algorithms that are widely used in digital image processing.
 II. Expose students to current technologies and issues that are specific to image processing systems
 III. Develop hands-on experience in using computers to process images.
 IV. Familiarize with MATLAB Image Processing Toolbox
 V.   Develop critical thinking about shortcomings of the state of the art in image processing.

Course Outcomes:

Upon completion of this course, students will be able to:

 1. Know and understand the basics and fundamentals of digital signal and image processing, such as digitization, sampling, quantization, and 2D-transforms.
 2. Operate on images using the processing techniques of smoothing, sharpening, enhancing, reconstructing geometrical alterations, filtering, restoration, segmentation, features extraction, compression, encoding and color /multichannel.
 3. Manipulate images using the computer: reading, writing, printing, and operating on them.
 4. Apply and relate the basic imaging techniques to practical cases, such as, multimedia, videoconferencing, pattern and object recognition.
 5. Aware of the ethical and legal issues related to image processing, such as, copyright, security, privacy, pornography, electronic distribution, etc.

B. Tech. IT VI SEMESTER

IMAGE PROCESSING
(Professional Elective-I)

Course Code: **A3554**

L	T	P	C
4	0	0	4

SYLLABUS

UNIT - I   (lectures 10)
FUNDAMENTALS OF IMAGE PROCESSING:
Image acquisition, image model, sampling, quantization, relationship between pixels, distance measures, connectivity, and image geometry.

UNIT – II   (lectures 8)
IMAGE TRANSFORMS:
Fourier transform, DFT, DFT-properties, FFT, WALSH transform, HADAMARD transform, DCT.

UNIT – III   (lectures 11)
IMAGE ENHANCEMENT (SPATIAL Domain Methods):
Histogram Processing - definition, equalization, matching, local enhancement, use of histogram statics for image enhancement, Arithmetic and logical operations, pixel or point operations, size operations, Smoothing filters-mean, median, mode filters, sharpening spatial filtering.

UNIT – IV   (lectures 9)
IMAGE ENHANCEMENT (FREQUENCY Domain Methods):
Design of low pass, high pass, edge enhancement, smoothening filters in frequency domain. Butter worth filter, sharpening frequency domain filters, homomorphic filters in frequency domain.

UNIT – V   (lectures 13)
IMAGE SEGMENTATION:
Detection of discontinuities, edge linking and boundary detection, thresholding, region based segmentation, use of motion in segmentation.
COLOR IMAGE PROCESSING:
Fundamentals, models, pseudo color image, color transformation, Fundamentals of image compression, image compression models, and color image compression.

TEXT BOOKS:
1. T1: Rafael C. Gonzalez, Richard E. Woods (2008), Digital Image Processing, Low Price Edition, Pearson Education, New Delhi, India.

REFERENCE BOOKS:
1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, Second Edition, Prentice Hall.

2. Fundamentals of digital image processing by Anil K. jain, Low Price Edition, Pearson Education.

3. Arthur R. Weeks (1996), Fundamentals of Electronic Image Processing, Prentice Hall of India, New Delhi.
4. Milan Sonka, Vaclav Hlavac, Roger Boyle (2008), Image processing, Analysis and Machine vision, Thomson Publications, India.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT VI SEMESTER

DISTRIBUTED OPERATING SYSTEMS
(Professional Elective-I)

Course Code: **A3558**

L	T	P	C
4	0	0	4

Course Overview:

This course covers advanced distributed operating system algorithms and theory. Topics such as distributed mutual exclusion, distributed event ordering, distributed deadlock detection/avoidance, agreement protocols, consistent global snapshot collection, stable predicate detection, failure recovery, fault-tolerant consensus, leader election, process groups and group communication. Case studies of distributed operating systems such as LOCUS, Grapevine, V System, ISIS, Amoeba, Sprite, and Mach will be used as illustrations of the above algorithms.

Prerequisite(s):
Operating Systems (A3515), Computer Networks (A3519)

Course Objectives:
I. Describe the issues in the design of modern operating systems of both single and multiple processor systems.
II. Provide hands-on experience in developing distributed protocols.
III. Create an awareness of the major technical challenges in distributed systems design and implementation.
IV. Acquainted with the design principles of distributed operating systems
V. The course gives a high ended view on synchronization in distributed systems.
VI. Understands the working of real time distributed systems.

Course Outcomes:
Upon completion of the course the student will be able to:
1. Analyze the issues of scheduling for user level processes/threads.
2. Understand the concepts of deadlock in operating systems and how they can be managed / avoided. Design and implement network computational techniques using distributed operating system.
3. Classify the types of security problems faced by operating systems and how to minimize these problems.
4. Understand the organization and synchronization of distributed operating systems.
5. Apply the knowledge of communication in distributed systems and how it can be used in remote procedure calls, remote objects and message-oriented communication.
6. Apply the organizing principles for distributed systems through selection algorithms

DISTRIBUTED OPERATING SYSTEMS
(Professional Elective-I)

Course Code: **A3558**

L	T	P	C
4	0	0	4

UNIT –I   (12 Lectures)
INTRODUCTION TO DISTRIBUTED SYSTEMS: What is a Distributed System? Hardware concepts, software concepts, design issues.

UNIT –II   (12 Lectures)
Communication in Distributed Systems, Layered Protocols, ATM networks, The client –server model, remote procedure call, group communication.

UNIT –III   (13 Lectures)
SYNCHRONIZATION IN DISTRIBUTED SYSTEM: Clock synchronization, mutual exclusion, election algorithms, atomic transactions, deadlocks in distributed systems.

UNIT –IV   (13 Lectures)
PROCESS AND PROCESSORS IN DISTRIBUTED SYSTEM: Threads, system models, processors allocation, scheduling in distributed system, fault tolerance, real time distributed system
DISTRIBUTED FILE SYSTEMS: Distributed file system design, distributed file system implementation, trends in distributed file system.

UNIT –V   (13 Lectures)
DISTRIBUTED SHARED MEMORY: Introduction, What is Shared memory? Consistency models, page based distributed shared memory, shared variable distributed shared memory, object based distributed shared memory.

Text Books:
    1. Distributed Operating Systems (2007), Andrew S. Tanenbanm, Pearson Education, Inc.

Reference Books:
    1. Advanced Concepts in Operating Systems, Makes Singhal and Niranjan G. Shivaratna.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

SOFTWARE ARCHITECTURE
(Professional Elective-II)

Course Code:**A3652**

L	T	P	C
4	0	0	4

Course Overview:

This course deals with the concepts of architecture of software. The list of topics to study in this course are Introduction to the fundamentals of software architecture, Software architecture and quality requirements of a software system, Fundamental principles and guidelines for software architecture design, architectural styles, patterns, and frameworks, Methods, techniques, and tools for describing software architecture and documenting design rationale, Software architecture design and evaluation processes, Rationale and architectural knowledge management in software architecting, Approaches and tools for designing and evaluating software architectures for the state-of- the-art technologies such as cloud-computing, service-orientation, and mobile computing, Future challenges and emerging trends in software architecture discipline

Prerequisite(s):
Software Engineering (A3514), Object Oriented Analysis and Design (3607)

Course Objectives:
   I.   Ability to understand the Software Architectural perspective and how it differs from lower-level design
   II.   Ability to understand the need for a Software Architecture.
   III. Ability to develop architectural approaches from basic requirement
   IV.   To provide knowledge of Software Architecture, various architectural styles used in developing software architecture
   V.   To provide knowledge of Components and different types of Connectors used in software architecture.

Course Outcomes:
Upon completion of the course the student will be able to:

   1. Demonstrate the importance and role of software architecture in large-scale software systems.
   2. Design and motivate software architecture for large-scale software systems.
   3. Recognize major software architectural styles, design patterns, and frameworks.
   4. Generate architectural alternatives for a problem and selection among them.
   5. Identify and assess the quality attributes of a system at the architectural level.
   6. Discuss and evaluate the current trends and technologies such as model-driven and service- oriented architectures.

SOFTWARE ARCHITECTURE
(Professional Elective – II)

Course Code: A3652

L	T	P	C
4	0	0	4

UNIT – I **(10 Lectures)**

INTRODUCTION TO SOFTWARE ARCHITECTURE: Introduction to software architecture, status of software architecture, architecture business cycle, software architectures evolution. Software processes and the architecture business cycle, features of good architecture.

ARCHITECTURE STYLES: Pipes and filters, data abstraction and object oriented organization, even-based implicit invocation, layered systems, repositories, interpreters, process control, other familiar architectures, heterogeneous architectures.

UNIT – II **(14 Lectures)**

SHARED INFORMATION SYSTEMS: Database integration, interpretation in software development environments, architectural structures for shared information systems.

ARCHITECTURAL DESIGN GUIDANCE: Guidance for user interface architectures, case study in inter-operability: World Wide Web.

UNIT – III **(12 Lectures)**

PATTERN TYPES: Architectural patterns, structural patterns, patterns for distribution, patterns for interactive systems.

FORMAL MODELS AND SPECIFICATIONS: Formalizing the architectural of a specific system, architectural styles, architectural design space, Case study: a product line development.

UNIT – IV **(12 Lectures)**

LINGUISTIC ISSUES: Requirements for architectural-description languages, first-class connectors, adding implicit invocation to traditional programming languages.

TOOLS FOR ARCHITECTURAL DESIGN: *Unicon* a universal connector language, exploiting style in architectural design environments, beyond definition /use: architectural interconnection

UNIT – V **(10 Lectures)**

CREATING AN ARCHITECTURE: Understanding quality attributes, achieving qualities, air traffic control, documenting software architectures.

TEXT BOOKS:

1. Mary Shaw, David Garlan (1996), *Software Architecture Perspective: on an Emerging Discipline*, Prentice Hall of India, New Delhi.
2. Len Bass, Paul Elements, Rick Kazman (1998), *Software Architecture in Practice*, Pearson Education Asia, India.

REFERENCE BOOKS:

1. Garmus, Herros(1996), *Measuring the Software Process: A Practical Guide to Functional Measure*, Prentice Hall of India, New Delhi.
2. Peters, Yourdon (1981), *Software Design: Methods and Techniques,* Yourdon Press, New York.
3. Buschmann (1996), *Pattern Oriented Software Architecture*, Wiley, New Delhi.
4. Gamma et al (1995), *Design Patterns*, Pearson Education Asia, New Delhi.
5. Gamma, Shaw(1993), *An Introduction to Software Architecture*, World Scientific Publishing Company,
6. Shaw, Gamma (1996), *Software Architecture*, Prentice Hall of India, New Delhi.

B.Tech IT VI SEMESTER

C# .NET FRAMEWORK
(Professional Elective-II)

Course Code: **A3653**

L	T	P	C
4	0	0	4

Course Overview:

This course will introduce the programming language C#. Recall that the reader has experience with C, or at least a similar imperative language. In the central part of this course will address how C# differs from C. This is done by 'a tour through C' in which it explains the major similarities and differences between the two languages. This course includes interfaces, .NET assembly, processes, object serialization and .Net remote layer etc.

Pre-requisites:

Computer Programming (A3501), Object Oriented Programming (A3509)

Course Objectives:

I. New features that is unique to c# such as properties, indexers, delegates, events and namespaces.
II. Develop data driven applications using ADO.NET, data providers.
III. Data base programming using sql server 2005 programming.
IV. Acquire a working knowledge of the .NET programming model and .NET Security
V. Develop Windows Applications using Windows Forms, Control Library, Advanced UI Programming, Data Binding concepts.

Course Outcomes:

Upon completion of this course, students will be able to:

1. Develop programs using C# programming language.
2. Proficiency in C# by building stand-alone applications in the .NET framework using C#
3. Create fully functional data driven applications using ADO.Net
4. Build secure web applications using ASP.Net.
5. Create dynamic Web applications that interact with a database using server-side programming.
6. Develop Windows Forms Applications and data driven applications using various controls.

C# .NET FRAMEWORK
(Professional Elective-II)

Course Code: **A3653**

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I   **(12 Lectures)**

INTRODUCING C# AND THE .NET PLATFORM: The Philosophy of .NET, The .NET Solution, Building Blocks of the .NET platform(the CLR, CTS, and CLS), Additional .NET-Aware Programming Languages, An Overview of .NET Assemblies, Understanding the CTS, CLS, and CLR, The Assembly / namespace / Type Distinction, Exploring an Assembly Using ildasm.exe, Exploring an Assembly Using Reflector, The Platform-Independent Nature of .NET. **BUILDING C# APPLICATION:** The Role of the .NET Framework 4.0 SDK, Building C# Applications Using csc.exe, Building .NET Applications Using Notepad++, Building .NET Applications Using SharpDevelop, Building .NET Applications Using Visual C# 2010 Express, Building .NET Applications Using Visual Studio 2010.

UNIT – II   **(12 Lectures)**

CORE C# PROGRAMMING CONSTRUCTS PART - I: The Anatomy of Simple C# Program, Environment Class, The System.Console Class, System Data Types and C# Shorthand notation, Working with String data, Narrowing and Widening Data Type Local Variables, C# Iteration Constructs, Decision Constructs and the relational / Equality Operators. **CORE PROGRAMMING CONSTRUCTS PART-II:** Methods and Parameter Modifiers, Understanding C# Arrays, Understanding the Enum Type, Understanding the Structure Type, Understanding Value Types and Reference Types, Understanding C# Nullable Type.

UNIT – III   **(12 Lectures)**

UNDERSTANDING INHERITANCE AND POLYMORPHISM: The Basic Mechanics of Inheritance, revising Visual Studio Class Diagrams, Defining the Pillars of OOP, The First Pillar, The Second Pillar of OOP, The Third Pillar of OOP, Understanding Base Class / Derived Class Casting Rules, The Master Parent Class.
UNDERSTANDING STRUCTURED EXCEPTION HANDLING: ODE to Errors, Bugs, and Exceptions, The Role of .NET Exception Handling, The Simplest Possible Example, Configuring the State of an Exception, System-Level Exceptions, Application-Level Exceptions, Processing Multiple Exceptions.

UNIT – IV   **(12 Lectures)**

DELEGATES AND EVENTS: Understanding the .NET Delegate type, defining a Delegate Type in C#, The System.MulticastDelegate and System.Delegate Base Classes, The Simple Possible Delegate Example, Sending Object State Notification using Delegates. **PROGRAMMING WITH .NET ASSEMBLIES:** Configuring .NET Assemblies, defining Custom Namespaces, The role of .NET Assemblies, Understanding the Format of a .NET assembly, Building and Consuming a Single-File Assembly, Building and Consuming a Multi-file Assembly, Understanding Private Assembly, Understanding Shared Assembly, Consuming a Shared Assembly, Configuring Shared assemblies, Understanding Publisher Policy assemblies, Understanding the <codebase> Element, The System.Configuration Namespace.

UNIT – V   **(12 Lectures)**

ADO.NET PART - I: The Connected Layer: A High-Level Definition of ADO.NET, Understanding ADO.NET Data Provider, Additional ADO.NET Namespaces, The Types of the System.Data.namespace, Abstracting Data Providers Using Interfaces, Creating the AutoLot Database, The ADO.NET data Provider Factory Model, Understanding the Connected Layer of Ado.NET, Working with Data Readers, Building a reusable Data Access Library, Creating a Console UI-Based Front End, Understanding Database Transactions.
ADO.NET PART - II: Disconnected Layer: Understanding the Disconnected Layer of ADO.NET, Understanding the Role of the Dataset, Working with DataColumns, Working with Datarows, Working with DataTables, Binding with Data Adapters, Adding Disconnected Functionality to AutoLotDAL.dll, Multi tabled Dataset Objects and Data Relationships, the Windows Forms Database Code into a Class Library, Programming with LINQ to DataSet.

TEXT BOOKS:

1. Andrew Troelsen (2010), *Pro C# and the .NET 4 Platform*, 5th edition, Springer (India) Private Limited, New Delhi, India.

REFERENCE BOOKS:

1. E. Balagurusamy *Programming in C#,* 5th edition, Tata McGraw-Hill, New Delhi, India.
2. Herbert Schildt *The Complete Reference: C#,* Tata McGraw-Hill, New Delhi, India.
3. Simon Robinson, Christian Nagel, Karli Watson, Jay Gl (2006), *Professional C#*, 3rd edition, Wiley & Sons, India.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech IT VI SEMESTER

WEB SERVICES
(Professional Elective-II)

Course Code: **A3654**

L	T	P	C
4	0	0	4

Course Overview

As XML and Web Services are the core technologies of modern software development, the knowledge about this technology certainly will prepare students well in working in software industry. This course teaches you about XML and the important technologies related to XML. It explains how to create well-formed XML documents. It also teaches you how to build, deploy, and call Web Services using Java.

Pre-requisites:

Software Engineering (A3514), Web Technologies (A3601)

+Course Objectives:

I.   To understand evolution of web services and their architecture
II. To be able to describe, discover & develop web services
III. To Understand paradigms needed for testing Web Services
IV. To understand how to design Web services using Java
V.   To understand how to well-formed XML documents

Course outcomes

Up on successful completion of the course student able to

1. develop web service enabled applications
2. use SOAP, WSDL & UDDI
3. create, deploy, and call Web services using Java
4. Design well-formed XML documents by following the rules of schema and DTD

WEB SERVICES
(Professional Elective-II)

Course Code: **A3654**

L	T	P	C
4	0	0	4

Syllabus

UNIT I   **(12 Lectures)**

Evolution and Emergence of Web Services: Evolution of distributed computing, Core distributed computing technologies, client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services

UNIT II   **(12 Lectures)**

Introduction to Web Services: The definition of web services, motivation and characteristics, core web services standards, other industry standards supporting web services, Tools and technologies enabling web services, benefits and challenges of using web services.
Web Services Architecture and core building blocks, web services communication models, basic steps of implementing web services, developing web services enabled applications.

UNIT III   **(12 Lectures)**

Developing web services using SOAP, Anatomy of a SOAP message: SOAP Encoding, SOAP message exchange models, SOAP communication and messaging, SOAP security, Building SOAP web services, Developing SOAP Web Services using Java, limitations of SOAP

UNIT IV   **(12 Lectures)**

Describing Web Services: WSDL, WSDL in the world of Web Services, Web Services life cycle, Anatomy of WSDL definition document, WSDL bindings, WSDL Tools, Future of WSDL, limitations of WSDL
Discovering Web Services: Service discovery, role of service discovery in a SOA, service discovery mechanisms

UNIT V   **(12 Lectures)**

UDDI: UDDI Registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, support for categorization in UDDI Registries, Publishing API, Publishing information to a UDDI Registry, searching information in a UDDI Registry, deleting information in a UDDI Registry, limitations of UDDI.
Web Services Interoperability: Means of ensuring Interoperability, Overview of .NET and J2EE. Web Services Security: XML security frame work, XML encryption, XML digital signature, XKMS structure, Guidelines for signing XML documents

TEXT BOOKS:

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P.Sriganesh, Wiley India, rp – 2008.
2. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education, 2008.
3. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.

REFERENCES:

1. Building Web Services with Java, Second Edition, S. Graham and others, Pearson Edition., 2008.
2. Java Web Services, D.A. Chappell and T. Jewell, O'Reilly, SPD.
3. Java Web Services Architecture, McGovern, et al., Morgan Kaufmann Publishers, 2005.
4. J2EE Web Services, Richard Monson-Haefel, Pearson Education.
5. Web Services, G. Alonso, F. Casati and others, Springer, 2005.

B. Tech IT VI SEMESTER

DISTRIBUTED DATABASES
(Professional Elective-II)

Course Code: **A3552**

L	T	P	C
4	0	0	4

Course Overview:

A Database is a collection of data describing the activities of one or more related organizations with a specific well defined structure and purpose. A Database is controlled by Database Management System(DBMS) by maintaining and utilizing large collections of data. A Distributed System is the one in which hardware and software components at networked computers communicate and coordinate their activity only by passing messages. In short a Distributed database is a collection of databases that can be stored at different computer network sites. It also provides various aspects like replication, fragmentation and various problems that can be faced in distributed database systems.

Pre-requisites:
Database Management Systems (A3516)

Course Objectives:

I. To understand the role of a database management system in an organization.
II. To understand basic database concepts, including the structure and operation of the relational data model.
III. To construct simple and moderately advanced database queries using Structured Query Language (SQL).
IV. To understand and successfully apply logical database design principles, including E-R diagrams and database normalization.
V. To understand the concept of a database transaction and related database facilities, including concurrency control, journaling, backup and recovery, and data object locking and protocols.

Course Outcomes:
Upon successful completion of this course, the students will be able to:

1. Understand good knowledge of the issues and challenges faced while designing distributed database systems.
2. Understand the fundamental principles and architecture of distributed database systems.
3. Get familiar with the different methods and techniques distributed query processing.
4. Develop the understanding of choosing the optimized query execution plan for distributed queries.
5. Have a broad picture of distributed transaction management and concurrency Control and distributed DBMS reliability and replication techniques.
6. Design multidatabase systems and can resolve problems of heterogeneous multidatabase systems in database integration strategies.

DISTRIBUTED DATABASES
(Professional Elective-II)

Course Code: **A3552**

	L	T	P	C
	4	0	0	4

UNIT-I   **(12 Lectures)**

Introduction: Introduction to Distributed Database Systems, Features of distributed versus centralized databases, Distributed Database System Architecture.

Distributed Database Design: Top-Down Design Process, Distributed Database Design Issues,Fragmentation, Allocation, Database Integration-Bottom-up approach, Schema Matching, Schema Integration, and Schema Mapping.

UNIT-II   **(13 Lectures)**

Query Processing: Query processing problem,Objectives of Query processing, Complexity of Relational Algebra Operations, Characterizationof Query Processors.

Layers of Query Processing: Query Decomposition and Data Localization, Query Decomposition: Normalization, Analysis, Elimination ofRedundancy and Rewriting. Localization of Distributed Data: Reduction for primary Horizontal, Vertical, derived andHybrid Fragmentation.

UNIT-III   **(13 Lectures)**

Optimization of Distributed Queries: Query optimization, Centralized Query Optimization, Join Ordering, Distributed Query Optimization: Dynamic, Static, Semijoin-based and Hybrid Approach.

Distributed Concurrency Control: Serializability Theory, Taxonomy of Concurrency Control Mechanisms, Locking- Based Concurrency Control Algorithms, Timestamp-Based Concurrency ControlAlgorithms, Optimistic Concurrency Control Algorithms,DeadlockManagement

UNIT-IV   **(10 Lectures)**

Parallel Database Systems: Parallel Database System Architectures, Parallel DataPlacement, Parallel Query Processing: Query Parallelism; Parallel Query Optimization, Load Balancing.

UNIT-V   **(10 Lectures)**

Distributed Object Database Management: Fundamental Object Concepts and Object Models, Object Distribution Design, Architectural Issues, Object Management: Object Identifier Management, Pointer Swizzling, Object Migration, Distributed Object Storage, Object Query Processing, Transaction Management.

Text book:

1. M T Ozsu, Patrick Valduriez, Principles of Distributed Database Systems, 3rd Edition, Springer, 2011.

References:

1. Stefano Ceri , Giuseppe Pelagatti (2008), Distributed Databases: Principles and Systems,McGraw Hill Education, India.
2. Chanda Ray(2012), Distributed Database Systems, 1st Edition, Pearson Education India.

B. Tech IT VI SEMESTER

PYTHON FOR MACHINE LEARNING
(Professional Elective-II)

Course Code: **A3681**

L	T	P	C
4	0	0	4

Course Description

Python is a very powerful programming language used for many different applications. Over time, the huge community around this open source language has created quite a few tools to efficiently work with Python. In recent years, a number of tools have been built specifically for data science. As a result, analyzing data with Python has never been easier. In this course learners will start from the very beginning, with basic arithmetic and variables, and learn how to handle data structures, such as Python lists, Numpy arrays, and Pandas Data Frames. Along the way, they'll learn about Python functions and control flow, look at the world of data visualizations with Python and create your own stunning visualizations based on real data.

Prerequisite(s): Basic mathematics, C programming Fundamentals

Course Outcomes:

    I.   Explore Machine learning and Python language fundamentals

    II.   Usage of lists, functions and packages

    III.   Apply data analysis over various data sets.

    IV.   Develop Basic mathematics, C programming Fundamentals classification and prediction models addressable by python language.

    V.   Analyze various clustering, text mining techniques

PYTHON FOR MACHINE LEARNING
(Professional Elective-II)

Course Code: **A3681**

L	T	P	C
4	0	0	4

UNIT I:

Introduction to Python for Machine learning: History, Methodologies, Data Science/ Machine learning Applications, Python for Data science/machine learning.

Introduction to Python: Keywords, Identifiers, Variables, operators, Indentations, conditional statement, Loops in Python.

UNIT II:

Standard Data types: number types, strings, list, tuple, dictionaries, Python functions, python Modules, few basic python programs.

Machine Learning with Python: Introduction to Machine Learning, Supervised, Unsupervised learning, python libraries for machine learning.

UNIT III:

Python packages and Libraries: Features of Numpy, NumPy ndarray, Data Types, Functions of NumPy Array, Numpy Array Indexing, Mathematical Functions on Arrays in NumPy.

Python Pandas: Pandas Features, Install Pandas, Dataset in Pandas, Data Frames, Manipulating the Datasets, Data preprocessing: mean removal, scaling, normalization, Data Analysis: Loading the data set, summarizing the data set, Data visualization- Histograms, Bar plots, Box plots, scatter plots. Training Data, Testing Data.

UNIT IV:

Classification: Decision Tree, Naïve Bayes classifier, SVM.

Regression: Introduction to regression, Linear Regression, logistic regression

UNIT V:

Clustering: Introduction to Clustering, Techniques-KMeans, agglomerative Hierarchical Clustering

Text Mining with Python: Text Cleaning, building Corpus, Text mining application-sentiment analysis.

TEXT BOOKS:
1. Mark Smart,(2018), Introduction to Data Science with Python: Basics of Numpy and Pandas.
2. VK Jain,Data Science & Analytics, Khanna Book Publishing; 1 edition (2018)

REFERENCE BOOKS:
1. Dr. Pooja Sharma, Programming in Python,BPB Publications
2. Frank Kane (2017)Hands-On Data Science and Python Machine Learning 1st Edition, Kindle Edition.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT VI SEMESTER

DATAWAREHOUSING AND DATAMINING LAB

Course Code: A3524

L	T	P	C
0	0	3	2

Course Overview:

The goal of this Laboratory is to help students learn working with WEKA tool for data mining techniques and kettle Pentaho for data Integration and develop data cubes and perform OLAP operations. Students will be able to perform data preprocessing, classification, clustering, association, attribute selection, and visualization using WEKA tool. Students will be able to perform various data transformations using kettle Pentaho data integration tool and interpret received results.

Prerequisites:
Data Base Management Systems Lab (A3518)

Course Objectives:

I. Learn to work with WEKA tool for data mining techniques.
II. Learn to work with kettle Pentaho and perform various data integration operations.
III. Understand mathematical foundations of data mining tools.
IV. Develop data Cubes and Perform OLAP Operations and data mining tools for solving practical problems.
V. Relate data mining issues to broader social, scientific and environmental context.

Course Outcomes:
Upon successful completion of this course, student will be able to:

1. Develop skills required to work with WEKA and KETTLE Pentaho tools

2. Develop various data transformations and flow controls using Kettle Pentaho tool.
3. Build data Cubes and perform OLAP Operations using Kettle Pentaho tool.

4. Apply various association rule mining and classification Techniques on given datasets and analyze their results.

5. Compare the clustering Techniques on given datasets and analyze their results.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT VI SEMESTER

DATAWAREHOUSING AND DATAMINING LAB

Course Code: **A3524**

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

Week – 1

1. **Installation** and Introduction to Weka Tool

Week-2

2. **Preprocessing** Data Using Weka Tool
   - ***a.*** File conversion
     - i. Excel to ARFF
   - ***b.*** Opening File from Local file system.
   - ***c.*** Opening File from website.

Week – 3

3. **Installation, Introduction** to Kettle Pentaho data Integration Tool.

3.1. Opening the Pentaho data Integration IDE

   a. **Creating** a New repository
   b. **Learning** how to connect to the Created Repository.
   c. **Learn** how to **create** an ODBC CONNECTION.

Week – 4

4. **Developing** transformations Using Kettle Pentaho data Integration Tool.

   i. Transform CSV file input into XML file output
   ii. Transform CSV file Input into excel file output.
   iii. **Transform Access to Excel**.
   iv. Transform Excel file input into MS-Access file output.
   v. Transform Sql server input to MS-ACCESS/MS-Excel.

Week-5

5. **Developing** Flow control Transformation using kettle Pentaho

   i. Transform Access file/sql server file into excel file by control data flow.

Week-6

6. **Sql server Analysis service for Data Analytics**
   - ***a.*** **Create** data source connection.
   - ***b.*** **Create** data source view.
   - ***c.*** **Create** OLAP Cube in SQL Server Analysis Server.

Week-7

7. **Sql server Analysis service for Data Analytics**
   - ***a.*** **Perform** OLAP operations on DATACUBE.

Week -8

8. **Association Rule Mining.**

   - ***a.*** ***Use Apriori*** Trace the results of using the Apriori algorithm on the grocery store example with

support threshold *s*=33.34% and confidence threshold *c*=60%. Show the candidate and frequent item-sets for each database scan. Enumerate all the final frequent item-sets.

Also indicate the association rules that are generated and highlight the strong ones, sort them by confidence.

Transaction ID	Items
T1	HotDogs, Buns, Ketchup
T2	HotDogs, Buns
T3	HotDogs, Coke, Chips
T4	Chips, Coke
T5	Chips, Ketchup
T6	HotDogs, Coke, Chips

Week-9

9. **Association Rule Mining.**

a. *FP-tree and FP-Growth*

a) **Use** the transactional database from the previous exercise with same support threshold and **build** a frequent pattern tree (FP-Tree). Show for each transaction how the tree evolves.

b) **Use** Fp-Growth to **discover** the frequent item-sets from this FP-tree.

b. *Using WEKA*

Load a dataset described with nominal attributes, e.g. weather.nominal. **Run** the Apriori algorithm to generate association rules.

c. *Apriori* **and FP-Growth (to be done at your own time, not in class)**

Giving the following database with 5 transactions and a minimum support threshold of 60% and a minimum confidence threshold of 80%,

Find all frequent item-sets using

(a) Apriori and

(b) FP-Growth.

(c) **Compare** the efficiency of both processes.

(d) **List** all strong association rules that contain "A" in the antecedent (Constraint).

(e) Can we **use** this constraint in the frequent item-set generation phase?

TID	Transaction
T1	{A, B, C, D, E, F}
T2	{B, C, D, E, F, G}
T3	{A, D, E, H}
T4	{A, D, F, I, J}
T5	{B, D, E, K}

Week 10

a. **Build** Base line classification models using **Zero R** and **One R**

b. Generate **Decision Tree** using **J48**, Use *credit .arff* database.

Week-11:

Being given the following relation: Student (Name, grade Math, grade Programming, grade Physics,

grade English, grade Overall), create an .arff file containing at least 15 instances, load it into Weka, and apply k-Means clustering to it. Also cluster the instances without Weka, and compare the results. Pick different initial cluster centroids and compare the results.

Week-12 & 13:

Bonus Assignment
Integrated project
Analyze the scores and percentages of the trainees in various modules. The **analysis** for scores and percentages has to be done in various assessments such as Test, Retest, Hands on, and/or Comprehensive Examination.
 Use the project specification document provided.
1. **Perform** (extraction Transformation Loading) ETL
2. **Create** a new database with the name "Integrated Assignment.
This database will include the following tables. (You are free to make the table names more meaningful by prefixing them with "Dim or "Fact.)

- Time (no need to create; load directly from the data provided).
- Assessment (to be created)
- Modules (to be created)
- Trainees (to be created)
- Score (to be created)

3. **Perform** (Multi Dimensional data Modeling) MDDM
4. **Create** the cube for analysis.

- Identify four dimensions for the cube.
- One of the dimensions is Time.
- Consider only calendar related attributes and create a calendar hierarchy
- Identify one measure group for the cube.
- Identify three measures for the cube.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT VI SEMESTER

COMPUTER AIDED SOFTWARE ENGINEERING TOOLS LAB

Course Code: **A3609**

L	T	P	C
0	0	3	2

Course Overview:

This Laboratory introduces the principles of object oriented design involved in development of software applications.

Prerequisite(s):

Computer Programming -A3501, Object Oriented Programming-A3509, Software Engineering-A3514

Course objectives:

    I.   Have a deeper knowledge of the principles of object-oriented design

    II.   Introduce students to the basic principles of OO Design,

Course outcomes:

Upon successful completion of this course, student will be able to:

1. Understand the overall concepts of software system by using UML modeling.
2. To Model real time software applications.
3. To develop object-based models in real world projects.
4. Analyze the basic design principles in solving real life problems.
5. To construct real world system using UML diagrams

B.TECH IT VI SEMESTER
COMPUTER AIDED SOFTWARE ENGINEERING TOOLS LAB

Course Code: **A3609**

L	T	P	C
0	0	3	2

List of Experiments

Students are divided into batches of 4 each and each batch has to draw the following diagrams using UML for the given case studies.

UML diagrams to be developed are:
1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.
4. Collaboration Diagram.
5. State Diagram.
6. Activity Diagram.
7. Component Diagram
8. Deployment Diagram.
9. Object Diagram.

1: Design and draw the UML diagrams for LIBRARY MANAGEMENT system.

2: Design and draw the UML diagrams for ONLINE RAILWAY RESERVATION system.

3: Design and draw the UML diagram for Automatic Teller Machine (ATM) application.

4: Design and draw the UML diagrams for HOSPITAL MANAGEMENT system.

5: Design and draw the UML diagrams for PAYROLL DETAILS application.

6: Design and draw the UML diagrams for ONLINE QUIZ application.

7: Design and draw the UML diagrams for ONLINE COURSE REGISTRATION system.

8: Design and draw the UML diagrams for MARKS ANALYSIS system.

9: Design and draw the UML diagrams for IT ENABLED ACADEMICA system.

10: Design and draw the UML diagrams for a COMPANY ORGANIZATION system.

11: Design and draw the UML diagrams for HOSTEL MANAGEMEN system.

12: Design and draw the UML diagrams for ADMISSION PROCESSING system.

13: Design and draw the UML diagrams for RESULTS PROCESSING system.

14: Design and draw the UML diagrams for ONLINE TICKET RESERVATION system.

15: Design and draw the UML diagrams for ONLINE AUCTION system.

Text book:

1. Grady Booch, James Rumbaugh, Ivar Jacobson(1999), "The Unified Modeling Language user guide pearson edition.

Reference books:

1. Atul Kahate(2004) , "Object Oriented Analysis and Design"
2. Hans-Erikson, David Fado Wiley (2009), "UML 2 toolkit" Wiley Publishing, Inc.
   3. Mellir Page-Jone (2004), "Fundamentals of Object Oriented design in UML".

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT VI SEMESTER

INTELLECTUAL PROPERTY RIGHTS

Course Code: **A3013**

L	T	P	C
3	0	0	0

Course Overview:

The course on Intellectual Property Rights covers all aspects of creations of the intellect: Images, names, inventions, literary works, artistic works etc. It also addresses new and upcoming areas of Intellectual Property (IP) like Biotechnology, Domain Names, Creative Commons, etc. This course has been designed to give the students a holistic understanding of the subject. What is IP? How is it created? How is it protected? - are a few of the key questions which will be discussed during this course. It also deals with fundamentals of laws to protect and encourage the inventions and creations.

Prerequisite (s):   **NIL**

Course Objectives:

I. To provide an overview on IPR.
II. Be familiar with different types of Intellectual Property (IP)
III. Be familiar with the Rights of Ownership
IV. Be familiar with Law of Intellectual Property , Explore knowledge in Trademarks, Copyrights, Patents and Trade Secrets
V. Adequate knowledge in New Developments in IP

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Understand different types of Intellectual Property
2. List the International organizations and its functions to protect Intellectual Property
3. Explain in detail about agencies and treaties related to Intellectual Property Rights and importance of Intellectual Property Rights
4. Explain the Trademark Evaluation, Registration Processes and describe the fundamentals of Copyright Law & patent law
5. Explain the New International Developments in Trademarks Law and Copyright Law and Patent Law

INTELLECTUAL PROPERTY RIGHTS
(Audit Course)

Course Code: **A3013**

L	T	P	C
3	0	0	0

UNIT – I **(10 Lectures)**
INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II **(10 Lectures)**
TRADE MARKS: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trademarks, trade mark registration process.

UNIT – III **(10 Lectures)**
LAW OF COPY RIGHTS : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.
LAW OF PATENTS: Foundation of patent law, patent searching process, ownership rights and transfer.

UNIT – IV **(10 Lectures)**
TRADE SECRETS: Trade secrete law, determination of trade secretes status, liability for misappropriations of trade secrets, protection for submission, and trade secrete litigation.
UNFAIR COMPETITION: Misappropriation right of publicity, false advertising.

UNIT – V **(10 Lectures)**
NEW DEVELOPMENT OF IPR: Geographical indication, Geographical indication protection, Importance to protect geographical indications, Biotechnology Research and Intellectual Property Rights Management, Intellectual property audits.

TEXT BOOKS:
1. Deborah. E. Bouchoux 4th Edition (2012*), Intellectual property*, Cengage learning, India.
2. T. M Murray and M.J. Mehlman, Encyclopedia of Ethical, Legal and Policy issues in Biotechnology, John Wiley & Sons 2000

REFERENCE BOOKS:
1. Prabudda ganguli (2003), *Intellectual property right*, Tata McGraw Hill Publishing company ltd., India.
2. P.N. Cheremisinoff, R.P. Ouellette and R.M. Bartholomew, Biotechnology Applications and Research, Technomic Publishing Co., Inc. USA, 1985
3. P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi, 2010

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

CLOUD COMPUTING & BIG DATA

Course Code: **A3610**

L	T	P	C
3	1	0	3

Course Overview:

In this course you will learn about two extremely important, and sometimes interrelated, emerging data management technologies: cloud computing and big data. You will analyze the reasons why cloud computing provides an attractive alternative to an on-site data center, and the technical and economic impacts of migrating to the cloud. You will also gain an appreciation of the challenges of managing vast quantities of structured and unstructured big data, and how organizations are trying to leverage big data stores via analytics for strategic decision making. You will conduct research into current and proposed solutions for both of these information technologies.

Pre-requisites:

Database Management Systems (A3516), Data Warehousing and Data Mining (A3522)

Course Objectives:

I. To understand the concepts of cloud and utility computing
II. To understand the various issues in cloud computing and Big Data
III. To appreciate the emergence of cloud as the next generation computing paradigm
IV. To be able to set up a private cloud
V. To understand the need and application of Map Reduce
VI. To learn how to handle large data sets in main memory

Course Outcomes:

Upon completion of the course the student will be able to:

1. Describe the architecture, service, deployment models, and pros and cons of cloud computing, vendors offering cloud services.
2. Comprehend the technical capabilities and business benefits by accessing cloud and virtualization.
3. Develop application on cloud platform such as Google, Azure, AWS and so on.
4. Evaluate open source cloud computing software, and free/commercial cloud services.
5. Understand the basic computing environment of BigData, Hadoop distributed file structure and MapReduce and Develop a MapReduce application and run it on locally and clusters

CLOUD COMPUTING & BIG DATA

Course Code: **A3610**

L	T	P	C
3	1	0	3

SYLLABUS

UNIT - I   **(10 Lectures)**

CLOUD COMPUTING BASICS: Cloud computing overview, applications, intranets and the cloud, first movers in the cloud **YOUR ORGANIZATION AND CLOUD COMPUTING**: When you can use cloud computing, benefits, limitations, security concerns, regulatory issues**. CLOUD COMPUTING WITH THE TITANS:** Google, EMC, netapp, Microsoft, Amazon, salesforce.com IBM, Partnerships

UNIT - II   **(10 Lectures)**

THE BUSINESS CASE FOR GOING TO THE CLOUD: Cloud computing services, how those applications help your business, deleting your datacenter, salesforce.com and Thomson Reuters. **HARDWARE AND INFRASTRUCTURE:** Clients, security, network, services. **ACCESSING THE CLOUD:** Platforms, web applications, web APIs, web browsers.

UNIT - III   **(10 Lectures)**

CLOUD STORAGE VENDORS: Overview of cloud storage, cloud storage providers. **STANDARDS:** Application, client, infrastructure, service. **STANDARDS:** Application, client, infrastructure, service. **DEVELOPING CLOUD SERVICES:** Types of cloud service development, software as a service: overview, driving forces, company offerings, industries. **SOFTWARE PLUS SERVICES**: overview, mobile device integration, providers, Microsoft online.

UNIT - IV   **(12 Lectures)**

DEVELOPING APPLICATIONS: Google, Microsoft, intuit quick base, cast iron cloud, bungee connect development, troubleshooting, application management. WORKING WITH BIG DATA: MapReduce, , The Hadoop Distributed File system

UNIT - V   **(14 Lectures)**

Hadoop I/O: Data Integrity, Compression, Serialization, Avro, File-Based Data Structures. Developing a MapReduce application : The Configuration API, Setting Up the Development Environment, Writing a Unit Test with MRUnit, Running Locally on Test Data, Running on a Cluster, Tuning a Job, MapReduce Workflows.

TEXT BOOK:

1. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter(2010), *Cloud Computing: A Practical Approach*, McGraw hill, New Delhi, India.
2. The Definitive Guide by Tom White, 3rd Edition, O'reilly Hadoop in Action by Chuck Lam, MANNING Publication

REFERENCE BOOKS:

1. E Haley Beard (2008), Cloud Computing Best Practices for Managing and Measuring Processes for Ondemand Computing, Applications and Data Centers in the Cloud with SLAs, 2nd edition, Emereo Pty Limited, USA.
2. Tim Mather, Subra Kumaraswamy, Shahed Latif (2009), Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance (Theory in Practice), 3rd edition, O'Reilly Media, Inc, India.
3. Michael Miller (2008), *Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online*, Que Publishing
4. Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.Tech IT VII SEMESTER

MOBILE APPLICATION DEVELOPMENT

Course Code: **A3611**

L	T	P	C
3	1	0	3

Course Overview

The latest mobile devices and applications are changing the way we communicate, do business, and access news and entertainment. Businesses, consumers and programmers have embraced this innovative medium, making mobile application developer one of the most demanded and fastest growing IT career paths. This course teaches students how to build mobile apps for Android mobile operating platform. Students learn to write native apps for Android based devices using Eclipse and the Android SDK. Students are expected to work on a project that produces a professional-quality mobile application. Projects will be deployed in real-world applications.

Pre-requisites:

Object Oriented Programming (A3509), Web Technologies (A3601)

Course objectives

With this course, students will be able to:

- I.   Describe those aspects of mobile programming that make it unique from programming for other platforms
- II.   Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces
- III. Program mobile applications for the Android operating system that use basic and advanced phone features
- IV.   Deploy applications to the Android marketplace for distribution

Course Outcome

Upon successful completion, students should be able to:

1. Develop mobile applications using android development application tools
2. Design, customize and enhance mobile applications
3. Modify existing mobile apps for better performance
4. Design various mobile applications for real time problems
5. Create effective user interfaces that leverage evolving mobile device capabilities
6. Identify and apply discipline-specific practices that contribute to the local and global community through social responsibility, economic commitment and environmental stewardship

MOBILE APPLICATION DEVELOPMENT

Course Code: **A3611**

L T P C
3 1 0 3

UNIT - I   (10 Lectures)
A brief history of Mobile, Types of mobile phone generations, The Mobile Ecosystem, Types of Mobile Applications, Mobile Information Architecture
Android Versions, Features of Android, Android Architecture, Installing Android SDK Tools, Configuring Android in Eclipse IDE, Android Development Tools (ADT), Creating Android Virtual Devices (AVD)

UNIT - II   (10 Lectures)
Creating first android application, Anatomy of android application, Deploying Android app on USB connected Android device, Android application components, Activity life cycle, Understanding activities, Exploring Intent objects, Intent Types, Linking activities using intents

UNIT - III   (12 Lectures)
Fragments life cycle, Interaction between fragments, Understanding the components of a screen (Layouts), Adapting to display orientation, Managing changes to screen orientation, Utilizing the Action Bar, Working with Views(UI Widgets)-Button, Toast, ToggleButton, CheckBox, RadioButton, Spinner, WebView, EditText, DatePicker, TimePicker, ListView, ProgressBar, Analog and Digital clock, Handling UI events, List fragment, Dialog fragment

UNIT - IV   (12 Lectures)
 Working with Menus-Option menu, Context menu, Popup menu, Working with images-ImageView, ImageSwitcher, AlertDialog, Alarm manager, SMS messaging, Sending E-mail, Media Player, Using camera for taking pictures, recording video, Handling Telephony Manager

UNIT - V   (12 Lectures)
Storing the data persistently-Introducing the Data Storage Options: The preferences, The Internal Storage, The External Storage, The Content Provider , The SQLite database, Connecting with the SQLite database and operations-Insert, Delete, Update, Fetch, Publishing android applications-preparing for publishing, Deploying APK files

Text Books:
1. Wei-Meng Lee(2011),Beginning Android 4 Application Development, Wiley Publishing, Inc.
2. Pradeep Kothari(2014), "Android Application Development(with KitKat support) Black Book", DreamTech Press

Reference Books:
1. James C.Sheusi(2013), "Android Application Development for Java Programmers", Cengage Learning
2. Mark L Murphy(2009), "Beginning Android", Wiley India Pvt Ltd
3. Sayed Y Hashimi and Satya Komatineni(2009), "Pro Android", Wiley India Pvt Ltd
4. Reto Meier, Professional Android 4 Application Development, Wiley India Pvt Ltd

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT VII SEMESTER

SOFTWARE TESTING METHODOLOGIES

Course Code: **A3612**

L	T	P	C
3	1	0	3

Course Overview:

This course presents a comprehensive study of software testing and quality control concepts, principles, methodologies, management strategies and techniques. The emphasis here is on understanding software testing process, planning, strategy, criteria, and testing methods, as well as software quality assurance concepts & control process. It covers the various subjects, including test models, test design techniques (black box and white-box testing techniques), integration, regression, and system testing methods.

Prerequisite(s):

Computer Programming (A3501), Object Oriented Programming (A3509), Software Engineering (A3514)

Course Objectives:

I.   To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
II. To discuss various software testing issues and solutions in software unit test; integration, system testing and regression.
III. To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
IV. To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.

Course Outcomes:

Upon completion of the course the student will be able to:

1. Understand various basic concepts, test processes, continuous quality improvement, types of errors and fault models.
2. Review various test techniques proposed
3. Analyze different kinds of testing techniques like path testing, transaction flow testing, data flow testing, domain testing, etc their application in different scenarios and their limitations.
4. Assessing the complexity of the testing by using various techniques like regular expression, kv maps, graphs and matrices
5. Demonstrate the usage of testing tools for different types of testing

B.TECH IT IV SEMESTER

SOFTWARE TESTING METHODOLOGIES

Course Code: **A3612**

L	T	P	C
3	1	0	3

SYLLABUS

UNIT – I   (12 Lectures)

INTRODUCTION AND THE TAXONOMY OF BUGS: Purpose of testing, some dichotomies, a model for testing, the consequences of bugs, taxonomy for bugs, some bug statistics.

FLOW GRAPHS AND PATH TESTING: Path testing basics, predicates, path predicates and achievable paths, pathsensitizing, path instrumentation, implement and application of path testing.

UNIT – II   (13 Lectures)

TRANSACTION FLOW TESTING AND DATA FLOW TESTING: Transaction flows, transaction flow testing techniques, dataflow testing basics, data flow testing strategies, application, tools andeffectiveness. DOMAIN TESTING: Domains and paths, nice and ugly domains, domain testing, domains and interfaces testing,domains and testability.

UNIT – III   (14 Lectures)

PATHS, PATH PRODUCTS AND REGULAR EXPRESSIONS: Path products and path expressions, a reductionprocedure, applications, regular expressions and flow anomaly detection.

LOGIC BASED TESTING: Motivational overview, decision tables, path expressions again, KV charts, specifications.

UNIT – IV   (12 Lectures)

STATES, STATE GRAPHS AND TRANSITION TESTING: State graphs, good state graphs and bad, state testing, testability tips.GRAPH MATRICES AND APPLICATIONS: Motivational overview, the matrix of a graph, relations, the powers of a matrix, node reduction algorithm, building tools

UNIT – V   (12 Lectures)

DEFECT MANAGEMENT: Introduction, Defect classification, Defect Management process (approach), Defect Life Cycle, Defect Template, Management process (Fixing and root cause of defect), Estimate expected impact of defect, why defect management needs a risk discussion, techniques for finding defects, reporting a defect. TESTING TOOLS: Introduction, features of a testing tool, guidelines for selection a tool, tools and skills of a tester, static testing tools, Dynamic testing tools, Advantages of Using testing tool, disadvantages of using testing tools, when to use automated testing tool, Testing using automated testing tools, Difficulties while introducing new tools, Process of procurement of COTS, procurement of tools from contractor, Advantages of the tools developed by external organizations, Contracting software, process of procurement of tools from contractor

Text book:

1. Boris Beizer (2004), "Software Testing Techniques", 2nd edition, Dreamtech Press, New Delhi, India .
2. M.G. Limaye (2009), "Software Testing: Principles, Techniques and Tools" The McGra Hill, New Del hi, Indian.

Reference Books:

1. William E. Perry (2006), Effective methods of Software Testing, 3rd edition, John Wiley Edition, USA.
2. Meyers (2004), Art of Software Testing, 2nd edition, John Wiley, New Jersey, USA

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT VII SEMESTER

DESIGN PATTERNS
(Professional Elective-III)

Course Code: A3655

L	T	P	C
4	0	0	4

Course Overview:

This course deals with the concepts that can speed up the development process by providing tested, proven development paradigms. Effective software design requires considering issues that may not become visible until later in the implementation. Reusing design patterns helps to prevent subtle issues that can cause major problems and improves code readability for coders and architects familiar with the patterns. Often, people only understand how to apply certain software design techniques to certain problems. These techniques are difficult to apply to a broader range of problems. Design patterns provide general solutions, documented in a format that doesn't require specifics tied to a particular problem.

Prerequisite(s):

Software Engineering (A3514), Software Architecture (A3652), Object Oriented Analysis and Design (A3607)

Course Objectives:

I. Have a deeper knowledge of the principles of object- oriented design.
II. Understand the design patterns that are common in software applications.
III. Understand how these patterns related to object- oriented design.
IV. Be able to identify appropriate design patterns for various problems
V. Be able to refactor poorly designed program by using appropriate design patterns

Course Outcomes:

Upon completion of the course the student will be able to:

1. Identify the appropriate design patterns to solve object oriented design problems.
2. Develop design solutions using creational patterns.
3. Apply structural patterns to solve design problems.
4. Construct design solutions by using behavioral patterns.

B.TECH IT VII SEMESTER

DESIGN PATTERNS
(Professional Elective-III)

Course Code: **A3655**

L	T	P	C
4	0	0	4

Syllabus

Unit-I   (11 Lectures)

Introduction: What is a Design Pattern? Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design patterns, Organizing the Catalog, How Design patterns solve Design problems, How to select a Design Pattern, How to use a Design Pattern.

Unit-II   (14 Lectures)

A Case Study: Designing a Document Editor, Design Problems, Document Structure, Formatting Embellishing the User Interface, Supporting Multiple Look and Feel Standards, Supporting Multiple Window systems, User Operations Spelling Checking and Hyphenation, Summary.
Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

Unit-III   (10 Lectures)

Structural Pattern Part – I: Adaptor, Bridge, and Composite.
Structural Pattern Part – II: Decorator, Acade, flyweight, proxy.

Unit- IV   (12 Lectures)

Behavior Patterns Part – I: Chain of Responsibility, Command, Interpreter, and Iterator.
Behavior Patterns Part – II: Mediator, Memento, Observer.

Unit- V   (13 Lectures)

Behavior Patterns Part – II: (cont'd) State, strategy, Template Method, Visitor, Discussion of Behavioral Patterns. What to Expect from Design Patterns, A brief History, and The Pattern Community an Invitation, A Parting Thought.

TEXT BOOKS
1. Design Patterns by Erich Gamma, Pearson Education.

REFERENCE BOOKS
1. Pattern's in JAVA Vol-I by Mark Grand, Wiley Dream Tech.
2. Pattern's in JAVA Vol – II BY Mark Grand, Wiley Dream Tech.
3. JAVA Enterprise Design Patterns Vol – III by Mark Grand, Wiley Dream TECH.
4. Head First Design Patterns By Eric Freeman – Oreilly – spd.
5. Peeling Design Patterns, Prof MedaSrinivasa Rao, NarsimhaKarumanchi, Career Monk Publication.
6. Design Patterns Explained By Alan Shallowy, Pearson Education.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. IT VII SEMESTER

CYBER SECURITY
(Professional Elective-III)

Course Code: **A3656**

L	T	P	C
4	0	0	4

Course Overview:

This course drawing upon a wealth of experience from academia, industry, and government service, *Cyber Security* details and dissects, in current organizational cyber security policy issues on a global scale—taking great care to educate students on the history and current approaches to the security of cyberspace. It includes thorough descriptions—as well as the pros and cons—of an excess of issues, and document policy alternatives for the sake of clarity with respect to policy alone. It also delves into organizational implementation issues, and equips students with descriptions of the positive and negative impact of specific policy choices.

Pre-requisites:

 Computer Networks (A3519), Information Security (A3608), E-Commerce (A3605)

Course Objectives:

  I.   Illustrate what is meant by cyber security and cyber security policy
  II. Discuss the process by which cyber security policy goals are set
  III. Educate the reader on decision-making processes related to cyber security
  IV. Describe a new framework and taxonomy for explaining cyber security policy issues

Course Outcomes:

Upon successful completion of this course, student will be can able to:

1. Analyze cyber attacks on different online web applications
2. Apply different techniques to classify different types of cybercrimes
3. Get an understanding over different government cyber laws and cyber-forensics techniques.
4. Understand how to protect them self and ultimately society from cyber attacks by studying various case studies.
5. Apply various investigating methods on the new cases using previous case studies

CYBER SECURITY
(Professional Elective-III)

Course Code: **A3656**

L	T	P	C
4	0	0	4

Syllabus

UNIT I (10 Lectures)

INTRODUCTION: Cyber Security, Cyber Security policy, Domain of Cyber Security Policy, Laws and Regulations, Enterprise Policy, Technology Operations, Technology Configuration, Strategy Versus Policy, **CYBER SECURITY EVOLUTION**: Productivity, Internet, E-commerce, Counter Measures and Challenges.

UNIT II (11 Lectures)

CYBER SECURITY OBJECTIVES AND GUIDANCE: Cyber Security Metrics, Security Management Goals, Counting Vulnerabilities, Security Frameworks, E-Commerce Systems, Industrial Control Systems, Personal Mobile Devices, Security Policy Objectives.
GUIDANCE FOR DECISION MAKERS: Tone at the Top, Policy as a Project, Cyber Security Management, Arriving at Goals, Cyber Security Documentation.
THE CATALOG APPROACH: Catalog Format, Cyber Security Policy Taxonomy.

UNIT III (12 Lectures)

CYBER SECURITY POLICY CATALOG: Cyber Governance Issues, Net Neutrality, Internet Names and Numbers, Copyright and Trademarks, Email and Messaging, Cyber User Issues, Malvertising, Impersonation, Appropriate Use, Cyber Crime, Geolocation, Privacy, Cyber Conflict Issues, Intellectual property Theft, Cyber Espionage, Cyber Sabotage, Cyber Welfare.

UNIT IV (10 Lectures)

CYBER MANGEMENT ISSUES: Fiduciary Responsibility, Risk Management, Professional Certification, Supply Chain, Security Principles, Research and Development, Cyber Infrastructure Issue, Banking and finance, Health care, Industrial Control systems.

UNIT V (10 Lectures)

CASE STUDY: A Government's Approach to Cyber Security Policy

Textbooks:
1. Jennifer L. Bayuk , J. Healey , P. Rohmeyer , Marcus Sachs , Jeffrey Schmidt , Joseph Weiss " Cyber Security Policy Guidebook" John Wiley & Sons 2012.

Reference Books:
1. Richard A. Clarke, Robert Knake " Cyberwar: The Next Threat to National Security & What to Do About It" Ecco 2010
2. Dan Shoemaker Cyber security The Essential Body Of Knowledge, 1st ed. Cengage Learning 2011
3. Anti-Hacker Tool Kit (Indian Edition) by Mike Shema, Publication Mc Graw Hill.
4. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunit Belpure, Publication Wiley.
5. Rick Howard "Cyber Security Essentials" Auerbach Publications 2011

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT VII SEMESTER

STORAGE AREA NETWORKS
(Professional Elective – III)

Course Code: **A3657**

L	T	P	C
4	0	0	4

Course Overview:

This course covers a range of storage technologies from local and network-attached to enterprise storage area networks. Students develop the ability to respond adaptively to changing storage needs based on network, application, and business environment presented in a range of companies. Through a series of projects, students provide technical solutions for a set of evolving technical and business challenges, while analyzing the advantages, limitations, and risks of a variety of technologies and designs

Prerequisite(s):

Computer Networks (A3519)

Course Objectives:

I. Evaluate storage architectures including storage sub systems, DAS,SAN,NAS,CAS
II. Understand logical and physical components of a storage infrastructure.
III. Define backup, recovery, disaster recovery, business continuity and replication

Course Outcomes:

Upon completion of the course the student will be able to:

1. Understand the concept of RAID and different RAID levels and their suitability for different application environments
2. Understand the different networked storage options for different application environments
3. Learn and apply various files sharing operations on NAS and IPSAN of the different network
4. Apply methods in the storage network for device sharing and data sharing among several servers
5. Analyze performance bottlenecks for conventional server-centric IT architectures

STORAGE AREA NETWORKS
(Professional Elective – III)

Course Code: A3657

L	T	P	C
4	0	0	4

UNIT – I **(10 Lectures)**

INTRODUCTION: Server-Centric & storage Centric – IT Architecture's, Limitations and Advantages.
INTELLIGENT DISK SUBSYSTEMS: Architecture of Intelligent Disk subsystems, Hard Disks and internal I/O Channels, Just Bunch of Disks (JBOD), Storage Virtualization using RAID, Different type RAID Levels, Caching: Acceleration of Hard Disk Access, Intelligent Disk Subsystems.

UNIT – II **(14 Lectures)**

I /O TECHNIQUES: The Physical I/O path from the CPU to the storage system, SCSI, The Fibre Channel Protocol stack, Fibre Channel SAN, IP Storage, Infiniband, Virtual interfaces and Remote Direct Memory Access (RDMA), RDMA over TCP,SDP and iSCSI.
FILE SYSTEM AND NETWORK ATTACHED STORAGE (NAS): Local file Systems, Network File Systems and servers, comparison: NAS, Fibre Channel SAN and iSCSI SAN.

UNIT – III **(14 Lectures)**

STORAGE VIRTUALIZATION: Limitations and Requirements, Definition of Storage Virtualization and its Implementation considerations, Storage Virtualization on Block or File Level and various Levels of the Storage Networks, Symmetric and Asymmetric Storage Virtualization in the Network.

UNIT – IV **(12 Lectures)**

APPLICATION OF STORAGE NETWORKS: Definition of the Term 'Storage Network', Storage Sharing, Availability of Data, Adaptability and Scalability of IT Systems.
NETWORK BACKUP: General conditions for Back Up, Network Backup Services, Server Components, Backup clients, Performance gains as a result of Network Backup, Performance Bottle Necks of Backup, Next Generation back-up, Backup of File Systems and Databases.

UNIT – V **(10 Lectures)**

MANAGEMENT OF STORAGE NETWORKS: System Management, Requirements of Management System, support by Management System, Management Interfaces, Standardized and proprietary Mechanisms, In-band and Out-Band Management, Operational Aspects of the Management of Storage Networks.

TEXT BOOKS:

1. Ulf Troppen, Rainer Erkens, Wolfgang Muller (2015), *Software Storage Networks Explained, Wiley India Pvt. Limited* Microsoft.

REFERENCE BOOKS:

1. Robert Spalding (2003)*, Storage Networks Complete Reference, Tata McGraw Hill*
2. EMC Corporation*, Information Storage and Management*, Wiley.
3. Meeta Gupta, *Storage Area Network Fundamentals*, Pearson Education Limited, 2002

VARDHAMAN COLLEGE OF ENGINEERING
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B. Tech IT VII SEMESTER

AD-HOC AND SENSOR NETWORKS
(Professional Elective – III)

Course Code: **A3560**

L	T	P	C
4	0	0	4

Course Overview:

This course covers a range of Ad-hoc and sensor networks. Students develop the ability to respond adaptively to changing Sensor network, application, and business environment presented in a range of companies. Through a series of projects, students provide technical solutions for a set of evolving technical and business challenges, while analyzing the advantages, limitations, and risks of a variety of technologies and designs

Prerequisite(s):

Computer Networks (A3519)

Course objectives:

The student should be made to:

  I.   Understand the design issues in ad hoc and sensor networks.
  II. Learn the different types of MAC protocols.
  III. Be familiar with different types of adhoc routing protocols.
  IV. Be expose to the TCP issues in adhoc networks.
  V.   Learn the architecture and protocols of wireless sensor networks.

Course outcomes:

Upon completion of the course, the student should be able to:

1. Explain the concepts, network architectures and applications of ad hoc and wireless sensor networks
2. Analyze the protocol design issues of ad hoc and sensor networks
3. Design routing protocols for ad hoc and wireless sensor networks with respect to some protocol design issues
4. Evaluate the QoS related performance measurements of ad hoc and sensor networks

AD-HOC AND SENSOR NETWORKS

Course Code: A3560   (PROFESSIONAL ELECTIVE – III)   L   T   P   C
                                                                                               4   0   0   4

UNIT I
INTRODUCTION: Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio propagation Mechanisms – Characteristics of the Wireless Channel -mobile ad hoc networks (MANETs) and wireless sensor networks (WSNs): concepts and architectures. Applications of Ad Hoc
and Sensor networks. Design Challenges in Ad hoc and Sensor Networks.

UNIT II
MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS: Issues in designing a MAC Protocol-Classification of MAC Protocols- Contention based protocols- Contention based protocols with Reservation Mechanisms- Contention based protocols with Scheduling Mechanisms – Multi channel MAC-IEEE 802.11

UNIT III
ROUTING PROTOCOLS AND TRANSPORT LAYER IN AD HOC WIRELESS NETWORKS: Issues in designing a routing and Transport Layer protocol for Ad hoc networks- proactive routing, reactive routing (on-demand), hybrid routing- Classification of Transport Layer solutions-TCP over Ad hoc wireless Networks.

UNIT IV
WIRELESS SENSOR NETWORKS (WSNS) AND MAC PROTOCOLS: Single node architecture: hardware and software components of a sensor node – WSN Network architecture: typical network architectures-data relaying and aggregation strategies -MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.

UNIT V
WSN ROUTING, LOCALIZATION & QOS: Issues in WSN routing – OLSR- Localization – Indoor and Sensor Network Localization-absolute and relative localization, triangulation-QOS in WSN-Energy Efficient Design-Synchronization-Transport Layer issues.

TEXT BOOK:

1.   C. Siva Ram Murthy, and B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols   ", Prentice Hall Professional Technical Reference, 2008.

REFERENCE Books:

1. Carlos De Morais Cordeiro, Dharma Prakash Agrawal "Ad Hoc & Sensor Networks: Theory and Applications", World Scientific Publishing Company, 2006.
2. Feng Zhao and Leonides Guibas, "Wireless Sensor Networks", Elsevier Publication – 2002
3. Holger Karl and Andreas Willig "Protocols and Architectures for Wireless Sensor Networks", Wiley, 2005
4. Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor Networks-Technology, Protocols, and Applications", John Wiley, 2007.
5. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003.

VARDHAMAN COLLEGE OF ENGINEERING
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B.TECH IT VII SEMESTER

SOFTWARE METRICS
(Professional Elective-IV)

Course Code:A3658

L	T	P	C
4	0	0	4

Course Overview:

Software Metrics has become essential to good software engineering and good software engineering project management, i.e., "You can't manage what you can't measure." This course uncovers what software metrics are, why they are used, who should develop the metrics, when they should be applied, who should own the measurements, and what should be done with them. It course explores the current definitions of measures and metrics related to software production. It provides (i) the theoretical definition of measure and its application to software engineering; (ii) a comprehensive review of the state of the art in measurement for software production; (iii) guidelines on establishing a measurement program; (iv) cost-benefit analyses for selected industrial case studies. This course makes extensive reference to both the researcher's and the practitioner's points of view. Extensive use of the Internet will allow access to up-to-date literature and fresh experimental data.

Pre-requisite(s):
Computer Programming (A3501), Object Oriented Programming (A3509), Software Engineering (A3514)

Course Objectives:
Upon successful completion of this course attendees will be able to:

- I. Understand the basic metrics and measurement theory and terminology.
- II. Identify internal and external customers who need software metrics information.
- III. Select software metrics based on goals.
- IV. Design and tailor the selected metrics to match your information needs.
- V. Minimize the impact of human factors on the selected metrics
- VI. Interpret and communicate metric results

Course Outcomes:
Upon completion of the course the student will be able to:

1. apply knowledge of metrics and measurements in software development.

2. analyze and interpret data to do planning and conduct software validations.

3. Compare different quality methods to ensure quality software.

4. Demonstrate a knowledge and understanding of management and business practices, such as risk and change management, and understand their limitations.

SOFTWARE METRICS
(Professional Elective-IV)

Course Code:A3658

L	T	P	C
4	0	0	4

2.

SYLLABUS

UNIT - I   **(10 Lectures)**

MEASUREMENT– Measurement in Everyday Life, Measurement in Software Engineering, Scope of Software Metrics.

BASICS OF MEASUREMENT- Representational Theory of Measurement, Measurement and Models, Measurement Scales and Scale Types.

UNIT - II   **(8 Lectures)**

EMPIRICAL INVESTIGATION- Principles of empirical studies, planning, experiments**.**

FRAME WORKFORSOFTWAREMEASUREMENT-Classifying Software Measures, determining what to measure, Applying Frame Work, and Software Measurement Validation

UNIT - III   **(10 Lectures)**

SOFTWAREMEASURESINDATACOLLECTION-Good Data, data Collection for incident reports, Storing and Extracting Data. **MEASURING INTERNAL PRODUCT ATTRIBUTES**-Measuring Size

UNIT - IV   **(8 Lectures)**

MEASURING INTERNAL PRODUCT ATTRIBUTES-Measuring Structure

MEASURING EXTERNALPRODUCTATTRIBUTES-Modeling Software, Quality, Measuring Aspects of Quality, usability measures, maintainability measures, and security measures.

UNIT - V   **(9 Lectures)**

MEASUREMENT AND PREDECTION- software reliability theory, parametric reliability growth models, predictive accuracy.

CUSTOMERSATISFACTION- Empirical Research in Software Engineering, Measuring, and Analyzing Customer Satisfaction: Customer Satisfaction Surveys, Analyzing Satisfaction Data, Satisfaction with Company

TEXT BOOK:
1. Fenton,Pfleeger,"SoftwareMetrics:A Rigorousand PracticalApproach", Thomson.
2. Stephen H. Kan:" Metrics&Models in Software QualityEngineering", PEA.

REFERENCE BOOKS:
1. Sheppard, "Software EngineeringMetrics",1992,MCG.
2. Pertisetal,"Software Metrics:An Analysis and Evaluation", 1981, MIT Press

VARDHAMAN COLLEGE OF ENGINEERING
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B. Tech. IT VII SEMESTER

SOFT COMPUTING
(PROFESSIONAL ELECTIVE- IV)

Course Code: **A3659**   **L T P C**
                                                           4 0 0 4

Course Overview:

This course provides an introduction to the basic concepts of Soft Computing methodology and covers three main components – Neural Networks, Fuzzy Logic and Evolutionary Computation. The course combines theoretical foundations with practical applications using different tools and techniques. Topics include Neural Networks, Fuzzy Logic, Evolutionary Computation and Recent developments and applications of Soft Computing in various areas.

Pre-requisites:

Artificial Intelligence

Course Objectives:

The main objective of the course is to expose the students to soft computing, various types of soft computing techniques, and applications of soft computing. .Upon completion of this course, the student should be able to get an idea on :

1. Artificial Intelligence, Various types of production systems, characteristics of production systems.
2. Neural Networks, architecture, functions and various algorithms involved.
3. Fuzzy Logic, Various fuzzy systems and their functions.
4. Genetic algorithms, its applications and advances.

Course Outcomes:

At the end of the course the student should be able to
1. Learn about soft computing techniques and their applications
2. Analyze various neural network architectures
3. Understand perceptrons and counter propagation networks.
4. Define the fuzzy systems
5. Analyze the genetic algorithms and their applications.

SOFT COMPUTING
(PROFESSIONAL ELECTIVE- IV)

Course Code: **A3659**   **L T P C**
                                                                                                            4 0 0 4

Syllabus

Unit-I   **(10 Lectures)**
BASICS OF ARTIFICIAL NEURAL NETWORK: Characteristics of Neural Networks, Structure and working ofa biological neural network, Artificial neural network: terminology, models of neurons: McCulloch Pitts model,Perceptron model, Adaline model, topology, Basic learning laws.
FUNCTIONAL UNITS FOR ANN FOR PATTERN RECOGNITION TASK: Pattern recognition problem, Basic functional units, PR by functional units

Unit-II   **(10 Lectures)**
FEED FORWARD NEURAL NETWORKS: SUPERVISED LEARNING - I: Perceptrons - Learning and memory, Learning algorithms, Error correction and gradient decent rules, Perceptron learning algorithms.
SUPERVISED LEARNING - II:
Back propagation, Multilayered network architectures, Back propagation learning algorithm, Example applications of feed forward neural networks.

Unit-III   **(13 Lectures)**
FEEDBACK NEURAL NETWORKS & SELF ORGANIZING FEATURE MAP:
Introduction, Associative learning,Hopfield network, Error performance in Hopfield networks, simulated annealing, Boltzmann machine and Boltzmann learning, state transition diagram and false minima problem, stochastic update, simulated annealing, Boltzmann machine bidirectional Associative memory, bam stability analysis. Self organization, generalized learning laws, Competitive learning, vector quantization, self organizing feature map, applications of self organizing feature map.

Unit-IV   **(11 Lectures)**
FUZZY LOGIC:
Fuzzy set theory, crisp sets, operations on crisp set, fuzzy sets, fuzzy versus crisp, operations, fuzzy relations, crisp relations, properties. Fuzzy logic Application: Fuzzy Control of Blood Pressure

Unit-V   **(10 Lectures)**
FUZZY LOGIC IN DATABASE AND INFORMATION SYSTEMS: Fuzzy Information, Fuzzy Logic in database Systems, Fuzzy Relational data Models, operations in Fuzzy Relational data Models, Design theory for Fuzzy Relational databases, Fuzzy information Retrieval and Web search, Fuzzy Object Oriented databases.
GENETIC ALGORITHMS: Introduction to Genetic Algorithms, Evolutionary Algorithms.

Text Books:
1. Satish Kumar (2004), Neural Networks A classroom Approach Tata McGraw Hill Publication, New Delhi.
2. Lotfi A. Zadeh (1997), Soft computing and Fuzzy Logic, World Scientific Publishing Co., Inc. River Edge, NJ, USA

Reference Books:
1. B. Yegnanarayana (2006), Artificial Neural Networks, Prentice Hall of India, New Delhi, India.
2. John Yen, Reza Langari (2006), Fuzzy Logic, Pearson Education, New Delhi, India.
3. S. Rajasekaran, Vijaylakshmi Pari (2003), Neural networks, Fuzzy Logic and Genetic Algorithms Synthesis and Applications, Prentice Hall of India, New Delhi, India.

B. Tech IT VII SEMESTER

INFORMATION RETRIEVAL SYSTEMS
(Professional Elective-III)

Course Code: A3559

L	T	P	C
4	0	0	4

Course Overview:

This course provides an introduction to the basic concepts of Information Retrieval Systems methodology and covers four main components – Searching techniques, Clustering algorithms, Data structures and Indexing strategies. The course combines theoretical foundations with practical applications using different algorithms and techniques.

Pre-requisites:

Data Warehousing and Data Mining (A3522)

Course Objectives:

I.   Appreciate the capabilities and limitations of information retrieval systems.
II. Understand the design and implementation of retrieval systems for text and other media.
III. Evaluate the performance of an information retrieval system.
IV. Identify current research problems in information retrieval.
V.   learn the important concepts, algorithms, and data/file structures that are necessary to specify, design, and implement Information Retrieval (IR) systems.

Course Outcomes:

After completing this course the student will demonstrate the knowledge and ability to:

1. Understand the functional processes and effectiveness of information storage and retrieval systems.
2. Implement different data structures and indexing techniques for information retrieval systems.
3. Analyze different clustering and visualization techniques to generate classification among the web pages.
4. Apply appropriate user search techniques and text search algorithms for different database systems.
5. Analyze new models based on existing challenges over multimedia web search and modern digital libraries.

INFORMATION RETRIEVAL SYSTEMS
(PROFESSIONAL ELECTIVE – IV)

Course Code: A3559

L	T	P	C
4	0	0	4

UNIT - I   **(10 Lectures)**

INTRODUCTION TO INFORMATION RETRIEVAL SYSTEMS: Definition, Objectives, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses. **INFORMATION RETRIEVAL SYSTEM CAPABILITIES**: Search, Browse and Miscellaneous

UNIT - II   **(12 Lectures)**

CATALOGING AND INDEXING: Objectives, Indexing Process, Automatic Indexing, Information Extraction. **DATA STRUCTURES**: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hidden Markov Models. **AUTOMATIC INDEXING**: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages.

UNIT - III   **(14 Lectures)**

DOCUMENT AND TERM CLUSTERING: Introduction, Thesaurus Generation, Item Clustering, Hierarchy of Clusters. **USER SEARCH TECHNIQUES**: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the Internet and Hypertext. **INFORMATION VISUALIZATION**: Introduction, Cognition and Perception, Information Visualization Technologies.

UNIT - IV   **(12 Lectures)**

TEXT SEARCH ALGORITHMS: Introduction, Software Text Search Algorithms, Hardware Text Search Systems. **INFORMATION SYSTEM EVALUATION**: Introduction, Measures used in System Evaluation, Measurement Example -TREC results.

UNIT - V   **(10 Lectures)**

MULTIMEDIA INFORMATION RETRIEVAL: Models and Languages, Data Modeling Query Languages, Indexing and Searching. **LIBRARIES AND BIBLIOGRAPHICAL SYSTEMS**: Online IR Systems, OPACs, Digital Libraries.

TEXT BOOKS:
1. Gerald J. Kowalski, Mark T. Maybury (2000), Information Storage and Retrieval Systems: Theory and Implementation , 2nd edition, Springer International Edition, USA.
2. Ricardo Baeza Yates, Berthier Ribeiro Neto (2009),   Modern Information RetrieVal , Pearson Education, India.

REFERENCE BOOKS:
1. Robert R. Korfhage (1997), Information Storage and Retrieval,John Wiley & Sons, India Edition, India.
2. Frakes W. B, Ricardo Baeza Yates (1992), Information Retrieval Data Structures and Algorithms ,Pearson Education / Prentice Hall of India, New Delhi, India

B. Tech. IT VII SEMESTER

BIOINFORMATICS
(Professional Elective-IV)

Course Code: **A3660**

L	T	P	C
4	0	0	4

COURSE OVERVIEW:

In the era of ever increasing amount of biological data, it is equally important to manage the data as well as to interpret it correctly. Thus, a course in Bioinformatics will enable the students to compile all the available information in a systematic manner and also to determine the meaning and structure of the biological information available in the existing databases. It will help the students to understand the algorithms of mathematical tools on which the analysis of biological data is based.

Pre-requisites:

Database Management Systems(A3516), Data Warehousing and Data Mining (A3522), Computer Programming (A3501), Data structures (A3503)

COURSE OBJECTIVES:

I. To impart the knowledge of theoretical and practical concepts of bioinformatics.
II. To develop skills in designing biological database and retrieving.
III. To apply appropriate sequence analysis methods for analyzing bio-molecular sequences.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Demonstrate the knowledge on concepts of biological databases, Genomes and Proteome.
2. Ability to analyze biological database management system.
3. Ability to select and apply appropriate techniques and tools to manage the biological data.

BIOINFORMATICS
(Professional Elective-IV)

Course Code: **A3660**

L	T	P	C
4	0	0	4

Syllabus

UNIT-I   **(12 Lectures)**

INTRODUCTION: Definition – Overview- Major databases in Bio Informatics- Molecular biology – Central Dogma- Data retrieval tools – Data mining of Databases – Gene Analysis – Prokaryotic and Eukaryotic Genomes – Sequence Assembly – Gene mapping – Physical maps – cloning – ORF – amino acids – DNA, RNA sequences – Genetic code.

UNIT-II   **(12 Lectures)**

DNA and PROTEIN SEQUENCES:-DNA: working with single DNA sequence : removing vector sequences- verifying restriction maps – PCR design – GC content – counting words – internal repeats – protein coding regions – ORFing – Genome scan, Protein: predicting properties – primary structure analysis – transmembrane segments – PROSITE patterns – interpreting scanprosite results- finding domains – CD server results – pfscan results.

UNIT-III   **(10 Lectures)**

ALIGNMENT OF PAIR OF SEQUENCES:- Terminology – Global and Local alignment – Dot matrix – dynamic programming – using scoring matrices –PAM matrices – BLOSUM, Working with FASTA – Algorithm – output – E-values – Histogram, Working with BLAST – algorithm – output – services – gapped BLAST- PSIBLAST – comparison of FASTA and BLAST.

UNIT-IV   **(10 Lectures)**

MULTIPLE SEQUENCE ALIGNMENT:- Criteria for Multiple sequence alignment – applications – choosing the right sequences; FASTA, ClustalW, TCoffee methods – interpreting multiple sequence alignment – getting in right format – converting formats – using Jalview – preparing for publication.

UNIT-V   **(10 Lectures)**

PROTEIN CLASSIFICATION & STRUCTURE PREDICTION:- Structure of amino acids – primary structure – secondary structure – folds and motifs – alpha and beta helix –structure based protein classification – protein structure Data bases – folding problem – PROPSEARCH –primary structure analysis and prediction – secondary structure analysis and prediction – motifs – profiles –patterns and fingerprints

TEXT BOOKS

1. S.C Rostogi , Mendiratta, P.Rastogi, " *BioInformatics: methods and applications* ",second edition, PHI 2006.
2. Jean Mickel Clavere & Cadrienotredom "*Bio Informatics– A beginners guide*" Wiley DreamTech, 2003.

REFERENCE BOOKS

1. T.K. Attwood and D.J Perry Smith, " *Introduction to Bio Informatics* ", Pearson Education, 1st Edition, 2001.
2. Dan E.Krane, Michael L.Raymer, "*fundamental concepts of BioInformatics* ", Pearson Education, 2004.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT VII SEMESTER

CLOUD COMPUTING & BIG DATA LAB

Course Code: **A3613**

L	T	P	C
0	0	2	1

Course Overview:

In this course you will learn about two extremely important, and sometimes interrelated, emerging data management technologies: cloud computing and big data. You will analyze the reasons why cloud computing provides an attractive alternative to an on-site data center, and the technical and economic impacts of migrating to the cloud. You will also gain an appreciation of the challenges of managing vast quantities of structured and unstructured big data, and how organizations are trying to leverage big data stores via analytics for strategic decision making. You will conduct research into current and proposed solutions for both of these information technologies.

Pre-requisites:

Database Management Systems (A3516), Data Warehousing and Data Mining (A3522)

Course Objectives:

I.   To understand the various issues in cloud computing and the need and application of Map Reduce
II. To familiarize themselves with the lead players in cloud
III. To appreciate the emergence of cloud as the next generation computing paradigm
IV. To be able to set up a private cloud
V.   To learn how to handle large data sets in main memory

Course Outcomes:

Upon completion of the course the student will be able to:

1. Implement a data center with two hosts using Virtualbox and MapReduce applications
2. Implement cloud Services using Windows Azure, GCP, AWS etc.
3. Write case studies on real time implementation of AmazonEC2, AmazonS3 and windows Azure etc.
4. Evaluate various vendor offerings in the cloud.

CLOUD COMPUTING & BIG DATA LAB

Course Code: **A3613**

L	T	P	C
0	0	2	1

Syllabus

EXPERIMENTS LIST:

1. Software Study – Hadoop
2. Service Deployment & Usage over cloud
3. Managing Cloud Computing Recourses
4. Using cloud characteristics & Service models
5. With cloud computing as with data breaches it is a question of "When" not "if", so what can information security professionals do practically to manage security compliance In the cloud.
6. Performance evaluation of service over cloud.
7. Create a "N "virtual machine in cloud environment.
8. Case Study: Google App Engine
9. Case Study: Microsoft Azure
10. Case Study: Hadoop
11. Case Study: Amazon, Aneka
12. Implement the following file management tasks in Hadoop:
    - Adding files and directories
    - Retrieving files
    - Deleting files

    Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.
13. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm
14. Write a Map Reduce program that mines weather data.

    Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.
15. Implement Matrix Multiplication with Hadoop Map Reduce

Text Books / Reference Books / Materials :

1. Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola, S Thamarai Selvi, TMH Publications.
2. Cloud Computing: Concepts, Technology & Architecture (The Prentice Hall Service Technology Services from Thomas Erl).
3. Microsoft System Center Building a Virtualized Network Solution, Second Edition by Nigel Cain, Michel Luescher, Damian Flynn and Alvin Morales.
4. The Definitive Guide by Tom White, 3rd Edition, O'reilly Hadoop in Action by Chuck Lam, MANNING Publication
5. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech IT VII SEMESTER

MOBILE APPLICATION DEVELOPMENT LAB

Course Code: **A3614**

L	T	P	C
0	0	2	1

Course Overview:

This subject covers building mobile applications using android application development tools. It includes developing simple applications that could run on android mobile devices. It covers designing mobile apps for various requirements like connecting to the databases, working with telephony manager, media player, camera, sending mail, working with SQLite database etc.

Pre-requisites:

Object Oriented Programming (A3509), Web Technologies (A3601)

Course Objectives:

I. Be competent in programming in an event-based model used in application development for mobile devices
II. Be able to write and deploy a content based application using a mobile computing software framework
III. Research new programming techniques to meet the requirements of a mobile application
IV. Identify the challenges that mobile programming has in providing an effective utilities

Course outcomes

1. Install and configure Android application development tools, Apply Java programming concepts to Android application development
2. Design and develop user Interfaces for the Android platform
3. Understand the technical challenges posed by current mobile devices and wireless communications; be able to evaluate and select appropriate solutions
4. Select and evaluate suitable software tools and APIs for the development of a particular mobile application and understand their strengths, scope and limitations
5. The students will be able to develop mobile applications with underlying database supports
6. Develop and apply current standard-compliant scripting/programming techniques for the successful deployment of mobile applications targeting a variety of android supported devices

B. Tech IT VII SEMESTER

MOBILE APPLICATION DEVELOPMENT LAB

Course Code: **A3614**

L	T	P	C
0	0	2	1

EXPERIMENTS

WEEK-1

1. Create an android app to illustrate activity life cycle
2. a) Create an android app to visit a specified webpage (Use Implicit Intent)
   b) Create an android app to navigate between activities (Use Explicit Intent)

WEEK-2

3. a) Create an android app to perform mathematical operations(+,-,*,/,%). (Use buttons, edittext, toast controls)
   b) Create an android app to display text in bold, italic, normal style with left, right, center alignments (use RadioButton, CheckBox controls)

WEEK-3

4. a) Create an android app to display name of the country from the list(Use spinner control)
   b) Create an android app to calculate age of a person (Use DatePicker control)
   c) Create an android app design login control and validate login details

WEEK-4

5. a) Create an android app to demonstrate AlertDialog
   b) Create an android app to demonstrate WebView control
6. a) Create an android app to show Analog and Digital clocks
   b) Create an android app to illustrate a progressbar

WEEK-5

7. a) Create an android app to demonstrate list fragment
   b) Create an android app to demonstrate dialog fragment

WEEK-6

8. Create an android app to demonstrate option menu, handling listeners
9. Create an android app to scroll list of images and display details of images (name, size etc) using ImageSwitcher control

WEEK-7

10. Create an android app to demonstrate mediaplyer
11. Create an android app to show details phone contacts, implement calling, receiving features

WEEK-8

12. Create an android app to demonstrate camera
13. a) Create an android app to demonstrate sending e-mail
    b) Create an android app to demonstrate sending SMS

WEEK-9

14. Create an android app to store details of students in SQLite and display the details
15. Create an android app to perform insert, update, delete operations on student database

Text Books:

1. Wei-Meng Lee(2011),Beginning Android 4 Application Development, Wiley Publishing, Inc.
2. Pradeep Kothari(2014), "Android Application Development(with KitKat support) Black Book", Drea mTech Press

Reference Books:

1. James C.Sheusi(2013), "Android Application Development for Java Programmers", Cengage Learnin g
2. Lucas Jordan, Pieter Greyling, Practical Android Projects, Apress
3. John Horton, Android Programming for Beginners, PACKT Publishing
4. Chris Haseman, Kevin Grant, Beginning Android Programming: Develop and Design, Peachpit press

VARDHAMAN COLLEGE OF ENGINEERING

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B. Tech. IT VIII SEMESTER

MANAGEMENT SCIENCE

	L	T	P	C
	3	1	0	3

Course Code: A3014

Syllabus

UNIT I (11 Lectures)

Introduction: Management - Definition, Nature, Importance of management, Functions of Management - Taylor's scientific management theory, Fayol's principles of management, Contribution of Elton mayo, Maslow, Herzberg, Douglas MC Gregor. Basic concepts of Organisation- Authority, Responsibility, Delegation of Authority, Span of control, Departmentation and Decentralization - Organisation structures (Line organization, Line and staff organization, Functional organization, Committee organization, Matrix organization)

UNIT II (11 Lectures)

Operations Management: Plant location, Factors influencing location, Principles and types of plant layouts - Methods of production (job, batch and mass production), Work study - Basic procedure involved in method study and Work measurement.

UNIT III (11 Lectures)

Quality Control and Materials management: Statistical quality control – Meaning- Variables and attributes - X chart, R Chart, C Chart, P Chart, (simple Problems) Acceptance sampling, Sampling plans, Deming's contribution to quality. Materials management – objectives, Need for inventory control, Purchase procedure, Store records, EOQ, ABC analysis, Stock levels.

UNIT IV (11 Lectures)

Human Resource management (HRM): Concepts of HRM, Basic functions of HR manager: Man power planning, Recruitment, Selection, Training and development, Placement, Wage and salary administration, Promotion, Transfers, Separation, performance appraisal, Job evaluation and Merit rating.

UNIT V (11 Lectures)

Project management: Early techniques in project management - Network analysis: Programme evaluation and review technique (PERT), Critical path method (CPM), Identifying critical path, Probability of completing project within given time, Project cost analysis, project crashing (simple problems)

Text Books:

1. Dr. A.R.Aryasri, Management Science, TMH, 4th edition, 2009

References:

1. Koontz & weihrich – Essentials of management, TMH, 8th edition, 2010
2. Stoner, Freeman, Gilbert, Management, 6th edition Pearson education, New Delhi, 2004
3. O.P. Khana, Industrial engineering and Management L.S.Srinath, PERT & CPM .

VARDHAMAN COLLEGE OF ENGINEERING
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B.TECH IT VIII SEMESTER

SOFTWARE PROJECT MANAGEMENT
(Professional Elective-V)

Course Code: **A3661**

L	T	P	C
4	0	0	4

Course Overview:

The conventional model performance and pitfalls, Software economic parameters, Software development lifecycle stages and phases, Artifacts and work flows of the process, Check points of the process(Milestones),Roles and Responsibilities of Management and Technical people, Tailoring of the project, Monitoring and controlling of process status using Metrics, Future software project management.

Prerequisite(s):
Software Engineering (A3514), Software Testing Methodology (A3612)

Course Objectives:
I. Provide cost effective, flexible project management for the software project to meet current and future demands of a business.
II. Able Ability to incorporate organizational culture into business software to build employee and workplace morale, to achieve the concurrence among stakeholders at every stage in the life cycle and synchronize the stakeholder's expectations by conducting the reviews.
III. Able to support configuration management and change management for a healthy project and define the roles and Responsibilities of the Management and Technical people.
IV. Optimize and analyze the software project resources to improve software ROI by reducing the development cost and State methods to analyze, estimate risks at early stages to reduce reengineering cost.

Course Outcomes:
Upon completion of the course the student will be able to:

1. Understand different models for development of the software.
2. Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
3. Analyze organizational structure and project structure.
4. Implement a project to manage project schedule, expenses and resources with the application of suitable application management tools.

SOFTWARE PROJECT MANAGEMENT
(Professional Elective-V)

Course Code: **A3661**

L	T	P	C
4	0	0	4

SYLLABUS

UNIT-I   **(12 Lectures)**
Conventional Software Management: The waterfall model, conventional software Management performance. **Evolution of Software Economics:** Software economics, pragmatic software cost estimation.
Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT-II   **(12 Lectures)**
The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.
Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. **Artifacts of the process:** The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.
Model based software architectures: A Management perspective and technical perspective.

UNIT-III   **(13 Lectures)**
Work Flows of the process: Software process workflows, Iteration workflows. **Checkpoints of the process:** Major milestones, Minor Milestones, Periodic status assessments.
Iterative Process Planning: work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT-IV   **(13 Lectures)**
Project Organization And Responsibilities Line-of-Business Organizations, Project Organizations, evolution of Organizations. **Process Automation:** Automation Building blocks, The Project Environment.
Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.
Tailoring the Process: Process discriminates.

UNIT-V   **(15 Lectures)**
Future Software Project Management: modern Project Profiles, Next generation Software economics, modern process transitions. **Case Study:** The command Center Processing and Display system-Replacement (CCPDSR).

TEXT BOOKS:
1. Software Project Management, Walker Royce: Pearson Education, 2005.

REFERENCE BOOKS:
4.   Software Project Management, Bob Hughes and Mike Cottere ll: Tata McGraw-Hill Edition.
5.   Software Project Management, Joel Henry, Pearson Education.
6.   Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

WEB MINING
(Professional Elective-V)

Course Code: **A3662**

L	T	P	C
4	0	0	4

Course Overview:

Web mining - is the application of data mining techniques to discover patterns from the World Wide Web. Web mining can be divided into three different types – Web usage mining, Web content mining and Web structure mining. Web Usage Mining is the application of data mining techniques to discover interesting usage patterns from Web data in order to understand and better serve the needs of Web-based applications. Web structure mining is the process of using graph theory to analyze the node and connection structure of a web site. Web content mining is the mining, extraction and integration of useful data, information and knowledge from Web page content.

Pre-requisites:
Data Warehousing and Data Mining (A3522), Information Retrieval System (A3559)

Course Objectives:
I. To focus on a detailed overview of the data mining process and techniques, specifically those those are relevant to Web mining.
II. To understand the basics of Information retrieval and Web search with special emphasis on web Crawling.
III. To appreciate the use of machine learning approaches for Web Content Mining.
IV. To understand the role of hyper links in web structure mining.
V. To appreciate the various aspects of web usage mining.

Course Outcomes:
Upon completion of the course the student will be able to:

1. Build a sample search engine using available open source tools.
2. Identify the different components of a web page that can be used for mining.
3. Apply machine learning concepts to web content mining.
4. Implement Page Ranking algorithm and modify the algorithm for mining information.
5. Process data using the Map Reduce paradigm.
6. Design a system to harvest information available on the web to build recommender systems.

WEB MINING
(Professional Elective-V)

Course Code: **A3662**

L	T	P	C
4	0	0	4

SYLLABUS

UNIT - I **(10 Lectures)**

INTRODUCTION Introduction – Web Mining – Theoretical background –Algorithms and techniques – Association rule mining – Sequential Pattern Mining -Information retrieval and Web search – Information retrieval Models-Relevance Feedback- Text and Web page Pre-processing – Inverted Index – Latent Semantic Indexing – Web Search – Meta-Search – Web Spamming

UNIT - II **(10 Lectures)**

WEB CONTENT MINING Web Content Mining – Supervised Learning – Decision tree - Naïve Bayesian Text Classification - Support Vector Machines - Ensemble of Classifiers. Unsupervised Learning - K-means Clustering - Hierarchical Clustering –Partially Supervised Learning – Markov Models - Probability-Based Clustering - Evaluating Classification and Clustering – Vector Space Model – Latent semantic Indexing – Automatic Topic Extraction - Opinion Mining and Sentiment Analysis - Document Sentiment Classification

UNIT - III **(10 Lectures)**

WEB LINK MINING Web Link Mining – Hyperlink based Ranking – Introduction -Social Networks Analysis-Co-Citation and Bibliographic Coupling - Page Rank -Authorities and Hubs -Link-Based Similarity Search - Enhanced Techniques for Page Ranking - Community Discovery – Web Crawling -A Basic Crawler Algorithm-Implementation Issues- Universal Crawlers- Focused Crawlers- Topical CrawlersEvaluation - Crawler Ethics and Conflicts - New Developments

UNIT - IV **(10 Lectures)**

STRUCTURED DATA EXTRACTION Structured Data Extraction: Wrapper Generation – Preliminaries-Wrapper Induction- Instance-Based Wrapper Learning ·- Automatic Wrapper Generation: Problems - String Matching and Tree Matching -. Multiple Alignment - Building DOM Trees - Extraction Based on a Single List Page and Multiple pages- Introduction to Schema Matching - Schema-Level Match -Domain and Instance-Level Matching – Extracting and Analyzing Web Social Networks

UNIT - V **(12 Lectures)**

WEB USAGE MINING

Web Usage Mining - Click stream Analysis -Web Server Log Files - Data Collection and PreProcessing - Cleaning and Filtering- Data Modeling for Web Usage Mining - The BIRCH Clustering Algorithm -Affinity Analysis and the A Priori Algorithm – Binning. Discovery and Analysis of Web Usage Patterns – Modeling user interests –Probabilistic Latent Semantic Analysis – Latent Dirichlet Allocation Model– Applications-Collaborative Filtering- Recommender Systems – Web Recommender systems based on User and Item – PLSA and LDA Models

TEXT BOOK:
1. Bing Liu, " Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data (Data-Centric Systems and Applications)", Springer; 2nd Edition 2009

REFERENCE BOOKS:

1. EGuandong Xu ,Yanchun Zhang, Lin Li, "Web Mining and Social Networking: Techniques and Applications", Springer; 1st Edition.2010
2. Zdravko Markov, Daniel T. Larose, "Data Mining the Web: Uncovering Patterns in Web Content, Structure, and Usage", John Wiley & Sons, Inc., 2007
3. Soumen Chakrabarti, "Mining the Web: Discovering Knowledge from Hypertext Data", Morgan Kaufmann; edition 2002
4. Adam Schenker, "Graph-Theoretic Techniques for Web Content Mining", World Scientific Pub Co Inc , 2005
5. Min Song, Yi Fang and Brook Wu, Handbook of research on Text and Web mining technologies, IGI global, information Science Reference – imprint of: IGI publishing, 2008.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B.TECH IT VIII SEMESTER

GEOGRAPHICAL INFORMATION SYSTEMS
(PROFESSIONAL ELECTIVE- V)

Course Code: **A3663**

L	T	P	C
4	0	0	4

Course Overview:

This course is an introduction to digital mapping and spatial analysis using a geographic information system (GIS). Students learn how to create their own maps and how to use a GIS to analyze geographic problems using methods that can be applied to a wide variety of subject areas within geography and in other disciplines. The course is designed to accommodate students from a variety of research backgrounds and with no previous GIS experience. The goal is to provide students with a theoretical understanding of spatial data and analysis concepts, and to introduce the practical tools needed to create and manage spatial data, perform spatial analysis, and communicate results using a well-designed map. Successful students should be able to learn new functions on their own and apply what they have learned to their own research.

Pre-requisites:
Database Management Systems (A3516)

Course Objectives:
Students successfully completing this course should be able to:
1. Understand the purposes of GIS and the kinds of problems to which GIS is applied.
2. Understand the fundamental types of GIS data, including raster and vector data.
3. Evaluate the appropriateness of the existing data sources for use in a project.
4. Understand the data creation process and create simple data sets and/or add to existing data

Course Outcomes:
Upon completion of the course the student will be able to:

1. Comprehend fundamental concepts and practices of Geographic Information Systems (GIS) and advances in Geospatial Information Science and Technology (GIS&T).
2. Apply basic graphic and data visualization concepts such as color theory, symbolization, and use of white space.
3. Demonstrate organizational skills in file and database management.
4. Give examples of interdisciplinary applications of Geospatial Information Science and Technology.
5. Apply GIS analysis to address geospatial problems and/or research questions.

GEOGRAPHICAL INFORMATION SYSTEMS
(PROFESSIONAL ELECTIVE- V)

Course Code: **A3663**   **L   T   P   C**
                                                                            4   0   0   4

SYLLABUS

UNIT-I   **(12 Lectures)**
FUNDAMENTALS OF GIS: What is GIS – Introduction Defining GIS – Components of a GIS – Spatial data – Introduction - Maps and their influence on the character of spatial data – Other sources of spatial data

UNIT-II   **(12 Lectures)**
SPATIAL DATA MODELING: Introduction – Entity definition – Spatial data models – Spatial data structures – Modeling surfaces – Modeling networks – Building computer networks – Modeling the third dimension – modeling the fourth dimension - Attribute data management - Introduction – Why choose a database approach? - Database data models – Creating a database – GIS database applications – Developments in databases.

UNIT-III   **(12 Lectures)**
DATA INPUT AND EDITING: Introduction – Methods of data input –Data editing – Towards an integrated database - Data analysis: Introduction – Measurements in GIS – lengths, perimeters and areas – Queries – Reclassification – Buffering and neighborhood functions – Integrating data –map overlay – Spatial interpolation – Network analysis.

UNIT-IV   **(12 Lectures)**
ANALYTICAL MODELING IN GIS: Introduction – process models – Modeling physical and environmental processes – Modeling human Processes –Modeling the decision – making process – Problems with using GIS to model spatial processes - Output: from new maps toenhanced decisions: Introduction – Maps as output – Non-cartographic output – Spatial multimedia – Mechanisms of delivery – GIS and spatial decision support

UNIT-V   **(12 Lectures)**
ISSUES IN GIS: The development of computer methods for handling spatial data – Introduction – Handling spatial data manually – The development of computer methods for handling spatial data – The development of GIS - Data quality issues – Introduction –Describing data quality and errors sources of errors in GIS.

Text Books:

1. Ian Heywood, Sarah Cornelius and Steve carver, "Introduction to geographical information systems", Pearson Education, 4th Edition, 2012.

Reference Books:

1. DeMers, M.N., "Fundamentals of Geographic Information Systems", 3 rdEdition, Wiley Press, 2009.

2. Lo C.P. and Yeung, A.K.W.,"Concepts and Techniques of Geographic Information Systems", Prentice Hall, 2002.

3. Burrough, P.A. and R.A. McDonald, "Principles of Geographical Information Systems", Oxford University Press, 1998.

B.TECH IT VIII SEMESTER

MULTIMEDIA AND APPLICATION DEVELOPMENT
(Professional Elective-V)

Course Code: **A3664**

L	T	P	C
4	0	0	4

Course Overview:

In this course multimedia is used as the subject of learning with ActionScript used as the programming language. The course is intended to appeal to students who would normally be interested in taking core courses using the Java language (which form the standard path for Computer Science majors). Students may find this course as interesting in learning about programming computers. The course emphasizes the concept of immediate applicability of the programming concepts introduced, particularly for introductory multimedia projects.

Prerequisite(s):

Object oriented programming through Java (A3509), Computer Graphics (A3602).

Course Objectives:

   I.   Understand different media types like text, audio, video, images.
  II.   Learn object oriented features using ActionScript2.0.
 III.   Analyze OOP framework and its components usage.
  IV.   Apply different compression algorithms on data, image and video techniques.
   V.   Learn about basics of multimedia networks and investigate models for multimedia for internet.

Course Outcomes:

Upon completion of the course the student will be able to:
1. Understand the characteristics of different media, representations of different multimedia data and understand different data formats.
2. Analyze different compression techniques and multimedia standards.
3. Expertise in design and develop multimedia systems according to the requirements of multimedia applications.
4. Understand the multimedia networks and data transmissions over internet.
5. Invest and implement the multimedia application projects.

MULTIMEDIA AND APPLICATION DEVELOPMENT
(Professional Elective-V)

Course Code: **A3664**

L	T	P	C
4	0	0	4

SYLLABUS

UNIT-I **(12 Lectures)**

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

UNIT-II **(13 Lectures)**

Fundamental concepts in video and digital audio: Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.
Action Script I: ActionScript Features, Object-Oriented ActionScript, Datatypes and Type Checking, Classes, Authoring an ActionScript Class.

UNIT-III **(12 Lectures)**

Action Script II : Inheritance, Authoring an ActionScript 2.0 Subclass, Interfaces, Packages, Exceptions.
Application Development : An OOP Application Frame work, Using Components with ActionScript MovieClip Subclasses.

UNIT-IV **(13 Lectures)**

Multimedia data compression : Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding

UNIT-V **(13 Lectures)**

BASIC VIDEO COMPRESSION TECHNIQUES: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.
 MULTIMEDIA NETWORKS: Basics of Multimedia Networks, Multimedia Network Communications and Applications : Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks.

TEXT BOOKS:

1. Fudamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI/Pearson Education.
2. Essentials ActionScript 2.0, Colin Moock, SPD O,REILLY.

REFERENCE BOOKS:

1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
2. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
3. Multimedia and communications Technology, Steve Heath, Elsevier(Focal Press).
4. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
5. Multimedia Basics by Weixel Thomson
6. Multimedia Technology and Applications, David Hilman , Galgotia

FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS
(Open Elective)

Course Code: **A3576**

L	T	P	C
3	0	0	3

Course Objectives:

I. Understand the areas of database design, SQL and programming

II. Learning the use of data base using SQL tool.

III. Understanding the importance of normalization.

IV. To study the concurrency and locking mechanism on DBMS

V. To design the searching and storing concepts in DBMS.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Understand the applications of dbms, difference between file systems and dbms, identify the data models, understands the dbms structures.

2. Analyze the working principle of DBMS using relational algebra concepts, selection ,projection relational calculus which helps in understanding queries

3. Implement queries on RDBMS with the help of SQL tool.

4. Understands the need of normalization and use of normalization theory and apply such knowledge to the normalization of a database for efficient use. Normal forms I,II,III,IV BCNF is learnt

FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS
(Open Elective)

Course Code: **A3576**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT – I   **(13 Lectures)**

INTRODUCTION: History of database systems, introduction to database management systems, database system applications, database systems versus file systems, view of data, data models, database languages- DDL & DML commands and examples of basic SQL queries, database users and administrators, transaction management. (T2: Ch-1)

DATABASE DESIGN: Introduction to database design and E-R diagrams, entities, attributes and entity sets, relationships and relationship sets, conceptual design for large enterprises. (T1: Ch-2)

UNIT – II   **(13 Lectures)**

THE RELATIONAL MODEL: Introduction to the relational model, integrity constraints over relations, enforcing integrity constraints, querying relational data. (T1: Ch-3)

RELATIONAL ALGEBRA AND CALCULUS: Preliminaries, relational algebra operators, relational calculus - tuple and domain relational calculus. (T1: Ch-4)

SQL: Overview, the form of a basic SQL query, union, intersect and except operators, nested queries, aggregate operators, null values, complex integrity constraints in SQL, cursors, triggers (T1: Ch-5)

UNIT – III   **(9 Lectures)**

SCHEMA REFINEMENT AND NORMAL FORMS: Functional dependencies, reasoning about FDs. Normal forms: 1NF, 2NF, 3NF, BCNF, properties of decompositions, normalization, schema refinement in database design, other kinds of dependencies: 4NF, 5NF. (T1: Ch-19)

UNIT – IV   **(10 Lectures)**

TRANSACTIONS MANAGEMENT: Transaction concept, transaction state, implementation of atomicity and durability, concurrent executions, Anomalies due to interleaved execution of transactions, serializability, recoverability. (T2: Ch-14)

CONCURRENCY CONTROL AND RECOVERY SYSTEM: Concurrency control - lock based protocols, time-stamp based protocols, validation based protocols, deadlock handling. (T2: Ch-16)

UNIT – V   **(8 Lectures)**

OVERVIEW OF STORAGE AND INDEXING: RAID levels, Index data structures, Tree structured indexing - intuition for tree indexes, indexed sequential access method (ISAM), B+ Trees - a dynamic tree structure. (T1: Ch-9,10)

TEXT BOOK(S):
   T3. Raghurama Krishnan, Johannes Gehrke (2007), *Database Management Systems*, 3rd Edition, Tata McGraw-Hill, New Delhi, India.
   T4. Abraham Silberschatz, Henry F. Korth, S. Sudarshan (2010), *Database System Concepts,* 6th Edition, McGraw- Hill, New Delhi, India.

REFERENCE BOOK(S):
   1.   Elmasri Navate (2014), *Fundamentals of Database Systems*, Pearson Education, India.

FUNDAMENTALS OF IMAGE PROCESSING
(Open Elective)

Course Code: **A3577**

L	T	P	C
3	0	0	3

Course Objectives:

Is to make the student

I.   Understand the basic principles and methods of digital image processing and pattern recognition
II. Develop critical thinking about shortcomings of the state of the art in image processing and pattern recognition
III. Be able to formulate solutions to general image processing and pattern recognition problems
IV. Be prepared for research in image processing and pattern recognition if the student chooses to go that way.

Course Outcomes:

Upon completion of this course, students will be able to:

1. Understand image formation and the fundamentals of Digital image processing and pattern recognition including the topics such as filtering, transforms and morphology, and image analysis, compression and clustering.
2. Able to understand and use basic image processing algorithms and techniques in image enhancement and image restoration.
3. Have the skill base necessary to further explore advanced topics of Digital Image Processing and pattern recognition.
4. Be in a position to make a positive professional contribution in the field of Digital Image Processing and pattern recognition

FUNDAMENTALS OF IMAGE PROCESSING
(Open Elective)

Course Code: **A3577**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT - I (Lectures 10)
FUNDAMENTALS OF IMAGE PROCESSING:
Image acquisition, image model, sampling, quantization, relationship between pixels, distance measures, connectivity, and image geometry. **(Chapter1: T1)**

UNIT – II (Lectures 8)
IMAGE TRANSFORMS:
Fourier transform, DFT, DFT-properties , FFT, WALSH transform, HADAMARD transform, DCT.
(chapter2: T1,R2)

UNIT – III (Lectures 11)
IMAGE ENHANCEMENT (SPATIAL Domain Methods):
Histogram Processing - definition, equalization, matching, local enhancement, use of histogram statics for image enhancement, Arithmetic and logical operations, pixel or point operations, size operations, Smoothing filters-mean, median, mode filters, sharpening spatial filtering. **(chapter3: T1)**

UNIT – IV (Lectures 9)
IMAGE ENHANCEMENT (FREQUENCY Domain Methods):
Design of low pass, high pass, edge enhancement, smoothening filters in frequency domain. Butter worth filter, sharpening frequency domain filters, homomorphic filters in frequency domain. **(chapter4: T1,R1)**

UNIT – V (Lectures 13)
IMAGE SEGMENTATION:
Detection of discontinuities, edge linking and boundary detection, thresholding, region based segmentation, use of motion in segmentation. **(Chapter5: T1)**

COLOR IMAGE PROCESSING:
Fundamentals, models, pseudo color image, color transformation, Fundamentals of image compression, image compression models, and color image compression. **(Chapter5: T1,R1)**

TEXT BOOKS:
3. T1: Rafael C. Gonzalez, Richard E. Woods (2008), Digital Image Processing, Low Price Edition, Pearson Education, New Delhi, India.

REFERENCE BOOKS:
5. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, Second Edition, Prentice Hall.
6. Fundamentals of digital image processing by Anil K. jain, Low Price Edition, Pearson Education.
7. Arthur R. Weeks (1996), Fundamentals of Electronic Image Processing, Prentice Hall of India, New Delhi.
8. Milan Sonka, Vaclav Hlavac, Roger Boyle (2008), Image processing, Analysis and Machine vision, Thomson Publications, India.

OPERATING SYSTEM FUNDAMENTALS
(Open Elective)

Course Code: **A3578**

L	T	P	C
3	0	0	3

Course Objectives:

I.   Understand the operation of process management, memory management, storage management and system calls & system programs.
II. Apply process concepts, process synchronization and classical synchronization problems.
III. Evaluate compare and contrast the key trade-offs between multiple approaches in deadlocks and analyze memory management schemes.
IV. Analyze file systems management and apply disk scheduling algorithms and disk storage implementation.
V.   Create and apply basic protection and security mechanisms for access control matrix and network threats

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Understand the operation of process management, memory management, storage management and system calls & system programs. Demonstrate knowledge process management.
2. Apply and implement process concepts, process synchronization, semaphores, readers & writer's problem and dining philosopher problem.
3. Evaluate and implement deadlock avoidance, deadlock detection and deadlock recovery mechanisms and Analyze and implement memory management schemes.
4. Apply and create file system concepts for file access, directory access methods, disk storage and disk scheduling algorithms.

OPERATING SYSTEM FUNDAMENTALS
(Open Elective)

Course Code: **A3578**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT – I **(11 Lectures)**
OPERATING SYSTEMS OVERVIEW: Introduction-operating system operations, process management, memory management, storage management, protection and security, System structures-Operating system services, systems calls, Types of system calls, system programs (**T1: Ch-1, 2**)

UNIT – II **(12 Lectures)**
PROCESS MANAGEMENT: Process concepts- Operations on processes, IPC, Process Scheduling
(**T1: Ch-3, 5).**
PROCESS COORDINATION: Process synchronization- critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of synchronization, readers and writers problem, dining philosopher's problem, monitors **(T1: Ch-6**).

UNIT – III **(11 Lectures)**
DEADLOCKS: System model, deadlock characterization, deadlock prevention, avoidance, detection and recovery from deadlock. **(T1: Ch-7**)
MEMORY MANAGEMENT: Memory management strategies-Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual-memory management- demand paging, page-replacement algorithms, allocation of frames, thrashing. (**T1: Ch-8, 9**)

UNIT – IV **(10 Lectures)**
STORAGE MANAGEMENT: File system-Concept of a file, access methods, directory structure, file system mounting, file sharing, protection. (**T1: Ch-10**)
SECONDARY-STORAGE STRUCTURE: Overview of mass storage structure, disk structure, disk attachment, disk scheduling algorithms, swap space management, stable storage implementation, and tertiary storage structure (**T1: Ch-12**).

UNIT – V **(11 Lectures)**
PROTECTION: System protection-Goals of protection, principles of protection, domain of protection access matrix, implementation of access matrix, access control, revocation of access rights. (**T1: Ch-13**)
SECURITY: System security-The security problem, program threats, system and network threats, implementing security defenses, firewalling to protect systems(**T1: Ch -18**).

TEXT BOOKS:
1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2009), Operating System Concepts, 8th Edition, Wiley India Private Limited, New Delhi.

REFERENCE BOOKS:
6. Stallings(2006), Operating Systems, Internals and Design Principles, 5th Edition, Pearson Education, India.
7. Andrew S. Tanenbaum (2007), Modern Operating Systems, 2nd Edition, Prentice Hall of India, India.
8. Deitel & Deitel (2008), Operating systems, 3rd Edition, Pearson Education, India.
9. Dhamdhere (2008), Operating Systems, 2nd Edition, Tata Mc graw Hill, New Delhi.
10. Paul Love, Joe Merlino, Craig Zimmerman, Jeremy C. Reed, and Paul Weinstein (2005), Beginning Unix, Wiley Publishing, Inc.

JAVA PROGRAMMING
(Open Elective)

Course Code: **A3579**

L	T	P	C
3	0	0	3

Course Objectives:

I.   The course presents a conceptual and practical introduction to Object Oriented Programming, exemplified by Java.

II.   Deliberate Extrapolate the basic principles of object oriented concepts.

III. Construct high speed, fault tolerant applications using multi-threading and exception handling concepts

IV.   Develop any GUI application with event handling for any real time applications.

V.   Exercise the core object oriented programming concepts, and associated class libraries, to develop any kind of robust application. For advance learning, teaching, research, and commercial software development.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1.   Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP like encapsulation, Inheritance and Polymorphism.

2.   Demonstrate an ability to design high speed, fault tolerant applications using multi-threading and exception handling concepts.

3.   Excel in contemporary Java based integrated development environments to develop rich GUI applications.

4.   Apply various concepts of swings, Iframes to develop java related projects.

JAVA PROGRAMMING
(Open Elective)

Course Code: **A3579**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT – I   **(15 Lectures)**

EVOLUTION OF JAVA: Object-Oriented Programming Introduction, Two Paradigms, The Three OOP Principles, Evolution of Java, Java Buzzwords, Java Program Structure, Implementing a Java Program, JVM Architecture, Data Types, Variables, Constants, Type Conversion and Casting, I/O Basics, Operators, and Control Statements.

CLASS, METHODS, OBJECTS AND CONSTRUCTORS: Introducing Classes, Objects, Methods, Constructors, Garbage Collection, finalize, Overloading Methods and Constructors, Argument Passing, Recursion, static and final Keywords.

ARRAYS: One dimensional and two dimensional arrays with sample examples.

STRINGS: Exploring String and String Buffer class and Methods.

UNIT – II   **(10 Lectures)**

INHERITANCE: Inheritance Basics, Member Access and Inheritance, this and super Keywords, Creating Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Abstract Classes ,inheritance with final keyword.

PACKAGES AND INTERFACES: Defining a Package, Finding Packages and CLASSPATH, Access Protection, Importing Packages, Defining an Interface, and Implementing Interfaces.

UNIT – III   **(10 Lectures)**

EXCEPTION HANDLING: Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try, catch, throw, throws and finally Keywords, Built-in Exceptions, Creating Own Exception.

MULTITHREADED PROGRAMMING: Thread Life Cycle, Creating a Thread - Extending Thread Class and Implementing Runnable Interface, Creating Multiple Threads**,** Thread Priorities, Synchronization.

UNIT – IV   **(10 Lectures)**

AWT CONTROLS: AWT Classes, Window Fundamentals, Working with Frame Windows, Working with Graphics, Color, Fonts, Control Fundamentals, Labels, Buttons, Check Boxes, Checkbox Group, Choice Controls, Lists, Scroll Bars, TextArea, and Layout Managers.

SWINGS: Swings Introduction, Features, Hierarchy of Swing, Top Level Containers - JFrame, JWindow, JApplet, Light Weight Containers - JPanel, Create a Swing Applet, Swing Components - JLabel and Image Icon, JTextField, JButton,JCheckBox, JRadioButton, and JComboBox.

EVENT HANDLING: Delegation Event Model, Event Classes, Sources of Events, Event Listener Interfaces, Handling Mouse and Keyboard Events, Adapter Classes.

UNIT – V   **(10 Lectures)**

FILE I/O: Streams, Stream Classes- Byte and Character, File Operations – Reading, Writing and Closing,

EXPLORING JAVA.UTIL: Array List, Vector, Hash table, StringTokenizer, and Date.

APPLETS: Applet Basics, Applet Lifecycle, Applet Skeleton, Simple Applet Display Methods, the HTML APPLET Tag, Passing Parameters to Applets.
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TEXT BOOK:

2. Herbert Schildt (2011), *Java: The Complete Reference*, 8th Edition, Tata McGraw-Hill Education, New Delhi.

REFERENCE BOOKS:

4. Michael Ernest (2013), *Java SE 7 Programming Essentials*, John Wiley & Sons Inc.
5. Y. Daniel Liang (2014), *Introduction to Java Programming, Comprehensive Version*, 10th Edition, Pearson Education, India.
6. Kathy Sierra, Bert Bates (2014), *OCA/OCP Java SE 7 Programmer I & II Study Guide* (Exams 1Z0-803 & 1Z0-804), 1st Edition, McGraw-Hill Education Publisher, USA.

CYBER LAWS
(Open Elective)

Course Code: **A3676**

L	T	P	C
3	0	0	3

Course Overview:

This course drawing upon a wealth of experience from academia, industry, and government service, Cyber Security details and dissects, in current organizational cyber security policy issues on a global scale—taking great care to educate students on the history and current approaches to the security of cyberspace. It includes thorough descriptions—as well as the pros and cons—of an excess of issues, and document policy alternatives for the sake of clarity with respect to policy alone. It also delves into organizational implementation issues, and equips students with descriptions of the positive and negative impact of specific policy choices.

Prerequisite(s):
- Computer Networks (A3519)
- Information Security (A3608)
- E-Commerce (A3605)

Course Objectives:

I. Illustrate what is meant by cyber security and cyber security policy
II. Discuss the process by which cyber security policy goals are set
III. Educate the reader on decision-making processes related to cyber security
IV. Describe a new framework and taxonomy for explaining cyber security policy issues

Course Outcomes:

Upon the successful completion of this course, students will be able to:

1. Analyze cyber attack on different online web applications
2. Apply different techniques to classify different types of cybercrimes.
3. Understand different government cyber laws and cyber forensics techniques and how to protect them self and ultimately society from cyber attacks.
4. Describe and analyze the hardware, software, components of a network and the interrelations.
5. Illustrate the concepts of confidentiality, availability and integrity in Information Assurance, including physical, software, devices, policies and people.

CYBER LAWS
(Open Elective)

Course Code: **A3676**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT I   10 Lectures)

INTRODUCTION: Cyber Security– Cyber Security policy – Domain of Cyber Security Policy – Laws and Regulations – Enterprise Policy – Technology Operations – Technology Configuration - Strategy Versus Policy – Cyber security Evolution – Productivity – Internet – E commerce – Counter Measures Challenges.

UNIT II   **(11 Lectures)**

CYBER SECURITY OBJECTIVES AND GUIDANCE: Cyber Security Metrics – Security Management Goals – Counting Vulnerabilities – Security Frameworks – E Commerce Systems – Industrial Control Systems – Personal Mobile Devices – Security Policy Objectives – Guidance for Decision Makers – Tone at the Top – Policy as a Project – Cyber Security Management – Arriving at Goals – Cyber Security Documentation – The Catalog Approach – Catalog Format – Cyber Security Policy Taxonomy.

UNIT III   **(10 Lectures)**

CYBER SECURITY POLICY CATALOG: Cyber Governance Issues – Net Neutrality – Internet Names and Numbers – Copyright and Trademarks – Email and Messaging - Cyber User Issues – Malvertising – Impersonation – Appropriate Use – Cyber Crime – Geo location – Privacy - Cyber Conflict Issues – Intellectual property Theft – Cyber Espionage – Cyber Sabotage – Cyber Welfare.

UNIT IV   **(10 Lectures)**

CYBER MANGEMENT ISSUES: Fiduciary Responsibility – Risk Management – Professional Certification – Supply Chain – Security Principles – Research and Development – Cyber Infrastructure Issue – Banking and finance – Health care – Industrial Control systems.

UNIT V   **(10 Lectures)**

CASE STUDY: A Government's Approach to Cyber Security Policy

TEXTBOOKS:
2. Jennifer L. Bayuk , J. Healey , P. Rohmeyer , Marcus Sachs , Jeffrey Schmidt , Joseph Weiss " Cyber Security Policy Guidebook" John Wiley & Sons 2012.
3. Rick Howard "Cyber Security Essentials" Auerbach Publications 2011

REFERENCE BOOKS:
6. Richard A. Clarke, Robert Knake " Cyberwar: The Next Threat to National Security & What to Do About It" Ecco 2010
7. Dan Shoemaker Cyber security The Essential Body Of Knowledge, 1st ed. Cengage Learning 2011
8. Anti-Hacker Tool Kit (Indian Edition) by Mike Shema, Publication Mc Graw Hill.
9. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunit Belpure, Publication Wiley

E-COMMERCE TRENDS
(Open Elective)

Course Code: **A3677**

L	T	P	C
3	0	0	3

Course Overview:

The tremendous growth of the Internet and World Wide Web is having great impact on businesses, governments and individuals throughout the world. In this course, we will attempt to understand the phenomena, technological, economic and social, behind these rapid changes, and how organizations successfully conduct Internet-based activities. We will also study some of the technology of the Internet. This course provides an overview of e-commerce from both technological and managerial perspectives. It introduces e-commerce frameworks, and technological foundations; and examines basic concepts such as strategic formulation for e-commerce enterprises, management of their capital structures and public policy. It is particularly important that the student place a great deal of emphasis in understanding the different E-Commerce system design principles.

Course Objectives:

VI. Identify the major categories and trends of e-commerce applications and essential processes of an e-commerce system.

VII. Identify several factors and web store requirements needed to succeed in e-commerce.

VIII. Discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.

IX. Understand the main technologies behind e-commerce systems and how these technologies interact.

X. Analyze the various marketing strategies for an online business.

XI. Define various electronic payment types and associated security risks and the ways to protect against them.

Course Outcomes:

Upon completion of the course the student will be able to:

1. Evaluate the components and roles of the E-Commerce environment.
2. Explain how to sell products and services on the web as well as to meet the needs of web site visitors.
3. Analyze e-commerce payment systems.
4. Identify and reach customers on the web.
5. Understand legal and ethical issues related to E-Commerce and web marketing approaches.

E-COMMERCE TRENDS
(Open Elective)

Course Code: **A3677**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT - I   (10 Lectures)
INTRODUCTION TO E-BUSINESS AND E-COMMERCE : What is the difference between e-commerce and e-business, E-business risks and barriers to business adoption, Management responses to e-commerce and e-business.
E-COMMERCE FUNDAMENTALS- Location of trading in the marketplace, Business models for e-commerce, *Focus on* auction business models, *Focus on* Internet start-up companies.

UNIT - II   (10 Lectures)
E-BUSINESS INFRASTRUCTURE- Introduction, Internet technology, Web technology, Internet-access software applications, Managing e-business infrastructure, *Focus on* web services, SaaS and service-oriented Architecture (SOA), *Focus on* mobile commerce.

UNIT - III   (10 Lectures)
E-ENVIRONMENT- Social and legal factors, Environmental and green issues related to Internet Usage, *Focus on* e-commerce and globalization, Political factors.
E-BUSINESS STRATEGY- What is e-business strategy, Strategic analysis, Strategic objectives, Strategy definition, Strategy implementation, *Focus on* information systems strategy and e-business strategy.

UNIT - IV   (10 Lectures)
SUPPLY CHAIN MANAGEMENT- What is supply chain management?, *Focus on* the value chain, Using e-business to restructure the supply chain, Supply chain management implementation
E-procurement- What is e-procurement, Drivers of e-procurement, *Focus on* estimating e-procurement cost, Implementing e-procurement, *Focus on* electronic B2B marketplaces.

UNIT - V   (12 Lectures)
E-MARKETING- What is e-marketing?, E-marketing planning, Situation analysis, Objective setting, Strategy, Tactics, *Focus on* online branding.
CUSTOMER RELATIONSHIP MANAGEMENT- What is e-CRM, The online buying process, *Focus on* marketing communications for customer Acquisition, Customer retention management, Technology solutions for CRM.

TEXT BOOK:

   2. E-Business and E-Commerce Management , strategy, Implementation and practice, Dave Chaffey, Fourth Edition, Prentice Hall

REFERENCE BOOKS:

   4. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.
   5. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
   6. E-Commerce, S.Jaiswal – Galgotia.
   7. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.

PRINCIPLES OF SOFTWARE ENGINEERING
(Open Elective)

Course Code: **A3678**

L	T	P	C
3	0	0	3

Course Overview:

This course acts as a foundation in the field of software engineering and is aimed at helping students develop an understanding of how software systems are developed from scratch, by guiding them through the development process, adopting the fundamental principles of system development. The course will orient the students to the different software process models, software requirements engineering process, systems analysis and design as a problem-solving activity, with focus on quality.

Prerequisite(s):

Object Oriented Programming (A3509)

Course Objectives:

I.   Is to introduces software engineering to students as a discipline, discuss stages of the software lifecycle, compare development models such as waterfall, prototyping and incremental/ iterative, agile process models.

II. Is to make the learner, model, design, implement, and test small to medium software products effectively.

III. Is to make students acquire skills related to software documentation, both internal and external, verification/validation, quality assurance and testing methods.

Course Outcomes:

Upon Completion of the course the Students will be able to:

1. Identify the right process model to develop the right software system.
2. Gather requirements and analyze them scientifically in order to develop the right product, besides authoring software requirements document.
3. Propose design as per functional and non-functional requirements using design principles.
4. Apply testing strategies for application being developed.
5. Find right set of umbrella activities for quality management and assurance.
6. Understand metrics in the process and project domains.

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PRINCIPLES OF SOFTWARE ENGINEERING

(Open Elective)
</div>

Course Code: **A3678**

L	T	P	C
3	0	0	3

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SYLLABUS
</div>

UNIT I   **(13 Lectures)**

INTRODUCTION TO SOFTWARE ENGINEEIRNG: The Evolving nature of software engineering, Changing nature of software engineering, Software engineering Layers, The Software Processes, Software Myths.

PROCESS MODELS: A Generic Process Model, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Spiral Model, the Unified Process, the Capability Maturity Model Integration (CMMI).

AGILE DEVELOPMENT: What is Agility? Agility and the Cost of Change, What is an Agile Process? Extreme Programming (XP), Other Agile Process Models, A Tool set for the Agile Process.

UNIT II   **(11 Lectures)**

REQUIREMENTS ENGINEERING: Functional and Non-Functional Requirements, The Software requirements Document, Requirements Specification, requirements Engineering, Requirements Elicitation and Analysis, Requirement Validation, Requirement Management, System Modeling: Context Models, Interaction Models, Structural Models, Behavioral Model, Model-Driven Engineering.

DESIGN CONCEPTS: The Design Process, Design Concepts, The Design Models, Architectural Design: Software Architecture, Architectural Genres, Architectural Styles.

UNIT III   **(12 Lectures)**

DESIGN AND IMPLEMENTATION: The Object Oriented Design with UML, Design Patterns, Implementation Issues, Open Source development. User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

SOFTWARE TESTING STRATEGIES: A Strategic approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Validation Testing, System Testing, The Art of Debugging, White-Box Testing, Black Box Testing.

UNIT IV   **(12 Lectures)**

PRODUCT METRICS: A Frame Work for Product Metrics, Metrics for the Requirements Model, Metrics for Design Model, Metrics for Source Code, Metrics for Testing

PROCESS AND PROJECT METRICES: Metrics in the Process and Project Domains, Software Measurements, Metrics for Software Quality, Risk Management: Risk verses Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinements, Risk Mitigation Monitoring and Management (RMMM), The RMMM Plan.

UNIT V   **(12 Lectures)**

QUALITY MANAGEMENT: Quality Concepts, Software Quality, Software Quality Dilemma, Achieving Software Quality, Review Techniques, Reviews: A Formal spectrum, Informal Reviews, Formal Technical Reviews.

SOFTWARE QUALITY ASSURANCE: Background Issues, Elements of Software Quality Assurance, Tasks, Goals and Metrics, Software Reliability, the ISO 9000 Quality Standards.

TEXT BOOK:
1. Roger S. Pressman (2011), Software Engineering, A Practitioner's approach, 7th edition, McGraw Hill International Edition, New Delhi.
2. Sommerville (2001), Software Engineering, 9th edition, Pearson education, India.

REFERENCE BOOKS:
1. K. K. Agarval, Yogesh Singh (2007),Software Engineering,3rd edition, New Age International ublishers, India.
2. Lames F. Peters, WitoldPedrycz(2000), Software Engineering an Engineering approach, John Wiely& Sons, New Delhi, India.
3. Shely Cashman Rosenblatt (2006), Systems Analysis and Design, 6thedition, Thomson Publications, India.

SCRIPTING LANGUAGES
(Open Elective)

Course Code: **A3679**

L	T	P	C
3	0	0	3

Course Overview:

This course will address the need for vertical open standards, domain knowledge and open source software skills for various industry verticals and drive to reduce the gap between industry requirement and availability of technical professionals for the same. This course provides the student with the insights into the world of open source software. Student will learn the Open source technologies like PHP, Perl, Python, MySQL technologies which helps him in developing applications (software) as part of project work and makes him industry ready.

Course Objectives:

I. To provide students with core competence in open source programming languages necessary to formulate, analyze and develop solutions for real world problems
II. To prepare students to develop interest and lay foundation to learn open source Programming.
III. To prepare students to apply their computer programming skills to continue implementing advanced and diverse projects, and excel as a professional programmer.
IV. To make students well versed with PHP, Perl, Python programming
V. To inculcate in students to maintain high programming standards and to work as individual or as a member in developing web based novel products.

Course Outcomes:

Up on successful completion of this course, student will be able to:

1. Demonstrate knowledge about the advanced concepts of Linux OS like scheduling, cloning, signals.
2. Show skills to write PHP based GUI applications connecting to MYSQL.
3. Familiarize and define the programming syntax and constructs of LDAP connectivity in MySQL.
4. Analyze and implement Scripting applications using tuples, dictionaries, lists using Python.
5. Develop the ability to exhibit knowledge of writing packages, modules using Perl.

SCRIPTING LANGUAGES
(Open Elective)

Course Code: **A3679**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT 1   **(13 Lectures)**
INTRODUCTION: Introduction to Open sources – Need of open Sources – Advantages of Open Sources – Applications of Open sources. Open Source operating systems:Linux : Introduction – General Overview – Kernel Mode and user mode
LINUX: Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux

UNIT 2   **(14 Lectures)**
PHP: What is PHP? - Basic Syntax of PHP – programming in web environment - Common PHP Script Elements - Using Variables - Constants – Data types - Operators ; Statements - Working With Arrays -Using Functions – OOP - String Manipulation and Regular Expression
FILE AND DIRECTORY HANDLING - Including Files - File Access
WORKING WITH FORMS -Processing Forms -Form Validation – Introduction to advanced PHP concepts

UNIT 3   **(12 Lectures)**
MySQL: Introduction - Setting up an account - Starting, Terminating and writing your own MySQL Programs - Record Selection Technology - Working with Strings - Date and Time - Sorting Query Results module - Generating Summary - Working with Metadata - Using Sequences – MySQL-and-Web
PHP AND SQL DATABASE: PHP and LDAP ; PHP Connectivity ; Sending and receiving emails - Retrieving data from MySQL - Manipulating data in MySQL using PHP

UNIT 4   **(13 Lectures)**
PYTHON: Syntax and style – Python Objects – Numbers _ Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and loops - Functions - File Handling – Exception – Handling Exception- Execution Environment

UNIT 5   **(13 Lectures)**
PERL: Perl back grounder- Perl overview-Perl parsing rules- Variables and Data – Statements and control structures – Subroutines, Packages, and Modules- Working with Files – Data Manipulation

TEXT BOOKS:
1. Remy Card, Eric Dumas and Frank Mevel, " The Linux Kernel Book ", Wiley Publications, 2003
2. Steve Surching , "MySQL Bible" , John Wiley, 2002

REFERENCE BOOKS:
6. Rasmus Lerdorf and Levin Tatroe, " Programming PHP", O'Reilly, 2002
7. Wesley J. Chun , " Core Python Programming", Prentice Hall, 2001
8. Martin C.Brown, "Perl: The Complete Reference", 2nd Edition , Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
9. Steven Holzner, "PHP: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
10. Vikram Vaswani, "MYSQL: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

PYTHON FOR DATA SCIENCE
(Open Elective)

Course Code: A3680

L	T	P	C
3	0	0	3

Course Overview:

Python is a very powerful programming language used for many different applications. Over time, the huge community around this open source language has created quite a few tools to efficiently work with Python. In recent years, a number of tools have been built specifically for data science. As a result, analyzing data with Python has never been easier. In this course learners will start from the very beginning, with basic arithmetic and variables, and learn how to handle data structures, such as Python lists, Numpy arrays, and Pandas DataFrames. Along the way, they'll learn about Python functions and control flow, look at the world of data visualizations with Python and create your own stunning visualizations based on real data.

Prerequisite(s): NIL

Course Outcomes:

CO1. Explore Python language fundamentals, including basic syntax, variables, and types
CO2. Use and manipulate regular lists, functions and packages
CO3. Build Numpy arrays, and perform interesting calculations
CO4. Create and customize plots on real data
 CO5. Supercharge your scripts with control flow, and get to know the Pandas Data Frame.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester   **VCE-R15**

PYTHON FOR DATA SCIENCE
(Open Elective)

Course Code: A3680

L	T	P	C
3	0	0	3

Syllabus

UNIT-I

Introduction to Data Science for Python: Objective,History, Methodologies, Data ScienceApplications, Python for Data science, Python Libraries.
Introduction to Python: Features of python, Applications of python, Syntax, Comments, Indentations, Number types, Variables and Data Types, Operators, conditional statement, Loops in Python.

UNIT-II:

Python List: Create Python List, Access Python List, Slicing a Python List, slicing and dicing, Reassigning a Python List (Mutable), Reassigning the whole Python list, Deleting list and elements, Multidimensional Lists, List Operations, Built-in List Functions.
Python Tuple: Create a Python Tuple, Tuples Packing, Tuples Unpacking, Creating a tuple with a single item, Access Python Tuple, Slicing a Tuple, Deleting a Python Tuple, Reassigning Tuples, Tuple Functions Tuple Operations.

UNIT-III:

Python Dictionary: Create a Dictionary, Dictionaries with mixed keys, Access a Python Dictionary, Delete Python Dictionary, In-Built Functions on a Python Dictionary, In-Built Methods on a Python Dictionary,Dictionary Operations.
Python Function: User-Defined Functions in Python, Python Built-in Functions, Python Lambda Expressions, Recursion Function.

UNIT-IV:

Python NumPy: Features of Numpy, NumPy ndarray, Data Types, Functions of NumPy Array, Numpy Array Indexing, Mathematical Functions on Arrays in NumPy.

UNIT-V:

Python Pandas: Pandas Features, Install Pandas, Dataset in Pandas, Data Frames, Manipulating the Datasets, Describing a Dataset, group by Function, Filtering, Missing Values in Pandas, Concatenating Data Frames.

TEXT BOOKS:

1.   Mark Smart,(2018),Introduction to Data Science with Python: Basics of Numpy and Pandas.
2.   VK Jain,Data Science & Analytics, Khanna Book Publishing; 1 edition (2018)

REFERENCE BOOKS:

1**.** Frank Kane (2017)Hands-On Data Science and Python Machine Learning 1st Edition, Kindle Edition

DIGITAL ELECTRONICS
(Open Elective)

Course Code: **A3476**

L	T	P	C
3	0	0	3

Course Overview:

This course provides a modern introduction to logic design and the basic building blocks used in digital systems, in particular digital computers. It starts with a discussion of information representation and number systems, Boolean algebra, logic gates and minimization techniques. The second part of the course deals with combinational and sequential logic, where in the procedures to analyze and design the same will be discussed. Moreover, this course forms the basis for the study of advanced subjects like Computer Architecture and Organization, Microprocessors and Interfacing and Embedded systems.

Prerequisite(s): NIL

Course Objectives:

I. To apply principles of Boolean algebra to minimize logic expressions using minimization techniques.
II. To outline the formal procedures to design the combinational and sequential circuits of desired functionality.
III. To illustrate minimization techniques of completely specified and incompletely specified sequential machines.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1. Perform arithmetic operations on different number systems and to apply the principles of Boolean algebra to minimize logic expressions.
2. Use K-map and Tabulation method to minimize and optimize two-level logic functions up to five variables.
3. Analyze some basic components used in digital systems such as adder and subtractor, decoder, encoder, multiplexer, flip-flops.
4. Design various combinational PLDs such as ROMs, PALs, PALs and PROMs.
5. Develop digital systems using registers and counters such as shift registers, Ripple counters, synchronous counters.

DIGITAL ELECTRONICS
(Open Elective)

Course Code: **A3476**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT-I   (11 Lectures)

DIGITAL SYSTEMS AND BINARY NUMBERS: Digital systems, binary numbers, number base conversions, octal and hexadecimal numbers, complements, signed binary numbers, binary codes.

BOOLEAN ALGEBRA AND LOGIC GATES: Basic definitions, axiomatic definition of Boolean algebra, basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, digital logic gates.

UNIT-II   (9 Lectures)

GATE LEVEL MINIMIZATION: The k-map method, four-variable map, five-Variable map, Sum of Products and Product of Sums simplification, don't-care conditions, NAND and NOR implementation, AND-OR-INVERT,OR-AND-INVERT implementations, exclusive – OR function, The tabulation (Quine Mccluskey) method, determination and selection of Prime implicants.

UNIT-III   (14 Lectures)

COMBINATIONAL LOGIC: Introduction, combinational circuits, analysis procedure, design procedure, binary adder, binary subtractor, BCD adder, binary multiplier, Magnitude comparator, decoder, encoders, multiplexers.

MEMORY AND PROGRAMMABLE LOGIC: introduction, Random-access memory, memory decoding, error detection and correction, read only memory, programmable logic array, programmable array logic, sequential programmable devices

UNIT-IV   (10 Lectures)

SEQUENTIAL LOGIC: Classification of Sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), latches, Flip-Flops.

UNIT-V   (10 Lectures)

REGISTERS AND COUNTERS: Registers, shift registers, Ripple counters, synchronous counters, counter with unused states, ring counter, Johnson counter, LFSR counter.

TEXT BOOKS:

T3. M. Morris Mano, Michael D. Ciletti (2008), *Digital Design*, 4th edition, Pearson Education/PHI, India.

T4. Thomas L. Floyd (2006), *Digital fundamentals*, 9th edition, Pearson Education International.

REFERENCE BOOKS:

4. Zvi. Kohavi (2004), *Switching and Finite Automata Theory*, Tata McGraw Hill, India.
5. C.V.S. Rao (2009), *Switching and Logic Design*, 3rd edition, Pearson Education, India.
6. Donald D.Givone (2002), *Digital Principles and Design*, Tata McGraw Hill, India.

PRINCIPLES OF ANALOG AND DIGITAL COMMUNICATIONS
(Open Elective)

Course Code: **A3477**

L	T	P	C
3	0	0	3

Course Overview:

This course is useful to understand the basics of Signals, Systems, Random Variables and Communication. The course presents and integrates the basic concepts for both continuous-time and discrete signals and systems. This course provides a foundation in the theory and applications of random variables stochastic processes and an understanding of the mathematical techniques elating to random processes in the areas of signal processing, detection & estimation theory and communications. it gives the basics of Analog and Digital Communication and also gives the background required for advanced study on the course. This is accomplished by providing overviews of the necessary background in signal, system, probability, and random process theory required for the analog and digital communications. It gives more emphasis on stressing fundamental concepts. The topics in the course, more than enough to students needs.

Prerequisite(s): NIL

Course Objectives:

- I. Appreciate the importance of Signals and Random Variables related to communication.
- II. To provide knowledge on various amplitude, frequency and pulse modulation and demodulation systems.
- III. To study some basic concepts information theory and error control coding.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1. Know the representation of signals and random variables.
2. Know the various analog modulation and demodulation techniques.
3. Understand the basic concepts of digital data and pulse communication.
4. Understand the basics of Digital communication system and different techniques of Digital Modulation.
5. Will be able to analyze the transmission & reception processes and information coding techniques.

PRINCIPLES OF ANALOG AND DIGITAL COMMUNICATIONS
(Open Elective)

Course Code: **A3477**	L	T	P	C
	3	0	0	3

SYLLABUS

UNIT - I   **(11 Lectures)**

Introduction to communication system, need for modulation, Types of modulation techniques: AM, FM, PM, Generation and detection. Comparison of AM, FM, PM. Radio transmitters and receivers (TRF& Super heterodyne).

UNIT - II   **(12 Lectures)**

Sources of Noise, Resistor Noise, Shot Noise, Calculation of Noise in a Linear System, Noise in AM Systems, Noise in Angle Modulation Systems, Comparison between AM and FM with respect to Noise, Threshold Improvement in Discriminators, Comparisons between AM and FM.

UNIT - III   **(11 Lectures)**

Analog-to-Digital Conversion: Pulse modulation techniques, Sampling, Time Division Multiplexing, Pulse Amplitude Modulation, Pulse Width Modulation, Pulse Position Modulation, Digital Modulation Techniques: Pulse Code Modulation, Differential Pulse Code Modulation, Delta Modulation, Adaptive Delta Modulation, Continuously Variable Slope Delta Modulation, Companding, Noise in Pulse-Code and Delta-Modulation Systems.

UNIT - IV   **(11 Lectures)**

Binary Phase-Shift Keying, Differential Phase-Shift Keying, Differentially Encoded PSK (DEPSK), Quadrature Phase-Shift Keying (QPSK), M-ary PSK, Quadrature Amplitude Shift Keying (QASK), Binary Frequency Shift-Keying, Similarity of BFSK and BPSK, M-ary FSK, Minimum Shift Keying (MSK), Duo-binary Encoding.

UNIT - V   **(11 Lectures)**

Spread Spectrum Modulation: Direct Sequence (DS) Spread Spectrum, Use of Spread Spectrum with Code Division Multiple Access (CDMA), Ranging using DS Spread Spectrum, Frequency Hopping (FH) Spread Spectrum, Generation and Characteristics of PN Sequences, Acquisition (Coarse Synchronization) of a FH Signal, Tracking (Fine Synchronization) of a FH Signal, Acquisition (Coarse Synchronization) of a DS Signal, Tracking of a DS Signal.

TEXT BOOKS:

1. *Communication Systems*, Simon Haykins (2nd Edition).
2. *Analog and Digital Communication Systems* by Martin S. Roden, 3rd edition, Prentice Hall, 1994.
3. *Principles of Communications* By Taub and Schilling

TRANSDUCERS & MEASUREMENTS
(Open Elective)

	L	T	P	C

Course Code: **A3478**   **3   0   0   3**

Course Overview:

This course provides an overall understanding of the elements and processes, including sources of errors, and digitally acquiring these measurements. Along with an overview of instrumentation principles, the physical principles and electrical characteristics for several common instrument transducers are studied. The electronic signal conditioning circuits required converting the electrical changes in the transducers to signal which can be interpreted accurately by a microprocessor or an embedded controller are analyzed and designed effectively. This course also gives an integration of hardware and software in designing computer controlled processes and/or systems with the aid of sensors, transducers data acquisition board, and instrument control.

Course Objectives:

I. To introduce the basic concepts related to the operation of electrical & electronic measuring instruments, application aspects of general cathode ray oscilloscope and special purpose oscilloscopes.
II. To analyze and apply various DC and AC bridges for the measurements of various physical quantities, minimizing errors by following proper precautions.
III. To appraise the principles behind various transducers and their applications in the measurement of various parameters in electrical and mechanical engineering fields.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1. Aware the basic concepts of measurement parameters as well as instrument standards, characteristics and errors.
2. Construct and design various measuring devices like voltmeters, Ammeters, Ohmmeters, analog, digital multi-meters and analyze different types of cathode ray oscilloscopes.
3. Design different bridge networks and analyze balanced condition for finding out values of resistance, capacitance and inductance.
4. Analyze different physical parameters like pressure, force, velocity, acceleration, sound, torque, strain and stress etc. using non-electrical transducers.
5. Apply the principles and practice for instrument design and develop for real world problems.

TRANSDUCERS & MEASUREMENTS
(Open Elective)

	L	T	P	C

Course Code: **A3478**   **3   0   0   3**

SYLLABUS

UNIT - I   **(12 Lectures)**

CHARACTERSTICS OF INSTRUMENTS: Block schematic of measuring system, Performance characteristics of instruments-static and dynamic characteristics, Errors in measurement.

MEASURING INSTRUMENTS: DC voltmeters- multirange, range extension, DC Ammeter- multi range, range extension, Aryton shunt, ohmmeters-series type and shunt type, AC Voltmeter, thermocouple type RF ammeter.
DIGITAL VOLTMETERS: Dual slope and Successive Approximation type DVM

UNIT – II   **(12 Lectures)**

CATHODE RAY OSCILLOSCOPE (CRO): Introduction to CRT, vertical amplifiers, horizontal deflection system, simple CRO.

SPECIAL PURPOSE OSCILLOSCOPES: Dual beam CRO, Dual trace oscilloscope, sampling oscilloscope, analog storage oscilloscope, digital storage oscilloscope, measurement of phase and frequency (lissajous patterns).

UNIT - III   **(10 Lectures)**

DC and AC BRIDGES: Measurement of resistance Wheat's stone bridge, Kelvin's double bridge, measurement of Inductance using Maxwell's inductance bridge, Anderson's bridge, Hay's bridge, measurement of capacitance using Schering bridge, Wagner's ground connection, errors and precautions in using bridges.

UNIT - IV   **(12 Lectures)**

TRANSDUCERS-I: Introduction, classification, strain gauges, LVDT, Piezo electric transducers, OPAMP applications in measurement and transducer circuits, instrumentation amplifier, thermometers, thermocouples, thermistors, sensistors.

UNIT - V   **(10 Lectures)**

TRANSDUCERS-II: Measurement of non electrical quantities- displacement, pressure, torque, vibration, pH, sound, velocity, humidity, speed, analog and digital data acquisition systems, interfacing and bus standards, programmable logic controllers and their industrial applications.

TEXT BOOKS:

    1. K Sawhney (2007), Electrical and Electronic Measurements and Instrumentation, 18th edition, Dhanpat Rai & Co, New Delhi.
    2. H.S.Kalsi, Electronic Instrumentation, 3rd edition, Tata McGraw-Hill Education

REFERENCE BOOKS:

    1. A. D. Helfrick, W.D. Cooper (2002), Modern Electronic Instrumentation and Measurement Techniques, 5th edition, Prentice Hall of India, New Delhi.
    2. David A. Bell (2003), Electronic Instrumentation & Measurements, 2nd edition, Prentice Hall of India, New Delhi.

INTERNET OF THINGS
(Open Elective)

Course Code: **A3479**

L T P C
3 0 0 3

Course Overview:

The explosive growth of the "Internet of Things" is changing our world and the rapid drop in price for typical IoT components is allowing people to innovate new designs and products at home. In this course students will learn the importance of IoT in society, the current components of typical IoT devices and trends for the future. This course covers IoT design considerations, constraints and interfacing between the physical world to mobile device, how to make design trade-offs between hardware and software, and key components of networking to ensure that students understand how to connect their device to the Internet.

Prerequisite(s):

- Computer Architecture and Organization (A3508)
- Microprocessors and Microcontrollers (A3419)
- Embedded Systems (A3424)

Course Objectives:

I. To give a comprehensive view of the "Internet of Things".
II. To analyze enabling technologies to make it happen in Embedded Devices and communication protocols
III. To make use of the fundamental building blocks of such systems (sensors, actuators, convertors, processors, intra- and inter-communication networks and interfaces, hardware and software co- design and related implementation and testing environments and techniques) and their inter- relationships.

Course Outcomes:

Up on successful completion of this course, student will be able to:
1. Explain the definition and usage of the term "The Internet of Things" in different contexts.
2. Understand where the IoT concept fits within the broader ICT industry and possible future trends.
3. Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack.
4. Design a simple IoT system comprising sensors, edge devices, wireless network connections and data analytics capabilities
5. Use the knowledge and skills acquired during the course to build and test a complete, working IoT system involving prototyping, programming and data analysis.

INTERNET OF THINGS
(Open Elective)

Course Code: **A3479**

L T P C
3 0 0 3

SYLLABUS

UNIT – I   **(10 Lectures)**

INTRODUCTION & CONCEPTS: Introduction to Internet of Things, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels.

UNIT - II   **(12 Lectures)**

DESIGN PRINCIPLES FOR CONNECTED DEVICES: Calm And Ambient Technology, Magic As Metaphor, Privacy, Keeping Secrets, Whose Data Is It Anyway?, Web Thinking For Connected Devices, Small Pieces, Loosely Joined, First Class Citizens On The Internet, Graceful Degradation.

UNIT - III   **(11 Lectures)**

INTERNET PRINCIPLES: An overview on IP, TCP & UDP, IP Addresses, MAC Addresses, TCP & UDP Ports, Application Layer Protocols

UNIT - IV   **(11 Lectures)**

PROTOTYPING EMBEDDED DEVICES: Electronics, Embedded Computing Basics, Arduino, Raspberry PI, Beagle Bone Black, Electronic IMP, and Other notable Platforms

UNIT - V   **(12 Lectures)**

TECHNIQUES FOR WRITING EMBEDDED CODE: Memory management, Types of memory, Making the most use of RAM, Performance & battery life, Libraries, Debugging.

PROTOTYPE TO REALITY: Who is the Business model for IoT?, Funding an IoT startup.

TEXT BOOKS:
1. Adrian McEwen & Hakim Cassimally (2014), *Designing the Internet of Things*, John Wiley and Sons, UK.
2. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands – on - Approach)", 1 st Edition,VPT, 2014.

REFERENCE BOOKS:
1. Jan Holler, Vlasios Tsiatsis , Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "*From Machine – to - Machine to the Internet of Things: Introduction to a New Age of Intelligence*", 1st Edition, Academic Press, 2014.
2. Francis daCosta, "*Rethinking the Internet of Things: A Scalable Approach to Connecting Everything*", 1st Edition, Apress Publications, 2013.
3. Daniel Kellmereit, "*The Silent Intelligence: The Internet of Things*", 2013.

NANO TECHNOLOGY APPLICATIONS TO ELECTRICAL ENGINEERING
(Open Elective)

Course Code: **A3276**

L	T	P	C
3	0	0	3

Course Over View:

The course is designed to teach the elements of advanced science and technology used in nanotechnology materials and nano device fabrication. The topics taught include the fundamentals of: quantum mechanics, nanoscale quantum structures, bulk semiconductor and epitaxial growth techniques, vacuum technology, semiconductor material characterization, defects in crystals, diffusion and implantation, wafer manufacturing, and processing.

Course Objectives:

I. Explain the fundamentals of Nano Materials and Nano technology
II. Enumerate the general introduction to different classes of nonmaterial's
III. To impart the basic knowledge on various Energy conversion and storage techniques involved in Nanotechnology
IV. Demonstrate about the Micro fluid systems and Nano engines – Driving mechanisms
V. Paraphrase about the Hydrogen storage methods

Course Outcomes:

At the End of the course students can

1. Explicate the fundamentals of nano technology and its role in sustainable energy
2. Analyze the Energy conversion and storage techniques involved in Nanotechnology
3. Analyze the performance of micro-fuel cell systems.
4. Demonstrate different Hydrogen storage methods, Metal hydrides and size effects ,Hydrogen storage capacity and Hydrogen reaction kinetics
5. Explicate the overview of the hydrogen storage methods

NANO TECHNOLOGY APPLICATIONS TO ELECTRICAL ENGINEERING
(Open Elective)

Course Code: **A3276**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT – I

INTRODUCTION : Nanotechnology and its role in sustainable energy - Energy conversion process, Direct and in-direct energy conversion - Materials for: Light emitting diodes, Batteries, Advance turbines, Catalytic reactors, Capacitors and Fuel cells. Energy challenges - Development and implementation of renewable energy technologies.

UNIT – II

RENEWABLE ENERGY CONVERSION AND STORAGE : Energy conversion and storage - Nano, micro, poly crystalline Silicon and amorphous Silicon for solar cells, Silicon-composite structure, Techniques for Si deposition. Micro-fuel cell technologies, integration and performance of micro-fuel cell systems.

UNIT – III

MICROFLUIDIC SYSTEMS-I : Nano-electromechanical systems and novel micro fluidic devices - Nano engines – Driving mechanisms. Power generation - Micro channel battery - Micro heat engine (MHE) fabrication – Thermo capillary forces –Thermo capillary pumping (TCP) - Piezoelectric membrane.

UNIT – IV

HYDROGEN STORAGE METHODS-I : Hydrogen storage methods - Metal hydrides and size effects - Hydrogen storage capacity -Hydrogen reaction kinetics - Carbon-free cycle.

UNIT – V

HYDROGEN STORAGE METHODS-II : Gravimetric and volumetric storage capacities – Hydriding / Dehydriding kinetics - High enthalpy of formation and thermal management during the hydriding reaction.

TEXT BOOKS:

1. J. Twidell and T. Weir, *Renewable Energy Resources*, E & F N Spon Ltd, London, (1986).
2. Martin A Green, *Solar cells: Operating principles, technology and system applications*, Prentice Hall Inc, Englewood Cliffs, NJ, USA, (1981).
3. H J Moller, *Semiconductor for solar cells*, Artech House Inc, MA, USA, (1993).
4. Ben G Streetman, *Solis state electronic device*, Prentice Hall of India Pvt Ltd., New Delhi (1995).

REFERENCE BOOKS:

1. M.A. Kettani , *Direct energy conversion,* Addision Wesley Reading, (1970).
2. Linden , *Hand book of Batteries and fuel cells*, Mc Graw Hill, (1984).
3. Hoogers , *Fuel cell technology handbook*. CRC Press, (2003).
4. Vielstich, *Handbook of fuel cells: Fuel cell technology and applications*, Wiley, CRC Press, (2003).

INDUSTRIAL ELECTRONICS
(Open Elective)

Course Code: **A3277**

L	T	P	C
3	0	0	3

Course Over View:

student is introduced to various electronic components and systems used in modern industry. Operational amplifier principles, applications including comparators (zero and nonzero crossing detectors), voltage followers, inverting, non-inverting amplifiers. Subtraction, summing (mixer), difference, compound amplifiers and active filters will be discussed . Operational amplifiers circuits are configured to make up complex analog circuits. The design of Precession mechanical systems will be explained also the over view of micro controllers will be dealt.

Course Objectives:

    I.   Understand the working of latest Electronic Devices
    II.   To provide effective explanation to the precision mechanical systems
    III.   Illustrate various electronic Interface Systems
    IV.   To analyze the Electro mechanical drives used in Industries
    V.   Outline 8051 micro controllers ,A to D and D to A converters

Course Outcomes:

At the End of the course students can

1. Identify the latest electronic devices available in industry
2. Demonstrate the sped channels Filtering Noise using passive components
3. Illustrate the precision mechanical systems and explain about their applications.
4. Explain about different Electro mechanical drives
5. Explain 8051 micro controllers and articulate A to D and D to A converters

INDUSTRIAL ELECTRONICS
(Open Elective)

Course Code: **A3277**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT - I
INTRODUCTION : Definition – Trends - Control Methods: Standalone , PC Based Real Time Operating Systems, Graphical User Interface , Simulation

SIGNAL CONDITIONING : Introduction – Hardware - Digital I/O , Analog input – ADC , resolution , sped channels Filtering Noise using passive components – Resistors, capacitors - Amplifying signals using OP amps.

UNIT – II
PRECISION MECHANICAL SYSTEMS : Pneumatic Actuation Systems - Electro-pneumatic Actuation Systems - Hydraulic Actuation Systems - Electro-hydraulic Actuation Systems - Timing Belts – Ball Screw and Nut - Linear Motion Guides - Linear Bearings - Harmonic Transmission - Bearings- Motor / Drive Selection.

UNIT – III
ELECTRONIC INTERFACE SUBSYSTEMS : TTL, CMOS interfacing - Sensor interfacing – Actuator interfacing – solenoids , motors Isoation schemes- opto coupling, buffer IC's - Protection schemes – circuit breakers , over current sensing , resetable fuses , thermal dissipation - Power Supply - Bipolar transistors / mosfets

UNIT – IV
ELECTROMECHANICAL DRIVES : Relays and Solenoids - Stepper Motors - DC brushed motors – DC brushless motors - DC servo motors - 4-quadrant servo drives , PWM's - Pulse Width Modulation – Variable Frequency Drives, Vector Drives - Drive System load calculation.

UNIT – V
MICROCONTROLLERS OVERVIEW : 8051 Microcontroller , micro processor structure – Digital Interfacing - Analog Interfacing - Digital to Analog Convertors - Analog to Digital Convertors - Applications.Programming –Assembly , (LED Blinking , Voltage measurement using ADC).

TEXT BOOKS :
1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering by W Bolton,Pearson Education Press, 3rd edition, 2005.
2. Mechatronics/M.D.Singh/J.G.Joshi/PHI.

REFERENCES :
1. Mechatronics Source Book by Newton C Braga, Thomson Publications, Chennai.
2. Mechatronics – N. Shanmugam / Anuradha Agencies Publisers.
3. Mechatronics System Design / Devdas shetty/Richard/Thomson.

SOLAR ENERGY AND APPLICATIONS
(Open Elective)

Course Code: **A3278**

L	T	P	C
3	0	0	3

Course Overview:

This is an engineering introduction to Solar energy technologies and potentials. The course aims to introduce a general engineering/science audience to the basic concepts of solar energy. The concepts of Photo Voltaic cells and their properties will be explained. Applications of solar cells will be explained in detail .Also the environmental issues of solar systems will be explained.

Course Objectives:

I. Learn the fundamentals of solar energy conversion systems, available solar energy   and the local and national needs, solar engineering applications, emerging technologies.
II. Learn how to advance the current technology of the solar energy systems for making   the process economical, environmentally safe and sustainable.
III. Aware different technologies that are adopted in the production of energy from Photo Voltaic.
IV. Design a standalone PV system and investigate the applications of Solar PV cells
V. Interpret the cost analysis and environmental issues of solar system

Course Outcomes:

At the End of the course students can

1. Extrapolate the available solar energy ,solar energy conversion and utilization processes
2. Analyze the development of advanced storage solutions in thermal solar systems
3. Identify and analyze the suitability of solar systems in different environmental Conditions
4. Explore the design of a standalone PV system and investigate the applications of Solar PV cells
5. Explore the cost analysis and environmental issues of solar system.

SOLAR ENERGY AND APPLICATIONS
(Open Elective)

Course Code: **A3278**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT - I

PRINCIPLES OF SOLAR RADIATION: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and Sun shine, solar radiation data.

UNIT - II

SOLAR ENERGY COLLECTORS: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

STORAGE AND APPLICATIONS: Different methods of solar energy storage, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating /cooling technique, solar distillation and drying.

UNIT - III

PHOTO VOLTAICS (PV): Fundamentals of solar cells, types of solar cells, semiconducting materials, band gap theory, absorption of photons, excitations and photo emission of electrons, band engineering.

PV CELL PROPERTIES: Solar cell properties and design, p-n junction photodiodes, depletion region, electrostatic field across the depletion layer, electron and holes transports, device physics, charge carrier generation, recombination and other losses, I-V characteristics, output power.

UNIT - IV

SOLAR CELL APPLICATIONS: PV cell interconnection, module structure and module fabrication, Equivalent circuits, load matching, efficiency, fill factor and optimization for maximum power, Design of stand-alone PV systems, system sizing, device structures, device construction, DC to AC conversion, inverters, on-site storage and grid connections.

UNIT - V

COST ANALYSIS AND ENVIRONMENTAL ISSUES: Cost analysis and pay back calculations for different types of solar panels and collectors, installation and operating costs, Environmental and safety issues, protection systems, performance monitoring.

ALTERNATIVE ENERGY SOURCES: Solar Energy: Types of devices for Solar Energy Collection, Thermal Storage System. Control Systems, Wind Energy, Availability, Wind Devices, Wind Characteristics, Performance of Turbines and systems.

TEXT BOOKS:
1. G. D. Rai (2009), *Non-Conventional Energy Sources*, 4th edition, Khanna Publishers, New Delhi.
2. Martin A. Green (2008), *Solar Cells: Operating Principles, Technology and system Applications*, 1st edition, Prentice Hall, New Delhi.

REFERENCES BOOKS:
1. Sukatme (2008), Solar Energy, 3rd Edition, McGraw Hill Companies, New Delhi.
2. D. Yogi gosuami, Frank Kreith, Jan F. Kreider (2000), Principles of Solar Engineering, 2nd edition, Taylor & Francis, USA.

ENERGY MANAGEMENT AND AUDIT
(Open Elective)

Course Code: **A3279**

L	T	P	C
3	0	0	3

Course Overview:

Energy management can help industry control its operating costs. Energy management is also important for reducing local, regional and global emissions and can help mitigate the problem of global warming. This course will help industry professionals acquire the skills and techniques required to implement energy management. This course will also benefit researchers and students who are interested in working on energy management.. This course is designed to provide the background required for engineers to meet this role.

Prerequisite(s):

- Knowledge of Energy systems

Course Objectives:

I. Discuss the fundamentals of energy management and Audit.
II. Discriminate the energy policies, processes, targets and measuring methods.
III. Establish internal benchmarking, measuring and documenting for improving energy Performance.
IV. To identify how to implement continual improvement.
V. Enumerate the voltage , reactive power calculations, Protection of capacitors and switching.

Course Outcomes:

At the End of the course students can

1. Analyze the benefits of energy management, Utility costs, legalization requirements, international energy standards
2. Design Conservation of Energy materials, energy flow networks, critical assessment of energy usage, formulation of objectives and constraints
3. Explore the Energy usage analysis and KPI's Degree day analysis
4. Identify Energy auditing tools & methodologies, identification of primary energy consumers
5. Analyze the different type of monitoring systems
6. Explicate the overview of the main sources of renewable energy.

ENERGY MANAGEMENT AND AUDIT
(Open Elective)

Course Code: **A3279**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT - I

INTRODUCTION: Principles of Energy Management, Managerial Organization. Functional Areas for Manufacturing Industry, Process Industry, Commerce, Government. Role of Energy Manager in each of the organization. Initiating, Organizing and Managing Energy Management Programs.

UNIT - II

ENERGY AUDIT: Definition and Concepts, Types of Energy Audits, Basic Energy Concepts. Resources for Plant Energy Studies, Data Gathering, Analytical Techniques. Energy Conservation: Technologies for Energy Conservation , Design for Conservation of Energy materials, energy flow networks, critical assessment of energy usage, formulation of objectives and constraints, synthesis of alternative options and technical analysis of options, process integration.

UNIT - III

ECONOMIC ANALYSIS: Scope, Characterization of an Investment Project, Types of Depreciation, Time Value of money, budget considerations, Risk Analysis.
METHODS OF EVALUATION OF PROJECTS: Payback, Annualized Costs, Investor's Rate of return, Present worth, Internal Rate of Return. Pros and Cons of the common methods of analysis, replacement analysis.

UNIT - IV

DEMAND SIDE MANAGEMENT: Concept and Scope of Demand Side Management, Evolution of Demand Side Management, DSM Strategy ,Planning, Implementation and its application. Customer Acceptance & its implementation issues. National and International Experienceswith DSM.

UNIT - V

VOLTAGE AND REACTIVE POWER IN DISTRIBUTION SYSTEM: Voltage and reactive power calculations and control: Voltage classes and nomenclature, voltage drop calculations, Voltage control, VAR requirements and power factor, Capacitors unit and bank rating, Protection of capacitors and switching, Controls for switched capacitors and fields testing.

TEXT BOOKS:

1. W. R. Murphy, G. McKay (2008), *Energy Management,* 1st edition*,* B.S. Publications, New Delhi.
2. Tripathy S. C., "Electric Energy Utilizati on and conservation", Tata McGraw Hill.
3. Industrial Energy Conservation Manuals, MIT Press, Mass, 1982.

REFERENCE BOOKS:

1. B. Smith (2007), *Energy Management Principles*, 1st edition, Pergamon Press, Inc., England.
2. Energy Management Handbook, Edited by W.C.Turner, Wiley, New York, 1982.
3. IEEE Bronze Book, 'Recommended Practice for Energy Conservation and cost effective planning in Industrial facilities, IEEE Press.

ELEMENTS OF MECHANICAL ENGINEERING
(Open Elective)

Course Code: **A3376**

L	T	P	C
3	0	0	3

Course Overview:

The course description is multidisciplinary nature of Natural Resources: Renewable and nonrenewable resource. Hydraulic Machines deals describes about the hydraulic turbines. The course is also describing about the various machine tool operations and joining processes.

Prerequisite(s):

- Environmental studies
- Manufacturing Technology
- Fluid Mechanics
- Thermodynamics

Course Objectives:

I. To demonstrate the fundamentals of different manufacturing processes like casting, welding, metal working processes, plastic processing methods.
II. To develop knowledge on different welding methods.
III. To design and analyze the performance of hydraulic turbines.
IV. Know the fundamental science and engineering principles relevant to materials.
V. To develop the knowledge about Refrigeration and air conditioning systems.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Explain the energy resources and environmental issues using Nonconventional energy.
2. Identify the uses of turbines for power generation and Principle and working of Hydraulic and gas turbines.
3. Understanding the different types of Manufacturing Process and apply the technology to fabricate different products
4. Comprehend the concepts of composite, ceramic and nano materials for practical applications
5. Understanding the Principle and applications of Refrigeration systems and Air-conditioners.

ELEMENTS OF MECHANICAL ENGINEERING
(Open Elective)

Course Code: **A3376**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT - I
ENERGY RESOURCES: Non-renewable and renewable energy resources, solid, liquid and gaseous fuels, Calorific values of fuels, Combustion and combustion products of fuels,

ENERGY: Introduction and application of Energy sources like fossil fuels, Nuclear Fuels, Solar, Hydal, wind and bio fuels, Environmental issues like global warming and ozonedepletion.

UNIT – II
TURBINES:
Introduction Classification Efficiency, Principal and operation of pelton wheel Francis Turbine and Caplon Turbine
Gas Turbines: Classification, Working principles and Operations of Open cycle and closed cycle gas turbines.

UNIT - III:
MACHINE TOOL OPERATIONS:
Turning, facing, knurling, Thread cutting, Taper Turning by swiveling the compound rest, Drilling, Boring, Reaming, Tapping, Counter Sinking, Counter Boring, -Plain milling, End milling, Slot milling.

UNIT –IV:
ENGINEERING MATERIALS AND JOINING PROCESSES:
ENGINEERING MATERIALS: Types and applications of Ferrous & Nonferrous metals and alloys.
Composites: Introduction: Definition, Classification and applications
Joining Process: welding: Definition, classification of welding, Description of Electric Arc Welding and Oxy-Acetylene Welding, soldering , brazing, Differences between soldering, Brazing and Welding.

UNIT - V
REFRIGERATION AND AIR-CONDITIONING: Properties of refrigerants, list of commonly used refrigerants. Refrigeration –Definitions – Refrigerating effect, Ton of Refrigeration, COP, Relative COP, unit of Refrigeration. Principle and working of anvapor compression refrigeration and vapour absorption refrigeration systems. Principle and applications of air conditioners, Room air conditioner.

TEXT BOOKS:
1. G. D. Rai (2010), Non-Conventional Energy Sources, 2nd edition, Pearson, India.
2. Domkundwar, S. C. Arora (2009), A Course in Refrigeration and Air conditioning, 6th edition, Dhanpatrai Publications, New Delhi, India.
3. Ganesan (2011), Gas Turbines, 3rd edition, Tata McGraw-Hill education (P) Ltd, New Delhi, India.
4. R K Jain(2004) Production Technology, Khanna Publications.

REFERENCE BOOKS:
1. S. Trymbaka Murthy, "A Text Book of Elements of Mechanical Engineering", 4th Edition, Universities Press (India) Pvt. Ltd., 2006.
2. K.P. Roy, S.K. Hajra Choudhury, Nirjhar Roy, "Elements of Mechanical Engineering", Media Promoters & Publishers Pvt. Ltd.,Mumbai,7th Edition, 2012
3. Pravin Kumar, (2013), "Basic Mechanical Engineering", Edition, Pearson.
4. B K Singh (2012), Elements by Mechanical Engineering, Published by Ane Books Pvt. Ltd.

BASIC THERMODYNAMICS AND HEAT TRANSFER
(Open Elective)

Course Code: **A3377**

L	T	P	C
3	0	0	3

Course Overview:

This course focuses on basic areas of the relationship between heat and work in a substance during different types of thermodynamic processes. Specifically, thermodynamics focuses largely on how a heat transfer is related to various energy changes within a system undergoing a thermodynamic process. The course is extended to study the Air standard cycles and various modes of heat transfer in detail.

Prerequisite(s):

- THERMODYNAMICS
- HEAT TRANSFER

Course Objectives:

I. To teach the students the basic terminology associated with the study of Thermodynamics for understand the principles of thermodynamics and apply them for basic
II. Conversion of mass and energy in closed and open systems.
III. To enable the students understand the principle of entropy increase, causes of irreversibility,
IV. Available and unavailable energy.
V. To enable the students understand the various air standard cycles.
VI. To enable the students understand the basics of heat transfer.
VII. To enable the students understand the modes of heat transfer like conduction and convection.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Demonstrate the basic concepts and laws of thermodynamics.
2. Calculate the system properties like pressure, volume, temperature, enthalpy etc. in variousthermodynamics processes.
3. Calculate the work and heat in various thermodynamics processes and efficiency of the air standard cycles.
4. To Demonstrate the basic concepts of Heat transfer and to apply the knowledge of Conduction heat transferfor various systems
5. To Apply the knowledge of convection and radiation heat transfers for various systems.

BASIC THERMODYNAMICS AND HEAT TRANSFER
(Open Elective)

Course Code: **A3377**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT – I
BASIC CONCEPTS OF THERMODYNAMICS: Macroscopic and microscopic approaches, thermodynamic systems, boundary, surroundings, thermodynamic property, intensive and extensive properties, thermodynamic equilibrium, state, path, process and cycle, quasi static, reversible and irreversible processes, Energy and its forms, concepts of heat and work, Zeroth Law of thermodynamics.

UNIT – II
FIRST LAW OF THERMODYNAMICS: First law of thermodynamics, internal energy, enthalpy, PMM -I, Steady flow energy equation, Application of First law and Limitations of first law of thermodynamics.
SECOND LAW OF THERMODYNAMICS: Kelvin-Planck and Clausius statements, heat engine, heat pump, refrigerator, PMM-II, Carnot cycle, Carnot heat engine, Carnot theorem and its corollaries, Entropy.

UNIT – III
AIR STANDARD CYCLES: Otto, Diesel and Dual combustion cycles, description and representation on PV and TS diagrams, Thermal efficiency, mean effective pressures.

UNIT –IV
BASIC CONCEPTS OF HEAT TRASFER: Modes and mechanisms of heat transfer, Basic laws of heat transfer – Applications of heat transfer.
CONDUCTION HEAT TRANSFER: General heat conduction equation in Cartesian coordinates. Different forms of general equation – Steady state and Transient heat transfer – Initial and boundary conditions. One dimensional steady state heat conduction through Homogeneous slabs, Overall heat transfer coefficient.

UNIT –V
FORCED CONVECTION: Concepts of hydrodynamic and thermal boundary layer and use of empirical correlations for Flat plates.
FREE CONVECTION: Development of Hydrodynamic and thermal boundary layer along a vertical plate – Use of empirical relations for Vertical plates.

RADIATION HEAT TRANSFER: Introduction, properties and definitions, Laws of black-body radiation, Laws of Planck, Kirchoff, Lambert, Stefan and Boltzmann, Heat exchange between two black bodies, Emissivity, heat exchange between grey bodies.

TEXT BOOKS:
1. P. K. Nag (2012), *Engineering Thermodynamics*, 4th edition, Tata McGraw-Hill, New Delhi, India.
2. YUNUS A CENGEL, (2016*), Heat and mass transfer: fundamentals & applications*, 5th edition, TMH, New Delhi, India.

REFERENCE BOOKS:
1. J. B. Jones, R. E. Dugan (2009), *Engineering Thermodynamics*, 1st edition, Prentice Hall of India Learning, New Delhi, India.
2. R. K. Rajput (2014), *A text book of Engineering Thermodynamics*, Fifth Edition, Laxmi Publications, New Delhi, India
3. M. Thirumaleshwar,(2014), *Fundamentals of Heat & Mass Transfer*, Second Edition, Pearson, India
4. R.C. Sachdeva, (2014), *Fundamentals of Engineering, Heat & Mass Transfer*, Third Edition, New Age, New Delhi.

MECHANICAL MEASUREMENTS AND INSTRUMENTATION
(Open Elective)

Course Code: **A3378**

L	T	P	C
3	0	0	3

Course Overview:

This course covers the terminology, concepts, principles and computations used by engineers and technicians to specify, analysis and maintain instrumentation and control systems. It emphasizes practices in industry concepts, so that students learn what aspects of plant design and control are critical. Practical examples have been used for many common pressure, level, temperature and flow measuring systems. Approaches are presented for measurement selection, process/modification, and control system design.

Prerequisite(s):

- Engineering Mechanics, Fluid Mechanics, Basic Thermodynamics

Course Objectives:

I.   To understand the Functional Elements of the Measuring System and Standards of the Measuring System for Calibration
II. To study the Static and Dynamic Characteristics of the measuring Instruments and to study the Errors occurring in the measuring system and to eliminate them.
III. To study the principle, working advantages limitations and applications of Displacement, pressure, flow, liquid level, temperature measuring instruments.
IV. To study the concepts of feedback control mechanism in process control systems.

Course Outcomes:

1. Explain the basics measurement system, error and transducers industrial applications.
2. Identify the uses of Pressure gauges in various applications
3. Understand the significance of measurement system, applications of flow measurement, speed esurient devices.
4. Comprehend the fundamentals of thermocouple and strain measurement
5. Interpret measurement of field variables like humidity, acceleration and vibration and pressure

MECHANICAL MEASUREMENTS AND INSTRUMENTATION
(Open Elective)

Course Code: **A3378**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT - I

INTRODUCTION: Definition, Basic principles of measurement, Measurement systems, generalized configuration and functional descriptions of measuring instruments, examples. Dynamic performance characteristics, sources of error, Classification and elimination of error.

MEASUREMENT OF DISPLACEMENT: Theory and construction of various transducers to measure displacement ,Piezo electric, Inductive, capacitance, resistance, ionization and Photo electric transducers, Calibration procedures.

UNIT - II

MEASUREMENT OF PRESSURE: Units, classification, different principles used. Manometers, Piston, Bourdon pressure gauges, Bellows, Diaphragm gauges. Low pressure measurement, Thermal conductivity gauges, ionization pressure gauges, McLeod pressure gauge.

UNIT - III

MEASUREMENT OF LEVEL: Direct method, Indirect methods, capacitative, ultrasonic, magnetic, Bubler level indicators.

FLOW MEASUREMENT: Rotameter, magnetic, Ultrasonic, Turbine flow meter, Hot, wire anemometer, Laser Doppler Anemometer (LDA).

MEASUREMENT OF SPEED: Mechanical Tachometers, Electrical tachometers, Stroboscope, Noncontact type of tachometer.

UNIT - IV

STRESS STRAIN MEASUREMENTS: Various types of stress and strain measurements , electrical strain gauge, gauge factor , method of usage of resistance strain gauge for bending compressive and tensile strains , usage for measuring torque, Strain gauge Rosettes.

MEASUREMENT OF TEMPERATURE: Classification , Ranges , Various Principles of measurement , Expansion, Electrical Resistance , Thermistor , Thermocouple , Pyrometers, Temperature Indicators.

UNIT - V

MEASUREMENT OF HUMIDITY: Moisture content of gases, sling psychrometer, Absorption psychrometer, Dew point meter.

MEASUREMENT OF ACCELERATION AND VIBRATION: Different simple instruments, Principles of Seismic instruments, Vibrometer and accelerometer using this principle.

TEXT BOOKS:

1. D.S. Kumar(2011), *Mechanical Measurements and Controls*, 4th edition, Metropolitan Book Co. Pvt Ltd., New Delhi, India**.**
2. A. K. Tayal (2004), *Instrumentation and mechanical Measurements,* 2nd edition, Galgotia Publications, New Delhi, India.

REFERENCE BOOKS:

1. Er. R. K. Jain (2011), *Mechanical and Industrial Measurements*, 12th edition, Khanna Publishers, New Delhi, India.
2. Chennakesava R. Alavala(2010), *Principles of Industrial Instrumentation and Control Systems*, 1st edition, Cengage Learning, New Delhi, India.

3. B. C. Nakra, K. K. Choudhary (2010*), Instrumentation, measurement and analysis*, 4th, Tata McGraw- Hill, New Delhi, India

ENGINEERING OPTIMIZATION
(Open Elective)

Course Code: **A3379**

L	T	P	C
3	0	0	3

Course Overview:

Optimization involves finding the "best" solution according to specified criteria. In the context of engineering design, the "best" solution may refer to a minimum cost or weight, maximum quality or efficiency, or some other performance index pertaining to a disciplinary objective. However, determining the optimal design involves more than just the minimization or maximization of an objective function. Designers must also identify the design variables that represent the physical form of the system and the constraints that represent limitations on the design space. Typically, the problems of interest in engineering are of a nonlinear nature, in that the objective functions and constraints considered are nonlinear.

Prerequisite(s):

- Mathematics, Numerical Methods

Course Objectives:

I.   To introduce the fundamental concepts of Optimization Techniques;
II.   To make the learners aware of the importance of optimizations in real scenarios;
III. To provide the concepts of various classical and modern methods of for constrained and unconstrained problems in both single and multivariable.

Course Outcomes:

Upon successful completion of this course, students will be able to

1. Formulate optimization problems;
2. Understand and apply the concept of optimality criteria for various type of optimization problems;
3. Solve various constrained and unconstrained problems in single variable as well as multivariable;
4. Apply the methods of optimization in real life situation.
5. To solve the any type of problem using principles of optimality.

ENGINEERING OPTIMIZATION
(Open Elective)

Course Code: **A3379**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT I
OPTIMIZATION TECHNIQUE: Introduction, Single-Variable Optimization, Multivariable Optimization with No Constraints, Multivariable Optimization with Equality Constraints, Multivariable Optimization with Inequality Constraints, Convex Programming Problem.

UNIT II
LINEAR PROGRAMMING : Introduction, Revised Simplex Method, Duality in Linear Programming, Decomposition Principle, Sensitivity or Postoptimality Analysis, Transportation Problem, Karmarkar's Method, Quadratic Programming.

UNIT III
NON-LINEAR PROGRAMMING : Introduction, Unimodal Function, Unrestricted Search, Exhaustive Search, Dichotomous Search, Interval Halving Method, Fibonacci Method, Golden Section Method, Comparison of Elimination Methods, Quadratic Interpolation Method, Cubic Interpolation Method, Direct Root Methods, Rate of convergence, Design variables, Random search methods, Chrivariate methods, Powell's method, Newton's method, Marquard Method, Test function.

UNIT IV
GEOMETRIC PROGRAMMING : Introduction, Posynomial, Unconstrained Minimization Problem, Primal-Dual Relationship and Sufficiency Conditions in the Unconstrained Case, Constrained Minimization, Primal and Dual Programs in the Case of Less-Than Inequalities, Geometric Programming with Mixed Inequality Constraints, Complementary Geometric Programming, Applications of Geometric Programming.

UNIT V
DYNAMIC PROGRAMMING : Introduction, Multistage Decision Processes, Concept of Sub optimization and the Principle of Optimality, Computational Procedure in Dynamic Programming, The Calculus Method of Solution, The Tabular Method of Solution, Conversion of a Final Value Problem into an Initial Value Problem, Linear Programming as a Case of Dynamic Programming, Continuous Dynamic Programming, Applications.

TEXT BOOKS:
1. Optimization Techniques – C.S. Rao – Dhanpat Rai & Sons, New Delhi
2. Engineering Optimization Theory and Practice – S.S. Rao – New Age Publishers.
3. Optimization methods for Engineering Design – R.L. Fox - Addison Wesley

REFERENCES:
1. Introduction to optimum Design – J.S. Arora – Mc. Grawhill publishers
2. Optimization Methods for Engineering – Raju – PHI,Delhi
3. Foundation of Mathematical optimization – Pallaschke – Kluwer Academic Publishers
4. Optimization Methods in Operations Research and System Analysis–K V Mittal–Wiley,Delhi
5. Optimization For Engineering Design- Deb, Kalyanmoy-Prentice Hall
6. Optimization Methods – Mohan & Deep- New Age, Delhi
7. An Introduction to Optimization- Chang, Edwin& Zak Stanislaw -John Wiley, New York
8. Optimization Concepts And Applications In Engineering – Belegundu & Chandrupatla-Pearson,Singapore

ENVIRONMENTAL POLLUTION AND MANAGEMENT
(Open Elective)

Course Code: **A3176**

L	T	P	C
3	0	0	3

Course Overview:

The course has been designed to improve the understanding of the students about different pollution control strategies and the skills of application of remediation techniques to combat pollution in three environmental compartments i.e. air, water and soil. The course will also be dealing about the sources of pollution in air, soil, water, solid-waste and noise and the impacts these sources on the environment and health. In addition, the students will be given the training to develop the particular skills required in pollution related structured research.

Prerequisite(s):

- Nil

Course objectives:

The course is designed to
   I.   Find air pollution: sources and effects.
  II.   Label sources and classification of water pollutants.
 III.   Classify sources of soil contamination.
  IV.   Summarize the standards laid by governing authorities.
   V.   Discuss functioning of control board.

Course outcomes:

Upon successful completion of this course, student will be able to:

1. Distinguish between various modes of air pollution and their characteristic.
2. Examine air pollution sampling and classify its level.
3. Evaluate water quality and propose necessary measures.
4. List different standards laid by governing authorities.
5. Summarize functions carried out by controlling bodies.

B. Tech. ECE VI/VII/VIII SEMESTER

ENVIRONMENTAL POLLUTION AND MANAGEMENT
(Open Elective)

Course Code: **A3176**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT-I **(12 Lectures)**

Water pollution – sources & types of water pollution – physical, chemical & biological – effect of water pollution. Drinking water quality standards waste water treatment – primary, secondary, tertiary-water pollution prevention & control act – 1974.

UNIT-II **(12 Lectures)**

Air pollution –structure and composition of atmosphere – classification, sources & effects of air pollution – Acid rain –green house effect – global warming – Ozone depletion.

UNIT-III **(12 Lectures)**

Prevention and control of air pollution particulate control – settling chamber, scrubber, bag filter, cyclones electrostatic precipitators. Gaseous emission control methods. Air pollution prevention and control Act 1981.

UNIT-IV **(12 Lectures)**

Soil Pollution – soil pollutants – types – sources, effects & Control. Noise Pollution – sources effects & Control.

UNIT-V **(12 Lectures)**

Government Agencies & Programs – The Tiwari committee – creation of NCEPC, Department of Environment & Forest – Function of State Pollution Control Board.

TEXT BOOKS:

1. Rao, M. N and H.V.N. Rao (1993) Air Pollution, Tata McGraw – Hill Publishing Company Limited. New Delhi.
2. Kudesia, V.P and Ritu Kudesia (1992) Water Pollution, Pragati Prakashan Publication, Meerut.

REFERENCES

1. Sawyer, C. N., P.L McCarty and G.F. Perkin (1994) Chemistry for Environmental Engineers, II Edition. McGraw-Hill.
2. Sharma, B.K and H.Kaur (1994) Soil and Noise Pollution. Goel Publishing House, Meerut.
3. Kumarasawmy, K., A. Alagappa Moses and M. Vasanthy (2004) Environmental Studies (A Text Book for All Under Graduate Students) Bharathidasan University Publications.

REMOTE SENSING AND GIS APPLICATIONS
(Open Elective)

Course Code: **A3177**

L	T	P	C
3	0	0	3

Course overview:

This course covers the study of elements in remote sensing process and steps involved in electromagnetic remote sensing process. This course also covers the principals of photometry and various concepts of and terminology of GIS and also includes how the data is presented and data base management system. In this course the applications of remote sensing and GIS in civil engineering.

Prerequisite(s):

- Nil

Course Objectives:

The course is designed to
- I. Analyze the basic components of GIS.
- II. Recall the terms of photogrammetry and photo-interpretation.
- III. Summarize the basic elements involved in the Operation of Remote Sensing &GIS.
- IV. Analyze the energy interactions in the atmosphere and earth surface features.
- V. Summarize applications of remote sensing and GIS in civil engineering.

Course outcomes:

Upon successful completion of this course, student will be able to:
1. Describe the working principle of interpretation of Aerial photographs and satellite.
2. Summarize the data types, data storage and carry out the analysis of spatial and attribute data.
3. Explain basics of Aerial Photography, Remote sensing and GIS.
4. Utilize knowledge about the principles and physics of Remote sensing and data acquisition.
5. List out and apply applications of remote sensing andGis in various fields.

REMOTE SENSING AND GIS APPLICATIONS
(Open Elective)

Course Code: **A3177**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT – I   **(12 Lectures)**

INTRODUCTION TO PHOTOGRAMMETRY: Principles & types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducial points, parallax measurement using fiducial line.

UNIT – II   **(12 Lectures)**

REMOTE SENSING: - Basic concept of Remote sensing, Data and Information, Remote Sensing data collection, Remote sensing advantages & Limitations, Remote sensing process. Electro-magnetic Spectrum, Energy interactions with atmosphere and with earth surface features (Soil, Water, and Vegetation). Indian Satellites and Sensors characteristics, Resolution, Map and Image and False color composite, introduction to digital data, elements of visual interpretation techniques.

UNIT – III   **(12 Lectures)**

GEOGRAPHICAL INFORMATION SYSTEMS: Introduction to GIS; Components of a GIS; Geospatial Data: Spatial Data - Attribute data - joining Spatial and Attribute data; GIS operations: Spatial Data input-Attribute data Management - Data display - data exploration - Data Analysis.

COORDINATE SYSTEMS: Geographic Coordinate System: Approximation of Earth, Datum; Map Projections; Types of Map Projection parameters - Commonly used Map Projections - Projected coordinate Systems.

UNIT – IV   **(10 Lectures)**

DATA COLLECTION: Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning.

TYPES OF DATA REPRESENTATION: Raster GIS, Vector GIS, File management, Spatial data, Layer based GIS, Feature based GIS mapping.

UNIT – V   **(14 Lectures)**

APPLICATIONS : WATER RESOURCES APPLICATIONS - Surface water mapping - Flood and Drought impact assessment - Rainfall – Runoff relations - Watershed management for sustainable development and Watershed characteristics - TRANSPORTATION – shortest path- vehicle tracking – network travel cost – transportation master plan. DISASTER MANAGEMENT – ENVIRONMENTAL ENGINEERING – environmental impact assessment - site remediation – fire growth stimulation. AGRICULTURE.

TEXT BOOKS:

1. James B. Campbell, Randolph H. Wynne (2011), *Introduction to Remote Sensing, 5*th edition, Guilford Publications Inc., New York, USA.
2. L. R. A. Narayana (1999), *Remote Sensing and its applications,* Universities Press, India.
3. M. Anji Reddy (2001), *Remote Sensing and Geographical Information systems,* B. S. Publications, New Delhi, India.

REFERENCE BOOKS:

1. Thomas M. Lillesand, Ralph W. Kiefer (1994), *Remote Sensing and Image Interpretation*, Wiley & Sons, New Delhi, India.
2. Peter A. Burragh, Rachael (2011), *Principals of Geo physical Information Systems,* Oxford Press, India.
3. S. Kumar (2005), *Basics of remote sensing and GIS*, Laxmi Publications, New Delhi, India.

DISASTER MANAGEMENT
(Open Elective)

Course Code: **A3178**

L	T	P	C
3	0	0	3

Course Overview:

This course will introduce students to the vocabulary and core components of Disaster Management. We will discuss the importance of this growing field that is changing rapidly as a result of an increase in frequency, complexity, and severity of man-made, natural, and technological disasters. We will examine historical events that have changed the nature of the field, and introduce students to the leadership and management roles that have emerged as a result of these events taking place.

Prerequisite(s):

- Environmental sciences

Course Objectives:

The course is designed to
  I. Give the basic knowledge of Environmental Hazards and disasters.
  II. Ensure awareness on the nature and types of disasters.
  III. Understand Endogenous hazards, exogenous hazards.
  IV. Understand Emerging approaches in Disaster management.
  V. Learn how to manage the three stages of as disaster.

Course Outcomes:

Upon successful completion of this course, student will be able to:
  I. List out different causes of Environmental hazards.
  II. Classify environmental hazards and disasters, Endogenous hazards, exogenous hazards, infrequent events - Cumulative atmospheric hazards / disasters.
  III. Explain different characteristics of hazards.
  IV. Develop Emerging approaches in Disaster management.

B. Tech. ECE VI/VII/VIII SEMESTER

DISASTER MANAGEMENT
(Open Elective)

Course Code: **A3178**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT–I (12Lectures)

ENVIRONMENTAL HAZARDS & DISASTERS: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

UNIT – II (12Lectures)

TYPES OF ENVIRONMENTAL HAZARDS & DISASTERS: Natural hazards and Disasters – Man induced hazards & Disasters - Natural Hazards - Planetary Hazards / Disasters - Extra Planetary Hazards / disasters - Planetary Hazards - Endogenous Hazards - Exogenous Hazards

UNIT- III (12Lectures)

ENDOGENOUS HAZARDS: Volcanic eruption - Earthquakes - landslides - Volcanic Hazards / Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards / disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - Human adjustment, perception & mitigation of earthquake.

UNIT- IV (13Lectures)

Exogenous hazards / disasters - Infrequent events - Cumulative atmospheric hazards / disasters Infrequent events: Cyclones - Lightning – Hailstorms.

CYCLONES: Tropical cyclones & Local storms - Destruction by tropical cyclones & local stroms (causes, distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters :- Floods - Droughts - Cold waves - Heal waves Floods :- Causes of floods - Flood hazards India - Flood control measures (Human adjustment, perception & mitigation) Droughts :- Impacts of droughts - Drought hazards in India - Drought control measures - Extra Planetary Hazards / Disasters - man induced Hazards / Disasters - Physical hazards / Disasters - Soil erosion

SOIL EROSION: Mechanics & forms of Soil Erosion - Factors 7 causes of Soil Erosion - Conservation measures of Soil Erosion.

CHEMICAL HAZARDS / DISASTERS: Release of toxic chemicals, nuclear explosion - Sedimentation processes Sedimentation processes: - Global Sedimentation problems - Regional Sedimentation problems - Sedimentation & Environmental problems - Corrective measures of Erosion & Sedimentation

BIOLOGICAL HAZARDS / DISASTERS: Population Explosion

UNIT-V (12Lectures)

Emerging approaches in Disaster Management - Three stages
1. Pre-disaster Stage (preparedness)
2. Emergency Stage
3. Post Disaster stage – Rehabilitation

TEXT BOOKS:
1. Disaster Mitigation: Experiences And Reflections by Pradeep Sahni
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman - Cengage Learning

REFERENCE BOOKS:
1. R. B. Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990
2. Savinder Singh Environmental Geography, PrayagPustakBhawann 1997
3. Kates, B. I & White, G. F The Environment as Hazards, oxford, New York, 1978
4. R. B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
5. H. K. Gupta (Ed) Disaster Management, Universities Press, India, 2003
6. R. B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr.Satender, Disaster Management in Hills, Concept Publishing Co., New Delhi, 2003
8. A. S. Arya Action Plan For Earthquake, Disaster, Mitigation in V. K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
9. R. K. Bhandani An overview on Natural & Manmade Disaster & their Reduction, CSIR, New Delhi
10. M. C. Gupta Manuals on Natural Disaster Management in india, National Centre for Disaster Management, IIPA, New Delhi, 2001.

CONSTRUCTING PLANNING AND MANAGEMENT
(Open Elective)

Course Code: **A3179**

L	T	P	C
3	0	0	3

Course Overview:

The construction management degree prepares you for a wide range of professional roles in the building and construction industry. This course is management-oriented and focuses on a broad range of interrelated disciplines including domestic, commercial and civil construction. You will be taught by a dedicated team of professionals with qualifications and experience in construction-related disciplines. Core subjects include construction technology, measurement and estimating, project management, contracts administration, building law and economics, and communication and computer skills.

Prerequisites:

- Nil

Course Objective:

The course is designed to

I. Prepare high-caliber professionals with strong technical, managerial, and practical skills.
II. Produce regional and national industry leaders who are ethically and socially responsible, quality- centered, and dedicated to safety.
III. Enable students to pursue successful, fulfilling careers in an industry that is vital to our nation's economic health and quality of life.
IV. Establish a reputation within the construction industry for professionalism, knowledge and cutting edge technology that will ensure Drexel Construction Management graduates are highly sought after.

Course Outcomes:

Upon successful completion of this course, student will be able to:

1. Improve business and management skills in positions within the construction industry.
2. Adapt technical skills and knowledge in mathematics, science, construction, and technology in support of planning, analyzing, and solving construction problems.
3. Utilize industry resources including associations and organizations, professional publications, and governmental data to analyze, evaluate, and apply current trends within the industry.
4. Make use of decision-making in personal and professional endeavors.
5. Design a quality construction project from start to completion while maintaining budget, schedule, and safety requirements.

CONSTRUCTING PLANNING AND MANAGEMENT
(Open Elective)

Course Code: **A3179**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT – I **(12Lectures)**

Contract management, project estimation, types of estimation, contract document, classification, bidding, and procurement process.

UNIT-II **(12Lectures)**

PERT AND CPM : Introduction, origin of PERT and CPM, planning, scheduling and controlling, bar charts, milestone charts, weaknesses in bar charts, PERT and CPM networks comparison, event, activity, rules for drawing networks, numbering the events (Fulkerson's law), dummy activities.

UNIT – III **(12Lectures)**

CPM - PERT NETWORK ANALYSIS : Time estimate, expected time, earliest allowable occurrence time, latest allowable occurrence time, slack, project duration, probability of completion, start and finish time estimates, floats, project scheduling, critical and sub-critical path. Updating - process of updating, when to update.

UNIT – IV **(12Lectures)**

CPM COST MODEL & RESOURCES ALLOCATIONS, RESOURCE SCHEDULING : Cost analysis, direct and indirect costs, operation time, normal and crash times and costs, optimizing project cost, crash limit, free float limit, optimization. Resource smoothening, resource leveling.

UNIT – V **(12Lectures)**

Construction claims, dispute and project closure, source of claim, claim management, dispute resolution, arbitration, construction closure, contract closure, documentation

TEXT BOOKS:

1. Punmia, Khandelwal (2006), *Project planning and control with PERT and CPM*, 3rd edition, Laxmi Publications, New Delhi, India.
2. Construction project management-theory and practice, Nirajjha, Pearson education,2010.

REFERENCE BOOKS:

1. L. S. Srinath (1975), *PERT and CPM*, 2nd Edition, Afflicted East West Press Pvt. Ltd, New Delhi, India.
2. U. K. Shrivastava (1999), Construction Planning and Management, Galgotia Publications Pvt. Ltd., New Delhi, Construction technology by subir k. Sarkar, subhajit saraswathi/oxford university press,2009

ENTREPRENEURSHIP DEVELOPMENT
(Open Elective)

Course Code: **A3076**

L	T	P	C
3	0	0	3

Course Educational Objectives (CEO'S):

The course make the students to learn

- I.   Role, characteristics, qualities, and functions of entrepreneur and also different barriers to entrepreneurship.
- II. Various Institutional support for setting up a business enterprise.
- III. Role, importance and functions of women entrepreneur and women entrepreneur development.
- IV. Concept of Project Management and steps in Project development.
- V.   Training programs to inculcate entrepreneurial spirit and different training institutions to impart training to entrepreneurs.

Course Outcomes (CO'S):

On successful completion of this course students able to:

1. Understand the role, characteristics, qualities and functions of entrepreneur and use this knowledge to become future entrepreneurs.
2. Interpret various Institutional support for setting up a business enterprise and apply this knowledge while approaching these institutions for financial support.
3. Illustrate role, importance and functions of women entrepreneur and use this knowledge to become future women entrepreneurs.
4. Infer the concept of Project Management and steps in Project development and analyse while taking future project assignments.
5. Indicate training programs and different training institutions to impart training and apply this knowledge to train existing and future entrepreneurs.

ENTREPRENEURSHIP DEVELOPMENT
(Open Elective)

Course Code: **A3076**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT - I
ENTREPRENEURSHIP: Importance and role of entrepreneurship, Qualities of an entrepreneur, Functions of entrepreneur, Theories of entrepreneurship, Stimulants of entrepreneurship and Barriers to entrepreneurship, Ethics and Social Responsibility, Role of entrepreneur in economic development.

UNIT - II
INSTITUTIONAL SUPPORT: Role of Government: Role of IDBI, SIDBI, SIDO, NIESBUD, DIC, Entrepreneurship Development Institute, T-Hub (Telangana Hub).

UNIT - III
WOMEN ENTREPRENEURSHIP: Role & Importance, Functions of women entrepreneur, Profile of Indian Women Entrepreneur, Problems of Women Entrepreneurs, Women Entrepreneurship Development in India and in Foreign Countries.

UNIT - IV
PROJECT MANAGEMENT: Concept of project and classification of project, Project life cycle- identification, Project formulation, Project report , Project evaluation- profitability appraisal, social cost benefit analysis, feasibility analysis, financial analysis and project financing, Project implementation, Project completion.

UNIT - V
ENTREPRENEUR TRAINING: Designing appropriate training programmes to inculcate Entrepreneurial Spirit, significance of entrepreneurial training, Feedback and Performance of Trainees, NSIC, Pradhan Mantri Kaushal Vikas Yojana (PMKVY), Telangana Academy for Skill and Knowledge (TASK).

TEXT BOOKS:
4. Robert Hisrich, Michael P. Peter, Dean A. Shepherd (2010), E*ntrepreneurship*, Tata Mc Graw Hill, New Delhi.

REFERENCE BOOKS:
1. Bholanath Datta (2009), Entrepreneurship, Excel publications, India.
2. David H Holt (2010), Entrepreneurship, Prentice hall of India, New Delhi, India.

HUMAN RESOURCE MANAGEMENT
(Open Elective)

Course Code: **A3077**

L	T	P	C
3	0	0	3

Course Educational Objectives (CEO's):

The course make the students to learn

- I. Equip the students with basic concepts, function of HRM and Human Resource Planning.
- II. HR specific functions – Job Analysis, Recruitment and Employee Retention.
- III. HR specific functions –, Training, Development, Career planning and Performance Appraisal activities.
- IV. Concept of compensation and different factors influencing wage fixation.
- V. Industrial relations, Trade Union and its functions and Grievance redressal machinery.

Course outcomes (CO's):

On successful completion of this course students able to:

1. Understand HR functions effectively and apply this knowledge to manage the employees in the organizations.
2. Explain Job Analysis, Recruitment and Employee Retention practices and strategies and apply this knowledge to hire and retain the right people for the right jobs in organizations.
3. Indicate different training methods and performance appraisal systems and apply this knowledge to impart appropriate training method as well as appraise the performance of the employees by using different appraisal methods.
4. Analyze decisions relating to compensation and factors influencing the employee compensation.
5. Apply knowledge on different techniques to resolve industrial disputes in the organization.

HUMAN RESOURCE MANAGEMENT
(Open Elective)

Course Code: **A3077**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT-I
INTRODUCTION HUMAN RESOURCE MANAGEMENT: Introduction and significance of HRM, Scope, functions of HRM, changing environment of HRM and Challenges. Human Resource Planning, Objectives, Factors influencing Human Resource planning, HR Planning Process.

UNIT-II
JOB ANALYSIS AND RECRUITMENT: Job analysis- Job description, Job specification, Sources of Recruitment; Selection, process of selection and techniques, Retention of Employees.

UNIT-III
HUMAN RESOURCES DEVELOPMENT: Training Vs Development, Need, Process of training, Methods of training, Training Evaluation, Career planning, Performance Management System, Methods of Appraisal, Common Errors.

UNIT-IV
COMPENSATION MANAGEMENT: Concepts and components of wages, Factors influencing wage fixation, Job evaluation, Methods of payment, Incentives and Fringe benefits.

UNIT-V
INDUSTRIAL RELATIONS: Components of Industrial Relation, Trade Unions, functions of Trade Union, Employee Participation, Collective Bargaining, Grievance Redressal, Industrial Dispute Settlement machinery.

TEXT BOOKS:
1. Biswajeet Pattnayak (2009), *Human Resource Management*, Prentice hall of India, New Delhi, India.
2. R. Wayne Mondy and Robert M. Noe (2009), *Human Resource Management*, Pearson, India.

REFERENCE BOOKS:
1. Aswathappa. K. (2007), *Human Resources and Personnel Management*, Tata MC Graw Hill, New Delhi, India.
2. Monappa. A, Saiyadain. M. (1979), *Personnel Management*, Tata Mc Graw Hill, New Delhi, India.
3. C. B. Mamoria (2003), *Personnel Management*, Himalaya Publishing House, India.

ORGANIZATIONAL BEHAVIOR
(Open Elective)

Course Code: **A3078**

L	T	P	C
3	0	0	3

Course Education Objectives (CEO's):

The course make the students to learn

- I. Organizational behaviour in its broadest multi – disciplinary context of Individual, group and organization as well as approaches, opportunities and challenges of OB.
- II. Importance of diversity management need in global context and Personality and perception of individual.
- III. Group behaviour and role of leadership theories related to behavioural perspectives.
- IV. Motivation theories and framework of different types of organization structures.
- V. Conflict management, Stress management, Organization change and Self management.

Course Outcomes (CO's):

On successful completion of this course students able to:

1. Understand approaches, opportunities and challenges of OB and use this knowledge to understand behaviour people in organizations.
2. Explain the importance of diversity in organizations as well as personality and perception of individual and apply this knowledge for better understanding of human beings in organizations.
3. Indicate the group behaviour and leadership styles exhibit by the managers and apply this knowledge to get the things done through subordinates efficiently and effectively.
4. Illustrate motivation theories and different Organization structures and apply this knowledge to create suitable organization structure for business as well as to get better work from employees.
5. Interpret the role of Conflict management, Stress management, Organization change and Self management and apply this knowledge for solving different problems of organizations.

ORGANIZATIONAL BEHAVIOR
(Open Elective)

Course Code: **A3078**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT-I
INTRODUCTION TO ORGANIZATIONAL BEHAVIOR: Foundation of O.B - Conceptual Model for O.B. – Organization System in Global Environment – Importance of Interpersonal Skills - Challenges & Opportunities for O.B- Developing O.B. Model – Approaches to O.B.

UNIT-II
INDIVIDUAL BEHAVIOR: Diversity – Biographical Characteristics - Ability – Implementing Diversity Management – Strategies – Attitudes & Job Satisfaction.

PERSONALITY: Theories of Personality –Perception – Process of Perception – Perception & Individual Decision Making – Motivation from concepts to Applications.

UNIT-III
GROUP BEHAVIOR: Foundations of Group Behaviour – Defining and Classifying Groups – Stages of Group Development – Group Properties – Roles – Norms – Status, Size and Cohesiveness – Group Decision Making – Understanding Work Teams – Types of Teams – Creating Effective Teams.

LEADERSHIP THEORIES: Leadership Theories – Challenges to Leadership Construct – Finding and Creating Effective Leaders – Power & Polities.

UNIT-IV
MOTIVATION THEORIES: Maslow's Hierarchy of Needs, Two- factor theory of Motivation, Alderfer's ERG theory, McClelland's need based Motivational Model, Douglas McGregor Theories of X and Y.

FOUNDATION OF ORGANIZATIONAL STRUCTURE: Nature of organizing, organizational levels, span of control and types of span of control, factors determining span, organizational structure, departmentation and types of departmentation, making organizing effective.

UNIT-V
ORGANIZATIONAL CULTURE AND CLIMATE: Conflicts management - Organization Change - Stress Management – Self Management – Managing Careers.

TEXT BOOKS:
1. Stephen P. Robbins, Timothy (2012)*, Organization Behaviour*,Ed. 14, Pearson Publications.
2. Mirza S Saiyadain (2011), *Organisation Behaviour*, TMH, New Delhi
3. Aryasri & VSP Rao (2009), *Management and Organisational Behaviour*, Excel Publications.

REFERENCE BOOKS:
1. Kavitha Singh (2009), *Organisational Behaviour*, Pearson Publictions
2. Aswathappa (2009), *Organisational Behaviour*,Himalaya Publictions
3. John M. Ivancevich (2009), *Organisational Behaviour & Management*, TMH, New Delhi
4. Koontz, Weihrich & Aryasri (2009), *Principles of Management*, TMH, New Delhi
5. Luthans, Fred (2009), *Organisational Behaviour*, 11/e, McGraw Hill, 2009.
6. Pierce and Gardner (2009), *Management and Organisational Behaviour: An Integrated Perspective*, Cengage
7. Deepak Kumar Bhattacharyya (2012), *Principles of Management-text and cases*, Pearson

LOGISTICS AND SUPPLY CHAIN MANAGEMENT
(Open Elective)

Course Code: **A3079**

L	T	P	C
3	0	0	3

Course Education Objectives (CEO's):

The course make the students to learn

I.   Supply chain management functions, drivers and different types of Logistics management.
II. Importance of Supply chain customer service and bench mark practices.
III. Role of sourcing and distribution in supply chain.
IV. Importance of Co-ordination in supply chain and role of Information Technology in supply chain.
V.   Global logistics & Global supply chain processes and strategies.

Course Outcomes (CO's):

On successful completion of these course students able to:

1. Understand Supply chain management functions, drivers and different types of Logistics and apply this knowledge in business environment.
2. Illustrate the importance of Supply chain customer service and bench mark practices and apply them in business environment.
3. Explain the role of Sourcing and Distribution in supply chain and apply the knowledge in decision making process of organization.
4. Interpret the importance of Co-ordination in supply chain and role of Information Technology in supply chain and use this knowledge to run the organization successfully.
5. Classify Global logistics & Global supply chain processes and strategies and use this knowledge to understand Global supply chain and logistics environment.

LOGISTICS AND SUPPLY CHAIN MANAGEMENT
(Open Elective)

Course Code: **A3079**

L	T	P	C
3	0	0	3

SYLLABUS

UNIT-I
INTRODUCTION: Supply Chain Management- Concept, Objectives, Scope and Functions of Supply Chain; Process view of a Supply Chain. Supply Chain Drivers - Facilities, Inventory, Transportation, Information, Sourcing, Pricing; Obstacles to Achieve Strategic fit, Logistics Management: Introduction, Difference between Logistics and Supply Chain; Inbound, Inter and Outbound Logistics; Integrated Logistics Management; 3PL, 4PL, Intermodal and Reverse Logistics.

UNIT-II
SUPPLY CHAIN CUSTOMER SERVICE - The Marketing and Logistics interface, Customer Service and Customer Retention, Service-Driven Logistics System, Setting customer Service Priorities and Service Standards.
BENCH MARKING: Objectives, Bench marking Cycle, Process and types, Setting Bench marking Priorities.

UNIT-III
SOURCING IN SUPPLY CHAIN: Role of Sourcing in Supply Chain Management, Supplier Scoring and Assessment; Supplier Selection and Controlling; The Procurement process, Sourcing Planning and Analysis; Global Sourcing.
NETWORK DESIGN IN SUPPLY CHAIN: The role of distribution in the Supply Chain Management, factors influencing distribution network design; Transportation Fundamentals: The role of Transportation in Supply Chain, Factors influencing Transportation Decisions, Modes of transportation, Transportation documentation.

UNIT-IV
COORDINATION IN SUPPLY CHAIN: Introduction, Lack of Supply Chain Coordination and the Bullwhip effect, Impact of Lack of Coordination, Obstacles to Coordination in Supply Chain, Managerial levers to achieve Coordination.

IT IN SUPPLY CHAIN: The role of IT in the Supply Chain, The Supply Chain IT framework; CRM, Internal SCM, SRM; The future of IT in Supply Chain, Supply Chain IT in Practice.

UNIT-V
GLOBAL LOGISTICS AND GLOBAL SUPPLY CHAIN: Logistics in Global Economy, Change in Global Logistics, Global Supply Chain business process; Global Strategy; Global Purchasing, Global SCM.

TEXT BOOKS:
1. K.Sridhara butt, "*Logistics and Supply Chain management*", Himalaya Publishers, New Delhi, 2009.

REFERENCE BOOKS:
1. Sunil Chopra and Peter Meindl, " *Supply Chain Management: Strategy, Planning & Operations*", Pearson Education, New Delhi, 2004.
2. Donald J Bowerfox and David J Closs, " *Logistics Management: The integrated Supply Chain Process*", TMH, 2003.
3. D.K.Agarwal, "*Logistics and Supply Chain management*", Mc millan Publishers, 2011
4. B.Rajasekhar, Acharyulu, "*Logistics and Supply Chain management*", Excel Books, New Delhi, 2009.

NATIONAL SERVICE SCHEME (NSS)
(Open Elective)

Course Code: **A3080**

L	T	P	C
3	0	0	3

Course Overview:

National Service Scheme, under the Ministry of Youth Affairs & Sports Govt. of India, popularly known as NSS was launched in Gandhiji's Birth Centenary Year 1969, in 37 Universities involving 40,000 students with primary focus on the development of personality of students through community service. Today, NSS has more than 3.2 million student volunteers on its roll spread over 298 Universities and 42 (+2) Senior Secondary Councils and Directorate of Vocational Education all over the country. From its inception, more than 3.75 crores students from Universities, Colleges and Institutions of higher learning have benefited from the NSS activities, as student volunteers.

Course Objectives:

I.   To demonstrate the fundamentals of different NSS activities and its financial pattern.
II.   To develop the knowledge on youth and its impact in community service.
III. To design and analysis the society problem, by providing realistic solutions.
IV.   To develop the knowledge on Volunteerism to enhance lifelong learning.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Contrast the different types of NSS activities and financial pattern of expenditure in Community service.
2. Enhance the concept of youth, as an agent in social change.
3. Classify and explain the working of an organizational functionaries of NSS.
4. Design a system, component or process to meet the desired needs applicable to society , with realistic constraints such as economic, safety, manufacturability and sustainability etc., by youth – adult partnership.
5. Recognize the need for, and an ability to engage in society with lifelong learning capabilities with the concepts of volunteerism and its functions.

NATIONAL SERVICE SCHEME (NSS)
(Open Elective)

Course Code: **A3080**

L	T	P	C
3	0	0	3

SYLLABUS

Unit-01: INTRODUCTION AND BASIC CONCEPTS OF NSS

a)   History, philosophy, aims & objectives of NSS

b)   Emblem, flag, motto, song, badge etc.

c)   Organizational structure, roles and responsibilities of various NSS functionaries

Unit-02: NSS PROGRAMMES AND ACTIVITIES

a)   Concept of regular activities, special camping, Day Camps

b)   Basis of adoption of village/slums, Methodology of conducting Survey

c)   Financial pattern of the scheme

d)   Other youth prog./schemes of GOI

e)   Coordination with different agencies

f)   Maintenance of the Diary

Unit-03: UNDERSTANDING YOUTH

a)   Definition, profile of youth, categories of youth

b)   Issues, challenges and opportunities for youth

c)   Youth as an agent of social change

Unit-04: COMMUNITY MOBILISATION

a)   Mapping of community stakeholders

b)   Designing the message in the context of the problem and the culture of the community

c)   Identifying methods of mobilization

d)   Youth-adult partnership

Unit-05: VOLUNTTERISM AND SHRAMDAN

a)   Indian Tradition of volunteerism

b)   Needs & importance of volunteerism

c)   Motivation and Constraints of Volunteerism

d)   Shramdan as a part of volunteerism

MALPRACTICES RULES
DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

		Nature of Malpractices/Improper conduct	Punishment
		If the candidate:	
1. (a)		Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)		Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.		Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.		Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.		Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.		Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.		Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year.

	the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Frequently asked Questions and Answers about autonomy

1. **Who grants Autonomy? UGC, Govt., AICTE or University**

   In case of Colleges affiliated to a university and where statutes for grant of autonomy are ready, it is the UGC that finally grants autonomy.

2. **Shall VCE award its own Degrees?**

   No. Degree will be awarded by Jawaharlal Nehru Technological University Hyderabad with a mention of the name Vardhaman College of Engineering on the Degree Certificate.

3. **What is the difference between a Deemed University and an Autonomy College?**

   A Deemed University is fully autonomous to the extent of awarding its own Degree. A Deemed University is usually a Non-Affiliating version of a University and has similar responsibilities like any University. An Autonomous College enjoys Academic Autonomy alone. The University to which an autonomous college is affiliated will have checks on the performance of the autonomous college.

4. **How will the Foreign Universities or other stake–holders know that we are an Autonomous College?**

   Autonomous status, once declared, shall be accepted by all the stake holders. Foreign Universities and Indian Industries will know our status through our college website.

5. **What is the change of Status for Students and Teachers if we become Autonomous?**

   An autonomous college carries a prestigious image. Autonomy is actually earned out of continued past efforts on academic performance, capability of self-governance and the kind of quality education we offer.

6. **Who will check whether the academic standard is maintained / improved after Autonomy? How will it be checked?**

   There is a built in mechanism in the autonomous working for this purpose. An Internal Committee called Academic Programme Evaluation Committee is a Non–Statutory body, which will keep an eye on the academics and keep its reports and recommendations every year. In addition to the Academic Council, the highest academic body also supervises the academic matters. At the end of three years, there is an external inspection by the University for this purpose. The standards of our question papers, the regularity of academic calendar, attendance of students, speed and transparency of result declaration, and such other parameters are involved in this process.

7. **Will the students of VCE as an Autonomous College qualify for University Medals and Prizes for academic excellence?**

   No. VCE has instituted its own awards, medals, etc. for the academic performance of the students. However for all other events like sports, cultural and co-curricular organized by the University the students shall qualify.

8. **Can VCE have its own Convocation?**

   No, since the University awards the Degree the Convocation will be that of the University.

9. **Can VCE give a provisional Degree certificate?**

   Since the examinations are conducted by VCE and the results are also declared by VCE, the college sends a list of successful candidates with their final percentage of marks to the University. Therefore, with the prior permission of the University the college will be entitled to give the Provisional Certificate.

10. **Will Academic Autonomy make a positive impact on the Placements or Employability?**

    Certainly. The number of students qualifying for placement interviews is expected to improve, due to rigorous and repetitive classroom teaching and continuous assessment, besides the autonomous

status is more responsive to the needs of the industry. As a result, there will be a lot of scope for industry oriented skill development built-in into the system. The graduates from an autonomous college will therefore represent better employability.

11. **What is the proportion of Internal and External Assessment as an Autonomous College?** Presently, it is 25 % for internal assessment and 75 % for external assessment. As the autonomy matures the internal assessment component shall be increased at the cost of external assessment.

12. **Will there be any Revaluation or Re-Examination System?**
Students shall be permitted for re-evaluation after the declaration of end semester examination results within a stipulated period by paying prescribed fee. But there will not be any re-examination system.

13. **How fast Syllabi can be and should be changed?**
Autonomy allows us the freedom to change the syllabi as often as we need.

14. **Will the Degree be awarded on the basis of only final year performance?**
No. The percentage of marks will reflect the average performance of all the semesters put together in CGPA format.

15. **Who takes Decisions on Academic matters?**
The Academic Council of College is the top academic body and is responsible for all the academic decisions. Many decisions are also taken at the lower level like the BOS which are like Boards of Studies of the University.

16. **What is the role of Examination committee?**
The Exam Committee is responsible for the smooth conduct of inter and external examinations. All matters involving the conduct of examinations, spot valuations, tabulations, preparation of Memorandum of Marks etc fall within the duties of the Examination Committee.

17. **Is there any mechanism for Grievance Redressal?**
Yes, the college has grievance redressal committee, headed by a senior faculty member of the college.

18. **How many attempts are permitted for obtaining a Degree?**
All such matters are defined in Rules & Regulations.

19. **Who declares the result?**
The result declaration process is also defined. After tabulation work the entire result is reviewed by the Moderation Committee. Any unusual deviations or gross level discrepancies are deliberated and removed. The entire result is discussed in the College Academic Council for its approval. The result is then declared on the college notice boards and posted on the web site of the college. It is eventually sent to the University.

20. **What is our relationship with the Jawaharlal Nehru Technological University Hyderabad?**
We remain an affiliated college of the Jawaharlal Nehru Technological University Hyderabad. The University has the right to nominate its members on the academic bodies of the college.

21. **Shall we require University approval if we want to start any New Courses?**
Yes, It is expected that approvals or such other matters from an autonomous college will receive priority.

22. **Shall we get autonomy for PG and Doctoral Programmes also?**
Yes, presently our UG and PG programmes are also enjoying autonomous status.

23. **How many exams will be there as an autonomous college?**
This is defined in the Rules & Regulations.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Undertaking by Students/Parents

"To make the students **attend** the classes regularly from the first day of starting of classes and be aware of the **College regulations**, the following Undertaking Form is introduced which should be signed by both **student and parent**. The same should be submitted to the College Administrative Office."

I, Mr. / Ms. -- joining I Semester / III Semester for the academic year 2015-2016 / 2016-2017 in Vardhaman College of Engineering, Hyderabad, do hereby undertake and abide by the following terms, and I will bring the **ACKNOWLEDGEMENT** duly signed by me and my parent and submit it to the Admin Office.

1. I will **attend** all the classes from the **joining day** of the College as per the timetable. In case, I do not turn up even after two weeks of starting of classes, I shall be **ineligible** to continue for the current academic year.

2. I will be regular and punctual to all the classes (theory/practical/drawing) and secure overall attendance of **not less than 75%** as stipulated by College/JNTUH. I am fully aware that an overall attendance of less **than 65% will make me lose one year.**

3. I will compulsorily follow the **dress code** prescribed by the college.

4. I will conduct myself in a highly **disciplined** and decent manner both inside the classroom and on campus, failing which suitable action may be taken against me as per the rules and regulations of the College.

5. I will concentrate on my **studies** without wasting time in the Campus/Hostel/Residence and attend all the **tests** to secure more than the minimum prescribed Class/Sessional Marks in each subject. I will submit the **assignments** given in time to improve my performance.

6. I will not bring **Mobile Phone** to the College campus and also, I will not involve in any form of **ragging** inside or outside the campus. I am fully aware that bringing mobile phone to the campus is not permissible and involving in Ragging is an **offence** and punishable as per JNTUH/UGC rules and the law.

7. I will **pay** tuition fees, examination fees and any other **dues** within the stipulated time as required by the Institution / authorities, failing which I will not be permitted to attend the classes.

8. I will **not cause or involve** in any sort of **violence or disturbance** both within and outside the college campus.

9. If I **absent myself continuously for 3 days**, my **parents** will have to meet the HOD concerned/ Principal.

10. I hereby **acknowledge** that I have **received** a copy of **R15 Academic Rules and Regulations, Syllabus copy** and hence, I shall **abide** by all the rules specified in it.

ACKNOWLEDGEMENT

I have carefully gone through the terms of the undertaking mentioned above and I understand that following these are for my/his/her own benefit and improvement. I also understand that if I/he/she fail to comply with these terms, shall be liable for suitable action as per College/JNTUH rules and the law. I undertake that I/he/she will strictly follow the above terms.

Signature of Student

Signature of Parent
Name & Address with Phone Number