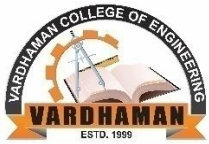

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

Autonomous Institute, Affiliated to JNTUH

Approved by AICTE, Accredited by NAAC and ISO 9001:2015 Certified

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

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BACHELOR OF TECHNOLOGY

INFORMATION TECHNOLOGY

(Accredited by NBA)

CURRICULUM AND SYLLABI (VCE R18)

UNDER CHOICE BASED CREDIT SYSTEM

B. Tech. - Regular Four Year Degree Program

(For batches admitted from the Academic Year 2018 - 2019)

&

B. Tech. - Lateral Entry Scheme

(For batches admitted from the Academic Year 2019 - 2020)

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

PROGRAM CURRICULUM STRUCTURE
B.TECH - INFORMATION TECHNOLOGY

REGULATIONS: VCE-R18

I YEAR I SEMESTER

Code	Course	Category	Periods per Week			Credits	Assessment Tools Maximum Marks		
			L	T	P		CIE	SEE	Total
A4001	Linear Algebra and Ordinary Differential Equations	BS	3	1	0	4	30	70	100
A4007	Engineering Chemistry	BS	4	0	0	4	30	70	100
A4501	Programming for Problem Solving	ES	3	1	0	4	30	70	100
A4302	Engineering Workshop	ES	0	0	3	1.5	30	70	100
A4008	Engineering Chemistry Laboratory	BS	0	0	2	1	30	70	100
A4502	Programming for Problem Solving Laboratory	ES	0	0	3	1.5	30	70	100
A4021	Social Innovation	ES	0	0	2	1	30	70	100
TOTAL			**10**	**2**	**10**	**17**	**210**	**490**	**700**

I YEAR II SEMESTER

Code	Course	Category	Periods per Week			Credits	Assessment Tools Maximum Marks		
			L	T	P		CIE	SEE	Total
A4002	Advanced Calculus	BS	3	1	0	4	30	70	100
A4003	Semiconductor Physics	BS	4	0	0	4	30	70	100
A4201	Basic Electrical Engineering	ES	3	1	0	4	30	70	100
A4009	Functional English	HS	3	0	0	3	30	70	100
A4301	Engineering Graphics and Computer Aided Drafting	ES	0	0	3	1.5	30	70	100
A4004	Semiconductor Physics Laboratory	BS	0	0	2	1	30	70	100
A4202	Basic Electrical Engineering Laboratory	ES	0	0	3	1.5	30	70	100
A4010	English Language Communication Skills Laboratory	HS	0	0	2	1	30	70	100
A4022	Engineering Exploration	ES	0	0	2	1	30	70	100
TOTAL			**13**	**2**	**12**	**21**	**270**	**630**	**900**

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

PROGRAM CURRICULUM STRUCTURE
B. TECH – INFORMATION TECHNOLOGY

REGULATIONS: VCE-R18

II YEAR ISEMESTER

Code	Course	Category	Periods per Week			Credits	Assessment Tools Maximum Marks		
			L	T	P		CIE	SEE	Total
A4503	Discrete Mathematical Structures	PC	3	0	0	3	30	70	100
A4025	Managerial Economics and Financial Analysis	HS	3	0	0	3	30	70	100
A4504	Data Structures	PC	3	0	2	4	30	70	100
A4512	Formal Languages and Automata Theory	PC	3	0	0	3	30	70	100
A4505	Object Oriented Programming	PC	3	0	2	4	30	70	100
A4601	Digital Design and Computer Organization	PC	3	0	0	3	30	70	100
A4017	Quantitative Aptitude	HS	1	0	0	1	30	70	100
A4014	Environmental Science	MC	2	0	0	0	-	100*	100*
TOTAL			**21**	**0**	**4**	**21**	**210**	**490**	**700**

II YEAR II SEMESTER

Code	Course	Category	Periods per Week			Credits	Assessment Tools Maximum Marks		
			L	T	P		CIE	SEE	Total
A4012	Probability and Statistics	BS	3	0	0	3	30	70	100
A4508	Database Management Systems	PC	3	0	2	4	30	70	100
A4509	Design and Analysis of Algorithms	PC	3	0	2	4	30	70	100
A4602	Web Technologies	PC	3	0	2	4	30	70	100
A4510	Python Programming	PC	1	0	2	2	30	70	100
A4507	Operating Systems	PC	3	0	0	3	30	70	100
A4019	Verbal Ability and Logical Reasoning	HS	1	0	0	1	30	70	100
A4013	Gender Sensitization	MC	2	0	0	0	-	100	100*
TOTAL			**19**	**0**	**8**	**21**	**210**	**490**	**700**

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

PROGRAM CURRICULUM STRUCTURE

B. TECH – INFORMATION TECHNOLOGY

REGULATIONS: VCE-R18

III YEAR I SEMESTER									
Code	Course	Category	Periods per Week			Credits	Assessment Tools Maximum Marks		
			L	T	P		CIE	SEE	Total
A4603	Software Engineering	PC	3	0	2	4	30	70	100
A4511	Computer Networks	PC	3	0	2	4	30	70	100
A4604	Mobile application Development	PC	3	0	2	4	30	70	100
A4515	Machine Learning	PC	3	0	2	4	30	70	100
	Professional Elective - I	PE	3	0	0	3	30	70	100
A4606	Internship – I	PW	0	0	4	2	100	-	100
A4018	Engineering Design Thinking	ES	0	0	2	1	30	70	100
A4016	Indian Constitution	MC	2	0	0	0	-	100*	100*
TOTAL			**17**	**0**	**14**	**22**	**280**	**420**	**700**
III YEAR II SEMESTER									
Code	Course	Category	Periods per Week			Credits	Assessment Tools Maximum Marks		
			L	T	P		CIE	SEE	Total
A4555	Compiler Design	PC	3	0	0	3	30	70	100
A4513	Big Data Analytics	PC	3	1	2	5	30	70	100
A4612	Network Security & Cryptography	PC	3	0	2	4	30	70	100
	Professional Elective – II	PE	3	0	0	3	30	70	100
	Open Elective – I	OE	3	0	0	3	30	70	100
A4518	Dynamic Web Application Development	PC	0	0	2	1	30	70	100
A4020	Product Realization	ES	0	0	2	1	30	70	100
A4607	Mini Project	PW	0	0	4	2	100	-	100
A4015	Essence of Indian Traditional Knowledge	MC	2	0	0	0	-	100*	100*
TOTAL			**17**	**1**	**12**	**22**	**310**	**490**	**800**

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

PROGRAM CURRICULUM STRUCTURE

B. TECH – INFORMATION TECHNOLOGY

REGULATIONS: VCE-R18

IV YEAR I SEMESTER (Tentative)									
Code	Course	Category	Periods per Week			Credits	Assessment Tools Maximum Marks		
			L	T	P		CIE	SEE	Total
A4608	Cloud Computing	PC	2	0	2	3	30	70	100
A4552	Artificial Intelligence	PC	3	1	0	4	30	70	100
	Open Elective-II	OE	3	0	0	3	30	70	100
	Professional Elective-III	PE	3	0	0	3	30	70	100
A4609	Project Work Phase – I	PW	0	0	8	4	100	-	100
A4610	Internship-II	PW	0	0	4	2	100	-	100
TOTAL			**11**	**1**	**14**	**19**	**320**	**280**	**600**
IV YEAR II SEMESTER (Tentative)									
Code	Course	Category	Periods per Week			Credits	Assessment Tools Maximum Marks		
			L	T	P		CIE	SEE	Total
A4026	Management Science	HS	3	0	0	3	30	70	100
	Open Elective-III	OE	3	0	0	3	30	70	100
	Professional Elective-IV	PE	3	0	0	3	30	70	100
A4611	Project Work Phase – II	PW	0	0	16	8	100	100	200
TOTAL			**9**	**0**	**16**	**17**	**190**	**310**	**500**

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

PROGRAM CURRICULUM STRUCTURE
B. TECH – INFORMATION TECHNOLOGY

REGULATIONS: VCE-R18

Professional Elective –I			
Code	**Course**	**Code**	**Course**
A4651	Image Processing	A4652	C # and .Net Frame Work
A4653	Computer Graphics	A4655	Distributed Operating Systems
Professional Elective –II			
Code	**Course**	**Code**	**Course**
A4656	Computer Vision	A4553	Robotic Process Automation Design & Development
A4554	Routing and Switching Network	A4654	Software Testing Methodologies
Professional Elective –III			
Code	**Course**	**Code**	**Course**
A4657	Block Chain Technology	A4556	DevOps
A4557	Data Mining	A4658	Design Patterns
Professional Elective –IV			
Code	**Course**	**Code**	**Course**
A4659	Digital Forensics	A4660	Human Computer Interaction
A4661	Deep Learning	A4662	Software Project Management

Open Electives

Code	Course	Code	Course
A4131	Project Planning and Management	A4531	Fundamentals of JAVA
A4132	Environmental Pollution and Management	A4532	Operation Research
A4133	Disaster Management	A4533	Fundamentals of DBMS
A4231	Transducers and Measurements	A4534	Fundamentals of Operating Systems
A4232	Solar Energy and Applications	A4631	Principles of Software Engineering
A4233	Energy Management and Audit	A4632	E-Commerce Trends
A4331	Basic Mechanical Engineering	A4633	Fundamental of Cyber Security
A4332	Introduction to 3D Printing	A4031	Numerical Techniques
A4333	Fundamentals of Robotics	A4032	Mathematical Programming
A4431	Fundamentals of IoT	A4033	Special Functions
A4432	Principles of Analog and Digital Communications	A4034	Entrepreneurship Development
A4433	Introduction to Signal Processing	A4035	Human Resource Management
		A4036	Logistics and Supply Chain Management

SYLLABI FOR I YEAR I SEMSETR

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH I SEMESTER

COURSE STRUCTURE

A4001 - LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	1	0	42	14	0	4	30	70	100

1. Course Description

Course Overview

This course offers more advanced topics of mathematics required to analyze the problems in engineering. Topics to be covered in this course include: Solution of system of linear equations, Eigen values and Eigen vectors, Quadratic forms, Differential equations and their applications, Laplace transforms and its applications to ordinary differential equations. The mathematical skills derived from this course provides necessary base to analytical and theoretical concepts occurring in the program.

Course Pre/co-requisites

This course has no specific prerequisite and co requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4001.1. Solve system of linear equations using rank of a matrix

A4001.2. Examine the nature of Quadratic form using Eigen values and Eigen vectors

A4001.3. Solve the first and higher order linear ordinary differential equations

A4001.4. Make use of ordinary differential equations to solve, Rate of growth/decay, Newton's law of cooling, Electrical circuits and Simple harmonic motion problems

A4001.5. Apply Laplace transforms to solve ordinary differential equations

3. Course Syllabus

Theory

Theory of Matrices: Real, Complex matrices and their properties, Rank of a matrix by reducing to Echelon form and Normal form, Inverse of a matrix by Gauss-Jordan method, Consistency of system of linear equations using the rank of a matrix.

Eigen Values, Eigen Vectors and Quadratic Forms: Linear dependence and independence of vectors, Linear transformation, Eigen values and Eigenvectors of a matrix, Properties of Eigen values and Eigen vectors of real and complex matrices, Cayley-Hamilton theorem (statement and verification), Inverse and powers of a matrix using Cayley-Hamilton theorem, Diagonalization of a matrix, Quadratic forms up to three variables: Rank, index, signature and nature of quadratic forms, Reduction of quadratic form to canonical form by orthogonal transformation.

Ordinary Differential Equations of First Order: Differential equations of first order and first degree: Exact equations and equations reducible to exact form using integrating factors, Linear and Bernoulli's equations. Equations not of first degree: Equations solvable for p, Equations solvable for y, Equations solvable for x and Clairaut's equation, Applications: Newton's law of cooling, Law of natural growth and decay.

Higher Order Linear Ordinary Differential Equations: Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type $Q(x)=e^{ax}$, $\sin(ax+b)/\cos(ax+b)$, 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: $L-C-R$ Circuits and Simple Harmonic Motion.

Laplace Transforms: 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, Laplace transform of unit step function, Second shifting theorem, Laplace transform of periodic function, Evaluation of some kind of integrals by Laplace transforms, Inverse Laplace transforms, Finding inverse Laplace transforms by different methods, Convolution theorem(without proof), Solving ordinary differential equations by Laplace transform method.

4. Books and Materials

Text Books

1. B S Grewal, *Higher Engineering Mathematics*, 43rd Edition, Khanna Publishers, New Delhi, 2014.
2. B V Ramana, *Engineering Mathematics*, 23rd Reprint, Tata Mc Graw Hill Education Private Limited, New Delhi, 2015.

Reference Books

1. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, *A text book of Engineering Mathematics*, Laxmi Publications, 2010.
3. D. Poole, *Linear Algebra: A Modern Introduction,* 2nd Edition, Brooks/Cole, 2005.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH I SEMESTER

COURSE STRUCTURE

A4007 – ENGINEERING CHEMISTRY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
4	0	0	56	0	0	4	30	70	100

1. Course Description

Course Overview

This course emphasizes a strong base in physical chemistry and organic chemistry to spread over an orientation towards the materials and drug synthesis. This course also focuses on the general applications of chemical principles to the analysis and evaluation of engineering problems such as Water and its treatment, batteries and fuel cells.

Course Pre/co-requisites

This course has no specific prerequisite and co requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4007.1. Apply knowledge of three - dimensional arrangements of atoms, molecules and their effects on chemical reactions

A4007.2. Identify differences and similarities of the Batteries

A4007.3. Evaluate the behavior and interactions between matter and energy at both the atomic and molecular levels

A4007.4. Make use of different methods for softening hardness of water

A4007.5. Apply major chemical reactions in the synthesis of various drugs

3. Course Syllabus

Theory

Atomic and Molecular Structure: Introduction, Concept of atomic and molecular orbitals, Molecular orbital theory, and Molecular orbital energy level diagrams of diatomic molecules - O_2 and N_2.Crystal field theory – crystal field splitting in Octahedral, Tetrahedral and Square planar complexes.

Stereochemistry 0f Carbon Compounds: Isomerism: Definition and their classification: Constitutional isomers: Definition, examples of chain, functional and positional isomers. Stereoisomers: Definition, examples of enantiomers and diastereomers. Optical activity: Definition, chiral centres. Chiral molecules: Definition and criteria - asymmetric and dissymmetric molecules. Examples of asymmetric molecules (Glyceraldehyde, Lactic acid, Alanine) and dissymmetric molecules (trans-1, 2-dichlorocyclopropane).R, S nomenclature, Cahn-Ingold-Prelog rules. Geometrical isomerism of alkenes–cis, trans and E, Z configuration.

Electrochemistry and Batteries: Electrochemical cells -Types, cell notation, cell reaction and cell emf - concentration cells – Electrode and Electrolyte concentration cells, numerical problems. Electrochemical series and its applications. Electrode potential, standard electrode potential, types of electrodes –Hydrogen, Calomel and Quinhydrone electrode. Batteries**:** Primary battery (Zinc- Carbon Battery) and Secondary battery (lead acid and lithium ion battery) - Applications. Fuel cells**:** Concept of Fuel-Cells. Hydrogen –Oxygen fuel cell – advantages and applications.

Organic Reactions, Drug Molecules and Spectroscopy: Introduction, Types of organic reactions, reactions involving substitution (S_N^1, S_N^2), addition of H_2, X_2 andHX to C-C double bond – Markownikoff and Anti-Markownikoff rule, elimination (E1 and E2), reduction: Hydrogenation by H_2 by Nickel and Pd/C (any two examples for each). Drugs: Introduction and classification. Structure, preparation and uses of commonly used drug molecules- paracetamol, aspirin and ibuprofen. Spectroscopy: Introduction. Principle, selection rules and applications ofVibrational, rotational and electronic spectroscopy.

Water Technology: Introduction, Hardness of water, causes of hardness and types of hardness: temporary and permanent – expression and units of hardness. Numerical problems. Potable water and its specifications.Treatment of water for drinking-filtration, sedimentation, chlorination and ozonization.Boiler troubles**:** Causes and effects. Sludges, scales and caustic embrittlement. Internal treatment of boiler feed water – Calgon conditioning, Phosphate conditioning, Colloidal conditioning – Softening of water by ion- exchange process. Desalination of water – Reverse osmosis.

4. Books and Materials

Text Books

1. Jain & Jain. *Engineering Chemistry:* Dhanapathrai Publications., 2015.
2. Prsanta Rath, B. Rama Devi, Ch. Venkata Ramana Reddy & Subhendu Chakroborty, *Engineering Chemistry:* Cengage Publications., 2018.
3. B. H. Mahan, Rollie. J. Meyers. *University chemistry*: Pearson publications, 4th edition, 2009.
4. C. N. Banwell. *Fundamentals of Molecular Spectroscopy:* McGraw Hill Education India, 4th edition, 2016.
5. GL David Krupadanam, Vijaya Prasad, Varaprasad Rao K. *Drugs: Universities Press (India) Limited.*

Reference Books

1. B. L. Tembe, Kamaluddin and M. S. Krishnan. *Engineering Chemistry (NPTEL Web-book)*
2. Peter Atkins, Julio de Paula's *Physical Chemistry*, Oxford University Press, Tenth Edition, 2014.
3. D. Nasipuri, *Stereochemistry of Organic Compounds – Principles and Applications*, 3rd Edition, New Age International (P) Limited.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH I SEMESTER

COURSE STRUCTURE

A4501 – PROGRAMMING FOR PROBLEM SOLVING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	1	0	42	14	0	4	30	70	100

1. Course Description

Course Overview

The course is a Basic Engineering course for all computation 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 are discussed. 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 Pre/co-requisites

No Pre requisites and co-requisites.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4501.1.Select right identifiers, data types and operators for effective computation.
A4501.2.Write programs using control statements.
A4501.3.Write programs demonstrating use of arrays, strings and their applications.
A4501.4.Demonstrate the applications of function and recursion.
A4501.5.Write programs for simple real life problems using pointers and structures.

3. Course Syllabus

Theory

Introduction to Programming: Introduction to components of Computer Systems. Steps to solve logical and numerical problems. Representation of Algorithm, Flowchart and Pseudo code with examples. introduction to the c language: program structure, identifiers, and data types, Formatting input/output, Syntax and Logical Errors in compilation, object and executable code.

Operators, Expressions and Control Statements: Arithmetic, Logical, Relational, Conditional, Assignment, Increment and Decrement operators. expressions: Arithmetic Expressions, Operator

precedence and Associativity. decision making and looping: Writing and evaluation of decision making, branching and looping.

Arrays, Sorting and Searching: Definition, Types of Arrays, declaration and Initialization of n-Dimensional Arrays and Character array, String manipulation. searching and sorting: Linear search, Bubble sort and Selection sort.

Functions and Recursion: Functions, Parameter passing in functions through call by value, passing arrays to functions, storage classes. recursion: Recursion as a different way of solving problems. Example programs, such as finding factorial, Fibonacci series.
Pointers and Structures: Definition, Declaration, Pointer arithmetic, Pointer to Pointer, Pointer to an array (base pointer), Dynamic memory allocation, Command Line arguments, idea of call by reference in functions. structures: Defining, Declaring and initialization of structures, nested structures, Array of Structures.

4. Books and Materials

Text Book

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

Reference Books

1. Brian W. Kernighan and Dennis M. Ritchie, *The C Programming Language*, 2nd Edition, Prentice Hall of India,2015.
2. E. Balagurusamy, *Programming in ANSI C*, 7th Edition Tata McGraw-Hill,2017.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH I SEMESTER

COURSE STRUCTURE

A4302 - ENGINEERING WORKSHOP

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	3	0	0	42	1.5	30	70	100

1. Course Description

Course Overview

The course is intended to familiarize students to all workshops including civil, mechanical, and electrical and electronics engineering. In each of these workshops, the students are exposed to basic understanding of components, equipment, trades and methods. Civil engineering workshop focuses on surveyinginstrumentsandtypesofbuildingmaterialsanditsidentification.Mechanicalengineering workshop focuses on fitting and carpentry trades, Tin-Smithy, foundry and plumbing. Electronic workshop focuses on basic electronic components, measuring equipment and Multisim software. Electrical workshop focuses on basic electrical wiring and installations.

Course Pre/co-requisites

The course aims to facilitate the students with the basic familiarization to all engineering streams and basic knowledge over civil, electrical, mechanical and electronics.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4302.1. Identify various surveying tools and choose building materials according to field conditions

A4302.2. Analyze the basic circuit connections, maintenance and troubleshooting of house hold equipment's

A4302.3. Make use of various electrical and electronic components to construct simple circuits and measure various physical quantities.

A4302.4. Explain basic components used in different trades.

A4302.5. Identify the associated tools used in different trades.

3. Course Syllabus

Part – A (Trades for Lectures & Videos)

Note: Minimum one Hour Lecture on each Trade, to be discussed by any class room teaching technique in following trades.

Manufacturing Methods:

1. Casting, Forming, Joining, Machining, Advanced Manufacturing Methods
2. CNC machining , Additive Manufacturing

3. Fitting Operation & Power Tools , Carpentry , Plastic Molding , Glass Cutting, Metal Casting
4. Welding (Arc Welding & Gas Welding), Brazing, Sheet Metal Forming

Part-B (Trades for Practice)

1. Fitting Trade: a. L -Fitting Joint b. V- Fitting Joint c. Square - Fitting Joint d. Semicircular - Fitting Joint
2. Carpentry Trade: a. Lap Joint (Two Experiments) b. Bridle Joint (Two Experiments)
3. House wiring Trade: a. House Wiring (5 Experiments)
4. Welding Trade: a. Arc Welding (Two Experiments) b. Gas Welding (Two Experiments)
5. Foundry Trade: a. Single Piece Pattern b. Multiple Piece Pattern
6. Tin Smithy Trade: a. Open Scoop b. Funnel c. Rectangular Tray d. Square & Cylindrical Pipes
7. Black Smithy Trade: a. Round to Square and Vice Versa b. S - Hook c. O - Ring Note: Minimum one experiment from each Trade with total of 12 Experiments.

4. Books and Materials

Text Books

1. B. L. Juneja, "*Workshop Practice",* 1st Edition,Cengage Learning India Private Limited, New Delhi, 2015.
2. H.S. Bawa, *"Workshop Practice",* 3rd Edition, Mc Graw Hill Education, New Delhi, 2017.
3. S.K.Garg, "*Workshop Technology (Manufacturing process)*" 4thEdition, Laxmi Publications (P) Ltd., New Delhi, 2017.

Reference Books

1. K.Venkata Reddy," *Workshop Manual",* 6th Edition Reprint, BSP Publications, Hyderabad, 2018.
2. S Gowri & T Jeyapoovan, *Engineering Practices Lab Manual*, 5th Edition, Vikas Publishing H

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH I SEMESTER

COURSE STRUCTURE

A4008 - ENGINEERING CHEMISTRY LABORATORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	2	0	0	28	1	30	70	100

1. Course Description

Course Overview

This course emphasizes a strong background to carryout chemical analysis. The objective of engineering chemistry laboratory is to understand various instrumental techniques, physical properties of organic liquids, separation techniques, and organic synthesis to inculcate the knowledge of engineering chemistry discipline. The experiments on water treatment are proved to be vital in engineering applications on industrial level.

Course Pre/co-requisites

This course has no specific prerequisite and co-requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4008.1. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions and redox potentials.

A4008.2. Apply various titrations for the estimation of strengths of solutions and hardness of water.

A4008.3. Identify different samples from a mixture by using various separation techniques.

A4008.4. Estimate rate constants of reactions from concentration of reactants/products as a function of time.

A4008.5. Evaluate the percentage of yield of chemical substances by organic synthesis.

3. Course Syllabus

1. Estimation of strength of hydrochloric acid by conductometric titration.
2. Estimation of strength of hydrochloric acid by potentiometric titration.
3. Estimation of Iron in Mohr's salt by potentiometric titration.
4. Estimation of hardness of water by complexometry using EDTA
5. Determination of chloride content in water by Argentometry.
6. Determination of viscosity of a given fluid by Ostwald's viscometer.
7. Determination of surface tension of a given liquid by using Stalagmometer
8. Synthesis of Aspirin and Paracetamol.
9. Thin layer chromatography calculation of R_f values. Eg. ortho and para nitro phenols.
10. Verification of Freundlich adsorption isotherm of acetic acid on Charcoal.

11. Determination of partition coefficient of acetic acid between butanol and water.
12. Determination of the rate constant of acid catalyzed hydrolysis of methylacetate.

4. Laboratory Equipment/Software/Tools Required

1. Digital Conduct meter
2. Digital Potentiometer
3. Electrical Water Heater
4. Wall Mount Distillation Plant
5. Analytical/Digital Weighing Balance
6. Ostawald's Viscometer
7. Stalagnometer
8. Stop watch
9. Thermometer
10. RB Flask condenser
11. TLC Plates (silica coated)
12. TLC Chambers
13. Magnetic Stirrer
14. Iodine Blowers

5. Books and Materials

Text Books

Nil

Reference Books

1. S.S.Dara, *Experiments and Calculations in Engineering Chemistry,* S-Chand Publications, Revised edition., 2008.
2. Dr.M.P.S Murali Krishna and M.Gopala Krishna, *Chemistry Lab Manual*, VGS Publications.
3. Dr. A.Ravi Krishnan, Dr.T.Syeda Jeelani Basri, and Mrs.M.B.Lakshmi, *Engineering Chemistry Laboratory Manual.*

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH I SEMESTER

COURSE STRUCTURE

A4502 – PROGRAMMING FOR PROBLEM SOLVING LABORATORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	3	0	0	42	1.5	30	70	100

1. Course Description

Course Overview

The course is a Basic Engineering course for all computation 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 are discussed. 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 Pre/co-requisites

No Pre requisites and co requisites.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4502.1. Select right identifiers, data types and operators for effective computation.
A4502.2. Write programs using control statements.
A4502.3. Write programs demonstrating use of arrays, strings and their applications.
A4502.4. Demonstrate the applications of function and recursion.
A4502.5. Write programs for simple real life problems using pointers and structures.

3. Course Syllabus

Practice

Week-1: Programs using I/O statements and various operators.
Week-2: Programs using expression evaluation and precedence.
Week-3: Programs using decision making statements and branching statements.
Week-4: Programs using loop statements.
Week-5: Programs to demonstrate applications of n dimensional arrays.
Week-6: Programs to demonstrate searching and sorting.
Week-7: Programs to demonstrate use of string manipulation functions.

Week-8: Programs using user-defined functions.
Week-9: Programs to demonstrate parameter passing mechanism.
Week-10: Programs to demonstrate recursion
Week-11: Programs to demonstrate use of pointers.
Week-12: Programs to demonstrate command line arguments. Programs to demonstrate dynamic memory allocation.
Week-13: Programs to demonstrate applications of structures.
Week-14: Programs to demonstrate file operations.

4. Laboratory Equipment/Software/Tools Required

- A computer system with Linux/Ubuntu OperatingSystem,C- Compiler

5. Books and Materials

Text Book

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

Reference Book

2. YashavantKanetkar, Let Us C, 15th Edition, BPB Publications, 2017

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH I SEMESTER

COURSE STRUCTURE

A4021 - SOCIAL INNOVATION

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	2	0	0	28	1	30	70	100

1. Course Description

Course Overview

Social Innovation is an open ended course to develop social connectedness in engineering students through social awareness and social consciousness. This can be done through live field exposure along with faculty led conceptual presentations, real case reviews; self-study assignments, literature and field survey. Through this course, the students are expected to use their engineering knowledge to provide innovative solutions to existing social problems. This course also develops critical thinking ability among the students.

Course Pre/co-requisites

To create innovative solutions/approaches to existing social problems by using basic engineering knowledge.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4021.1. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions and redox potentials.

A4021.2. Apply various titrations for the estimation of strengths of solutions and hardness of water.

A4021.3. Identify different samples from a mixture by using various separation techniques.

A4021.4. Estimate rate constants of reactions from concentration of reactants/products as a function of time.

A4021.5. Evaluate the percentage of yield of chemical substances by organic synthesis.

3. Course Syllabus

Theory

Introduction to Social Innovation: Core definitions, core elements and common features of Social innovation, a typology of social innovation, Awakening social consciousness.

Create Mindsets: Seven mindsets– Empathy, Optimism, Iteration, Creative confidence, Making it, Embracing ambiguity, Learning from failures.

Wicked Problems: Distinguish between simple, complicated and complex problems; describe the characteristics of wicked problems, breakdown a given problem by unpacking its complexity.

Critical Thinking for Social Innovation: Definition, engineering thinking and learning, distinguish between creativity and innovation.

Models for Creative Thinking: Appreciative Inquiry (AI), Asset Based Community Development (ABCD) and Concept of Bricolage.

Process of Social Innovation: Community study, develop questionnaire, identifying the causes of a particular problem.

Process of Social Innovation: Identify needs, record your learning's.

Process of Social Innovation: Generate ideas, select promising ideas, proto typing and testing.

Social Innovation across Four Sectors - The non-profit sector, public sector, the private sector, the informal sector, links between and cross sectors.

Stages of Innovation: Social organizations and enterprises, social movements, social software and open source methods, common patterns of success and failure.

4. Books and Materials

Text Books

1. RobinMurray, Julie Caulier-Grice, Geoff Mulgan, "The open book of social innovation: Ways to Design, Develop and Grow Social Innovation", The Young Foundation, 2010.
2. Julie Caulier-Grice, Anna Davies, Robert Patrick & Will Norman, The Young Foundation (2012) Social Innovation Overview: Adeliverable of the project:"The theoretical, empirical and policy foundations for building social innovation in Europe" (TEPSIE), European Commission–7th Frame work Programme, Brussels: European Commission, DG Research.

Reference Books

1. Geoff Mulgan, "Social Innovation: What it is, Why it matters and How it can be accelerated", The Young Foundation,2007.
2. Asset Based Community Development (ABCD) Model –
3. http://www.nurturedevelopment.org/asset-based-community-development/.
4. Diana Whitney & Amanda Trosten-Bloom, "The Power of Appreciative inquiry – A Practical Guide to Positive Change", 2nd Edition, Berrett-Koehler Publishers, Inc, 2010.

SYLLABI FOR I YEAR II SEMSETR

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH II SEMESTER

COURSE STRUCTURE

A4002 - ADVANCED CALCULUS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	1	0	42	14	0	4	30	70	100

1. Course Description

Course Overview

This course offers more advanced topics of mathematics required to analyze the problems in engineering. Topics to be covered in this course include: Evaluation of improper integrals, functions of single, several variables and their applications, Multiple integrals, Vector differential and integral calculus, Fourier series and Fourier transforms. The mathematical skills derived from this course provides necessary base to analytical and theoretical concepts occurring in the program.

Course Pre/co requisites

This course has no specific prerequisite and co requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4002.1. Evaluate improper integrals and examine the extremum of a function of several variables

A4002.2. Make use of multiple integrals to find the area and volume of a solid

A4002.3. Determine scalar potential function for irrotational force fields

A4002.4. Evaluate line, surface and volume integrals using vector integral theorems

A4002.5. Develop Fourier series and Fourier transforms of a function

3. Course Syllabus

Theory

Calculus: Evaluation of improper integrals: Beta and Gamma functions and their properties, Rolle's Theorem, Lagrange's mean value theorem and Cauchy's mean value theorem, Taylor's and Maclaurin's series. Functions of several variables: Limit, continuity and partial derivatives of functions of two variables (not to be examined), Jacobians, Functional dependence, Maxima and minima of functions of two variables, Lagrange's method of undetermined multipliers.

Multiple Integrals: Double integrals, Change of order of integration, Change of variables, Area enclosed by plane curves, Triple integrals, Change of variables, Area, volume, mass and centre of gravity (constant and variable densities).

Vector Differentiation: Scalar and vector point functions, Gradient, Directional derivative, Tangent plane and normal line to the surface, Divergence, Curl and their related properties, Scalar potential function, Laplacian operator, Vector identities.

Vector Integration: Line integral, work done, Surface integrals, Volume integrals. Vector integral theorems: Green's theorem in a plane, Stoke's theorem and Gauss divergence theorem (without proof) and related problems, Irrotational fields.

Fourier Series and Fourier Transforms: Euler's formulae, Dirichlet's conditions, Fourier series for functions having period $2l$, Fourier series for even and odd functions, Half range Fourier sine and cosine series. Fourier integral theorem (without proof), Fourier sine and cosine integrals, Fourier transforms, Fourier sine and cosine trans forms, Inverse Fourier transforms.

4. Books and Materials

Text Books

1. B.S. Grewal, *Higher Engineering Mathematics*, 43rdEdition, Khanna Publishers, New Delhi, 2014.
2. B.V. Ramana, *Higher Engineering Mathematics*, 23rdReprint, Tata Mc-Graw Hill Education Private Limited, New Delhi, 2015.

Reference Books

1. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, *A text book of Engineering Mathematics*, Laxmi Publications, 2010.
3. G.B. Thomas and R.L. Finney, *Calculus and Analytic Geometry*, 9thEdition, Pearson Education, 2002

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH II SEMESTER

COURSE STRUCTURE

A4003 - SEMICONDUCTOR PHYSICS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
4	0	0	56	0	0	4	30	70	100

1. Course Description

Course Overview

Semiconductor physics for engineers is the study of fundamental physics combined with problem solving and engineering skills. This interdisciplinary knowledge of quantum physics, semiconductor physics and devices, lasers and optical fiber physics encourages an understanding of technological applications of physics and its importance as a subject of social, economic and industrial relevance enabling the student to design and innovate

Course Pre/co-requisites

This course has no specific prerequisite and co-requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4003.1. Analyze crystal structures in terms of lattice parameters and describe structures using X-rays. Identify various planes in crystals

A4003.2. Interpret the principles of quantum mechanics to classify solids. Relate semiconductor solid properties to the underlying physical concepts.

A4003.3. Analyze the charge carrier dynamics and transport properties in semiconductors

A4003.4. Apply the concepts of semiconductor physics to analyze the various basic electronic devices

A4003.5. Illustrate working of a laser and develop communication systems using optical fibers.

3. Course Syllabus

Theory

Introduction to Crystallography: Lattice parameters, lattice constant of cubic, packing factor of SCC, BCC, FCC and diamond, Miller indices, Crystal planes and directions, Interplanar spacing of an orthogonal crystal system. Crystal structures of ZnS, Silicon (diamond).

Basic principles of X-ray diffraction, Bragg's law, Laue method, Powder method, applications of X- ray diffraction.

Introduction to Quantum Physics: De-Broglie hypothesis, wave particle duality, Davison and Germer experiment, G P Thomson experiment, Wave nature of Particles, Time-independent Schrodinger

equation, Application of Schrodinger wave equation: Particle in a 1-D box. Infinite and Finite square well potential. Bloch's theorem, Particle in a periodic potential: Kronig-Penny model (to introduce origin of band gap), Energy bands in solids, E-k diagram.

Semiconductors: Types of electronic materials: metals, semiconductors, and insulators, Concept of effective mass of electron and hole, Density of states, Intrinsic and Extrinsic semiconductors, Fermi-Dirac distribution function, Fermi level, Carrier concentration in intrinsic semiconductors, donor and accepter impurities, Variation of Fermi level with temperature, Position of Fermi level in intrinsic and extrinsic semiconductor, Mobility of electrons and holes, charge densities in a semiconductor, direct and indirect band gap semiconductors, Carrier transport: diffusion and drift, Hall Effect.

Semiconductor Devices: P-N junction diode – V-I Characteristics, Diode current equation, Temperature dependence of V-I characteristics, Diode resistances, Diode models, Diode capacitances, Breakdown mechanisms, Zener diode and their I-V characteristics, Recombination mechanisms, LED, Types of semiconductor photo detectors - PN junction, PIN, and Avalanche and their structure, materials, working principle, and characteristics, solar cell.

Lasers & Optical Fibres : Absorption, spontaneous and Stimulated emission, Einstein's coefficients, population inversion, pumping processes, three and four level laser systems, He-Ne laser, Semiconductor lasers (homo junction and hetero junction), Applications of lasers. Introduction to Optical fibres, total internal reflection, Acceptance angle, Numerical aperture, step and graded index fibre, Losses in optical fibres, Applications of optical fibres.

4. Books and Materials

Text Books

1. B. K. Pandey and S. Chaturvedi. Engineering Physics. New Delhi: Cengage Learning India Pvt. Ltd., 2014.
2. D. K Bhattacharya and Poonam Tandon. Engineering Physics. New Delhi: Oxford University Press, 2017
3. M S Thyagi. Introduction to Semiconductor Materials and Devices, Wiley, 2008
4. S.M Sze, Semiconductor Devices Physics and Technology, John Wiley & Son, Inc. 2nd edition, 2002.
5. Satya Prakash, Swati Saluja. Quantum Mechanics, Kedar Nath Ram Nath, 2018

Reference Books

1. Kittel Charles. Introduction to solid state physics. New Jersey: John Wiley and sons, 2005.
2. S.S. Islam. Semiconductor Physics and Devices. Oxford University Press, 2005.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH II SEMESTER

COURSE STRUCTURE

A4201 – BASIC ELECTRICAL ENGINEERING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	1	0	42	14	0	4	30	70	100

1. Course Description

Course Overview

The course addresses the underlying concepts and methods behind Electrical Engineering. The course presents a problem oriented introductory knowledge of the Fundamentals of Electrical Engineering and focuses on the study of basic electrical parameters, basic principles, different types of electrical circuit and methods to solve electrical circuit. The principle and operating conditions of D.C. Machines (Motor & Generator), Transformers, Induction Motors, design of windings, types & characteristics will be discussed. Also the concepts related to electrical installation and protective devices will be discussed.

Course Pre/co-requisites

The course has no specific prerequisite and co-requisite

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4201.1. Apply the network reduction techniques and Knowledge of Alternating quantities to calculate Current, Voltage and Power for complex circuits.

A4201.2. Analyze the electrical Circuits using Nodal Analysis, Mesh analysis and Network theorems.

A4201.3. Study and Analyze the different types of DC Machines, Transformers.

A4201.4. Test the performance of DC Generator, DC Motor, transformer and Induction Motor.

A4201.5. Introduce components of low voltage electrical Installations.

3. Course Syllabus

Theory

Dc Circuits: Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

Ac Circuits: Representation of sinusoidal waveforms, peak and RMS values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting

of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

Transformers: Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Electrical Machines: Generation of rotating magnetic fields, Construction and working of a three phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed Characteristic and speed control of separately excited dc motor. Construction and working of synchronous generator.

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries.

4. Books and Materials

Text Books

1. D. P. Kothari and I. J. Nagrath, Basic Electrical Engineering, 3rd edition 2010, Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, Basic Electrical Engineering, McGraw Hill, 2009.
3. L. S. Bobrow, Fundamentals of Electrical Engineering, Oxford University Press, 2011.

Reference Books

1. E. Hughes, Electrical and Electronics Technology, 10th edition Pearson, 2010.
2. Vincent Deltoro, Electrical Engineering Fundamentals, 2nd edition, Prentice Hall India, 1989.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH II SEMESTER

COURSE STRUCTURE

A4009 - FUNCTIONAL ENGLISH

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic and communicative competencies of Engineering students. In English classes, the focus should be on the development of competence in the areas of grammar and vocabulary and skills development in terms of reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts/poems silently leading to reading comprehension. Reading comprehension passages are given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind. For instance, newspaper articles, advertisements, promotional material etc could be deployed as supplementary material to enhance their communication skills. The focus of the syllabus is on language acquisition and skill development.

Course Pre/co-requisites

This course has no specific prerequisite and co requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4009.1. Demonstrate an understanding of the significance of humanity, love and service to mankind
A4009.2. Utilize appropriate vocabulary in the given contexts
A4009.3. Build competence in grammar
A4009.4. Develop effective academic reading skills
A4009.5. Develop effective academic writing skills

3. Course Syllabus

Theory

Vocabulary: Word Formation – Prefixes – Suffixes – Guessing the meanings of the words using prefixes and suffixes- Standard Abbreviations
Grammar: Articles
Reading: Presidential Address by Apj Abdul Kalam: Techniques for effective comprehension - Skimming and Scanning-Types of texts – Summarizing

Writing: Sentences – Paragraphs – Cohesion – Coherence – Logical, Lexical and Grammatical Devices – Punctuation – Types of Paragraphs: Description – Definition – Classification.

Vocabulary: Synonyms – Antonyms
Grammar: Prepositions

Reading: the Road not Taken (Robert Frost): Reading using different strategies: Types of Reading – Extensive and Intensive-Do's and Dont's of reading
Writing: Letter Writing – Formats, Styles, Parts – Letters of Requisition, Letters of Inquiry, Letters of Apology.

Vocabulary: Homonyms, Homophones, Homographs, Foreign Words - Redundancies – Clichés
Grammar –Changing words from one form to another – Concord – Tenses: Present, Past and Future Active and Passive Voice.

Vocabulary: Idiomatic Expressions - One Word Substitutes
Grammar: Noun-Pronoun Agreement – Misplaced Modifiers
Reading: Good Manners (J C Hill): Practice in reading different types of texts efficiently - Predicting the Content – Understanding the gist - Note Making- Understanding Coherence- Sequencing Sentences
Writing: Information Transfer: Bar Charts – Flow Charts – Tree Diagrams.

Reading:*Exercises for practice
Writing: Essay writing: Introduction – Conclusion- Précis Writing: Introduction – Steps to Effective Précis writing – Guidelines.
*Reading material from Text books and Reference books

4. Books and Materials

Text Books

1. *Fluency in English – A Course book for Engineering Students* (by Board of Editors: Orient BlackSwan Pvt. Ltd, Hyderabad, 2016.
2. Raman, Meenakshi , Sharma, Sangeeta, *Technical Communication- Principles and Practice,* 3rd Edition, Oxford University Press, New Delhi. Print, 2015.

Reference Books

1. Green, David *Contemporary English Grammar –Structures and Composition,* MacMillan India, 2014.
2. Rizvi, M. Ashraf, *Effective Technical Communication,* Tata Mc Graw –Hill, 1995.
3. Michael Swan, *Practical English Usage,* 3rd Edition, Oxford University Press, 1995.
4. Wood F. T, *Remedial English Grammar for Foreign Students,* Macmillan, 2007.
5. Zinsser William, *On Writing Well,* Harper Resource Book, 2001.
6. Liz Hamp- Lyons, Ben Heasley, *Study writing,* Cambridge University Press, 2006.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH II SEMESTER

COURSE STRUCTURE

A4301– ENGINEERING GRAPHICS AND COMPUTER AIDED DRAFTING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	3	0	0	42	1.5	30	70	100

1 Course Description

Course Overview

Engineering drawing is said to be the language of engineers. It is the graphical representation of objects & their relationships based on certain basic principles and standard conventions. It can be regarded as a powerful tool to convey ones ideas. This course is included in all engineering curricula with the aim of training the students and making them graphically literate. This course covers orthographic projections for points, lines, planes and solids in different positions, the development of lateral surfaces and the isometric projections. The students are able to create simple solid models of various domain applications. This course forms as a basis for studying the courses on Machine Drawing, Production Drawing, Building Drawing and Circuit Drawings etc.

Course Pre/co-requisites

This course has no specific pre/co-requisites.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4301.1. Construct various types of curves commonly used in engineering practice.
A4301.2. Distinguish between first, second, third and fourth angle projections of systems.
A4301.3. Estimate lateral surface of the sheet metal requirement for making regular solids.
A4301.4. Compare isometric and orthographic views of an object.
A4301.5. Select CAD tools for drafting regular solids.

3. Course Syllabus

Theory

Introduction to Engineering Drawing: Introduction to engineering drawing: Principles of Engineering Graphics and their significance, usage of Drawing instruments, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epi-cycloid, Hypocycloid; Scales – Plain, Diagonal.

Orthographic Projections and Projections of Regular Solids: Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined to both Planes; Projections of Regular Solids: Prism, Cylinder, Pyramid, Cone-inclined to both planes.

Sectional Views and Development of Surfaces of Right Regular Solids: Sectional views of right regular solids: Prism, Cylinder, Pyramid, Cone-Development of surface of right regular solids: Prism, Cylinder, Pyramid, Cone.

Isometric Projections: Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa.

Computer Based Drawing overview of Computer Graphics: Overview of Computer Graphics, Customisation, Demonstration of a simple team design project: listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software; Customisation & CAD Drawing: consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles; Annotations, layering & other functions: applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings ; Demonstration of a simple team design project: Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids.

4. Laboratory Equipment/Software/Tools Required

1. PC installed with operating system (Windows)
2. Auto cad software

5. Books and Materials

Text Books

1. Bhatt N.D., Panchal V.M. & Ingle P.R., Engineering Drawing, Charotar Publishing House, 2014.
2. Basant Agrawal B. & Agrawal C. M., Engineering Graphics, TMH Publication, 2016.

Reference Books

1. Narayana, K.L. & P Kannaiah, Text book on Engineering Drawing, Scitech Publishers, 2016.
2. K. Balaveera Reddy et al, Computer Aided Engineering Drawing, CBS Publications, 2017.
3. Shah, M.B. & Rana B.C., Engineering Drawing and Computer Graphics, Pearson Education, 2008.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH II SEMESTER

COURSE STRUCTURE

A4004 - SEMICONDUCTOR PHYSICS LABORATORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	2	0	0	28	1	30	70	100

1. Course Description

Course Overview

This lab course covers the concepts from semiconductors to electricity and magnetism to modern optics. These experiments have a number of applications in today's world and are a valuable tool in the arsenal of engineers across multiple fields. This Laboratory also prepares the students to study the photovoltaic materials and to compute the various parameters of semiconductor materials and devices. The course also makes the students familiar with instrumental methods and various properties of materials. This basic knowledge will enable the scientific fervour to solve the various engineering problems.

Course Pre/co-requisites

This course has no specific prerequisite and co-requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4004.1. Determination of Planck's constant and work function of a metal.

A4004.2. Evaluation of band gap of a semiconductor and understand the temperature dependence function of resistivity.

A4004.3. Analyze the diode characteristics.

A4004.4. Analyze the I-V characteristics of solar cell and LED.

A4004.5. Apply the principles of laser light and estimate the losses in the propagation of light in optical fibers.

3. Course Syllabus

1. Determination of Planck's Constant
2. Photoelectric effect
3. Temperature dependence of resistivity of a semiconductor material.
4. Energy gap of a semiconductor
5. Forward and reverse bias characteristics of P-N junction diode
6. Zener diode characteristics and Zener diode voltage regulator
7. V-I Characteristics of solar cell

8. V-I Characteristics of Light Emitting Diode
9. Hall Effect
10. Laser wave length
11. Measurement of Numerical Aperture and Acceptance Angle of given Optical Fiber
12. Losses in Optical Fibers

4. Laboratory Equipment/Software/Tools Required

1. Photo Emissive Cell
2. Regulated Power Supply (DC and AC)
3. Energy Gap Kit
4. Hall Effect Setup
5. Light Emitting Diode Kit
6. Solar Cell Kit
7. Semiconductor Laser Source
8. Plane Diffraction Grating
9. Optical Fiber Trainer Kit
10. Meters - Ammeter, Voltmeter, Digital Multimeter
11. Diodes, Resistors, Capacitors, Bread Board

5. Books and Materials

Text Books

1. M. S. Tyagi, *Introduction to Semiconductor Materials and Devices*, John Wiley & Sons, India, 2008.
2. D. K. Schroder, *Semiconductor Material and Device Characterization*, Third Edition, John Wiley & Sons, New Jersey, 2015.
3. S. M. Sze and K. Ng. Kwok, *Physics of Semiconductor Devices,* 3rd edition, John Wiley & Sons, New Jersey, 2008.

Reference Books

1. B. L. Worsnop and H. T. Flint, *Advanced Practical Physics for students*, 9th edition, Methuen, London, 1957.
2. M. Nelkon and J. M. Ogborn, *Advanced Level Practical Physics*, 4th edition, Heinemann Educational Publishers, London, 1985.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH II SEMESTER

COURSE STRUCTURE

A4202 – BASIC ELECTRICAL ENGINEERING LABORATORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	3	0	0	42	1.5	30	70	100

1. Course Description

Course Overview

The course addresses the verification and analysis of Kirchhoff laws and Network Theorems. It also gives the exposure of analyzing transient response of series RL, RC and RLC circuit. Testing of Single phase transformer is done to calculate voltage, current, real power, efficiency and regulation, also the performance of DC motor, three phase Induction Motor and Alternator will be analysed.

Course Pre/co-requisites

This course has no specific prerequisite and co-requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4202.1. Verify Ohms law, Kirchhoff laws and Impedance & Current of Series RL, RC and RLC Circuits.

A4202.2. Analyze the transient response of Series RL, RC and RLC series circuits.

A4202.3. Calculate the Voltage, Current Real power in a single phase Transformer.

A4202.4. Test the performance of DC Motor, 1- phase transformer, Alternator and 3 phase Induction Motor.

3. Course Syllabus

1. Verification of Ohms Law.
2. Verification of KVL and KCL.
3. Transient Response of Series RL and RC circuits using DC excitation.
4. Transient Response of RLC Series circuit using DC excitation.
5. Resonance in series RLC circuit.
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits.
7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single Phase Transformer.
8. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation).
9. Three Phase Transformer: Verification of Relationship between Voltages and Currents.(Star-Delta, Delta-Delta, Delta-star, Star-Star).
10. Measurement of Active and Reactive Power in a balanced Three-phase circuit.
11. Performance Characteristics of a Separately Excited DC Shunt Motor.

12. Torque-Speed Characteristics of a DC Compound Motor.
13. Performance Characteristics of a Three-phase Induction Motor.
14. Torque-Speed Characteristics of a Three-phase Induction Motor.
15. No-Load Characteristics of a Three-phase Alternator.

4. Laboratory Equipment/Software/Tools Required

1. Theorems boards.
2. Transformer panel.
3. DC compound Motor.
4. Phase induction motor.
5. Separately Excited DC motor.
6. Phase Alternator.
7. Resistors.
8. Bread boards.
9. Regulated Power Supply.

5. Books and Materials

Text Book

1. Sudhakar, Shyammohan S. Palli, *Electrical Circuits,* 2nd Edition, Tata Mc Graw Hill, NewDelhi, 2003.

Reference Book

1. B. L. Theraja, A. K. Theraja, *A text book of Electrical Technology,* 2nd edition, S. Chand Publishers, New Delhi, 2002.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH II SEMESTER

COURSE STRUCTURE

A4010 - ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	2	0	0	28	1	30	70	100

1. Course Description

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 and intonation, making effective oral presentations – both extempore and prepared, role- play, telephonic skills, asking for and giving directions, etc. The lab encourages students to work in a group, engage in peer-reviews and inculcate team spirit through various exercises related to listening to native speakers' accent and participating in speaking activities.

Course Pre/co-requisites

This course has no specific prerequisite and co-requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4010.1. Improve his/her pronunciation

A4010.2. Take part in role-plays and perform effectively in real-life situations

A4010.3. Choose appropriate words and phrases to make effective telephonic conversations

A4010.4. Minimize stage fear and make effective presentations

A4010.5. Build sustained conversations

3. Course Syllabus

A. Computer Assisted Language Learning (CALL) Lab

B. Interactive Communication Skills (ICS) Lab

Module – 1:

ALL: Introduction to Phonetics - Speech Sounds – Vowels and Consonants

ICS: Ice-Breaking activity and JAM session.

Module – 2:

CALL: Past Tense Marker and Plural Marker – Syllable Structure – Consonant Clusters - Minimal Pairs

Module – 3:

ICS: Situational Dialogues – Role-Play – Expressions in Various Situations: Greetings: Self-introduction and Introducing others – Apologies – Requests – Complaints – Congratulating – Expressing sympathy/ condolences.

Module – 4:

CALL: Basic Rules of Word Accent – Stress Shift – Weak Forms and Strong Forms

Module – 5:

ICS: Asking for and Giving Directions – Giving Instructions – Seeking Clarifications – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions

Module– 6:

CALL: Neutralization of Mother Tongue Influence-Common Indian Variants in Pronunciation – Differences between British and American pronunciation

Module – 7:

CALL: Intonation Patterns-Types of Tones - Sentence Stress

Module – 8:

ICS: Social and Professional Etiquette - Telephone Etiquette

Module – 9:

ICS: Oral Presentation Skills (short presentations) - Making a Presentation-Prepared –Extempore

Module – 10:

ICS: Listening-Types of Listening-Steps to effective Listening –Business Listening Comprehension exercises

4. Laboratory Equipment/Software/Tools Required

1. Computers with internet
2. K VAN Solutions Software
3. Headphones
4. Audio Visual Equipment

5. Books and Materials

Text Books

NIL

Reference Books

1. Mohanraj, J., *Let Us Hear Them Speak,* Sage Texts. Print, New Delhi, 2015.
2. Hancock, M., *English Pronunciation in Use* Intermediate, Cambridge University Press. Print, Cambridge, 2009.
3. Sanjay Kumar and Pushp Lata, *Communication Skills,* Oxford University Press, 2011.
4. *Exercises in Spoken English,* Parts I-III CIEFL, Oxford University Press, Hyderabad.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

I B.TECH II SEMESTER

COURSE STRUCTURE

A4022 - ENGINEERING EXPLORATION

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	2	0	0	28	1	30	70	100

1. Course Description

Course Overview

This course starts with differentiating science and engineering, scientist and engineer, followed by describing engineering graduate attributes and what engineers "do". This course offers the fundamental principles, concepts of engineering, as well as the influences of engineering on society and also hands-on and experiential learning opportunities in specific areas of engineering. This course focuses on data collection and analysis, engineering problem-solving, mathematical modeling, contemporary tools (software and hardware), professional practice and expectations (e.g. Communication, teamwork, ethics) and the diversity of fields and majors within engineering. Topics to be covered in this course include: engineering design process in multidisciplinary domain, and unique platform to showcase any idea into functional prototype, project management skills, exploring engineering skills with ethical and sustainability perspective.

Course Pre/co-requisites

To design and develop a sustainable model to existing social problems by using a development platform (ARDUINO or equivalent).

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4022.1. Compare and contrast the contributions of different types of engineers in the development of a product, process or system.

A4022.2. Apply the common engineering design process to solve complex problems and arrive at viable solution

A4022.3. Explore various contemporary software and hardware tools to provide solutions for the problems.

A4022.4. Apply skills needed for successful teamwork including the basics of project management and written and oral communication.

A4022.5. Identify the key elements of professional codes of ethics as well as the ethical and societal issues related to the disciplines and their impact on society and the world.

3. Course Syllabus

- Introduction to Engineering and Engineering Study: Difference between science and engineering,

scientist and engineer needs and wants.

- Various disciplines of engineering, some misconceptions of engineering, Expectation for the 21st century engineer and Graduate Attributes
- Engineering Design Process, Multidisciplinary facet of design, Importance of analysis in engineering design, general analysis procedure.
- Introduction to mechatronics system, generation of multiple solution, decision matrix, Concepts of reverse engineering.
- Introduction to various plat form based development (Arduino) programming and its essentials.
- Introduction to sensors, transducers and actuators and its interfacing with arduino Community study, develop questionnaire, identifying the causes of a particular problem.
- Engineering Ethics: Identifying Engineering as a Profession, Significance of Professional Ethics, Code of Conduct for Engineers.
- Identifying Ethical Dilemmas in different tasks of engineering, Applying Moral Theories and codes of conduct for resolution of Ethical Dilemmas.
- Sustainability: Introduction to sustainability, Sustainability leadership, Life cycle assessment.
- Project Management: Introduction, Significance of team work, Importance of communication in engineering profession.
- Project management tools: Checklist, Timeline, Gantt Chart, Significance of documentation.

4. Books and Materials

Text Books

1. PhilipKosky, RobertT.Balmer, William D.Keat, George Wise, Exploring Engineering: An Introduction to Engineering and Design, Academic Press, 3rd edition, 2012.
2. Byron Francis, Arduino: The Complete Beginner's Guide, Create space Independent Publishers, 2016.
3. M. Govindarajan, S. Natarajan & V. S. Senthil Kumar, Engineering Ethics, 1st Edition, Phi Learning, 2009.

Reference Books

1. Neerparaj Rai, Arduino Projects for Engineers, 1st edition, BPB Publications, 2016. 2.
2. A Simon Monk, Programming Arduino : Getting Started with Sketches, 2nd Edition, Mc Graw - Hill Education, 2016.
3. W. Richard Bowen, Engineering Ethics – Outline of an aspirational approach, Springer London.

SYLLABI FOR II YEAR I SEMSETR

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH I SEMESTER

COURSE STRUCTURE

A4503 – DISCRETE MATHEMATICAL STRUCTURES

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course will provide the mathematical fundamentals needed to understand computer applications. This course will be begun by covering the mathematical concepts necessary in the study of propositional and predicate logic. Next, it covers the concepts of relations and ordering to study and construct the lattices. Further, it discusses the concepts of algebraic systems like semi groups and groups. Then move on to graph theory to analyze the complex structures using the concepts of planar, Euler graphs and chromatic number. Finally, it covers the topics of recurrence relations, which helps in writing efficient code.

Course Pre/co-requisites

This course has no specific prerequisite and co-requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4503.1. Understand the importance of statements and predicate calculus in deriving valid inferences.

A4503.2. Use relations and ordering methods to identify the relationship among the elements in the system.

A4503.3. Select suitable algebraic systems to find solutions for real time problems.

A4503.4. Apply the graph theoretical concepts to solve network related problems

A4503.5. Analyze the recurrence relations to improve the code efficiency.

3. Course Syllabus

Theory

Propositional Logic: Statements and Notation, Connectives, Well-formed formulas Tautologies, Equivalence of formulas and Tautological implications, Rules of Inference, consistency of premises and indirect method of proof. Predicates, the statement Functions, Variables and Quantifiers, Free and Bound Variables

Relations and Ordering: Basics of Relations, Properties of Binary Relations in a Set, Partial Ordering Relations, Hasse diagrams. Lattices as Partially Ordered Sets: Definitions and Examples, Properties of Lattices, Some Special Lattices.

Algebraic Structures: Algebraic Systems: Definitions and Examples, Simple algebraic systems and General properties. Semi groups and Monoids : Definitions and Examples. Groups: Definitions and Examples.

Graph Theory: Basic Concepts, Isomorphisms and Sub graphs, Planar Graphs, Euler Circuits, Hamiltonian graphs, Chromatic Numbers.

Recurrence Relations: Solving Recurrence Relations by Substitution, The method of characteristic Roots, Solutions of inhomogeneous recurrence relations.

4. Books and Materials

Text Book

1. J. P. Trembly, R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, India.

Reference Books

1. Joe L. Mott, Abraham Kandel, Theodore P. Baker, Discrete Mathematics for Computer Scientists and Mathematicians, 2nd edition, Prentice Hall of India Learning Private Limited, New Delhi, India.
2. Kenneth H. Rosen, Discrete Mathematics and its Applications, 7th Edition, Tata McGraw Hill, India.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH I SEMESTER

COURSE STRUCTURE

A4025– MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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 aspects. 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, final accounts and interpretation of financial statements through ratios.

Course Pre/co-requisites

This course has no specific prerequisite and co-requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4025.1. Explain the concepts of Managerial Economics and Financial Accounting.
A4025.2. Analyze interrelationship among various economic variables and it's impact.
A4025.3. Classify the market structure to decide the fixation of suitable price.
A4025.4. Analyze financial statements to assess financial health of business.
A4025.5. Apply capital budgeting techniques to select best investment opportunity.

3. Course Syllabus

Theory

Introduction to Managerial Economics & Demand: Managerial Economics - Meaning, Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand - Meaning, Types, Demand Determinants, Law of Demand and its assumptions & exceptions. elasticity of demand & demand forecasting: Elasticity of Demand - Meaning, Types, Measurement and Significance. Demand Forecasting - Meaning, Need, Methods of demand forecasting.

Production Analysis: Production – Meaning, Production function, Production function with one variable input, Iso-quants and Iso-costs, MRTS, Least Cost Combination of Inputs, Law of returns to scale. cost& break even analysis: Cost- Meaning, Cost Concepts - Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Marginal cost, Sunk cost. Break-even Analysis (BEA)- Determination of Break-Even Point (simple problems) - Significance and limitations of BEA.

Introduction to Markets: Market – Meaning, structure, Types of competition - Features of Perfect competition, Monopoly, Monopolistic Competition and Oligopoly - Price-Output Determination in case of Perfect Competition, Monopoly. pricing: Objectives and Pricing policies - 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.

Introduction to Financial Accounting: Accounting Principles - Concepts, Conventions - Double-Entry Book Keeping - Journal, Ledger, Trial Balance. Preparation of financial statements: Final Account problems with simple adjustments.

Financial Analysis Through Ratios: Ratio Analysis – Meaning, importance - Types: Liquidity Ratios, Solvency Ratios, Turnover Ratios and Profitability ratios. (Simple problems).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).

4. Books and Materials

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, HYDERABAD

II B.TECH I SEMESTER

COURSE STRUCTURE

A4504– DATA STRUCTURES

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	2	42	28	0	4	30	70	100

1. Course Description

Course Overview

Data Structures is a course of primary importance to the discipline of Computer Science and Engineering. It is a mathematical and logical model of organizing data and also used in designing and implementing efficient algorithms. Different kinds of data structures like arrays, linked lists, stacks, queues, etc are suited to implement different kinds of real time applications. Some specific data structures such as Trees and Graphs are especially used to handle large amount of data (Tera, Peta bytes) generated by social networking sites. C programming language is used to implement the concepts of Data Structures.

Course Pre/co-requisites

- A4501 - Programming for Problem Solving
- A4502 - Programming for Problem Solving Laboratory.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:
A4504.1. Demonstrate various operations on stacks, queues.
A4504.2. Perform different operations on linked lists.
A4504.3. Implementation of various Trees and Graphs.
A4504.4. Select appropriate searching and sorting techniques for given application.
A4504.5. Use hashing techniques for efficient data retrieval.

3. Course Syllabus

Theory

Stacks and Queues: Stacks- Definition, Representation and operations on stack, implementation of stack using array. Applications of stack: factorial of the given number, Infix, Prefix, Postfix expressions, Conversions: Infix to postfix, Evaluation of postfix expression. Queues- Definition, Representation and operation on linear queues, Implementation of queue using array, Circular Queue.

Linked Lists: Introduction, Singly Linked List: Representation of a Singly Linked List, Operations on a Singly Linked List. Doubly linked list, Linked list implementation of Stack and Queue.

Trees and Graphs: Trees-Definition, Basic Terminologies, Types of Trees, Representation of a Binary Tree using Array and Linked List, Operations on a Binary Tree, Tree Traversals, Binary Search Trees and operations, AVL Tree and operations. GRAPHS- Introduction, Graph Terminologies, Representation of Graphs, Graph Traversals-Breadth First Search (BFS) and Depth First Search (DFS).

Searching and Sorting Techniques: Linear Search and Binary Search. Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge sort, Heap Sort.

Hashing: Introduction, Hash functions, Collision Resolution Techniques: Linear Probing,Quadratic Probing, Double hashing, Rehashing, Separate Chaining.

Practice

Week-1:

a. Implement stack using array.
b. Factorial of a given number.

Week-2:

a) Convert Infix expressions to postfix expression.
b) Evaluate postfix expression.

Week-3:

a. Implement Queue using arrays
b. Implement circular Queue using arrays

Week-4:

a. Implement single linked list.
b. Implement double linked list.

Week-5:

Implement circular linked list.

Week-6:

Implement stack and queue operations using linked list.

Week-7:

Implement binary tree and BST using linked list.

Week-8:

Perform Tree traversal using linked list.

Week-9:

Implement graphs, BFS and DFS using linked list.

Week-10:

Programs to implement Linear and Binary search techniques.

Week-11:

Implement Bubble, Selection and Insertion sort.

Week-12:

Implement Hash table

4. Laboratory Equipment/Software/Tools Required

- A Computer System with Linux/Ubuntu Operating System, C Compiler

5. Books and Materials

Text Book

1. Reema Thareja (2014), Data Structures Using C, 2nd Edition, Oxford University Press Indi

Reference Books

1. Samanta Debasis (2012), Classic Data Structures, 2nd Edition, Prentice Hall of India.
2. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan (2008), Fundamentals of Data Structure in C,2nd Edition, University Press, India.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH I SEMESTER

COURSE STRUCTURE

A4512– FORMAL LANGUAGES AND AUTOMATA THEORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The course introduces several formal mathematical models of computation such as Finite Automata, Push down automata and Turing machines along with their relationships with formal languages like regular languages, context free languages, context sensitive languages.

Course Pre/co-requisites

- A4503 - Discrete Mathematical Structures
- A4504 - Data Structures

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4512.1. Interpret the core concepts in automata theory and formal languages.
A4512.2. Build Finite automata and regular expression for a given formal language.
A4512.3. Construct context-free grammar& push down automata for various programming constructs.
A4512.4. Categorize various formal languages.
A4512.5. Examine computational models including decidability and intractability.

3. Course Syllabus

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, Finite Automata with Epsilon Transitions, Eliminating epsilon transitions, Minimization of DFA, Finite automata with output (Moore and Mealy machines).

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. Proving languages to be non-regular -Pumping lemma. Closure properties of regular languages.

Context Free Grammars (CFG) -Formal definition, sentential forms, leftmost and rightmost derivations, the language of a CFG. Derivation tree or parse tree, ambiguous Grammar. SIMPLIFICATION OF CFG -Removing useless symbols, Null (epsilon) -productions and unit productions. Normal forms –CNF, GNF. Proving that some languages are not context free -Pumping lemma for CFLs, closure properties of CFLs.

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-CFG to Pushdown Automata, Pushdown Automata to CFG. Deterministic PDA.

Turing Machines (TM)-Formal definition and behavior, languages of a TM, TM as accepters, computable functions, Types of TMs. RECURSIVE AND RECURSIVELY ENUMERABLE LANGUAGES (REL) -Properties of recursive and recursively enumerable languages. COMPUTABILITY THEORY - Context sensitive language and linear bounded automata (LBA), Chomsky hierarchy, post's correspondence problem (PCP).

4. Books and Materials

Text Book

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2007), Introduction to Automata Theory Languages and Computation, 3rdEdition, Pearson Education, India.

Reference Books

1. Daniel I.A. Cohen (2007), Introduction to Computer Theory, 2ndEdition, JohnWiley.
2. K.L.P Mishra, N. Chandrashekaran (2003), Theory of Computer Science-Automata Languages and Computation, 2ndedition, Prentice Hall of India.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH I SEMESTER

COURSE STRUCTURE

A4505– OBJECT ORIENTED PROGRAMMING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	2	42	0	28	4	30	70	100

1. Course Description

Course Overview

This integrated course provides a comprehensive coverage of theory and practice of OOP concepts using Java. The course focuses on different aspect of core Java Environment suitable to write efficient, maintainable, and portable code. It also ignites Object Oriented thinking and explores with the evolution of Java and its basics. It provides strong foundation on Inheritance, Packages, and Interfaces and also illustrates Exception Handling and Multithreaded mechanisms. In depth knowledge to implement Collection frameworks and Event handling is discussed. Emphasis on Swing concepts used for GUI applications is given. The course plays a vital role in develop front-end interface for Mini and Major Projects.

Course Pre/co- requisites

- A4501 - Programming for Problem Solving
- A4504 - Data Structures

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4505.1. Understand the principles of object oriented programming.
A4505.2. Design user defined packages and interfaces.
A4505.3. Analyze the applications for handling exceptions and multithreading.
A4505.4. Implement Collection Frameworks to retrieve data efficiently and to handle events.
A4505.5. Build GUI applications using swings.

3. Course Syllabus

Theory

Introduction To OOP: Evolution of Java, OOP principles, Java Buzzwords, Implementing Java program, JVM, DATA TYPES, Variables, Type conversions and Casting, Operators, Control statements, Arrays. class, objects, methods and constructors: Classes, Objects, Methods, Constructors, this keyword, static keyword, Overloading Methods and Constructors, Argument passing, Exploring String class, String Tokenizer class.

Inheritance, Packages and Interfaces: Inheritance Basics, Using super, Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Abstract classes , final keyword. Packages and interfaces: Defining a Package, Finding Packages and class path, Access Protection, Importing Packages, Defining and Implementing interfaces, Extending interfaces.

Exception Handling and Multithreading: Exception-Handling Fundamentals, Exception Types, Using try catch, throw throws and finally keywords, Built-in Exceptions, Creating own exception subclasses. **Multithreading:** Life cycle of a thread, creating threads, thread priorities, Synchronizing threads, Inter thread Communication.

Collections Framework and Event Handling: Collection classes- Array List, Linked List, Hash Set, Tree Set, Date. Event handling: Delegation Event Model, Event Sources, Event Classes, Event Listener Interfaces, Handling Mouse and Keyboard Events, Adapter classes.

AWT and Event Handling: AWT Hierarchy, AWT controls, Layout Managers: Flow Layout, Border Layout, Grid Layout, Card Layout, Limitations of AWT, and Moving beyond Applets. SWINGS: JFrame, JPanel, JComponent- JLabel and ImageIcon, JText Field, JTabbed Pane , Swing Buttons, JScrollPane, JCombo Box, JTable.

Practice

Week-1:
Implement Control statements and Arrays
a. Read the marks of a student in 4 subjects and find grade.
b. Program to check a number is Amstrong or not.
c. Program to display prime numbers from m to n.

Week-2:
Implement OOP First principle - Encapsulation
a. Define a class Rectangle with data member's length and width. Write methods to find perimeter and area of a rectangle. (class and object)
b. Create a class Account with data members name, acno and balance. Use appropriate methods to perform various operations like deposit, withdraw, balanceCheck.
c. Create a class Student with appropriate data and methods using constructor.

Week-3:
Implement OOP Second principle – Polymorphism and Arrays
a. Create overloaded methods to find volume of Sphere, Cylinder & Cone.
b. To sort given list of elements in ascending order.
c. Read two matrices of size m*n , p*q , perform the multiplication of matrices.

Week-4:
Implement Java String Class.
a. Check a string is palindrome or not.
b. Given a string and an int n, return a string made of n repetitions of the last n characters of the string. You may assume that n is between 0 and the length of the string, inclusive. Write a Java program.

Repeat End ("Hello",3)→"llollollo
Repeat End ("Hello",2)→"lolo"
Repeat End ("Hello", 1) → "o"

c. We'll say that a "triple" in a string is a char appearing three times in a row. Return the number of
triples in the given string. The triples may overlap. Write a Java program.

Count Triple ("abcXXXabc")→1,
Count Triple ("xxxabyyyycd")→3
Count Triple ("a") → 0

d. Read array of City names and Sort in dictionary order. (Ascending order).

Week-5:

Implement OOP Third principle – Inheritance.

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.

b. Write a Java program that 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(). Write a driver classes (main) to display the area of the triangle and the rectangle.(Use super keyword).

Week-6:

Implement Packages and Interfaces.

a. Create a Package Measure; in which store a class named Convertor that contains methods to convert mm to cm, cm to m and m to km. Define a class Need_Convertor that imports the Convertor class, now store Need_ Convertor outside the package Measure. Perform path settings accordingly.

b. Write a Java program that implements an interface Student which has two methods Display Grade() and attendance(). Implement two classes PG_ Student and UG_ Student with necessary inputs of data.

Week-7:

Implement Exception Handling.

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 Number Format Exception. If Num2 is Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

b. In the Custom Exception Test class, the age is expected to be a positive number. It would throw the user defined exception Negative Age Exception if the age is assigned a negative number.

Week-8:

Develop applications on Multithreaded Programming and thread synchronization.

a. Create a multithreaded java 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” in console window.

b. Implement the concept of producer consumer problem using thread synchronization.

Week-9:

Implement Collection Frameworks to retrieve data.

a. Use an Array List to manage Employee objects for insertion, display and remove.
b. Use Hash Set methods to perform operations on collection of data.

Week-10:

Implement Mouse and Key events.

a. Implement Mouse Listener and Mouse Motion Listener to handle various mouse events.
b. Implement Key Listener to handle key events.

Week-11:

Develop GUI applications using AWT.

a. Create a Simple login window to validate a user with name and password.
b. Using Grid Layout design a Simple calculator with appropriate event handling.

Week-12:

Develop GUI applications using Swing Controls.

a. Create a user interface to insert employee details, Display the data in Text area.
b. Create a JTable to display various fields of Student data like RollNo, Name, Branch ,Year, Percentage etc.

4. Laboratory Equipment/Software/Tools Required

- A computer System with Ubuntu Operating System.
- JDK 8 and above

5. Books and Materials

Text Book

1. Herbert Schildt (2019), Java: The Complete Reference, 11th Edition, Tata McGraw-Hill Education, New Delhi.

Reference Books

1. Y. Daniel Liang (2018), Introduction to Java Programming, Comprehensive Version, 10thEdition, Pearson Education, India.
2. Kathy Sierra, Bert Bates (2017), OCA Java SE 8 Programmer I Exam Guide (Exams 1Z0-808), 1st Edition, McGraw-Hill Education Publisher, USA.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH I SEMESTER

COURSE STRUCTURE

A4601– DIGITAL DESIGN AND COMPUTER ORGANIZATION

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course is a combination of digital logic design and computer organization concepts. This course will provide the fundamental background needed to understand how digital systems work and in particular digital computers. This course will cover the mathematical concepts necessary in the study of digital systems and then design and analysis of combinational circuits, and show how to construct the minimal (least number of gates) circuit necessary to implement a specific function. Further, Sequential circuits, combinational circuit design is discussed. These concepts form the basis for the study of Computer Architecture and Organization. Finally, this course will discuss about register transfers, micro operations and computer arithmetic concepts.

Course Pre/co-requisites

- A4001 - Linear Algebra and Ordinary Differential Equations

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4601.1. Illustrate the number system, Boolean algebra, Computer Arithmetic and Logical Gates concepts to construct and simplify digital circuit.

A4601.2. Apply K-Maps to minimize the Boolean expression to construct Combinational and Sequential circuits.

A4601.3. Design Combinational and Sequential by using logic gates and memory units.

A4601.4. Analyze the computer arithmetic algorithms.

3. Course Syllabus

Theory

Number System: Binary numbers, number base conversions, octal and hexadecimal numbers, complements, signed binary numbers, BCD addition.

Boolean Algebra: Digital logic gates, logic implementation and axiomatic definition of Boolean algebra.

Gate Level Minimization: Sum of Products and Product of Sums, Canonical and standard forms. Simplification, the k-map method, four-variable map, don’t-care conditions.

Combinational Logic: Binary adder, binary adder / subtract or, BCD adder, decoder, encoders, and multiplexers.

Sequential Logic: Flip-Flops (SR, JK, D, T), shift registers, ripple counters.
Registers and Counters: registers, counters, ripple counter, synchronous counter, counter with unused states.
Memory and Programmable Logic.

Structure of Computers: Von-Neumann architecture, performance, floating point representation. **Register Transfer and Micro-Operations:** Register transfer language, bus and memory transfers, arithmetic micro-operations, logic micro-operations, and shift micro-operations.

Basic Computer Organization: Instruction formats, instruction cycle, addressing modes.
Computer Arithmetic: Addition and subtraction, multiplication (normal and Booth's) and digital division algorithm and floating point addition and subtraction.

4. Books and Materials

Text Books

1. M. Morris Mano, Michael D. Ciletti (2008), Digital Design 4thEdition, Pearson Education/ PHI, India
2. M. Moris Mano (2006), Computer System Architecture, 3rd Edition, Pearson/PHI, India.

Reference Books

1. Zvi. Kohavi (2004), Switching and Finite Automata Theory, Tata McGraw Hill, India. 2. C.V.S. Rao
2. (2009), Switching and Logic Design, 3rd edition, Pearson Education, India.
3. Carl Hamacher, ZvonksVranesic, SafeaZaky (2002), Computer Organization, 5th Edition, McGraw-
4. Hill, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH I SEMESTER

COURSE STRUCTURE

A4017 - QUANTITATIVE APTITUDE

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
1	0	0	14	0	0	1	30	70	100

1. Course Description

Course Overview

This course provides the basic skills required in solving the problems of Aptitude required by various companies for Campus Recruitment and competitive tests. The contents of course include solving problems on different concepts such as – Permutations and Combinations, Averages, Percentages and Logarithms etc.

Course Pre/co-requisites

To equip learners with the knowledge and skills required to get placed in reputed companies and appear for competitive exams.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4017.1. Interpret data using graphs and charts.

A4017.2. Apply the concepts of ratios, proportions and percentages to solve problems.

A4017.3. Solve problems on Logarithms, permutations, combinations, clocks, and calendars.

3. Course Syllabus

Theory

Ratio and Proportion: Ratio, Proportion, Variations, Problems on Ages

Average, Mixtures And Alligation : Averages, Weighted average, Difference between mixture and alligation, Problems on Mixtures and allegation

Percentages, Simple Interest (Si) And Compound Interest (Ci): Fundamentals of Percentage, Percentage change, SI and CI, Relation between SI and CI.

Data Interpretation: Introduction, Tabulation, Bar Graph, Pie Charts, Line Graphs, Combined Graphs.

Profit and Loss, Partnerships: Basic terminology in profit and loss, Types of partnership, Problems related to partnership

Logarithms: Fundamental formulae of logarithms and problems, finding number of terms on expanding a given number.

Permutations and Combinations: Fundamentals counting principle, Definition of Permutation, Seating arrangement, Problems related to alphabets, Rank of the word, Problems related to numbers, Circular permutation, Combination.

Clocks: Introduction, Finding angle between hands of clock, Gain or loss of time
Calendar: Calendars method- 1, Calendars method -2

4. Books and Materials

Text Book

1. R.S Aggarwal , *Quantitative Aptitude for competitive examinations*, 2017 edition, S.Chand.

Reference Books

1. Abhijit Guha, *Quantitative Aptitude for competitive examinations*, 6th Edition, McGraw Hill Education.
2. Dinesh Khattar, *The Pearson guide to Quantitative Aptitudefor Competitive Examinations*, 3rd Edition, Pearson Education.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH I SEMESTER

COURSE STRUCTURE

A4014 - ENVIRONMENTAL SCIENCES

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
2	0	0	28	0	0	0	30	70	100

1. Course Description

Course Overview

Through this course students engage with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world. The course requires that students identify and analyze natural and human-made environmental problems, evaluate the relative risks associated with these problems, and examine alternative solutions for resolving or preventing them. It is essentially a multidisciplinary approach that brings about an appreciation of our natural world and human impact on its integrity. Its components include biology, geology, chemistry, physics, engineering, sociology, health, anthropology, economics, statistics, computers and philosophy.

Course Pre/co-requisites

This course has no specific prerequisite and co requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to

A4014.1. Identify the important components of environment.

A4014.2. Identify global environmental problems and come out with best possible solutions.

A4014.3. Apply environmental laws for the protection of forest and wild life.

A4014.4. Apply the knowledge of Environmental ethics to maintain harmonious relation between nature and human being.

A4014.5. Illustrate the major environmental effects of exploiting natural resources.

3. Course Syllabus

Theory

Introduction: Definition, the Multidisciplinary nature of environmental studies, importance of environmental education, need for public awareness.

Ecosystems: Ecosystem Definition. Classification of ecosystems. Structure of an ecosystem: Producers, Consumers and Decomposers. Function of ecosystems: Food chains, food webs and Energy flow in an ecosystem. Ecological pyramids: Pyramid of number, Pyramid of biomass and Pyramid of energy. Ecological succession. Biogeochemical Cycles: Definition, Carbon cycle, Hydrologic cycle and Nitrogen cycle. Natural Resources Classification Of 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, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
Energy Resources: Growing energy needs, renewable energy resources-solar energy, wind energy, geothermal energy. Bio fuels- definition, Gobargas production and biodiesel production by trans esterification.
Land Resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Biodiversity And Its Conservation: Introduction and definition. Genetic diversity, species diversity and ecosystem diversity. Values of biodiversity: Consumptive use, Productive use, Social, Ethical, Aesthetic and Option values. Threats to biodiversity: Habitat loss, Poaching of wildlife, Man-wildlife conflicts. In-situ conservation of biodiversity. Ex-situ conservation of biodiversity. Endangered and endemic species of India. Hot-spots of biodiversity. India as a mega diversity nation.

Environmental Pollution: Definition, Causes, Effects And Control Measures Of :Air Pollution, Water pollution, Marine pollution, Soil pollution, Noise pollution, Thermal pollution, Nuclear pollution. Eutrophication, bio-magnification. Solid waste management: Causes, effects and methods of solid waste disposal. E-waste. Role of an individual in prevention of pollution. Disaster management: Floods, Earthquakes and Cyclones. Pollution case studies.
Global Environmental Problems And Global Efforts: Global warming, Acid rain, Ozone layer depletion. Kyoto protocol1997, Carbon credits, clean development mechanism.

Social Issues And The Environment: Concept of sustainable development. Threats to sustainability: Population explosion, Crazy consumerism, Over exploitation of resources. Environmental economics: Strategies of environmental economics. Green Building definition, green building materials, energy considerations in green buildings, water requirement in green buildings, health considerations in green buildings.Role of information Technology in Environment and human health. Water conservation, Rainwater harvesting, watershed management, A brief study about Environmental performance Index(EPI), mission Kakatiya, water man of India Dr. Rajendra singh and Anna hazare watershed management development programme. Environmental ethics. A brief study about Bishnoi tribe environmental conservation, Khejarli massacre.

Environmental Policies and Legislations**:** Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act.Wildlife Protection Act. Forest Conservation Act.

4. Books and Materials

Text Books

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
2. Environmental Studies by R.J. Ranjit Daniels, Jagdish Krishnaswamy, first edition,Wiley India (P)Ltd., New Delhi. ISBN 9788126519439.
3. Environmental Studies by Anubha Kaushik, C.P. Kaushik, 4th edition, New age international publishers, New Delhi.
4. Environmental studies by Benny joseph, Third edition, McGraw Hill Education (India) Private Limited, Chennai.

Reference Books

1. Environmental science by Daniel B.Botkin & Edwards A.Keller, 8th edition, International student version, Wiley India (P) Ltd., New Delhi. ISBN 9788126534142.
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Ecology And Environment by P.D.Sharma, 2005 reprint edition, Rastogi Publications, Meerut, Uttar Pradesh. ISBN 8191339050.

SYLLABI FOR II YEAR II SEMSETR

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH II SEMESTER

COURSE STRUCTURE

A4012 - PROBABILITY AND STATISTICS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course provides a solid undergraduate foundation in both probability theory and mathematical statistics and at the same time provides an indication of the relevance and importance of the theory in solving practical problems in the field of multidisciplinary engineering applications. The mathematical skills sustained from this course form a suitable base to analytical and theoretical concepts encountered in engineering profession.

Course Pre/co-requisites

The course has no specific prerequisite and co-requisite

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4012.1. Solve real world problems using the theory of probability.
A4012.2. Identify the types of random variables, distributions involved in a given problem.
A4012.3. Determine probabilities using discrete and continuous distributions.
A4012.4. Evaluate confidence interval for a population parameter for single and two sample cases.
A4012.5. Estimate goodness of fir, hypothesis testing for small and large samples.

3. Course Syllabus

Theory

Probability: Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes' Theorem.

Random Variables And Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Statistical Independence, Joint Probability Distributions. Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables.

Discrete and Continuous Distributions: Moment generating function, moments and properties. Discrete distributions: Binomial distribution, Poisson Distribution, Continuous Distribution: Uniform

distribution, Normal distribution, Evaluation of all statistical constants of above mentioned distributions through moments, MGF.

Estimation and Testing Of Hypothesis For Large Samples: Point estimation, Maximum error estimate, Interval Estimation, Introduction to Hypothesis, Type I and Type II error, Level of significance, one tailed and two tailed test, Test concerning one mean and one proportion, Two means and two Proportions.

Testing of Hypothesis for Small Samples: Test for single mean, difference of means and paired t-test, Test for ratio of variances (F-test), Chi-square test for goodness of fit and independence of attributes.

4. Books and Materials

Text Books

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye., *Probability & Statistics for Engineers & Scientists,* 9th Edition, Pearson Publication, 2012.
2. S.C. Gupta and V. K. Kapoor**,** *Fundamentals of Mathematical statistics*, Tenth Revised Edition, S Chand & Sons, New Delhi, 2000.

Reference Books

1. T.T. Soong, *Fundamentals of Probability and Statistics for Engineers***,** *John Wiley & Sons, Ltd, 2004*
2. Sheldon M Ross, *Probability and Statistics for Engineers and Scientists*, 4th Edition, Academic Press**,** 2009.
3. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH II SEMESTER

COURSE STRUCTURE

A4508– DATABASE MANAGEMENT SYSTEMS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	2	42	0	28	4	30	70	100

1. Course Description

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, Recovery and various types of databases like distributed database, and intelligent database, Client/Server. Students can undertake a semester project to design, 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 required for using databases in information technology applications.

Course Pre/co-requisites

- A4503 - Discrete Mathematical Structures
- A4505 - Object Oriented Programming

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4508.1. Understand design and implementation of a database for a given problem domain.
A4508.2. Construct Queries in Relational algebra, relational calculus and SQL.
A4508.3. Apply Normalization techniques to reduce data redundancy in data base.
A4508.4. Analyze various transaction control and recovery methods to keep data base consistent.
A4508.5. Construct the file of data records by using appropriate storage and access structure.

3. Course Syllabus

Theory

Introduction: Introduction to database management systems, database management system applications, database management systems versus file systems, view of data, database users and administrators, database system structure. Database Design: E-R diagrams, entities, attributes, entity sets, relationships and relationship sets, additional features of the E-R model

Relational Algebra and Calculus: relational algebra and relational calculus. the relational model-Introduction to the relational model, integrity constraints over relations, querying relational data, logical database design: E-R to relational ,SQL - PART I- Database languages- DDL , DML, DCL and TCL commands ,SQL Overview, the form of a basic SQL query, basic SQL queries examples, union, intersect, except operators and aggregate operators, joins, nested queries , null values, SQL-PART II-PL/SQL basics for writing triggers, cursors, stored procedures, SQL Vs NoSQL.

Schema Refinement and Normal Forms: Introduction to schema refinement, properties of decompositions, functional dependencies, reasoning about FDs. Normalization, Normal forms: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF, schema refinement in database design.

Transaction Management and Concurrency Control: Transaction concept, transaction states, ACID properties, implementation of atomicity and durability, concurrent executions, Anomalies due to interleaved execution of transactions, serializability and recoverability. CONCURRENCY CONTROL-Concurrency control - lock based protocols, time-stamp based protocols, validation based protocols, deadlock handling.

Overview of Recovery and Indexing: Recovery system – failure classification, log-based recovery, shadow paging, recovery with concurrent transactions, ARIES Algorithm. RAID, Overview of File organization, Tree index structures: ISAM and B+ trees.

Practice:

Week-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 such that there is no redundancy.

Consider the table structure as follows:

Employee (empno, ename, job, mgr, hiredate, sal, comm, deptno)

Department (deptno, dname,location)

Construct queries for the following:

1. Write queries for creating above relations Employee and Department.
2. Write queries for inserting necessary data into above relations
3. display all information of emp table
4. display unique jobs from emp table
5. list the employes in ascending order of their salaries
6. display unique job groups in descending order

7. Display all the details of all 'Mgrs'
8. List the emps who joined before 1981.
9. List the Empno, Ename, Sal, Daily sal of all emps in the asc order of Annsal
10. Display the Empno, Ename, job, Hiredate, Exp of all Mgrs
11. List the Empno, Ename, Sal, Exp of all emps working for Mgr 7369
12. Display all the details of the emps whose Comm. Is more than their Sal.
13. List the emps in the asc order of Designations of those joined after the second half of 1981.
14. List the emps along with their Exp and Daily Sal is more than Rs.100.
15. List the emps who are either 'CLERK' or 'ANALYST' in the Desc order.
16. List the emps who joined on 1-MAY-81,3-DEC-81,17-DEC-81,19-JAN-80 in asc order of seniority.
17. List the emp who are working for the Deptno 10 or20
18. List the emps who are joined in the year 81.
19. List the emps who are joined in the month of Aug 1980.
20. List the emps Who Annual sal ranging from 22000 and 45000
21. List the Enames those are having five characters in their Names.
22. List the Enames those are starting with 'S' and with five characters.
23. List the emps those are having four chars and third character must be 'r'.
24. List the emps whose Sal is four digit number ending with Zero.
25. List all the emps except 'PRESIDENT' & 'MGR" in asc order of Salaries.
26. List all the emps who joined before or after 1981.
27. List the emps whose Empno not starting with digit78
28. Display the details of SMITH.
29. Display the location of SMITH.
30. Display the total information of the emps along with Grades in the asc order.
31. List the details of the emps whose Salaries more than the employee BLAKE.
32. List the emps whose Jobs are same as ALLEN
33. List the emps who are senior to King
34. List the emps Whose Jobs are same as MILLER or Sal is more than ALLEN.
35. Find details of highest paid employee.
36. Find the highest paid employee of sales department.
37. List the employee in dept 20 whose sal is >the average sal 0f dept 10 emps.
38. List the no. of emps in each department where the no. is more than 3.
39. Display the number of employee for each job group
40. Display the number of employee for each job group deptno wise.
41. List the department, details where at least two emps are working
42. List the employees whose salary is more than 3000 after giving 20% increment.
43. List the emps name ,dept, sal and comm. For those whose salary is between 2000 and 5000 while loc is Chicago.
44. List the name ,job, dname, location for those who are working as MGRS.

Week-2

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. Create above relations and create indexing for accessing records faster.
2. First insert data into sailors table , then insert data into Boats table and last insert data into Reserves table. Use data shown in above tables to insert.
3. display the sailors names and age
4. display the unique sailor names and age
5. Find the names of sailors who have reserved at least one boat.
6. Find all information of sailors who have reserved boat number 101
7. Find the names of sailors who have reserved a red boat
8. Find the name and the age of the youngest sailor
9. Calculate the average age of all sailors
10. Find the average age of sailors for each rating level
11. Find the sid's , names of sailors who have reserved all boats and having age greater than30.
12. Find the sids ,names of sailors who have reserved a red or a greenboat
13. Find the sids of sailors with age over 20 who have not reserved a redboat
14. Compute increments for the rating of sailors who have sailed two different boats on the sameday
15. 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 twosailors.
16. Find those ratings for which the average age of sailors is the minimum overallratings
17. Find sailors whose rating is better than some sailor called"Horatio"
18. Find sailors whose rating is better than every sailor called"Horatio
19. Find the names of sailors who are older than the oldest sailor with a rating of10
20. Find the average age of sailors for each rating level that has at least twosailors

Week-3

Design an ER diagram for Bank Database

Week-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 is 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.

Create necessary relations and create indexing for accessing records faster.

Answer to the following Queries:

1. Find all account whose balance is smaller than 500.
2. Find all employees who se salary is greater than 1400 and working branch is not 'Downtown'
3. Give the name of the customer having maximum deposit among deposits of city "Harrison" for branch "Perry ridge".
4. Give the names of cities in which the maximum number of branches located.
5. Add amount "100" to the account of all those depositors who are having the highest deposit amount in their respective branches.
6. Find the name, account number, and balance of all customers who have an account with a balance of $400 or less.
7. Find the names ,street, addresses and cities of residence of all employees who work for First Bank Corporation and earn more than 10000/-
8. Give all loans numbers for a loan made at the Perryidge branch with loan amount greater than 1200
9. Find customer name, loan number, loan amount branch name for all loans
10. Find customer name, loan number , loan amount branch name for all loans given by "perryridge" branch
11. Find names of all branches that have asserts greater than all branches located in Brooklyn
12. Find names of all branches that have asserts greater than at least one branch located in Brooklyn.
13. Find average balance for each customer who lives in Harrison and has at least 2 accounts
14. Delete borrower of branches having the minimum number of customers.

Week-5

- Design an ER diagram for inventory management system database.
- Convert the ER diagram into relational model tables.
- Normalize the above tables upto 3rd Normal Form to reduce redundancy.

Week-6

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

Create necessary relations and create indexing for accessing records faster.

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

Week-7

B] Pl/Sql Programs

- Write a PL/SQL program to read number from a user and find out whether it is Odd or Even.
- Write a PL/SQL program to insert a row into emp table using variables
- Write a PL/SQL program to get the name and salary of employee whose eno is 501.(use %type)

Week-8

- Write a PL/SQL program to display Salary of a employee whose eno is 502 by increasing with 500 if its salary is more than 3000.
- Write a PL/SQL program to read employee number from a user and increase its salary depends on the current salary as follows.

Salary	Increment
>= 5000	10%;
<5000	05%

- Write a PL/SQL Block to read employee name from a user if it is exist display its salary otherwise display appropriate message using exception handling.

Week-9

- Write a PL/SQL Block to insert add one row in employee table. Display appropriate message using exception handling on duplication entry of employee number.(use Dup_val_on_index exception)
- Write a PL/SQL program to read number from a user and find out whether it is Odd or Even.
- Write the PL/SQL program to retrieve the data from emptable?

Week-10

- 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 andClarkby2000and1500.Thnchecktoseethatthetotalsalarydoesnotexceed20000.Iftotal

>20000 then undo the updates made to salaries of Blake and clerk?

- 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?

Week-11

Cursors

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

- 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 ofwithdrawals.

Week-12

Triggers

- Write a PL/SQL block that will display the name, dept no ,salary of fist highest paid employees.
- Display sailors information using cursor. if the sailor is not available insert the sailorsdetails
- Create pl/sql program to insert and update record in customer table usingcursors Write a PL/SQL program for deletion of row from employee table usingTriggers.
- Write a PL/SQL program to update a row from employee table usingTriggers.

4. Laboratory Equipment/Software/Tools Required

1. Oracle SQL Plus
2. IDE: SQL Developer
3. OS: Windows / Linux

5. Books and Materials

Text Books

1. Raghurama Krishnan, Johannes Gehrke (2007), Database Management Systems, 3rd Edition, Tata McGraw-Hill, New Delhi, India.
2. 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

2. C. J. Date, A. Kannan and S. Swamynathan(2009), An Introduction to Database Systems,3rd Edition,Pearson Education, India.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH II SEMESTER

COURSE STRUCTURE

A4509–DESIGN AND ANALYSIS OF ALGORITHMS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	2	42	0	28	4	30	70	100

1. Course Description

Course Overview

This course will provide the program analysis skills needed to develop computer applications efficiently. This course will be begun by covering the asymptotic notations necessary in the study of time and space complexities. Next, it covers the concepts of divide and conquers to analyze the decomposition of complex problems. Further, it discusses the concepts of greedy method to solve the spanning trees and knapsack problems. Then move on to dynamic programming and back tracking to analyze the complex problems with exponential time complexity. Next it covers branch and bound concepts to study the pruning strategies and cost function. Finally, it covers the topics of NP-Hard and NP-Complete to study the nondeterministic algorithms.

Course Pre/co-requisites

- A4501 - Programming for Problem Solving
- A4504 - Data Structures

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4509.1. Understand the asymptotic notations, divide and conquer techniques to decompose complex problems into small and simple problems.

A4509.2. Choose Greedy method to find out feasible solutions of problems.

A4509.3. Analyze the complex engineering problems to find out the optimal solutions.

A4509.4. Apply the backtracking and branching methods to solve the problems by verifying all possibilities of solutions.

A4509.5. Analyze nondeterministic algorithms to solve polynomial and non polynomial problems.

3. Course Syllabus

Theory

Introduction: Algorithm definition, Pseudo code Specifications, Performance Analysis-Space Complexity, Time Complexity, Asymptotic Notations-Big-Oh, Omega, and Theta.

Divide and Conquer and Greedy Method: General Method, Finding Maximum and Minimum, Merge Sort, Quick sort, Strassen's Matrix Multiplication. GREEDY METHOD - General Method, Real Knapsack Problem, Job sequencing with deadlines, Minimum-cost spanning trees- Prim's Algorithm and Kruskal's algorithm, Single source shortest Path.

Dynamic Programming: General method, All pairs shortest path, Matrix Chain Multiplication, Optimal Binary search trees, 0/1 Knapsack, the travelling salesman problem.

Back Tracking: The General Method, The n-Queens Problem, Sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack Problem.

Branch and Bound and NP-Hard and NP-Complete Problems: 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.

Practice

Week-1

Write a program to implement the following sorting algorithms, measure and compare their time complexities.

a) Quick sort
b) Merge sort
c) Insertion sort

Week-2

Write a program for matrix multiplication of two matrices

a) Conventional matrix multiplication
b) Stassen's matrix multiplication

Compare the time complexities of both algorithms and fix the time difference boundary.

Week-3

Write a program to find out minimum and maximum values of a list, with more than 1000 elements using iterative and divide and conquer methods. Compare the time complexities.

Week-4

Write a program to find out the solution vector of knapsack problem using greedy method. Select the objects based on their profit per unit weight

Week-5

Write a program to find the sequence of jobs to maximize the total profit. Where each job is associated deadline and profit, the application will get the profit it a job is completed within it's dead line. Analyze the execution times of different number of jobs and propose the time complexity.

Note: consider the jobs with single unit execution time.

Week-6

Write a program to read a weighted connected graph to find out the minimum distances from a given vertex to all other vertices using dijkstra's algorithm

Note: read the weighted graph in the form of matrix. Where the element represents the cost of edge from vertex to vertex.

Week-7

Implement the 0/1 knapsack algorithm and compare the output with greedy knapsack problem for same set of input objects. Compare its time complexities. Find the set of objects for which, 0/1 knapsack gives best solution than greedy knapsack problem.

Week-8

Write a program to read a weighted connected graph to find out the minimum distance between each pair of vertices (All pair shortest paths). Find its time complexity.

Note: read the weighted graph in the form of matrix. Where the element represents the cost of edge from vertex to vertex.

Week-9

Find the matrix multiplication of matrices , to minimize the number of total elementary multiplications. Where in each consecutive pair of matrices, the number of first matrix columns is equal to number rows in second column.

Week-10

Write a program to read a weighted connected and implement the below graph traversal algorithms

a) Depth first search

b) Breadth first search

Analyse and find out the space and time complexities.

Week-11

Write a program to read a weighted connected and implement the below spanning tree algorithms

a) Prims algorithm

b) Kruskal algorithm

Week-12

Write a backtracking algorithm to solve the problem of placing eight queens on (eight by eight) chess board. Two queens are said to attack each other if they are on the same row, Column or diagonal

Week-13

Write a recursive program for the below algorithms using backtracking method and find the time complexities

a) Find the chromatic number(number of colors) of a connected graph

b) Sum of subsets problem.

Week-14

Consider a currency system with coins of decreasing value c_1, c_2, c_3, … ,c_N rupees. Give an algorithm that computes

a) The minimum number of coins required to give K rupees in change.

b) The number of different ways to give K rupees in change.

4. Laboratory Equipment/Software/Tools Required

- Computer systems installed with C Compiler

5. Books and Materials

Text Books

1. Ellis Horowitz, Satraj Sahni, Rajasekharam(2007), *Fundamentals of Computer Algorithms*, 2nd edition, University Press, New Delhi.
2. Thomas H. Cormen, Charles E. Leiserson Introduction to Algorithms 3rd edition, (Eastern Economy Edition)

Reference Books

1. R. C. T. Lee, S. S. Tseng, R.C. Chang and T. Tsai (2006), Introduction to Design and Analysis of Algorithms Astrategic approach, McGraw Hill, India.
2. Allen Weiss (2009), Data structures and Algorithm Analysis in C++, 2nd edition, Pearson education, New Delhi.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH II SEMESTER

COURSE STRUCTURE

A4602– WEB TECHNOLOGIES

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	2	42	0	28	4	30	70	100

1. Course Description

Course Overview

This course introduces web technologies such as HTML, CSS, XML, PHP and Server-side scripting. The course covers how to use these technologies to develop static and dynamic web pages with an emphasis on client-side scripting. The course also explains the differences between client-side and server-side Web development and how to build applications using Servlets, JSP and JDBC.

Course Pre/co-requisites

- A4505 - Object Oriented Programming

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4602.1. Understand the importance of various technologies for web development.
A4602.2. Apply the concepts of HTML and JavaScript to create web pages.
A4602.3. Validate XML document using DTD or XML Schema.
A4602.4. Construct server side components using Servlets, PHP and JSP.
A4602.5. Use JDBC API to communicate with database server.

3. Course Syllabus

Theory

Hypertext Markup Language: Introduction, Common tags, Lists, Tables, Form Elements, Frames.
Cascading Style Sheets: Introduction, Types of Style sheets, CSS properties: Text, Background, border, margin.

Java Script: Introduction, objects, event handling
Bootstrap: Introduction, Bootstrap with CSS, Images, Tables
XML: Introduction, DTD, XML Schema, XSLT, Types of parsers:DOM,SAX

JDBC: Introduction, Types of JDBC Drivers, Process to establish a connection, Types of Statements, Result set Metadata

Servlets: Introduction to server side programming, web server, servlet life cycle, types of servlets, reading servlet parameters, initialization of servlet parameters, Sessions and Cookies.

JSP: Advantages of JSP over Servlets, JSP Life Cycle, JSP Elements: Scripting elements, directives, action elements, Implicit objects of JSP,Error handling, Accessing Bean using JSP, MVC Architecture.

PHP: Introduction, variables, data types, constants, control structures, arrays, functions, working with forms and database.

Practice

Week-1

HTML Program to work with Lists.
HTML Program to work with tables.

Week-2

HTML Program to design login page, registration page.
HTML program to design feedback form.

Week-3

CSS Program to work with background and border properties.
Java script program to print multiplication table of the given integer.
Java script program to validate the registration form contents with the following rules(Use RegExp Object)

a. Username Must starts with Uppercase followed by set of lowercase letters or digits.
b. Password must contain only uppercase letters and length must be in between 8 to 12.
c. Phone number contains 10 digits.
d. E-mail must follow some predefined format(example@domain.com)

Week-4

Apply Various Bootstrap CSS Properties
Create a DTD document to validate the XML document.
Create a XML Schema document to validate the XML document.

Week-5

JDBC Program to create a student table in the database.
JDBC Program to perform various DML Operations on the database using Statement.

Week-6

JDBC Program to perform various DML operations using Prepared Statement.
JDBC Program to execute stored procedure using Callable Statement.
JDBC Program to execute stored function using Callable Statement.

Week-7

Servlet program to read the parameters from user interface and display welcome message.

Servlet program to read initialization parameters using ServletConfig and ServletContext object.

Week-8

Servlet program to work with HttpSession Object.

Servlet program to work with Cookie.

Servlet program to insert the form contents into the database using JDBC.

Week-9

JSP Program to print multiplication table.

JSP Program to handle the exceptions.

JSP Program to retrieve the student data from database based on his roll number.

Week-10

JSP Program to access bean information using useBean tag.

JSP Program to authenticate the login details. If user is valid forward the control to **success.html** otherwise forward to **fail.html.**

Week-11

PHP program to work with associative arrays.

PHP program to find factorial using Recursion.

PHP Program to display the following.

a. Sum of array elements.
b. Product of array elements
c. Display array elements in sorted order
d. Display array elements in reverse sorted order.

Week-12

PHP Program to perform various DDL operations on MySQL database.

PHP Program to perform various DML operations on MySQL database.

4. Laboratory Equipment/Software/Tools Required

- PC's Installed with OS
- notepad ++
- Java
- Wamp (or) xamp server
- apache tomcat

5. Books and Materials

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.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH II SEMESTER

COURSE STRUCTURE

A4510– PYTHON PROGRAMMING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
1	0	2	14	0	28	2	30	70	100

1. Course Description

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 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.

Course Pre/co-requisites

- A4501 - Programming for Problem Solving
- A4502 - Programming for Problem Solving Laboratory
- A4504 - Data Structures

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4510.1. Understand fundamentals of Python language.
A4510.2. Use and manipulate Python lists, tuples, sets, dictionaries.
A4510.3. Build functions to increase code reusability.
A4510.4. Build Numpy arrays, and perform interesting calculations.
A4510.5. Analyze data with the Pandas Data Frames.

3. Course Syllabus

Theory

Introduction to Python Programming: Features of Python, History of Python. Python Basics- Literal Constants, Variables and Identifiers, Data Types, Input/output Operations, Comments, Reserved Words, Indentation

Operators, Expressions and Control Statements: Arithmetic, Comparison, Assignment, Relational, Unary, Bitwise, Shift, Logical, Membership, Identity, Operator Precedence and Associativity, Expressions. Decision Control Statements-Selection/Conditional Branching Statements – if, if-else,

Nested if. Basic Loop Structures/Iterative Statements- while, for, Nested loops, continue, break, pass statements.

Data Structures and Functions: Lists, Tuple, Sets, Dictionaries. Introduction to Functions-Declaration and Definition, Variable Scope and Lifetime, Return Statements, Types of Arguments, Lambda function, Recursion, Random module.

Python Numpy: 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, Describing a Dataset, group by Function, Filtering, Missing Values in Pandas, Concatenating Data Frames

Practice

Week 1:

1. Write a python program to find the area of triangle
2. Write a python program to take the marks of 5 courses and display the average of it.

Week 2:

1. Write a program that reads the user input for a number of seconds and prints out how many minutes and seconds that is.
   (*For instance, 200 seconds is 3 minutes and 20 seconds. [Hint: Use the // operator to get minutes and the % operator to get seconds*.])
2. Write a program that reads the user input to enter a length in centimeters. If the user enters a negative length, the program should tell the user that the entry is invalid. Otherwise, the program should convert the length to inches and print out the result. [*Hint: - Consider 2.54 centimeters as 1 inch]*

Week 3:

1. Read the user input to enter a temperature in Celsius. The program should print a message based on the temperature:

- If the temperature is less than -273.15, print that "*The temperature is invalid"* because it is below absolute zero.
- If it is exactly -273.15, print that *"The temperature is absolute 0*".
- If the temperature is between -273.15 and 0, print that *"The temperature is below freezing".*
- If it is 0, print that *"The temperature is at the freezing point*".
- If it is between 0 and 100, print that *"The temperature is in the normal range".*
- If it is 100, print that "*The temperature is at the boiling point"*.
- If it is above 100, print that"*The temperature is above the boiling point*".

2. Write a Python program to find GCD (greatest common divisor) of two numbers using loops.

Week 4:

1. Write a program to print all Armstrong numbers between given range using for loop.*[Hint:- 153=*

$1^3 + 5^3 + 3^3$ (use 2 digits for 2 squares , 3 digit for 3 cubes)]

2. Write a program that counts how many of the squares of the numbers from 1 to 100 end in a 4 and how many end in a 9.

Week 5:

1. Write a program that reads the user input to enter a *List* of integers. Do the following:

(a) Print the total number of items in the list.
(b) Print the last item in the list.
(c) Print the list in reverse order.
(d) Print *Yes*if the list contains a 5 and *No* otherwise.
(e) Print the number of fives in the list.
(f) Remove the first and last items from the list, sort the remaining items, and print the result.
(g) Print how many integers in the list are less than 5.
(h) Print the average of the elements in the list.
(i) Print the largest and smallest values in the list.
(j) Print the second largest and second smallest entries in the list
(k) Print how many even numbers are in the list.

Week 6:

1. Write a program that uses a dictionary that contains ten user names and passwords. The program should read the user input to enter their username and password. If the username is not in the dictionary, the program should indicate that the person is '*Not a valid user*'. If the username is in the dictionary, but the user does not enter the right password, the program should say that the '*Password is valid'.*

Week 7:

1. Write a python program to demonstrate various operations on tuples.
2. Write a python program to demonstrate various operations on sets

Week 8:

1. Write a python program to find factorial of a given number using recursion.
2. Write a python program to find sum of individual digits of a given number using recursion.

Week 9:

1) Create a Numpy array and do the following

a. How to replace items that satisfy a condition with another value in numpy array?
b. How to replace items that satisfy a condition without affecting the original array?
c. How to reshape an array?
d. How to stack two arrays vertically?
e. How to stack two arrays horizontally?

Week 10:

1. Create a Table and do the following using Pandas

a) How to combine many series to form a data frame?
b) How to assign name to the series' index?

c) How to get the items of series A not present in series B?

d) How to get the items not common to both series A and series B?

e) How to get the minimum, 25th percentile, median, 75th, and max of a numeric series?

4. Laboratory Equipment/Software/Tools Required

- A Computer system with Windows/Ubuntu Operating System.
- Python IDE with Python Run Time System

5. Books and Materials

Text Books

1. Python Programming using Problem solving Approach – Reema Thareja, Oxford University Press
2. Python Data Science Handbook: Essential Tools for Working with Data 1st Edition- O'Reilly Media; 1 edition by Jake Vander Plas
3. A Practical Introduction to Python Programming Brian Heinold Department of Mathematics and Computer Science Mount St. Mary's University,2012

Reference Books

1. Zelle, Python Programming: An Introduction to Computer Science. Franklin, Beedle & Assoc., 2010
2. Pearson Education Publishing Starting Out with Python 3rd (2015)

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH II SEMESTER

COURSE STRUCTURE

A4507– OPERATING SYSTEMS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

Operating Systems is a graduate-level introductory course that teaches the basic concepts in operating systems like abstractions, mechanisms, and their implementations. This course also deals with Process Management & Synchronization, Inter process communication, Memory Management, Virtual Memory, File & Disk Management and Deadlock handling methods. This course encourage the students to know operating systems internals and their functions. Provides the concepts to study and design services in operating systems.

Course Pre/co-requisites

- A4601 – Digital Design and Computer Organization

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4507.1. Understand the various services provided by the operating system.

A4507.2. Analyze the concepts of Process management and Synchronization in a multi processing system.

A4507.3. Apply the Memory management techniques for efficient usage.

A4507.4. Use File and Disk management schemes for effective storage management.

A4507.5. Demonstrate Deadlock Handling Methods to allocate resources among processes.

3. Course Syllabus

Theory

Operating Systems Overview: Definition, Operating System Types, Operating System operations, Operating system services, System calls and System Programs, Distributed Systems, Special Purpose Systems.

Process Management and Process Synchronization: Process concepts- Process, Process State Diagram, PCB and Operations on processes, IPC- Pipes, Message Passing and Shared Memory. Process Scheduling- Scheduling Criteria, Scheduler Types and Scheduling Algorithms. PROCESS SYNCHRONIZATION: Concept of Synchronization, Critical section problem, Peterson's solution,

Semaphores- Definition, wait and signal operations and Binary and Counting Semaphores. Classic problems of Synchronization-The Bounded Buffer Problem, The Readers –Writers Problem, Dining – Philosopher's Problem.

Memory Management: Introduction to Memory Management, Swapping, Contiguous Memory Allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, Page-replacement algorithms, allocation of frames, thrashing.

File System and Mass Storage Structure: Concept of a file – File Attributes, File Types, Access Methods, Directory Structures, File System structure, File System Implementation, directory implementation, File Allocation methods, and Free-Space management. MASS-STORAGE STRUCTURE: Introduction to Magnetic Disks, Disk Structures, Disk Scheduling, Swap Space Management.

Deadlocks and Protection: System Model, Deadlock Characterization, Deadlock Prevention, Avoidance, Detection and recovery from deadlock. PROTECTION: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Revocation of Access Rights.

4. Books and Materials

Text Books

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2009), *Operating System Concepts*, 8th Edition, Wiley India Private Limited, New Delhi.
2. Dhananjay M. Dhamdhere (2009), Operating Systems, A Concept-Based Approach, 3rd Edition, McGraw Hill, New Delhi.

Reference Books

1. William Stallings (2006), *Operating Systems, Internals and Design Principles*, 5th Edition, Pearson Education, India.
2. Achyuth S Godbole, Atul Kahate (2017),Operating Systems, 3rd Edition, McGraw Hill, New Delhi.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH II SEMESTER

COURSE STRUCTURE

A4019 - VERBAL ABILITY AND LOGICAL REASONING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
1	0	0	14	0	0	1	30	70	100

1. Course Description

Course Overview

This course provides the basic skills of verbal and logical reasoning as required by companies for Campus Recruitment and also for other Competitive exams. The contents of this course includes different techniques of solving problems on Coding and Decoding, Seating Arrangements, Syllogisms, Blood Relations, Visual reasoning and brief account on basic grammar such as Error detection, Modifiers, Articles etc .

Course Pre/co-requisites

To equip learners with the knowledge and skills required to get placed in reputed companies and other competitive exams.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4019.1. Identify efficient and appropriate methods to solve logical reasoning problems.

A4019.2. Choose the techniques to solve puzzles on analytical reasoning.

A4019.3. Apply the grammar rules for effective sentence formation.

3. Course Syllabus

Theory

Coding and Decoding: Coding and Decoding, Arrow Method, Chinese coding, Series, Analogy, Odd man out.

Articles and Tenses: Introduction, usage of articles, Omission of Articles, Types of tenses, Forms and Usage of tenses.

Direction Sense: Introduction, Distance method, Facing Method and Shadow Method.

Blood Relations: Introduction, Direct, Puzzle and Coded models.

Voices and Forms of Speech: Introduction, conversion of active and passive voice, conversions of direct and indirect speech.

Data Arrangements: Linear Arrangement, Circular Arrangement, Multiple Arrangements.
Syllogisms: Introduction, Tick-Cross method, Inferential Technique, Venn-Diagram method.

Visual Reasoning: Patterns, Folded Images, Cubes and Analytical Reasoning.
Sentence Correction: Subject-Verb Agreement, Pronoun Antecedent, Parallelism, Verb-Time Sequence Error, Determiners and Modifiers.

4. Books and Materials

Text Books

1. R.S. Aggarwal, Vikas Aggarwal, *Quick Learning Objective General English,* S.Chand, 2003.
2. *R*.S. Aggarwal, *A Modern Approach to Logical Reasoning*, Revised Edition, **S Chand & Co Ltd.**

Reference Books

1. Edgar Thorpe, *Test of Reasoning for all competitive examinations*, 6th Edition, McGraw Hill Education, 2017.
2. Arun Sharma, *How to Prepare for Logical Reasoning for CAT and other Management Examination*s, 4th edition, McGraw Hill Education, 2017.
3. Simbo Nuga, *English Grammar and Verbal Reasoning – The Toolkit for Success*, Trafford Publishing, 2013.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

II B.TECH II SEMESTER

COURSE STRUCTURE

A4013 - GENDER SENSITIZATION

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
2	0	0	28	0	0	0	0	70	100

1. Course Description

Course Overview

Towards a World of Equals is a course that introduces students to different dimensions of gender issues. 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.

Course Pre/co-requisites

This course has no specific prerequisite and co-requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4013.1. Build the significance of the process of socialization and relationships between men and women on the basis of a just and equal world

A4013.2. Examine the decline of female sex ratio and discrimination faced by people with different gender identities

A4013.3. Take part in house work, in order to allow for equality and share equal family spaces Estimate women's contribution to the nation's economy

A4013.4. Analyze the consequences of sexual violence and importance of consent in friendship and other relationship

A4013.5. Perceive the invisibility of women in history and show how locating a women in history makes them visible

3. Course 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
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

Missing Women: Sex Selection and Its Consequences
Declining Sex Ratio
Demographic Consequences
Gender Spectrum: Beyond the Binary
Two or Many?
Struggles with Discrimination
Additional Reading: Our Bodies, Our Health

Housework: The Invisible Labor
"My Mother doesn't work"
"Share the load"
Women's Work: Its Politics and Economics
Fact and fiction
Unrecognized and unaccounted work
Further Reading: wages and conditions of work.

Sexual Harassment: Say No!
Sexual harassment, not eve-teasing
Coping with everyday harassment
Further Reading: "Chupulu"
Domestic Violence: Speaking Out
Is home a safe place?
When women unite (Film)
Rebuilding lives
Further Reading: New Forums for justice.
Thinking about Sexual Violence
Blaming the Victim- " I Fought for my life…"
Further Reading: The caste face of violence.

Knowledge: Through the Lens of Gender Point of view
Gender and the structure of knowledge
Further Reading: Unacknowledged women artists of Telangana
Whose History? Questions for Historians and Others
Reclaiming a Past
Writing other Histories
Further Reading: Missing pages from modern Telangana history

4. Books and Materials

Text Book

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

Reference Book

NIL

SYLLABI FOR III YEAR I SEMSETR

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH I SEMESTER

COURSE STRUCTURE

A4603 - SOFTWARE ENGINEERING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	2	42	0	28	4	30	70	100

1. Course Description

Course Overview

Software engineering is a discipline that allows us to apply engineering and computer science concepts in the analysis, design, development and maintenance of reliable, usable, and dependable software, which is a pre-requisite to the entry of any industry. The course is designed to present software engineering concepts and principles in parallel with the software development life cycle. The purpose of the course is to prepare a Software Requirements Specification (SRS) document for the smooth handling of any project. This course will enable how to gather requirements, how to do analysis, what we need to design, what are the test strategies we can apply, and also learn quality management & assurance concept.

Course Pre/co-requisites

- A4501 - Programming for Problem Solving
- A4505 - Object Oriented Programming

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4603.1. Understand the importance of both conventional and contemporary process models

A4603.2. Document requirements as per the IEEE standards

A4603.3. Work as an individual and as part of a multidisciplinary team to develop and deliver quality software adopting agile principles

A4603.4. Model different phases of software development.

A4603.5. Propose appropriate testing strategies and techniques for given project

3. Course Syllabus

Theory

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, Specialized Process models, The Unified Process, Personal and Team Process Models.

Agile Development: What is Agility, Agility and the Cost of Change, Agile Process, Extreme Programming (XP).
Requirements Engineering: Functional and Non-Functional Requirements, The Software requirements Document, Requirements Specification, requirements Engineering, Requirements Elicitation and Analysis, Requirement Validation, Requirement Management.

Design Concepts: Importance of modeling, Overview of modeling, conceptual model of Unified Modeling Language (UML), Architecture.
Relationships: dependency, Generalization, association, aggregation
Common Mechanisms: Stereotypes: Include, extend, copy, type, tagged value and Constraints

Structural Modeling (Terms, Concepts, Relations): Class diagram, Object diagram, Component diagram, Deployment diagram.
Behavioral Modeling (Terms, Concepts, Relations): Use Case diagram, Activity diagram, State machine diagram, *Interaction diagrams*: Sequence diagram, Collaboration diagram.

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.

Practice:

Do the following seven exercises for any two projects given in the list below or any other projects
Week-1
Development of problem statement
Week-2
Preparation of Software Requirements specification Document, Design Documents and Test phase related documents
Week-3
Preparation of software Configuration Management and Risk Management related document
Week-4
Design structural diagrams using CASE tools
Week-5
Design behavioral diagrams using CASE tools
Week-6
Develop test cases for unit testing and integration testing
Week-7
Develop test cases for various system and regression testing techniques

Sample projects for the above problems

1. Withdraw money from an Automatic Teller Machine (ATM)
2. Online bus Ticket reservation system
3. Exam registration
4. Library Management system
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management system
10. Recruitment system

4. Laboratory Equipment/Software/Tools Required

1. Word Processor Examples: Microsoft Word, Apache Open Office, Open Office Google Docs etc.
2. IBM Rational rose/other open source toolsEx: Star UML
3. IBM Rational rose/other open source tools Ex: Star UML
4. Manual Testing

5. Books and Materials

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.
3. Grady Booch, James Rumbaugh, Ivar Jacobson (1999), The Unified Modeling Language user guide, pearson edition.

Reference Books

1. Pankaj Jalote (2010), Software Engineering, A Precise Approach, Wiley India.
2. Rajib Mall (2005), Fundamental of Software Engineering, PHI

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH I SEMESTER

COURSE STRUCTURE

A4511 - COMPUTER NETWORKS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	2	42	0	28	4	30	70	100

1. Course Description

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 and some of the issues of Network Security. 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 includes interfaces.

Course Pre/co-requisites

- A4502 - Programming for Problem Solving Laboratory

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4511.1. Understand the concepts of OSI and TCP/IP reference models and their applications.
A4511.2. Compare different types of network topologies, protocols and their functionalities.
A4511.3. Apply various control mechanisms to resolve data transmission problems.
A4511.4. Analyze various sub netting and routing techniques.
A4511.5. Use appropriate techniques to achieve better Quality of Service.

3. Course Syllabus

Theory

Introduction: Network hardware, Reference models: OSI, TCP/IP, Internet, Connection oriented network and connectionless network. The physical layer-guided transmission media, wireless transmission media.

The Data Link Layer: Design issues, error detection and correction, elementary data link protocols, sliding window protocols. the medium access sub layer: Channel allocations problem, multiple access protocols: ALOHA, CSMA, Collision free protocols; Ethernet, Data Link Layer switching.

The Network Layer: Network layer design issues, Routing Algorithms: Shortest path routing, flooding, distance vector routing, link state routing. Congestion control algorithms, the network layer in the internet: IPv4, Sub-netting, Super-netting, CIDR, NAT and IPv6.

The Transport Layer: Transport service, elements of transport protocol, Simple Transport Protocol, Internet transport layer protocols: UDP and TCP, Introduction, The TCP service model, The TCP protocol, The TCP Segment Header, TCP connection establishment, connection release, TCP sliding window, TCP Timer management, TCP Congestion control, Performance issues.

The Application Layer: Domain name system- DNS Name Space, Domain Resource Records, Name Servers. application layer protocols: Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet

Practice

1. Implementation of bit stuffing
2. Implementation of character stuffing
3. Implementation of Cyclic redundancy check
4. Implementation of hamming code.
5. Implementation of data encryption and decryption.
6. Implementation of the evolution of Djakarta's routing algorithm.
7. Implementation of the evolution of Distance Vector Routing algorithm.
8. Implementation of the evolution of Link State Routing algorithm
9. Implementation of Stop and Wait protocol working
10. Implementation of GoBack-N Protocol working.
11. Implement, and verify through a simulator, a program to create sub-network and assign addresses based on the number of hosts connected to the network. (Exercise)
12. Create a simulator to transfer of files from PC to PC using packet tracer software. (Additional Practice).
13. Implementation of Iterative and Concurrent Echo Server using Connection Oriented Protocol (TCP)
    and Connection Less Protocol (UDP).(Additional Practice)

4. Laboratory Equipment/Software/Tools Required

- A computer system with C- Language compiler, Packet Tracer Software

5. Books and Materials

Text Books

1. S.Tanenbaum, Computer Networks (2003), 4thed, Pearson Education/ PHI. New Delhi, India.
2. Bhavneeth Sidhu, "An Integrated Approach to Computer Networks", Khanna Publishing House

Reference Books

1. William Stallings (2006), Cryptography and network security, 4thedition, Pearson Education, India.
2. Behrouz A. Ferozen (2006), Data communication and Networking, Tata McGraw-Hill, India.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH I SEMESTER

COURSE STRUCTURE

A4604 - MOBILE APPLICATION DEVELOPMENT

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	2	42	0	28	4	30	70	100

1. Course Description

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 the Android Studio IDE. Students are expected to work on a project that produces a professional-quality mobile application.

Course Pre/co-requisites

- A4505 - Object Oriented Programming
- A4602 - Web Technologies

2. Course Outcomes (COs)

Upon successful completion, students should be able to:

A4604.1. Understand architecture, the ecosystem, features and tools to design mobile applications
A4604.2. Create effective user interfaces that leverage evolving mobile device capabilities
A4604.3. Design, customize and enhance mobile applications with various widgets
A4604.4. Develop various user friendly mobile applications with different application components
A4604.5. Build database applications to provide complete mobile development solutions

3. Course Syllabus

Theory

Android Introduction: Introduction to Android, Features of Android, Android Versions, Android Architecture, Installing Android SDK Tools, Android Development Tools (ADT), Creating Android Virtual Devices (AVD).

Working with Android Applications: Creating first android application, Anatomy of android application, Deploying Android app on USB connected Android device, Core Building Blocks of Android application, Activity life cycle, Intent Types, Linking activities by using EXTRAS.
Views (UI Widgets): Toast, Edit Text, Button, Toggle Button, Checkbox, Radio Button, Spinner, Date Picker, Time Picker, Web View, List View, Progress Bar, Analog and Digital clock, Handling UI events.

Fragments: Introduction to Fragments, Fragments life cycle, Layouts in Android, Managing changes to screen orientation, utilizing the Action Bar.
Menus: Option menu, Popup menu
Images: Image View, Image Switcher
Working With Applications: Alert Dialog, Alarm manager, SMS messaging, Sending E-mail, Media Player, Using camera for taking pictures, Recording video, Handling Telephony Manager

Introducing the Data Storage Options: The preferences, The Internal Storage, The External Storage, The Content Provider
Database: The SQ Lite database, connecting with the SQ Lite database and CRUD operations
Publishing Android Applications: Preparing for publishing, Deploying APK files

Practice

Week-1
Create an android app to illustrate activity life cycle
Week-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-3
a. Create an android app to perform mathematical operations (+ , - ,*, / , %). (Use buttons, edit text, toast controls)
b. Create an android app to display text in bold, italic, normal style with left, right, center alignments (use Radio Button, Check Box controls)
Week-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 Date Picker control)
c. Create an android app design login control and validate login details
Week-5
a. Create an android app to demonstrate Alert Dialog
b. Create an android app to demonstrate Web View control
Week-6
a. Create an android app to show Analog and Digital clocks
b. Create an android app to illustrate a progressbar
Week-7
a. Create an android app to demonstrate list fragment

b. Create an android app to demonstrate dialog fragment

Week-8

a. Create an android app to demonstrate option menu, handling listeners

b. Create an android app to scroll list of images and display details of images (name, size etc.) using Image Switcher control

Week-9

a. Create an android app to demonstrate sending e-mail

b. Create an android app to demonstrate sending SMS

Week-10

Create an android app to show details phone contacts, implement calling, receiving features

Week-11

a. Create an android app to demonstrate camera

b. Create an android app to demonstrate media player

Week-12

a. Create an android app to store details of students in SQ Lite and display the details

b. Create an android app to perform insert, update, delete operations on student database

4. Laboratory Equipment/Software/Tools Required

1. Android Studio IDE
2. Java

5. Books and Materials

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. Reto Meier, Professional Android 4 Application Development, Wiley India Pvt Ltd

Web Link:

1. https://developer.android.com/reference

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III B.TECH I SEMESTER

COURSE STRUCTURE

A4515 - MACHINE LEARNING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	2	42	0	28	4	30	70	100

1. Course Description

Course Overview

This course provides a concise introduction to the fundamental concepts in machine learning and popular machine learning algorithms. This undergraduate-level course, students will be introduced to the foundations of machine learning along with a slew of popular machine learning techniques. This will also give insights on how to apply machine learning to solve a new problem. Students will learn the algorithms which underpin many popular Machine Learning techniques, as well as developing an understanding of the theoretical` relationships between these algorithms

Course Pre/co-requisites

- A4012 - Probability and statistics.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4515.1. Understanding the fundamental issues and challenges of machine Learning: data, model selection, model complexity, etc.

A4515.2.Understand the importance of Reinforcement algorithms

A4515.3.Implement machine learning solutions to regression and Clustering problems

A4515.4.Apply supervised and unsupervised techniques on various data sets.

A4515.5. Implement various machine learning algorithms in a range of real-world applications using Supervised Learning concepts

3. Course Syllabus

Theory

Introduction – Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning Concept learning and the general to specific ordering – Introduction, A concept le arning task, Concept learning as search, Find-S: finding a maximally specific hypothesis

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm

Computational learning theory – Introduction, Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, The mistake bound model of learning.

Instance-Based Learning- Introduction, k -Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning Genetic Algorithms – Motivation, Genetic Algorithms, An illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms

Practice

Week-1

Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.

Week-2

Implement linear Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs

Week-3

Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample

Week-4

Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.

Week-5

Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a.CSV file. Compute the accuracy of the classifier, considering few test data sets.

Week-6

Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.

Week-7

Write a program to implement the KNN classifier for a sample training data set stored as a.CSV file. Compute the accuracy of the classifier.

Week-8

Write a program to implement K Means Clustering algorithm

Week-9

Open ended Experiment – 1

Week-10

Open ended Experiment – 2

4. Books and Materials

Text Book

1. Tom M. Mitchell, Machine Learning, India Edition 2013, McGraw Hill Education.

Reference Books

1. Ethem Alpaydın, Introduction to machine learning, second edition, MIT press.
2. Chris Bishop, Pattern Recognition and Machine Learning.

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III B.TECH I SEMESTER

COURSE STRUCTURE

A4651 - IMAGE PROCESSING (PROFESSIONAL ELECTIVE-I)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course introduces digital image processing explaining the concepts of Image fundamental, Image enhancement in spatial and frequency domain, various image transformation techniques in spatial and frequency domain, segmentation, image filtering and color image processing. The primary goal of this course is to lay a solid foundation for students to study basic image processing functionalities in details so that they can design real life applications based on their learning of the key concepts. 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.

Course Pre/co-requisites

• A4001 - Linear Algebra and Ordinary Differential Equations

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4651.1. Know and understand the basics and fundamentals of digital signal and image processing, such as digitization, sampling, quantization, and 2D-transforms.

A4651.2. Apply image transforms like DFT,FFT, walsh, hadamard DCT.

A4651.3. Operate on images using the processing techniques of smoothing, sharpening, enhancing, reconstructing geometrical alterations, filtering, restoration, segmentation.

A4651.4. Apply and relate the basic imaging techniques to practical cases, such as multimedia, videoconferencing, pattern and object recognition.

3. Course Syllabus

Theory

Fundamentals Of Image Processing: Image acquisition, image model, sampling, quantization, relationship between pixels, distance measures, connectivity, and image geometry.

Image Transforms: Fourier transform, DFT, DFT-properties, FFT, WALSH transform, HADAMARD transform, DCT.

Image Enhancement (Spatial Domain Methods): Histogram Processing -definition, equalization, matching, local enhancement, use of histogram statics forz image enhancement, Arithmetic and logical operations, pixel or point operations, size operations, smoothing filters-mean, median, mode filters, sharpening spatial filtering.

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.

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

4. Books and Materials

Text Book

1. 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, PrenticeHall.
2. Fundamentals of digital image processing by Anil K. jain, Low Price Edition, PearsonEducation.
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.

Self-Learning Topics:

1. Interpolation
2. Some basic intensity transformation in spatial do main
3. Image restoration
4. Image reconstruction
5. Learning Google Colab

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III B.TECH I SEMESTER

COURSE STRUCTURE

A4652 - C# and .NET FRAME WORK

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course provides a comprehensive coverage of all components required to develop an .Net application. Today C# is considered to be the most popular and modern Programming language. It belongs to "C" family and inherently has lots of things carried from C programming language. It is the ideal choice of all .net developers for the reason that Microsoft has developed C# with features of popular languages to develop different types of .net applications. It has SIMPLICITY of Java, POWER of C++ and PRODUCTIVITY of VB.

Course Pre/co-requisites

- A4505 - Object Oriented Programming

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4652.1. Understand the basic constructs of C# and .NET frame work.
A4652.2. Apply object oriented features of C# to solve real world problems.
A4652.3. Demonstrate the usage of ADO.NET to create window applications for database access.
A4652.4. Design ASP. NET web applications to create user friendly environment.
A4652.5. Analyze the features like security, assemblies and CLR in .NET framework.

3. Course Syllabus

Theory

I**ntroduction** Introducing C#, Understanding .NET, overview of C#, Literals, Variables, Data Types, Operators, , Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, Arrays, Array Class, Array List, String, String Builder, Structure, Enumerations.

Object Oriented Aspects of C# Class, Objects, Constructors and its types, inheritance, polymorphism, sealed class and methods, interface, abstract class, operator overloading, delegates, events, errors and exceptions, Threading.

Application Development on .Net Building windows application, Creating our own window forms with events and controls, menu creation, inheriting window forms, SDI and MDI application, Dialog Box(Modal and Modeless), accessing data with ADO.NET, DataSet, typed dataset, Data Adapter, updating database using stored procedures, SQL Server with ADO.NET, handling exceptions.

Web Based Application Development on .Net Programming web application with web forms, ASP.NET introduction, working with XML and .NET, Creating Virtual Directory and Web Application, session management techniques, web. config, web services, passing datasets, returning datasets from web services.

CLR and .Net Framework Assemblies, Versoning, Attributes, reflection, viewing meta data, type discovery, reflection on type, marshalling, remoting, security in NET

4. Books and Materials

Text Books

1. Herbert Schildt, “The Complete Reference: C# 4.0”, TMH, 2012.
2. Christian Nagel et al. “Professional C# 2012 with .NET 4.5”, Wiley India, 2012.

Reference Books

1. Andrew Troelsen , “Pro C# 2010 and the .NET 4 Platform, Fifth edition, A Press, 2010.
2. Ian Griffiths, Matthew Adams, Jesse Liberty, “Programming C# 4.0”, OReilly,6 th edition 2010.

Self-learning topics:

a. Data Types,
b. Control Statements
c. Enumerations
d. OOP concepts

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III B.TECH I SEMESTER

COURSE STRUCTURE

A4653 - COMPUTER GRAPHICS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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 representing2D-objects, 3D-objects in computer are mentioned here. Curve Generation Techniques, viewing mechanism of 2D-objects, 3D-objects is also taught and also focuses on Animation.

Course Pre/co-requisites

- A4001 - Linear Algebra And Ordinary Differential
- A4504 - Data Structure

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4653.1. Understand computer graphics Hardware, Software and Applications.

A4653.2. Apply basic geometric primitive algorithms to compute transformations for producing custom shaped objects.

A4653.3. Analyze various curve generation techniques by different projection methods.

A4653.4. Distinguish the various animation sequences of motion.

A4653.5. Choose an appropriate visible surface detection algorithm.

3. Course Syllabus

Theory

Introduction: Application areas of Computer Graphics, Video-display devices,Raster scan and Random scan Systems, Workstations and Input devices, Graphics Standards.

Output Primitives: Points and Lines, Line drawing algorithms, Midpoint circle and Ellipse algorithms.

2d-Geometrical Transformations: Translation, Scaling, Rotation, Reflection and Shear Transformation, Matrix representations and homogeneous coordinates, Composite Transformations and transformation between Coordinate Systems.
2d-Viewing:The Viewing Pipeline, Viewing Coordinate Reference frame, Window to Viewport Coordinate Transformation, Cohen-Sutherland Line Clipping Algorithm, Sutherland - Hodgeman Polygon Clipping Algorithm.

3d-Geometrical Transformations: Translation, Scaling, Rotation, Reflection and Shear Transformation and Composite Transformations.
3d-Viewing:The Viewing Pipeline, Viewing coordinates, General Projection Transformations and 3D Clipping.

Visible Surface Detection Methods: Classification, Back-Face detection method, Depth buffer method, Depth Sorting method.
Computer Animation: Design of Animation Sequence, General Computer Animation functions, Raster Animation, Computer Animation languages, Motion Specifications.

Graphics Programming: OpenGL, Graphics Primitives, Color, Viewing, Event-Driven I/O, GL toolkit. Ray Tracing: Ray-tracing model, Reflective and Transparent Objects, Shadows, Light transport and radiosity, rasterization.

4. Books and Materials

Text Books

1. Donald Hearn, M. Pauline Baker (2011), Computer Graphics with OpenGL, 3rd edition, Pearson Education, India.
2. Realistic Ray Tracing, 2nd edition, Peter Shirley, Keith Morley A.K Peters, ISBN:1-56881-198-5.

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.

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III B.TECH I SEMESTER

COURSE STRUCTURE

A4655 - DISTRIBUTED OPERATING SYSTEMS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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.

Course Pre/co-requisites

• A4507 - Operating systems

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4655.1. Describe about control access to a computer and the distributed files that may be shared (Understand).

A4655.2. Demonstrate the knowledge of the components of synchronization, deadlocks and their respective roles in computing (Apply).

A4655.3. Differentiate to recognize and resolve user problems with standard operating environments (Analyze).

A4655.4. Weigh practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.(Evaluate).

3. Course Syllabus

Theory

Introduction to Distributed Systems: What is a Distributed System? Hardware concepts, software concepts, design issues.

Communication in Distributed Systems, Layered Protocols, ATM networks, The client –server model, remote procedure call, group communication.

Synchronization in Distributed System: Clock synchronization, mutual exclusion, election algorithms, atomic transactions, deadlocks in distributed systems.

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.

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.

4. Books and Materials

Text Book

1. Distributed Operating Systems (2007), Andrew S. Tanenbanm, Pearson Education, Inc.

Reference Book

1. Advanced Concepts in Operating Systems, Makes Singhal and Niranjan G. Shivaratna.atm layers

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH I SEMESTER

COURSE STRUCTURE

A4016 - INDIAN CONSTITUTION

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	2	0	0	28	0	0	100	100

1. Course Description

Course Overview

This course enables the students to understand the constitution of India as the Supreme law of India. The student will also gain knowledge about the parliament of India and how it functions. This course will survey the basic structure and operative dimensions of the Indian constitution. It will explore various aspects of the Indian political and legal system from a historical perspective highlighting the various events that led to the making of the Indian constitution.

Course Pre/co-requisites

This course facilitates graduate students to know about importance of the Indian constitution and facilitates students to know about the fundamental rights of the citizens.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4016.1. Identify the important components of Indian Constitution.

A4016.2. Apply the fundamental rights in right way and become a more responsible citizen.

A4016.3. Illustrate the evolution of Indian Constitution.

A4016.4. Explain the basic structure of Indian Constitution.

A4016.5. Define the basic concepts democracy, liberty, equality, secular and justice.

3. Course Syllabus

Theory

Evolution of Indian Constitution: Indian independence act 1947, formation of constituent assembly of India, committees of the constituent assembly, constitution of India drafting committee, brief study about *Dr.* B. R. Ambedkar, *time line of formation of the constitution of India.*

Structure of the Constitution of India: Parts, schedules, appendices, constitution and government, constitution and judiciary.

Preamble to the Constitution of India: Brief study about sovereignty, socialist, secularism, democracy, republic, justice (political justice, social justice, economic justice), liberty, equality, fraternity, unity & integrity.

Acts: Right to education act, right to information act, anti-defection law, Jan Lokpal bill.

Fundamental Rights: Right to equality, right to freedom (freedom of speech and expression, right to practice any profession etc.), right against exploitation, right to freedom of religion, cultural & education rights, right to property, right to constitutional remedies.

4. Books and Materials

Text Book

1. Dr. Durga das basu. Introduction to the constitution of India. 21st edition, Lexis Nexis books publication Ltd, 2013.

Reference Books

1. Subhash C. Kashyap, Our Constitution, National Book Trust, New Delhi, 2011.
2. Arun K Thiruvengadam. The constitution of India.1st edition, Hart publishing India, 2017.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH I SEMESTER

COURSE STRUCTURE

A4018 - ENGINEERING DESIGN THINKING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	2	0	0	28	1	30	70	100

1. Course Description

Course Overview

Engineering Design Thinking is an extension to Engineering Exploration course studied at first year level. This course links the primary fields of engineering and explores the engineering design process from conceptual design and optimal choice evaluation to prototyping and project construction. This course provides insights into particular design challenges within their specific fields of engineering and enables the learners to apply the knowledge in real time - designing, constructing and testing a prototype (actual physical build) to solve a real-world engineering problem. In extent, this course is an excellent roadmap for the design engineers seeking to broaden their engineering knowledge to design concepts to their current work.

Course Pre/co-requisites

No Prerequisite or co-requisite

2. Course Outcomes (COs)

At the end of this course of study, the students will be able to:

A4018.1. Interpret the problem-solving skills and product design skills

A4018.2. Apply foundational knowledge of the primary fields of engineering and scientific concepts to find the solution

A4018.3. Identify various techniques and applications of the engineering design process

A4018.4. Inspect the design and assess a prototype that solves an engineering problem

A4018.5. Interpret the solutions and document the findings/reflections

2. Course Syllabus

Introduction Definition of design, design process, different problem types, characteristics of novice and informed designers, enhance negotiation and iteration in design.

Case Studies Recognized organizations for design and innovation, shopping cart case study, benefits of failure in design

Human Centered Design Introduction to HCD (Human Centered Design), HCD as a Mindset, personas and scenarios, best practice working with communities

Specification Development Definition of specification, three examples of ways to generate specifications, how to manage specifications, functional decomposition

Prototyping Three kinds of prototypes, how prototypes can be used in the design process, how to use prototypes can be used to elicit input from users

Ideation, Innovation & Creativity Concept Selection, Interpretation of Creativity and Innovation, Brain storming Expanding the Design Space, case study using decision matrix

Teamwork and Leadership in Design Professional Preparation, Recognizing differences in teammates, VRE Model, Best Model for Leadership, Conflict Vs. Effectiveness, Code of Cooperation, Project (Team) and individual Artifacts, Evaluating Teams

Design for Robustness Review the design, Brainstorm potential failure models, List potential effects of failure &potential causes for each failure, Rank failures, Develop action plan, Implement fixes, Revisit potential failure risks

4. Books and Materials

Text Books

1. Oakes, Leone, and Gunn (2004). Engineering Your Future. Okemos, MI: Great Lakes Press.
2. Crismond, D. (2007). Contrasting strategies of beginning and informed designers: One representation of learning progressions in engineering design.
3. Ryan Jacoby and Diego Rodriguez, Innovation, Growth, and Getting to Where You Want to Go, Design Management Review Vol. 18 No. 1
4. G.Pahl and W.Beitz," Engineering design: A systematic approach", Springer 2ndEditon.
5. Dean Nieusma (2012), "Seeing Social Power: Technology Design for User Empowerment," Great Lakes Press.
6. Avery, C. M. (2001). Teamwork is an Individual Skill: Getting Your Work Done When Sharing Responsibility. San Francisco, CA: Berrett-Koehler Publishers, Inc.
7. Astin, A. W., &Astin, H. S. (2000). Leadership reconsidered: Engaging higher education in social change. Battle Creek, MI: W. K. Kellogg Foundation.

Reference Books

1. Ali k.Kamrani, EmadAbouel Nasr, "Engineering design and Rapid Prototyping", Springer.
2. Ken Hurst," Engineering design principles", Elesiever,2ndedition.

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VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH II SEMESTER

COURSE STRUCTURE

A4555- COMPILER DESIGN

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course deals 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 compiler design (e.g. Lex and Yacc).

Course Pre/co-requisites

- A4504 - Data Structures
- A4512 - Formal Languages and Automata Theory

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4555.1. Use finite automata to recognize the tokens by lexical analyzer.

A4555.2. Interpret various parsing techniques to construct syntax analyzer.

A4555.3. Write SDT for various transformations of programming language construct.

A4555.4. Discuss various runtime environment and symbol table implementations.

A4555.5. Demonstrate the various code optimization techniques for improving efficiency of target code.

3. Course Syllabus

Theory

Introduction to Compilers: Definition of compiler, the phases of a compiler and translation, role of lexical analyzer, LEX-lexical analyzer generator. parsing: Parsing, role of parser, context free grammar, derivations, parse trees, ambiguity, elimination of left recursion, left factoring, top down parsing–backtracking, recursive-descent parsing, predictive parsers, LL(1) grammars.

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, parsing ambiguous grammars, YACC-automatic parser generator.

Syntax-Directed Translation: Syntax directed definition, construction of syntax trees, S-attributed and L-attributed definitions, translation schemes, emitting a translation. Intermediate code generation: 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.

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. Run time environments: Source language issues, Storage organization, storage-allocation strategies, access to nonlocal names, parameter passing, symbol tables

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, peephole optimization.

4. Books and Materials

Text Book

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, HYDERABAD

III B.TECH II SEMESTER

COURSE STRUCTURE

A4513–BIG DATA ANALYTICS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	1	2	42	14	28	5	30	70	100

1. Course Description

Course Overview

Big data analytics is the use of advanced analytic techniques against very large, diverse data sets that include structured, semi-structured and unstructured data, from different sources, and in different sizes from terabytes to zeta bytes. Big data is a term applied to data sets whose size or type is beyond the ability of traditional relational databases to capture, manage and process the data with low latency. Analysis of big data allows users to make better and faster decisions using data that was previously inaccessible or unusable.

Course Pre/co-requisites

- A4508 - Database Management Systems

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4513.1. Understand the fundamental concepts of big data analytics.
A4513.2. Apply various Frameworks to meet Challenges in Big Data analytics.
A4513.3. Apply the HADOOP -Map Reduce to analyze the data.
A4513.4. Apply Mango DB on Unstructured data.
A4513.5. Analyze Big Data applications Using Pig and Hive.

3. Course Syllabus

Theory

Introduction to Big Data: Classification of Digital Data, Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, Other Characteristics of Data Which are not Definitional Traits of Big Data, Are We Just an Information Consumer or Do we also Produce Information, Traditional Business Intelligence (BI) versus Big Data, A Typical Data Warehouse Environment, A Typical Hadoop Environment, What is New Today, What is changing in the Realms of Big Data.

Big Data Analytics: What is Big Data Analytics, What Big Data Analytics Isn't, Why this Sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Businesses

from Capitalizing on Big Data, Top Challenges Facing Big Data, Why is Big Data Analytics Important?, What Kind of Technologies are we looking Toward to Help Meet the Challenges Posed by Big Data?, Terminologies Used in Big Data Environments, Basically Available Soft State Eventual Consistency (BASE), Few Top Analytics Tools

The Big Data Technology Landscape: Hadoop, Introduction to Hadoop, Introducing Hadoop, RDBMS versus Hadoop, Distributed Computing Challenges, History of Hadoop, Hadoop Overview, Use Case of Hadoop, Hadoop Distributors, HDFS (Hadoop Distributed File System), Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN (Yet another Resource Negotiator), Interacting with Hadoop Ecosystem

Introduction to Mapreduce Programming: Introduction, Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression. Introduction to Hive: What is Hive, Hive Architecture, Hive Data Types, Hive File Format, Hive Query Language (HQL)

Introduction to Pig: What is Pig, The Anatomy of Pig, Pig on Hadoop, Pig Philosophy, Use Case for Pig: ETL Processing, Pig Latin Overview, Data Types in Pig, Running Pig, Execution Modes of Pig, HDFS Commands. Introduction to MongoDB: What is MongoDB, Why MongoDB, Terms Used in RDBMS and MongoDB, Data Types in MongoDB, MongoDB Query Language.

Practice

Working with HDFS

Week-1

1. Perform setting up and Installing Hadoop.

Week-2

1. Basic file commands: ls, copy, put, get etc

Week-3

1. Implement the following file management tasks in Hadoop:

a. Adding files and directories

b. Retrieving files

c. Deleting files

Week-4

1. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm. Find the number of occurrence of each word appearing in the input file(s)

Week-5

1. Perform Incremental Map-Reduce using MangoDB

Week-6

1. Write and execute simple queries to perform indexing and aggregation

Week-7

2. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

Week-8

1. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes.

Week-9

1. Write a Map Reduce program that mines weather data. Hint: 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 Map Reduce, since it is semi structured and record-oriented

Week-10

1. Run the Pig Latin Scripts to find a max temp for each and every year.

4. Laboratory Equipment/Software/Tools Required

1. A computer system with Ubuntu , Hadoop , Pig, Hive ,Manodb

   Or

2. A computer system with Windows operating system , Virtual machine with Cloud era.

5. Books and Materials

Text Book

1. Big Data and Analytics by Seema Acharya, Wiley Publishers.

Reference Books

1. Big Data Now, O'Reilly Media, 2nd Edition, 2012.
2. Viktor Mayer-Schonberger, Kenneth Cukier, Big Data: A Revolution That Will Transform How We Live, Work, and Think, Mariner Books, 2014

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH II SEMESTER

COURSE STRUCTURE

A4612– NETWORK SECURITY AND CRYPTOGRAPHY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	2	42	0	28	4	30	70	100

1. Course Description

Course Overview

Cryptography is an indispensable tool for protecting information across computer systems. The course introduces the technical and policy foundations of information/ network security. This course explains the inner workings of cryptographic systems and how to correctly use them in real-world applications.

Course Pre/co-requisites

- A4511 - Computer Networks

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4612.1.Understand different Security Attacks, Services, Mechanisms and classical encryption techniques.

A4612.2. Apply classical encryption algorithms (Substitution and Transposition ciphers) and DES, AES algorithms to encrypt plain text.

A4612.3. Articulate different key management techniques (RSA, DiffieHellman).

A4612.4. Examine the problems of authentication techniques (SHA, Digital signature).

A4612.5. Analyse different network security protocols (TLS, PGP).

3. Course Syllabus

Theory

Introduction: Computer security concepts, OSI security architecture, security attacks, security services, security mechanisms, A model for network security.
Classical Encryption Techniques: Symmetric Cipher Model, Substitute Techniques, Transposition Techniques.

Block Cipher and Data Encryption Standards: Traditional Block Cipher Structure, Data Encryption Standard, Strength of DES, Block Cipher Design Principles.
Advanced Encryption Standards: AES Structure, AES Transformation Functions, AES Key Expansion.

Number Theory: Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, extended Euclid's algorithm.

Public-Key Cryptography And Rsa: Principles of Public key crypto Systems, RSA algorithm, DiffieHellman Key Exchange.

Cryptographic Hash Functions: Applications of Cryptographic Hash Functions, Hash Functions Based on Cipher Block Chaining, Secure Hash Algorithm (SHA-512).
Digital Signature: Digital Signature Requirements, Attacks and Forgeries, Properties, Digital Signature Algorithm.

Key Management and Distribution: Symmetric Key Distribution Using Symmetric Encryption, Symmetric Key Distribution Using Asymmetric Encryption, Distribution of Public Keys, X.509 Certificates.
Transport-Level Security: Web Security Considerations, Secure Sockets Layer, Transport Layer Security.
E-Mail security, PGP

Practice

1. Implement the Caesar Cipher substitution technique.
2. Implement the Playfair Cipher substitution technique.
3. Implement the Hill Cipher substitution technique.
4. Implement the Vigenere Cipher substitution technique.
5. Implement Rail fence – row & Column Transformation Technique,
6. Implement DES algorithm.
7. Demonstrate AES Transformation logic.
8. Implement public- key cryptography with RSA algorithm.
9. Implement Diffie-Hellman Key exchange algorithm.
10. Calculate the message digest of a text using the SHA-1
11. Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG).

4. Laboratory Equipment/Software/Tools Required

1. PCs installed with operating system
2. GnuPGopen source software.
3. Java/Python software

5. Books and Materials

Text Book

1. William Stallings, Cryptography and network security: principles and practice. Upper Saddle River: Pearson, 6th edition.

Reference Books

1. Forouzan, Behrouz A., and DebdeepMukhopadhyay. Cryptography and network security (Sie). McGraw-Hill Education, 2011.
2. AtulKahate (2008), Cryptography and Network Security, 2nd edition, Tata McGrawhill, India.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH II SEMESTER

COURSE STRUCTURE

A4654–SOFTWARE TESTING METHODOLOGIES (PROFESSIONAL ELECTIVE-II)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

Testing is a critical component in the successful implementation of software project and its quality assurance for any application. Effective Test Management will ensure the delivery of high-quality applications, satisfied clients. This course presents a comprehensive study of software testing principles, methodologies, management strategies and techniques. The emphasis here is on understanding software testing process and testing tools.

Course Pre/co-requisites

- A4501 - Programming for Problem Solving
- A4603 - Software Engineering

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4654.1. Understand various basic concepts, test processes, continuous quali improvement.

A4654.2. Analyze different kinds of testing techniques like path testing, transaction flow testing, data flow testing, etc their application in different scenarios and their limitations.

A4654.3. Make use of test tools for automated test management.

A4654.4. Illustrate various types of errors and fault models.

3. Course Syllabus

Theory

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, path sensitizing, path instrumentation.

Paths, Path Products and Regular Expressions: Path products and path expressions, a reduction procedure, applications, regular expressions and flow anomaly detection.

Transaction Flow Testing and Data Flow Testing: Transaction flows, transaction flow testing techniques, dataflow testing basics, data flow testing strategies, application, tools and effectiveness.

Testing tools: JUnit: Introduction, Environment setup, test framework, usage, API, Writing tests cases. Selenium: Introduction, IDE, Environment Setup, Remote Control, commands, WebDriver,

4. Books and Materials

Text Book

1. Boris Beizer (2004), Software Testing Techniques, 2nd edition, Dreamtech Press, New Delhi, India.

Reference Books

1. Richardson, Alan John. *Selenium Simplified: A Tutorial Guide to Selenium RC with Java and JUnit*. Compendium Developments, 2012
2. Krishna Rungta, Learn Selenium in 1 Day: Definitive Guide to Learn Selenium for Beginners
3. Software Testing – Principles, Techniques and Tools, M.G.Limaye, Tata McGraw-Hill, 2009.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH II SEMESTER

COURSE STRUCTURE

A4553– ROBOTIC PROCESS AUTOMATION DESIGN & DEVELOPMENT (PE-II)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

RPA is an advanced form of business process automation that can provide a path for businesses to automate human actions. RPA is ultimately about automating some of the most mundane and repetitive computer-based tasks and processes in the workplace like text, image automation with sequence of actions, keyboard based automation, and E-mail automation etc. Process automation is able to record tasks performed by a human on their computer, then perform those same tasks without human intervention.

Course Pre/co-requisites

- A4510 - Python Programming
- A4602 - Web Technologies

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4553.1. Recall the fundamental concepts of programming languages and platforms.

A4553.2. Analyse the RPA tool concepts and learn how to apply in various business applications.

A4553.3. Apply the advanced automation concepts to enhance the UI interaction in different application software.

A4553.4. Apply the automation in real time applications like E-mail and exception handling.

3. Course Syllabus

Theory

Programming Basics & Recap: Programming Concepts Basics - Understanding the application - Basic Web Concepts - Protocols - Email Clients -. Data Structures - Data Tables - Algorithms - Software Processes - Software Design - Scripting - .Net Framework - .Net Fundamentals - XML - Control structures and functions - XML - HTML - CSS - Variables & Arguments.

Rpa Concepts: RPA Basics - History of Automation - What is RPA - RPA vs Automation - Processes & Flowcharts - Programming Constructs in RPA - What Processes can be Automated - Types of Bots - Workloads which can be automated - RPA Advanced Concepts - Standardization of processes - RPA

Developemt methodologies - Difference from SDLC - Robotic control flow architecture - RPA business case - RPA Team - Proccess Design Document/Solution Design Document - Industries best suited for RPA - Risks & Challenges with RPA - RPA and emerging ecosystem.

Rpa Tool Introduction & Basics: Introduction to RPA Tool - The User Interface - Variables - Managing Variables - Naming Best Practices-The Variables Panel - Generic Value Variables - Text Variables - True or False Variables - Number Variables - Array Variables - Date and Time Variables - Data Table Variables - Managing Arguments - Naming Best Practices - The Arguments Panel - Using Arguments - About Imported Namespaces - Importing New Namespaces- Control Flow - Control Flow Introduction - If Else Statements - Loops - Advanced Control Flow - Sequences - Flowcharts - About Control Flow - Control Flow Activities - The Assign Activity - The Delay Activity - The Do While Activity - The If Activity - The Switch Activity - The While Activity - The For Each Activity - The Break Activity - Data Manipulation - Data Manipulation Introduction - Scalar variables, collections and Tables - Text Manipulation - Data Manipulation - Gathering and Assembling Data.

Advanced Automation Concepts and Techniques : Recording and Advanced UI Interaction - Recording Introduction - Basic and Desktop Recording - Web Recording - Input/Output Methods - Screen Scraping - Data Scraping - Scraping advanced techniques - Selectors - Selectors - Defining and Assessing Selectors - Customization - Debugging - Dynamic Selectors - Partial Selectors - RPA Challenge - Image, Text & Advanced Citrix Automation - Introduction to Image & Text Automation - Image based automation - Keyboard based automation - Information Retrieval - Advanced Citrix Automation challenges - Best Practices - Using tab for Images - Starting Apps - Excel Data Tables & PDF - Data Tables in RPA - Excel and Data Table basics - Data Manipulation in excel - Extracting Data from PDF - Extracting a single piece of data - Anchors - Using anchors in PDF.

Email Automation & Exceptional Handling: Email Automation - Email Automation - Incoming Email automation - Sending Email automation - Debugging and Exception Handling - Debugging Tools - Strategies for solving issues - Catching errors.

4. Books and Materials

Text Book

1. Alok Mani Tripathi, Learning Robotic Process Automation, Publisher: Packt Publishing Release Date: March 2018 ISBN: 9781788470940

Reference Books

1. Frank Casale (Author), Rebecca Dilla (Author), Heidi Jaynes (Author), Lauren Livingston (Author), Introduction to Robotic Process Automation: a Primer, Institute of Robotic Process Automation.
2. Richard Murdoch, Robotic Process Automation: Guide To Building Software Robots, Automate Repetitive Tasks & Become An RPA Consultant.
3. Srikanth Merianda, Robotic Process Automation Tools, Process Automation and their benefits: Understanding RPA and Intelligent Automation.
4. https://www.uipath.com/rpa/robotic-process-automation

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH II SEMESTER

COURSE STRUCTURE

A4656 – COMPUTER VISION (PROFESSIONAL ELECTIVE-II)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

In this course students will learn basic principles of image formation, image processing algorithms and different algorithms for 3D reconstruction and recognition from single or multiple images (video). This course emphasizes the core vision tasks of scene understanding and recognition. Applications to 3D modelling, video analysis, video surveillance, object recognition and vision-based control will be discussed.

Course Pre/co-requisites

- A4001 - Linear Algebra and Ordinary Differential Equations
- A4002 - Advanced Calculus
- A4651 - Image Processing
- A4510 - Python Programming

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4656.1. Understand Image formation process, fundamental image processing techniques required for computer vision.

A4656.2. Analysis of Images, extract features form Images and shape analysis.

A4656.3. To develop applications using computer vision techniques, Object Detection and Pattern Recognition.

A4656.4. Understand video processing, motion computation and 3D vision and geometry.

3. Course Syllabus

Theory

Image Formation: Geometric primitives and transformations, Geometric primitives, 2D transformations, 3D transformations, 3D rotations, 3D to 2D projections, Lens distortions, Photometric image formation. Sampling and aliasing, Color, Compression. Image processing: Point operators, Pixel transforms Color transforms, Compositing and matting, Histogram equalization.

Linear Filtering: Separable filtering, Examples of linear Band-pass and steerable filters. More neighborhood operators: Non-linear filtering, Morphology, Distance transforms, Connected components. Fourier transforms: Fourier transform pairs, Two-dimensional Fourier transforms, Wiener filtering. Pyramids and wavelets: Interpolation, Decimation, Multi-resolution representations, Wavelets. Geometric transformations: Parametric transformations, Mesh-based warping, Global optimization: Regularization, Markov random fields.

Feature Detection and Matching: Points and patches, Feature detectors, Feature descriptors, Feature matching, Feature tracking. Edges: Edge detection, Edge linking. Lines: Successive approximation, **Hough transforms Vanishing points. Segmentation:** Active contours, Snakes, Dynamic snakes and condensation, Scissors Level Sets ,Split and merge, Watershed, Region splitting (divisive clustering), Region merging (agglomerative clustering) . Graph-based segmentation, Probabilistic aggregation, Mean shift and mode finding, K-means and mixtures of Gaussians, Mean shift, Normalized cuts, Graph cuts and energy-based methods.

Facet Model Recognition: Labeling lines, Understanding line drawings, Classification of shapes by labeling of edges, Recognition of shapes, consisting labeling problem, Back-tracking, Perspective Projective geometry, Inverse perspective Projection, Photogrammetry. From 2D to 3D, Image matching : Intensity matching of ID signals, Matching of 2D image, Hierarchical image matching. Object Models and Matching: 2D representation, Global vs. Local features.

General Frame Works for Matching: Distance relational approach, Ordered structural matching, View class matching, Models database organization. General Frame Works: Distance .relational approach, ordered .Structural matching, View class matching, Models database organization. Knowledge Based Vision: Knowledge representation, Control-strategies, Information Integration.

4. Books and Materials

Text Books

1. Richard Szeliski, Computer Vision : Algorithms and Applications, Springer-verlag London Limited 2011.
2. R. Jain, R. Kasturi, and B. G. Schunk, Machine Vision, McGraw-Hill.

Reference Books

1. Milan Sonka,Vaclav Hlavac, Roger Boyle, .Image Processing, Analysis, and Machine Vision. ThomsonLearning.
2. Richard Harley, Multiple view geometry in computer vision, second edition, Cambridge university presss.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH II SEMESTER

COURSE STRUCTURE

A4554 – ROUTING AND SWITCHING NETWORKS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course covers networking architecture, structure, and functions. The course introduces the principles and structure of IP addressing, media, architecture, components, and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality.

Course Pre/co requisites

- A4511 - Computer Networks.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4554.1. Understand the basics of routing, switching, and advanced technologies to prepare for the Cisco CCENT and CCNA certification exams

A4554.2. Emphasize critical thinking, problem solving, collaboration, and the practical application of skills.

A4554.3. Determine how a router will forward traffic based on the contents of a routing table.

A4554.4. Implement access control lists (ACLs) to filter traffic.

A4554.5. Implement network address translation (NAT).

3. Course Syllabus

Theory

Explore the Network: Globally Connected, LANs, WANs, and the Internet, The Network as a Platform The Changing Network Environment. Configure a Network Operating System - IOS, Basic Device Configuration, and Address Schemes: Given an IP addressing scheme, configure IP address. Network Protocols and Communications - Rules of Communication, Network Protocols and Standards Data Transfer in the Network

Network Access: Physical Layer Protocols, Network Media Data Link Layer Protocols, Media Access Control, LAN Switches, Address Resolution Protocol. Network Layer : Network Layer Protocols, Routing, Routers and Router basic configurations. IP Addressing, Configuring IPv4 and IPv6 Network

Addresses to provide connectivity in small to medium-sized business networks, Sub netting IP Networks. Build a Small Network: Network Design, Network Security, And Basic Network Performance.

Routing Concepts: Router Initial Configuration, Routing Decisions, Router Operation, Static Routing: Implement Static Routes, Configure Static and Default Routes, Dynamic Routing: Dynamic Routing Protocols, RIPv2, the Routing Table, Switched Networks

Switch Configuration: Basic Switch Configuration, Switch Security, VLANs: VLAN Segmentation, VLAN Implementations, Inter-VLAN Routing Using Routers,

Access Control Lists: ACL Operation, Standard IPv4 ACLs .DHCP:DHCPv4, 2 DHCPv6, NAT for IPv4: NAT Operation, Configure NAT

4. Books and Materials

Text Book

1. Cisco CCNA Routing and Switching 200-120 Official Cert Guide, 2013, WENDEL ODOM, CCIE No 1624.

Reference Book

1. CCNA Routing and Switching 200-125, Odom Wendell, Official Cert Guide and Network Simulator Library

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH II SEMESTER

COURSE STRUCTURE

A4020 -PRODUCT REALIZATION

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	2	0	0	28	1	30	70	100

1. Course Description

Course Overview

The accelerating demand for rapid product design and manufacturing, calls for constant technological innovation. The art of launching latest technological concepts and creating better products for future is achieved by strong Engineering judgment. Current research in this area includes lean product development, integration of knowledge and learning into design through product realization and rapid prototyping. In a similar note an initiative is taken to further explore and implement concepts like product realization and concurrent engineering1 Design and manufacturing tasks are central to mechanical engineering as these experiences begin in the freshman year and last until a real world component is designed and manufactured at a senior level. This process introduces the students to the concept of problems having more than one valid solution and to methods for generating parametric solutions to problems 2. Thus, a curriculum that provides a base for future professional growth is highlighted and enhanced by launching a ”learning laboratory”, or “research laboratory”, with state- of- the- art rapid prototyping and experimental stress analysis devices 4.

Course Pre/co-requisites

This course has no prerequisite and co-requisite

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4020.1. Interpret the specifications of product and solve it for Practical realization

A4020.2. Analyze the Costumers mindset and accordingly designing of the product.

A4020.3. Applying Gantt Charts to define timeline for Product Realization.

A4020.4. Conceptualize the terms called Product, Purchase, Production and Monitoring ofproducts.

A4020.5. Communicate the process of converting an idea to physical Product

3. Course Syllabus

Introduction to Product Realization: Introduction to Product Realization, Need for Product Realization, Product realization process, Case Study of Product Realization for Global Opportunities.

Planning of Product Realization: Plan and develop the processes needed for product realization, Defining Quality objectives and requirements, establish processes documents. Needs - verification, validation,

monitoring inspection and test activities (inspection nodes) and criteria for product acceptance and record needed. Case study on timeline of Product realization planning (Gnatt Chart).

Customer-Related Processes: Product information Enquiries, contracts or order handling Customer feedback including customer complaints, A field survey.

Design and Development: Review verification and validation of each design and development stages, Functional and performance requirements, Information for purchasing, production and service provisions, review and validation, Develop a Design model of the product.

Purchasing, Production and Service Provision: Purchasing information, Vendors evaluation and approval process, Verification of purchased product. Control of production, service provision, validation of processes for production and service provision, Identification and tractability, Customer property and Preservation of product.

Control of Monitoring and Measuring Equipment: Monitoring and measurements - Calibrated or verified, Adjusted or re-adjusted, Identified to determined the calibration status, Safeguarded from adjustment and Protection from change and deterioration.

Regulatory Investigation & Identification: Various regulatory bodies, roles and responsibilities, model of comprehensive document for the body of information about an investigational product.

4. Books and Materials

Text Books

1. Mileta M Tomovic, Sowping Wang, Product Realization – A Comprehensive Approach, Spinger.
2. Stark, John, Product Life Cycle Management, 21st centaury Paradigm for Product Realisation 2011, Springer.

Reference Books

1. Verna J. Bowen , Lucy V. Fusco, The Competitive Edge Research Priorities for U.S. Manufacturing, National Academy of Sciences.
2. Renuka Thota, Suren Dwivedi, Implementation of product realization concepts in design and manufacturing courses, University of Louisiana-Lafayette.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH II SEMESTER

COURSE STRUCTURE

A4518 – DYNAMIC WEB APPLICATION DEVELOPMENT

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	2	0	0	28	4	30	70	100

1. Course Description

Course Overview

This course helps students to learn AngularJS for building large, dynamic and single page web applications. Angular JS is an open source JavaScript-based framework, used for building the client-side of a web application. It helps in resolving the challenges faced by the developers while developing single-page applications. AngularJS is based on MVW (stands for Model-View-Whatever) model. It provides the flexibility to choose the design pattern for developing the application. It helps to focus on writing the application logic without updating views manually.

Course Pre/co-requisites

- A4602 - Web Technologies

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4518.1. Understand the programming model of AngularJS framework.

A4518.2. Implement two way data binding for web application.

A4518.3. Design single page dynamic web applications using AngularJS MVW pattern.

A4518.4. Design rich GUI with minimum code.

3. Course Syllabus

The student will be able to understand and become familiar with:

1. **Introduction to Angulajs:** AngularJS, Introduction to Typescript, AngularJS MVC, Features of Angular JS ,sample application, understanding attributes
2. **Data Binding And Expressions:** Number and String Expressions, Object Binding and Expressions, Working with Arrays, Forgiving Behavior, Understanding Data binding, Angular vs JavaScript
3. **Directives:** Conditional Directives, Styles Directives, Mouse and Keyboard Events Directives, Angular JS built-in directives
4. **Controllers:** AngularJS Controllers, AngularJS Controller in external files
5. **Filters:** Built-In Filters, Uppercase and Lowercase Filters, Currency and Number Formatting Filters, Order By Filter, Filter Filter, Creating Custom Filter.

6. **Scope:** scope, Scope Lifecycle , Scope Inheritance, Scope & Controllers, Root scope, Scope Broadcasting , Two-way data binding, Scope Inheritance , Scope & Directives, $apply and $watch, Scope Events
7. **Forms:** Using Simple Form, Working with Select and Options, input controls, Input Validations, Using CSS classes, Angular JS Tables, Form Events, Custom Model update triggers.
8. **Form Validation:** Form Validation, Custom Validations, AngularJS AJAX
9. **Angularjs Modules:** creating a module, add controller to module, add directive to module,Modules and controllers in file, AngularJS Animation.
10. **Services:** $http, $log, $interval, $window.

4. Laboratory Equipment/Software/Tools Required

1. A computer system with Windows 7 or higher version
2. Angular JS library
3. Tomcat Web Server
4. A Text Editor or IDE supports JavaScript. (Notepad++ , Eclipse)

5. Books and Materials

Text Book

1. Brad Green& Seshadri. Angular JS. 1st Edition. O'Reilly Media, 2013.

Reference Books

1. Adam Freeman. Pro Angular 6. 3rd Edition. Apress, 2018.
2. Greg Lim. Beginning Angular with Typescript. Independently Published, 2020.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

III B.TECH II SEMESTER

COURSE STRUCTURE

A4015 – ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
2	0	0	28	0	0	0	0	100*	100*

1. Course Description

Course Overview

The course focuses on introducing Indian Knowledge Systems, Indian perspective of modern scientific world-view, and basic principles of Yoga and holistic health care system to the students. The course is intended to develop the understanding of Traditional Knowledge in terms of various government acts and modern society and science among students.

Course Pre/co-requisites

This course has no specific prerequisite and co-requisite.

2. Course Outcomes (COs)

A4015.1. Interpret the basic structure of traditional knowledge

A4015.2. Organize the need to preserve traditional knowledge through various acts

A4015.3. Identify the role of Indian contribution to modern science

A4015.4. Understanding the importance of traditional knowledge for holistic health

A4015.5. Compare Indian artistic tradition with the present art

3. Course Syllabus

Module 1: Introduction to traditional knowledge and basic structure of Indian Knowledge System: Features of Indian Traditions: Nature and Characteristics of traditional knowledge-scope and importance-kinds of traditional knowledge-traditional knowledge Vs western knowledge.

Module 2: Philosophical Tradition and Protection of traditional knowledge: Significance of traditional knowledge protection-value of traditional knowledge in global economy-role of government to harness traditional knowledge –Various Acts regarding protection of Traditional Knowledge.

Module 3: Modern Science and Indian Knowledge System: Historical Background- the global problem today-Indian contributions to global science.

Module 4: Yoga and Holistic Health care**:** Science and Spirituality in India- the need for both outer and inner sciences- yogic science.

Module 5: Indian Artistic Tradition: Visual arts and culture- the journey of Indian art from traditional to modern era.

4. Books and Materials

Text Book

NIL

Reference Books

1. Sengupta, Nirmal. Traditional Knowledge in Modern India: Preservation, Promotion, Ethical Access and Benefit Sharing Mechanisms, Springer, London. 2018. Print.
2. V. Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, Bharatiya Vidya Bhavan, Mumbai. 5th Edition, 2014.
3. Swami Jitatmanand, Holistic Science and Vedant, Bharatiya Vidya Bhavan.
4. VN Jha (Eng. Trans.), Tarkasangraha of Annam Bhatta, International Chinmay Foundation, Velliarnad, Ernakulam.
5. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkata.
6. GN Jha (Eng. Trans.), Ed. RN Jha, Yoga-darshanam with Vyasa Bhashya, Vidyanidhi Prakashan, Delhi 2016.

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VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

IV B.TECH I SEMESTER

COURSE STRUCTURE

A4608 – CLOUD COMPUTING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
2	0	2	28	0	28	3	30	70	100

1. Course Description

Course Overview

This course introduces you to the core concepts of cloud computing. You gain the foundational knowledge required for understanding cloud computing from a business perspective as also for becoming a cloud practitioner. You understand the definition and essential characteristics of cloud computing, its history, the business case for cloud computing, and emerging technology use cases enabled by cloud. You learn about the various cloud service models (IaaS, PaaS, SaaS) and deployment models (Public, Private, Hybrid) and the key components of a cloud infrastructure (VMs, Networking, Storage - File, Block, Object, CDN). We also cover emergent cloud trends and practices.

Course Pre/co-requisites

- A4501 - Programming for Problem Solving
- A4511 - Computer Networks

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4608.1. Explain cloud and there characteristics, advantages and challenges brought about by the various models and services in cloud computing.

A4608.2. Apply the fundamental concepts in data centres to understand the trade-offs in power, efficiency and cost.

A4608.3. Identify resource management fundamentals, i.e. resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing.

A4608.4. Analyze various cloud programming models and apply them to solve problems on the cloud.

3. Course Syllabus

Theory

Cloud Introduction: Cloud Computing Fundamentals Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing, usage scenarios and Applications , Business models around Cloud – Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus - Open Nebula, CloudSim. (TB-1)

Cloud Services: Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as services. Service providers Google App Engine, Amazon EC2, Microsoft Azure, Sales force. (TB-2)

Collaborating With Cloud: Collaborating on Calendars, Schedules and Task Management – Collaborating on Event Management, Contact Management, Project Management – Collaborating on Word Processing , Databases – Storing and Sharing Files- Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Collaborating via Social Networks – Collaborating via Blogs and Wikis. (TB-3)

Virtualization For Cloud: Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization – System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hypervisor-V. (TB-4)

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, and industries. SOFTWARE PLUS SERVICES: overview, mobile device integration, providers, Microsoft online. (TB-5)

Practice

Week-1

Analyze the simulation of cloud sim (Covers the topic of introduction to cloud and how simulation can be done in cloud sim which covers the Unit-1syllabi)

Week-2

Implementing User Management in Cloud using Owncloud. (Analyze how to work with own cloud which covers the Unit-1syllabi)

- Create, manage user and group of user accounts.
- Technology Used: Apache,PHP,MySql and Owncloud

Week-3

Implementation of Resource Security (Covers the topic of AWS, AZURE, GOOGLE Services which covers the Unit-2syllabi)

- IAM in AWS
- Azure Security
- Identity and Secure Management

Week-4

Implementation of virtual networking (Covers the topic of AWS, AZURE, GOOGLE Services which covers the Unit-2syllabi)

- VPC in aws
- Virtual networking in Azure

- Virtual Network in GCP

Week-5

Implementation of virtual Machines(Covers the topic of AWS EC2, AZURE Virtual machines, GOOGLE Services which covers the Unit-3 Syllabi)

- EC2 in aws
- Virtual Machine in azure
- Compute service in Gcp

Week-6

Implementation of Load balancing(Covers the AWS essentials)

- ELB in aws

Week-7

Implementation of auto scaling (Covers the aws, azure essentials)

- Auto Scaling

Week-8

Implementation of databases in cloud (Covers databases with cloud providers)

- RDS in aws
- Azure databases
- Cloud SQL

Week-9

Implementation of Big data solutions In Azure (Covers Implementation of big data in cloud)

Week-10

Analyzing how Machine Learning Explore In google cloud (Introduction to ML in cloud)

Week-11

Implementation of Para-Virtualization using VM Ware‘s Workstation/ Oracle‘s Virtual Box and Guest O.S. (Covers the topic of introduction to virtualization and working with VMWARE and Virtual box in Unit-4)

Week-12

Implementation of Storage services (Covers the topic of AWS, AZURE, GOOGLE Services which covers the Unit-5syllabi)

- S3 in aws
- Storage Management in azure
- Cloud Storage in Google Cloud

4. Laboratory Equipment/Software/Tools Required

- Cloud sim
- Own Cloud
- Aws
- Azure
- Google

5. Books and Materials

Text Books

1. Bloor R., Kanfman M., Halper F. Judith Hurwitz "Cloud Computing for Dummies" (Wiley India Edition), 2010 (UNIT-I)
2. John Rittinghouse& James Ransome, "Cloud Computing Implementation Management and Strategy", CRC Press, 2010.(UNIT-II)
3. Michael Miller, Cloud Computing: "Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2008.(UNIT -III)
4. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers, 2006.(UNIT-IV)
5. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter(2010), *Cloud Computing: A Practical Approach*, McGraw hill,New Delhi, India.

Reference Books

1. Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing", Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008
2. webpages.iust.ac.ir/hsalimi/.../89.../Cloud%20Common%20standards.ppt opennebula.org,
3. www.cloudbus.org/cloudsim/ ,http://www.eucalyptus.com/

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

IV B.TECH I SEMESTER

COURSE STRUCTURE

A4552 - ARTIFICIAL INTELLIGENCE

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	1	0	42	14	0	4	30	70	100

1. Course Description

Course Overview

This course is for students who want to acquire the ability to design intelligent solutions to problems in a variety of domains and business applications and fields such as natural language processing, text mining, robotics, reasoning and problem-solving

Course Pre/co-requisites

This course has no Pre Requisite or Co-requisite

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4552.1. Interprets different types of AI agents.

A4552.2. Identify various AI search algorithms (Un-informed, Informed, Heuristic, Constraint Satisfaction, Genetic Algorithms) for e-domain application systems.

A4552.3. Compare fundamentals of knowledge representation (Logic-based, Frame-based, Semantic Nets), Inference and Theorem proving.

A4552.4. Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information.

A4552.5. Apply knowledge representation, reasoning

3. Course Syllabus

Theory

Introduction: AI problems, Intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, Structure of agents, Problem solving agents, Problem formulation.

Knowledge Representation & Reasons: Knowledge – Based Agents, the Wumpus world.
Propositional Logic: Reasoning patterns in propositional logic - Resolution, Forward & Backward Chaining. Inference in First order logic: Propositional vs. first order inference.

Searching: Searching for solutions, uniformed search strategies – Depth limited search, bi-direction search, Comparing uninformed search strategies. Search with partial information (Heuristic search), TSP problem, best first search, A* search, Hill climbing, Simulated annealing search.

Constrain Satisfaction Problems: Backtracking search for CSPs local search for constraint satisfaction problems. Game Playing: Games, Min - Max algorithm, Optimal decisions in multiplayer games, Alpha-Beta pruning.

Planning: Classical planning problem, Language of planning problem, planning with state – space search, forward state spare search, backward state space search, Heuristics for state space search, Partial order planning Graphs, Planning graphs.

4. Books and Materials

Text Book

1. Stuart Russel, Peter Norvig, (2009), Artificial Intelligence – A Modern Approach,3rd Edition, Pearson Education.

Reference Books

1. E.Rich and K.Knight, (2008), Artificial Intelligence, 3rd Edition, Tata McGraw Hill.
2. Patterson, (2009), Artificial Intelligence and Expert Systems, 2nd Edition, PHI.
3. Giarrantana/ Riley, (2004), Expert Systems: Principles and Programming,4th Edition, Thomson.
4. Ivan Bratka, (2000), PROLOG Programming for Artificial Intelligence.3rdEdition – Pearson Education.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

IV B.TECH I SEMESTER

COURSE STRUCTURE

A4657 - BLOCKCHAIN TECHNOLOGY (PROFESSIONAL ELECTIVE III)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course introduces blockchain, a revolutionary technology that enables peer-to-peer transfer of digital assets without any intermediaries, and is predicted to be just as impactful as the Internet. A blockchain is a permanent, sequential list of transaction records distributed over a network. The course introduces consensus, proof of work, mining, in Bitcoin. The course introduces ethereum blockchain and smart contracts.

Course Pre/co requisites

- A4612 – Network Security and Cryptography

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4657.1. Understand the basics of block chain like consensus, proof of work, etc.
A4657.2. Make use of Bitcoin as crypto currency.
A4657.3. Analyse Ethereum block chain.
A4657.4. Design smart contracts as per the requirements.

3. Course Syllabus

Theory

Introduction to Crypto currencies: Cryptographic Hash Functions, Hash Pointers and Data Structures, Digital Signatures, Public Keys as Identities, A Simple Crypto currency
How Bit Coin Achieves Decentralization: Centralization vs. Decentralization, Distributed Consensus, Consensus without Identity: the Block Chain, Incentives and Proof of Work, Putting It All Together

Mechanics of Bitcoin: Bitcoin Transactions, Bitcoin Scripts, Applications of Bitcoin Scripts, Bitcoin Blocks, The Bit coin Network, Limitations & Improvements
Store & Usage**:** How to Store and Use Bit coins, Hot and Cold Storage, Splitting and Sharing Keys, Online Wallets and Exchanges, Payment Services, Transaction Fees, Currency Exchange Markets.

Bitcoin Mining: The Task of Bitcoin Miners, Mining Hardware, Energy Consumption & Ecology, Mining

Pools, Mining Incentives and Strategies.
Bitcoin and Anonymity: Anonymity Basics, How to de-anonymize Bitcoin, Mixing, Decentralized Mixing, Zerocoin and Zerocash, Tor and the Silk Road

Ethereum: What is Ethereum, smart contracts, Solidity & Ethereum Virtural machine. Installing solidity &ethereum wallet, basics of solidity by example, Layout of a solidity source file & structure of smart contracts, General value types, ether units, Time units, Globally available variables and functions

Operators: Arithmetic, Logical & Bitwise operators, Control structure (if-else, for, while, do-while), Scoping and declarations, Input parameters and output parameters, Function calls & return types, Function Modifiers, Fallback functions, Abstract contract, Creating contracts via new operator, Inheriting smart contracts, Importing smart contracts & compiling contracts, Events & logging, exceptions, Examples of smart contract : crowd funding, voting ballot

4. Books and Materials

Text Books

1. Narayanan, A., Bonneau, J., Felten, E., Miller, A., &Goldfeder, S. (2016). Bitcoin and crypto currency technologies: a comprehensive introduction. Princeton University Press.
2. Hands–On Smart Contract Development with Solidity and Ethereum O'Reilly 2019

Reference Book

1. Andreas M. Antonopoulos Mastering Bitcoin: Unlocking Digital Crypto currencies, O'Reilly Media; 1st edition

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

IV B.TECH I SEMESTER

COURSE STRUCTURE

A4557 - DATA MINING (PROFESSIONAL ELECTIVE-III)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course is a graduate level survey of concepts, principles and techniques related to data mining. Students will become acquainted with both the strengths and limitations of various data mining techniques like Classification, Association analysis and Cluster analysis.

Course Pre/co-requisites

- A4508 - Database Management Systems

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:
A4557.1. Apply pre-processing techniques on various data sets.
A4557.2. Develop data warehouse using various schemas for enterprise applications.
A4557.3. Apply supervised learning techniques on given data sets.
A4557.4. Apply unsupervised techniques on various data sets.
A4557.5. Analyze various visualization techniques on data.

3. Course Syllabus

Introduction to Data Mining: What is data mining**,** Data Mining Functionalities, Kinds of Patterns, Classification of Data Mining Systems, Data Mining Task Primitives, and Major Issues in Data Mining? **Preprocessing:** Types of data, Data quality, Data pre-processing Techniques.

Data Ware House and Olap Technology: Data Warehouse basic concepts, Multidimensional model, data ware house architecture.

Association Analysis: Basic Concepts, Frequent Item set Mining Methods Apriori, FP tree. Mining multilevel association rules, Mining Multi dimensional association rules, correlation analysis

Classification: Problem definition, General approach, Decision tree induction, Rule based classifiers, Nearest neighbour classifiers, Bayesian classifiers, Artificial neural networks, Support vector machine, Linear and Non linear Regression .

Cluster Analysis: Introduction, Similarity and distance, Characteristics of clustering algorithms, partition based clustering techniques, Hierarchical clustering method BIRCH, Density based clustering method DBSCAN, outlier analysis. Visualization: Introduction, General concepts, Visualization techniques.

4. Books and Materials

Text Book

1. Jiawei Han, Micheline Kamber, Jian Pei (2012), *Data Mining: Concepts and Techniques*, 3rd Edition, Elsevier, United States of America. India.

Reference Books

1. Pang-Ning Tan, Michael Steinbach, and Vipin Kumar (2005), *Introduction to Data Mining*, Pearson Addison Wesley.
2. Margaret H Dunham (2006), *Data Mining Introductory and Advanced Topics*, 2nd Edition, Pearson Education, New Delhi, India.
3. Amitesh Sinha (2007), *Data Warehousing*, Thomson Learning, India.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

IV B.TECH I SEMESTER

COURSE STRUCTURE

A4556 – DEVOPS (PROFESSIONAL ELECTIVE-III)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This DevOps course helps to become familiar in all DevOps Concepts form the Basics. This course gives the basic foundational principles of DevOps with a particular focus on various devops tools. We will know how Devops help improve collaboration between developers and operations team members. We'll learn about strategies to manage work, monitor it, keep it organized, and maintain a high level of quality by following key DevOps principles. DevOps course helps in becoming master with various aspects of the principles of continuous development and deployment, software development operations, continuous integration, automation of configuration management and learn the various tools like Git, Docker, Jenkins, Ansible, sonar cube and Kubernetes etc.

Course Pre/co-requisites

- A4602 - Web Technologies
- A4654 - Software Testing Methodologies

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:
A4556.1. Understand the DevOps Concepts and DevOps Tools
A4556.2. Deploy the main DevOps tools
A4556.3. Manage and keep a track of different versions of the source code using Git
A4556.4. Build and Automate Test using Jenkins and Maven, containerization using Docker
A4556.5. Use Automation tool ANSIBLE and Deployment using Kubernetes

3. Course Syllabus

SDLC: Introduction to SDLC, Agile Model. introduction to devops: Introduction, DevOps Features, Work Management, Source Code Management, Build Automation, Delivery Automation, Understanding Code Quality, Automation of CI/CD.

Source Code Management (GIT): What is Vesion Control and GIT, GIT Installation, Working with remote repository, Standard Branching Workflows, Branching Workflow – GitFlow. unit testing – code coverage: JUNIT, nUnit & Code Coverage with Sonar Qube, SonarQube – Code Quality Analysis. build

automation – CI: Build Automation, What is CI , Why CI is Required , Introduction to Jenkins (With Architecture),Build (CI) Orchestration using Jenkins Automation Server, Introduction to Build Tools – Apache Maven, Gradle, Ant, NPM/Node.js. Build and automation of Test using Jenkins & Maven.

Pipeline Basics – Jenkins Master, Node, Agent, and Executor, Freestyle Projects & Pipelines. automation server – jenkins: jenkins– continuous integration and delivery server (jenkins POPULARITY: THROUGH THE ROOF), JENKINS – CD Orchestrator. artifact management: Nexus, JFrog Artifactory, JFrog Artifactory as Kubernetis Registry, Helm chart for Microsoft Azure Pipeline.

Continuous Delivery: Software components can be released in short cycles, Every Change is automatically deployed to Dev environment. continuous deployment: Extends Continuous Delivery, Every Change is automatically deployed to Production, CD Flow. Continuous Deployment: Containerization with Docker: Introduction to Docker, Images & Containers, DockerFile, Working with containers and publish to Docker Hub.

Continuous Deployment: Configuration Management – Ansible: Introduction to Ansible, Ansible tasks, Roles, Jinja2 templating, Vaults, Deployments using Ansible. containerization using kubernetes (OPENSHIFT): Introduction to Kubernetes Namespace &Resources , CI/CD – On OCP, BC , DC & ConfigMaps, Deploying Apps on Open shift Container Pods. aws& azure – cloud: Introduction to AWS & Azure Clouds, Pipeline of AWS & Azure Clouds – CI/CD.

4. Books and Materials

Text Books

1. The DevOps Handbook:: How to Create World-Class Agility, Reliability, and y Gene Kim, Jez Humble, Patrick Debois, John Willis.
2. Practical DevOps By Joakim Verona.

Reference Book

1. DevOps for Developers By Michael Huttermann.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

IV B.TECH I SEMESTER

COURSE STRUCTURE

A4658 - DESIGN PATTERNS (PROFESSIONAL ELECTIVE-III)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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.

Course Pre/co-requisites

- A4603 - Software Engineering
- A4505 - Object Oriented Programming

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4658.1. Identify the appropriate design patterns to solve object oriented design problems.
A4658.2. Develop design solutions using Creational patterns.
A4658.3. Apply structural patterns to solve design problems.
A4658.4. Construct design solutions by using behavioral patterns.

3. Course Syllabus

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.

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.

Structural Pattern Part – I: Adaptor, Bridge, and Composite.
Structural Pattern Part – II: Decorator, Acade, flyweight, proxy.

Behavior Patterns Part – I: Chain of Responsibility, Command, Interpreter, and Iterator.
Behavior Patterns Part – II: Mediator, Memento, Observer.

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.

4. Books and Materials

Text Book

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.

SYLLABI FOR IV YEAR II SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

IV B.TECH II SEMESTER

COURSE STRUCTURE

A4026 - MANAGEMENT SCIENCE

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

In this course, students will learn the fundamental concepts and contributions of Management. It also explains Inventory control techniques, Human Resource Practices, Quality control techniques and Project Management which plays a vital role in the organization.

Course Pre/co-requisites

This course has no prerequisite and co-requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A5024.1. Explain and infer the concepts and aspects of management.

A5024.2. Analyze the different organizational structures, plant layouts, work study tools for enhancement of productivity in an organization.

A5024.3. Apply Inventory control and statistical quality control techniques for better management.

A5024.4. Use Human resource management techniques for better people management.

A5024.5. Apply the project management techniques to decide the optimum time and cost for completion of a project.

3. Course Syllabus

Theory

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)

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.

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.

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.

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).

4. Books and Materials

Text Books

1. Koontz & weihrich – Essentials of management, TMH, 8th edition, 2010 .
2. O.P. Khana, Industrial engineering and Management, Dhanpat rai publication.

Reference Books

1. Dr.A.R.Aryasri, Management Science, TMH, 4th edition, 2009.
2. Stoner,Freeman, Gilbert, Management, 6th edition Pearson education, New Delhi, 2004.
3. L.S.Srinath, PERT &CPM , 3rd edition East-West press pvt. ltd.-New Delhi.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

IV B.TECH II SEMESTER

COURSE STRUCTURE

A4659 - DIGITAL FORENSICS (PROFESSIONAL ELECTIVE IV)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course presents an overview of the principles and practices of digital investigation. The objective of this class is to emphasize the fundamentals and importance of digital forensics. Students will learn different techniques and procedures that enable them to perform a digital investigation. This course focuses mainly on the analysis of physical storage media and volume analysis. It covers the major phases of digital investigation such as preservation, analysis and acquisition of artifacts that reside in hard disks and random access memory. The objective of this class is to emphasize the importance of digital forensics, and to prepare students to conduct a digital investigation in an organized and systematic way. This course will provide theoretical and practical knowledge, as well as current research on Digital Forensics. Upon completion of the course, students can apply open-source forensics tools to perform digital investigation and understand the underlying theory behind these tools.

Course Pre/co-requisites

This course has no specific prerequisite and co requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4659.1. Acquire knowledge of various digital forensic tools

A4659.2. Understand the limitations imposed by data privacy laws.

A4659.3. Interpret security issues in Information Communication Technology (ICT) world, and apply digital forensic tools for security and investigations.

A4659.4. Achieve adequate perspectives of digital forensic investigation in various applications /devices like Windows/Unix system, mobile, email etc

A4659.5. Generate legal evidences and supporting investigation reports

3. Course Syllabus

Theory

Computer Forensics Fundamentals: Introduction to Computer Forensics, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps Taken by

Computer Forensics Specialists, Who Can Use Computer Forensic Evidence? Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement Computer Forensic Technology, Types of Business Computer Forensics Technology.

Computer Forensics Evidence and Capture: Data Recovery: Data Recovery Defined Data Backup and Recovery, the Role of Backup in Data Recovery, the Data-Recovery Solution, and Case Histories. Evidence Collection and Data Seizure: Why Collect Evidence?, Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collecting and Archiving, Methods of Collection, Artifacts, Collection Steps, Controlling Contamination: The Chain of Custody.

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene, Computer Evidence Processing Steps, Legal Aspects of Collecting And Preserving Computer Forensic Evidence. Computer Image Verification and Authentication: Special Needs of Evidential Authentication, Practical Considerations, Practical Implementation.

Computer Forensics Analysis: Discovery of Electronic Evidence: Electronic Document Discovery: A Powerful New Litigation Tool, Identification of Data: Timekeeping, Time Matters, Forensic Identification and Analysis of Technical Surveillance Devices. Reconstructing Past Events: How to Become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files.

Network Forensics: Scenario, A Technical Approach, Destruction of Email, Damaging Computer Evidence, International Principles Against Damaging of Computer Evidence, Tools Needed for Intrusion Response to the Destruction of Data, Incident Reporting and Contact Forms.

4. Books and Materials

Text Book

1. “Computer Forensics : Computer Crime Scene Investigation”, JOHN R. VACCA, Firewall Media.

Reference Books

1. “Computer Forensics and Cyber Crime”, Marjie T Britz, Pearson Education.
2. “Guide to Computer Forensics and Investigations” 4e, Nelson, Phillips Enfinger, Steuart, Cengage Learning.
3. “Computer Forensics”, David Cowen, McGraw Hill.
4. Brian Carrier , “File System Forensic Analysis” , Addison Wesley, 2005
5. Dan Farmer & WietseVenema ,”Forensic Discovery”, Addison Wesley, 2005
6. Eoghan Casey , —Digital Evidence and Computer Crime —, Edition 3, Academic Press, 2011
7. Chris Pogue, Cory Altheide, Todd Haverkos ,Unix and Linux Forensic Analysis DVD ToolKit, Syngress Inc. , 2008
8. Harlan Carvey ,Windows Forensic Analysis DVD Toolkit, Edition 2, Syngress Inc. , 2009
9. Harlan Carvey ,Windows Registry Forensics: Advanced Digital Forensic Analysis of the Windows Registry, SyngressInc, Feb 2011

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

IV B.TECH II SEMESTER

COURSE STRUCTURE

A4660 - HUMAN COMPUTER INTERACTION (PROFESSIONAL ELECTIVE-IV)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course teaches students to design user interfaces based on the capabilities of computer technology and the needs of human factors. Students design a user interface for a system and implement a prototype from a list of informal requirements. The project is developed over three assignments by a design process based on current human–computer interaction principles

Course Pre/co-requisites

- A4501 - Programming for Problem Solving

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4660.1. Choose the basic components that which interact devices with computers

A4660.2. Select the window, device and screen based control navigation schemes

A4660.3. Identify the elements of good user interface design and effective gui.

A4660.4. Analyse screen design principles for making good decisions based on technological constraints in interface design

A4660.5. Determine the importance of human characteristics and understanding business functions

3. Course Syllabus

Theory

Introduction: Importance of user Interface – definition, importance of good design, Benefits of good design. A brief history of Screen design. (T1: chapter1)

THE GRAPHICAL USER INTERFACE – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface. (T1: chapter2)

Design Process: Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions. (T1: Ch-2, step1)

Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design. (T1: Ch-2, step3)

Windows: New and Navigation schemes selection of window, selection of devices based and screen based controls. (R1: chapter12)

Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors. Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers. (R1: chapter5)

4. Books and Materials

Text Book

1. Wilbert O Galitz, The essential guide to user interface design, 3rd Edition. Wiley DreamaTech. India

Reference Books

1. Alan Dix, Janet Fincay, Gre gory D.Abowd, Russell Beal, Human – Computer Interaction, 3rd Edition
2. Ben Shneidermann, Designing the user interface, 3rd Edition, Pearson Education Asia.
3. Rogers, Sharps, Preece (2013), Interaction Design 3rd Edition, Wiley, India
4. Soren Lauesen (2005), User Interface Design, Pearson Education.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

IV B.TECH II SEMESTER

COURSE STRUCTURE

A4661 - DEEP LEARNING (PROFESSIONAL ELECTIVE IV)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

In this Deep Learning course, you will become familiar with libraries and fundamental concepts of artificial neural networks. Upon completion, you will be able to build deep learning models, interpret results, and build your own deep learning project.

Course Pre/co-requisites

- A4515 - Machine Learning

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4661.1. Understand the constructs of Neural Networks

A4661.2. Design Neural Network APIs

A4661.3. Build Deep Neural Networks using APIs

A4661.4. Building Deep variants of Neural Networks

3. Course Syllabus

INTRODUCTION: Introduction to learning techniques, Fundamentals of Neural networks, layers, topology, purpose of activations functions-gradient descent.

ARTIFICIAL NEURAL NETWORKS: Multi layer Neural networks, Feed forward, Feedback neural networks.

TRAINING NEURAL NETWORKS: Back-propagation algorithm, model selection, loss functions, regularization, optimization-tuning the hyper parameters.

MODEL BUILDING TOOLS: Introduction to Keras, Tensor flow , building Neural networks using functional and sequential APIs, Hands on- building few Neural network APIs and analyzing the model parameters, compiling and fitting the model.

DEEP NEURAL NETWORKS: CNN-Introduction to Convolutional Neural Neworks (CNN)- understanding main components in CNN- convolution layers, pooling layers, non linearity, classification layer, error metrics.

USING CNN FOR IMAGE CLASSIFICATION:

CASE STUDY 1: Hand written digit classification using CNN,
CASE STUDY 2: Customized multi class image classification (use pre trained CNNs-VGG-16, Res NET, use Image Net data source)

RECURRENT NEURAL NETWORKS (RNN): Introduction to RNN, Back propagation through time, variants of RNN- BRNN, LSTMS, vanishing/exploding gradients, difference between CNN, BRNN, LSTMs.
USING RNN FOR TEXT CLASSIFICATION: Introduction to text mining, basic concepts in Text processing, document classification, LDA, word2vec.

USING NLTK : CASE STUDY 3: Text review classification Using RNN (movies or product reviews)
CASE STUDY 4: Ham/spam classification using LSTM

4. Books and Materials

Text Books

1. Deep Learning with Keras- by Antonio Gulli, Sujit Pal, PACKT publishing
2. Recurrent Neural Networks wiyh python quick start guide- by Simeon Kostadinov, PACKT publishing

Reference Book

1. Deep Learning a practitioners approach-by Josh Patterson and Adam Gibson

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

IV B.TECH II SEMESTER

COURSE STRUCTURE

A4662 - SOFTWARE PROJECT MANAGEMENT (PROFESSIONAL ELECTIVE-IV)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course provides, 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.

Course Pre/co-requisites

- A4603 - Software Engineering
- A4654 - Software Testing Methodology

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4662.1. Understand different models for development of the software.

A4662.2. Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.

A4662.3. Analyze organizational structure and project structure.

A4662.4. Implement a project to manage project schedule, expenses and resources with the application of suitable application management tools.

3. Course Syllabus

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.

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.

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.

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.

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).

4. Books and Materials

Text Book

1. Software Project Management, Walker Royce: Pearson Education, 2005.

Reference Books

1. Software Project Management, Bob Hughes and Mike Cottere ll: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4131 - PROJECT PLANNING AND MANAGEMENT

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course will provide a general introduction to project management. This course covers key components of project management including project integration, project scope management, project time and cost management, quality management, human resource considerations, communications, and procurement management. Understand network techniques for Project planning, scheduling and Execution Control with limited resources.

Course Pre/co requisites

This course has no specific prerequisite and co requisite.

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4131. 1 Identify project characteristics and various phases of a project.
A4131. 2 Explain project organization, staffing and feasibility of projects.
A4131. 3 Apply the techniques of Project planning, scheduling and Execution Control.
A4131. 4 Analyse the role of stakeholders.
A4131. 5 Evaluate Resources, Budget, Claims and Disputes.

3. Course Syllabus

Project Management: Overview of Project Management, Concepts and Definitions. Project manager and his responsibilities. Types of projects, Various stages of projects, Organizational structures used in project management. Management Functions and staffing.

Project Planning: Time planning, Contents of Project plan, planning process, Work breakdown structure, process mapping. Project Budgeting: Financial Projections, time value of money, cost of capital, capital investment decisions.

Scheduling Techniques: Bar Charts, CPM & PERT: Time estimate- Optimistic time estimate, Most likely time estimate, Pessimistic time estimate & Expected time. Project Scheduling, Network Analysis, Cost-Time Analysis in Network Planning, Float - Total float, free float.

Monitoring and Controlling: Plan monitor control cycle, data collection and reporting, Project control. Working with stakeholders.

Conflict Management: claims and Disputes- Source of claim, Claim Management, Dispute resolution, Arbitration and its advantages, Project closure.

4. Books and Materials

Text Books:

1. Punmia B.C., Khandelwal K.K., Project *planning and control with PERT and CPM*, Fourth Edition, Laxmi Publications, New Delhi, 2016.

Reference Books:

1. Stephen A. Robbins, David A. Decenzo & Mary Coulter,*Fundamentals of Management* 7th Edition, Pearson Education, 2011.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4132 – ENVIRONMENTAL POLLUTION AND MANAGEMENT

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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, and noise and the impacts these sources on the environment and health. In addition, the students will be given the knowledge to develop the particular skills required in pollution related structured research and environmental management.

Course Pre/ Co-requisites

A4014 - Environmental Science

2.Course Outcomes (COs)

After the completion of the course, the student will be able to:
A4132.1. Identify water pollution sources, types and treatment methods.
A4132.2. Apply knowledge on Prevention and control of air pollution.
A4132.3. Inspect sources, effects and mitigation methods of noise pollution.
A4132.4. Examine soil pollution sources, effects and control measures.
A4132.5. Formulate Environmental management plan to minimize environmental pollution.

3. Course Syllabus

Water pollution: Water Pollution - Introduction - Sources and types of water pollutants Physical, Chemical and Biological. Ground water - Surface water - lake water - seawater. Effects of water pollution. Water Quality standards (drinking and industrial) - water treatment - physical, chemical and biological. Water Pollution Prevention and Control Act, 1974.

Air pollution: Structure and composition of atmosphere – classification, sources and effects of air pollution – Acid rain –green house effect – global warming – Ozone depletion, 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.

Noise Pollution: Noise Pollution Basics of acoustics- propagation of indoor and outdoor sound- noise profiling effects of noise – measurement, index and mitigation methods- health effects of noise- Vibration and its Effects, Whole body vibration problems in opencast mines-ground vibration and Air blast. Green Belt Development--Principles and design considerations, Industrial Noise Pollution Control methods.

Soil Pollution: Sources - solid waste disposal and their effects - pesticides - types and effect of pollutants on Plants - animals and human beings - biomagnifications - fertilizers and its Effect of pollutants on plants - animals and human beings - soil pollution Control measures - soil microbes and function - biofertilizer.

Environmental management: Environmental impact assessment and statement; Government strategies in pollution control: subsides, polluter pays principle and regulations; Government Agencies and Programs – The Tiwari committee – creation of NCEPC, Department of Environment & Forest – Function of State Pollution Control Board. Sources of environmental information and regulations; Sustainable development and environmental protection.

4. Books And Materials

Text Books:

1. Prof. Y. Anjaneyulu, "Air Pollution and Control Technologies", Allied publishers, 2002.
2. M. N. Rao, H. V. N. Rao, “Air pollution”, Tata McGraw Hill Education, New Delhi, India, 2017.

Reference Books:

1. R. K. Trivedy, P. K. Goel, “Introduction to Air pollution”, ABD Publications, New Delhi, India, 2003.
2. Wark, Warner, “Air pollution its origin and control”, Addison-Wesley, New York, 1998.
3. K.V.S.G. Murali Krishna, “Air Pollution and Control”, USP, India, 2017.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4133 – DISASTER MANAGEMENT (OPEN ELECTIVE-III)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The course has been framed with an intention to provide a general concepts in the dimensions of disasters caused by nature beyond human control as well as the disasters and environmental hazards induced by human activities with emphasis on Natural disaster, Man-made disaster, vulnerability and risks of disasters, Disaster Management Mechanism, Capacity Building and disaster coping Strategies and Disaster management planning.

Course Pre/co requisites

A5012- Environmental science

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4133. 1. Identify concepts, hazards and vulnerabilities of different types of disasters.
A4133. 2. Examine the components of disaster management mechanism.
A4133. 3. Select suitable capacity building frame work for disaster management
A4133. 4 Interpret various disaster coping strategies
A4133. 5. Develop Strategies for disaster management planning

3. Course Syllabus

CONCEPT- HAZARDS - VULNERABILITIES OF DISASTERS: Concept of Disaster - Different approaches- Concept of Risk - Levels of Disasters - Disaster Phenomena and Events (Global, national and regional) Hazards and Vulnerabilities: Natural and man-made hazards; response time, frequency and forewarning levels of different hazards - Characteristics and damage potential or natural hazards; hazard assessment - Dimensions of vulnerability factors; vulnerability assessment - Vulnerability and disaster risk - Vulnerabilities to flood and earthquake hazards.

DISASTER MANAGEMENT MECHANISM: Concepts of risk management and crisis managements - Disaster Management Cycle - Response and Recovery - Development, Prevention, Mitigation and Preparedness - Planning for Relief.

CAPACITY BUILDING: Capacity Building: Concept - Structural and Nonstructural Measures Capacity Assessment; Strengthening Capacity for Reducing Risk - Counter-Disaster Resources and their utility in Disaster Management - Legislative Support at the state and national levels.

COPING WITH DISASTER: Coping Strategies; alternative adjustment processes - Changing Concepts of disaster management - Industrial Safety Plan; Safety norms and survival kits - Mass media and disaster management.

DISASTER MANAGEMENT PLANNING: Strategies for disaster management planning - Steps for formulating a disaster risk reduction plan - Disaster management Act and Policy in India -Organizational structure for disaster management in India - Preparation of state and district disaster management plans.

4. Books And Materials:

Text Books:

1. Manual on Disaster Management, National Disaster Management, Agency Govt of India.
2. Disaster Management by Mrinalini Pandey Wiley 2014.
3. Disaster Science and Management by T. Bhattacharya, McGraw Hill Education (India) Pvt Ltd Wiley 2017

Reference Books:

1. Earth and Atmospheric Disasters Management, N. Pandharinath, CK Rajan, BS Publications 2009.
2. National Disaster Management Plan, Ministry of Home affairs, Government of India (http://www.ndma.gov.in/images/policyplan/dmplan/draftndmp.pdf)

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE
A4231 – TRANSDUCERS AND MEASUREMENTS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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 Pre/co requisites

The course has no specific prerequisite and co requisite

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4231.1. Aware the basic concepts of measurement parameters as well as instrument standards, characteristics and errors.

A4231.2. Construct and design various measuring devices like voltmeters, Ammeters, Ohmmeters, analog, digital multi-meters and analyze different types of cathode ray oscilloscopes.

A4231.3. Design different bridge networks and analyze balanced condition for finding out values of resistance, capacitance and inductance.

A4231.4. Analyze different physical parameters like pressure, force, velocity, acceleration, sound, torque, strain and stress etc. using non-electrical transducers.

A4231.5. Apply the principles and practice for instrument design and develop for real world problems.

3. Course Syllabus

CHARACTERSTICS OF INSTRUMENTS: Block schematic of measuring system, Performance characteristics of instruments-static and dynamic characteristics, Errors in measurement.

MEASURING INSTRUMENTS: DC voltmeters- multi-range, range extension, DC Ammeter- multi range, range extension, ohm-meters-series type and shunt type, AC Voltmeter.

DIGITAL VOLTMETERS: Dual slope and Successive Approximation type DVM.

TRANSDUCERS-I: Introduction, classification, strain gauges, LVDT, Piezo electric transducers, OP-AMP applications in measurement and transducer circuits, instrumentation amplifier, thermometers, thermocouples, thermistors, sensistors.

TRANSDUCERS-II: Measurement of non electrical quantities- displacement, pressure, torque, vibration, pH, sound, velocity, humidity, speed, analog and digital data acquisition systems, programmable logic controllers and their industrial applications.

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.

CATHODE RAY OSCILLOSCOPE (CRO): Introduction to CRT, vertical amplifiers, horizontal deflection system, simple CRO, measurement of phase and frequency (lissajous patterns).

4. Books and Materials

Text Books:

1. A. 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. 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.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4232 – SOLAR ENERGY AND APPLICATIONS (OPEN ELECTIVES-II)

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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 Pre/co requisites

The course has no specific prerequisite and co requisite.

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4232.1 Compare the present and future available electrical power from solar energy in the world based on the knowledge of global solar horizontal irradiation.

A4232.2 Assimilate and acquire the skills for design and engineering of solar thermal and solar photovoltaic technology and systems.

A4232.3 Identify simple to complex problems involved in solar thermal energy conversion technique used in the liquid based solar heating and cooling systems for buildings/societal needs.

A4232.4 Examine a solar PV(Photo Voltaic) system components and their function by utilizing the previous literature knowledge on different Photovoltaic solar cells like crystalline, Multi-Crystalline, Amorphous and thin film.

A4232.5 Analyze the techno economics interaction of developments in the solar energy systems

3. Course Syllabus

PRINC PLES OF SOLAR RADIATION: Role and potential of solar energy, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and Sun shine, solar radiation data.

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.

PHOTO VOLTAICS (PV): Fundamentals of solar cells, types of solar cells, absorption of photons, excitations and photo emission of electrons.
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.

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.

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.

4. Books And Materials

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.

Reference Books:

1. B. H. Khan (2016)- Non Conventional Energy Resources-3rd Edition, McGraw Hill Education (India) Private Limited.
2. Sukatme (2008), Solar Energy, 3rd Edition, McGraw Hill Companies, New Delhi.
3. D. Yogi gosuami, Frank Kreith, Jan F. Kreider (2000), Principles of Solar Engineering, 3rd Edition, Taylor & Francis, USA.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE
A4233 – ENERGY MANAGEMENT AND AUDIT

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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. In the context of the Energy Conservation Act 2001, the Bureau of Energy Efficiency has emphasised the importance of Energy Managers and Certified Energy Auditors. This course is designed to provide the background required for engineers to meet this role.

Course Pre/co requisites

The course has no specific prerequisite and co requisite

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4233.1 Analyze the influence of energy availability on the development of Industries and various other organizations.

A4233.2 Discuss the concepts and technologies used for energy conservation.

A4233.3 Develop methods for evaluating worth of project.

A4233.4 Investigate the schemes for demand side management.

A4233.5 Evaluate the VAR requirements for effective voltage control.

3. Course Syllabus

ELECTRICAL ENERGY AND SAFETY AUDIT: Overview of Electricity Act – Energy conservation act – Electrical energy audit – Types – Tools – Tariff – Load factor improvement – Power factor correction – Power demand control and shifting – Electrical safety Auditing.

ENERGY CONSERVATION IN ELECTRIC MOTORS: Motors efficiency – Motor selection – Factors affecting motor performance – Efficiency at low load – Rewound motors – Variable speed drives – Load reduction – High efficiency motors – Energy savings in transformers – Case studies.

ELECTRICAL ENERGY CONSERVATION IN DRIVEN EQUIPMENTS: Input electrical energy requirements in pumps, fans and compressors – Load factor estimation in the equipment – Energy conservation potential.

ENERGY CONSERVATION IN INDUSTRIAL LIGHTING: Concept of lighting systems – Choice of lighting – Different lighting technologies – Energy saving – Control of lighting – Lighting standards and requirements – Light meter audit – Methods to reduce costs.

ENERGY MANAGEMENT: Principles of energy management, organizing energy management program, initiating, planning, controlling, promoting, monitoring, reporting – Energy manager, Qualities and functions.

4. Books and Materials

Text Books:

1. W. R. Murphy, G. McKay (2008), *Energy Management,* 1st Edition, B.S. Publications, New Delhi.
2. Tripathy S. C., "Electric Energy Utilization 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.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE
A4331 - BASIC MECHANICAL ENGINEERING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview:

This course is designed to lay emphasis on the fundamental principles of Thermodynamics, Fluid Mechanics, Hydraulic Machines and heat transfer and to equip the students with the knowledge and skills to solve mechanical engineering problems efficiently.

Course Pre/co requisites

A4003 - Semiconductor Physics
A4001 - Linear Algebra and Ordinary Differential Equations

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4331.1. Develop the general energy equations for thermal systems by laws of thermodynamics.
A4331.2. Compare types of fluids, fluid flows, pressure and flow measuring devices, losses in pipes, laminar and turbulent boundary layer concepts.
A4331.3. Evaluate design parameters of hydraulic turbines at given efficiency and discharge
A4331.4. Analyze an expression for force, workdone and efficiency of vane, turbines and pumps.
A4331.5. Apply the principles of conduction, convection and radiation heat transfer to analyze natural phenomena.

3. Course Syllabus

BASIC THERMODYNAMIC CONCEPTS: System, surroundings, universe, Intensive and Extensive Properties, Macroscopic and Microscopic Approach, Force, Pressure, Energy, Work, Power, Heat, Temperature, Specific Heat Capacity, Change of State, Path, Process, Cycle, Internal Energy, Enthalpy, Statements of Zeroth and First Laws of Thermodynamics**.**

FUELS AND COMBUSTION: Types of Fuels and their Characteristics, Combustion and Combustion Products of Fossil Fuels, Environmental Effects of Fossil Fuel Combustion, Bio-fuels, Comparison of Bio-fuels with Petroleum Fuels in Terms of Calorific Value and Emission.

ENERGY RESOURCE UTILIZATION:

Classification of Energy Resources, Non-Renewable Energy - Principles of Generating Electricity by Steam, Gas and Nuclear Power Plants; Renewable Energy - Utilization of Hydro, Solar, Wind, Geothermal and Biomass Energies**.**

ENGINEERING MATERIALS AND MACHINING PROCESSES:

Classification of Materials, Types and Applications of Ferrous & Non-Ferrous Metals, Alloys and Composites; Principles of Metal Joining Processes -Riveting, Bolting, Soldering, Brazing, and Welding, Principles of Metal Cutting Processes - Turning, Drilling, Milling, Boring, Shaping, Slotting Broaching and Sawing

POWER TRANSMISSION DRIVES:

Types of Power Transmission, Belt Drives - Open and Crossed Belt, Flat and V-Belt, Stepped Pulley; Gear Drives – Spur, Helical and Bevel Gears, Rack and Pinion, Worm Gear; Gear Trains – Simple and Compound; Chain Drives, Rope Drives, Advantages and Disadvantages of Chain Drive Over Belt or Rope Drive.

4. Books and Materials

Text Book(s)

1. B S Grewal, *Higher Engineering Mathematics*, 43rd Edition, Khanna Publishers, New Delhi, 2014.
2. B V Ramana, *Engineering Mathematics*, 23rd Reprint, Tata Mc Graw Hill Education Private Limited, New Delhi, 2015.

Reference Book(s)

1. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, *A text book of Engineering Mathematics*, Laxmi Publications, 2010.
3. D. Poole, *Linear Algebra: A Modern Introduction*, 2nd Edition, Brooks/Cole, 2005.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE
A4332 - INTRODUCTION TO 3D PRINTING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

3D printing is an additive manufacturing process whereby objects are built up from plastic filament, liquid resin, layers of powder, or even bio-compatible and edible materials. Desktop 3D printing is today's printing press, putting rapid prototyping, customizable products, and individualized medical appliances in reach of the general public. Literacy in basic 3D modeling and manufacturing is an essential skill for future STEM success in this country. In this course students will learn how to be "makers" by using various types of 3D modeling software and imaging equipment, printing actual physical objects that they have designed and modeled themselves, and participating in educational outreach in the institute and the community

Course Pre/co requisites

- AutoCAD and Manufacturing Process

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to

A4332.1. Understand the fundamental concepts of Additive Manufacturing (i.e. Rapid Prototyping) and 3-D printing, its advantages and limitations.

A4332.2. Apply engineering knowledge, techniques, skills and modern tools to analyze problems in 3D PRINTING .

A4332.3. Appraise additive manufacturing through 3d printing.

A4332.4. Solve Complex manufacturing problems for significant technological and societal development

A4332.5. Analyze, design and evaluate engineering products using the knowledge of mathematics, science, engineering and IT tools.

3. Course Syllabus

INTRODUCTION TO 3D PRINTING: Fundamental of 3D printing, Need for 3D printing Generic 3d printing process, Distinction between 3D printing and CNC, Classification of 3D printing Processes, Steps in 3D printing process, Advantages of 3D printing, standards for 3D printing, Major Applications. **VAT PHOTO POLYMERIZATION 3D PRINTING PROCESSES:** Stereo lithography (SL), Materials, SL resin curing process, Process Benefits and Drawbacks, Applications of Photo polymerization Processes

MATERIAL JETTING 3D PRINTING PROCESSES:- Binder Jetting 3D PRINTING Processes: Evolution of Printing as a 3D printing Process, Materials, Process Benefits and Drawbacks, Applications of Material Jetting Processes.

BINDER JETTING 3D PRINTING PROCESSES: Materials, Process Benefits and Drawbacks, Research achievements in printing deposition, Technical challenges in printing, Applications of Binder Jetting Processes

EXTRUSION-BASED 3D PRINTING PROCESSES: Fused Deposition Modeling (FDM), Principles, Materials, Plotting and path control, Bio-Extrusion, Process Benefits and Drawbacks, Applications of Extrusion-Based Processes.

POWDER BED FUSION 3D PRINTING PROCESSES: Selective laser Sintering (SLS), Materials, Powder fusion mechanism, SLS Metal and ceramic part creation, Electron Beam melting (EBM), Process Benefits and Drawbacks, Applications of Powder Bed Fusion Processes.

DIRECTED ENERGY DEPOSITION 3D PRINTING PROCESSES: Process Description, Laser Engineered Net Shaping (LENS), Direct Metal Deposition (DMD), Electron Beam Based Metal Deposition, Benefits and drawbacks, Applications of Directed Energy Deposition Processes.

Wire arc based additive manufacturing methods, Advantages and disadvantages, comparison with conventional 3D printing and WAAM.

POST PROCESSING OF 3D PRINTING PARTS: Support Material Removal, Surface Texture Improvement, Accuracy Improvement, Aesthetic Improvement, Preparation for use as a Pattern, Property Enhancements using Non-thermal and Thermal Techniques.

Inspection of 3D printing parts: Different destructive and non-Destructive testing of 3D printing parts, acceptance standards for 3D printing parts

3D PRINTING APPLICATIONS: Functional models, Pattern for investment and vacuum casting, Medical models, art models, Engineering analysis models, Rapid tooling, new materials development, Bi-metallic parts, Re-manufacturing. Application examples for Aerospace, defense, automobile, Bio-medical and general engineering industries

Software Package: FUSION 360 and CATIA

4. Books And Materials

Text Books:

1. Ian Gibson, David W Rosen, Brent Stucker (2015) “Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing”, 2nd Edition, Springer.
2. Ali K. Kamrani, EmandAbouel Nasr (2006) “Rapid Prototyping: Theory & Practice”, Springer

Reference Books:

1. D.T. Pham, S.S. Dimov (2001) “Rapid Manufacturing: The Technologies and Applications of Rapid Prototyping and Rapid Tooling”, Springer.
2. Rafiq Noorani (2006) “Rapid Prototyping: Principles and Applications in Manufacturing”, John Wiley & Sons.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE
A4333 - FUNDAMENTALS OF ROBOTICS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course introduces students to the basics, types and elements of robots. The course exposes students to the theoretical concepts of robot kinematics. Path planning and trajectory planning concepts gives the perception on control of robotics. The concepts on actuators and sensors gives clear understanding and design ability for mobility systems. It gives an overview on application of robotics in manufacturing industry.

Course Pre/co requisites

The course has no specific prerequisite and co requisite

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to

A4333.1. Understand the basic concepts and components of a robotic system.
A4333.2. Identify the use of actuators and sensors for designing robot mobility system.
A4333.3. Solve transformation problems to describe the robot position and orientation of robot.
A4333.4. Apply the concepts of robot work cell design and control.
A4333.5. Select appropriate robots for various applications suitable to modern manufacturing systems.

3. Course Syllabus

Introduction to Robotics, Classification of Robots, Advantages and Disadvantages of Robots, Degree of freedom, joints, Robot coordinates, Robot workspace, Robot characteristics, Robot Components, types of robot arms, end effectors, grippers.

Actuators:Characteristics of Actuating Systems, Comparison of Actuating Systems, Hydraulic and Pneumatic Devices, Electric Motors in Robotics.
Sensors: Sensor Characteristics, Position Sensors, Velocity Sensors, Acceleration Sensors, Touch and Tactile Sensors, Proximity Sensors, Range Finder.

Manipulator Kinematics:Specifications of matrices, Homogeneous Transformation, D-H notation, joint coordinates and world coordinates, Forward and inverse kinematics, Simple problems.

Path Planning:Trajectory planning and avoidance of obstacles, Path planning, introduction to robot programming.

Robot Work Cell Design and Control:Robot Cell Layouts, Multiple Robots and Machine Interface, Some Consideration in Work Cell Design, Interlocks, Error Detection and Recovery, Robot Cycle Time Analysis.

Robotic Applications:Robots in manufacturing and non- manufacturing applications, Health Service, Intelligent Home Applications, Military Applications, Space Application, Entertainment robots, Service robots, Domestic or household robots.

4. Books and Materials

Text Books:

1. Richard D. Klafter (2010), Robotic Engineering, 2nd edition, Prentice Hall of India, New Delhi.
2. M.P. Groover (2010), Industrial Robotics, 3rd edition, Pearson Education, New Delhi.

Reference Books:

1. R.K. Mittal, I.J. Nagrath (2012), Robotics and Control, 1st edition, Tata Mc Graw Hill, New Delhi.
2. P. Coiffet, M. Chaironze (2010), An Introduction to Robot Technology, 3rd edition, Kogam Page Ltd., London.
3. Ganesh S. Hegde (2015), A Textbook of Industrial Robotics, 2nd edition, University Science Press.
4. K.S. Fu (2010), Robotics, 1st edition, Tata Mc Graw Hill, New Delhi.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4431 - FUNDAMENTALS OF IoT

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The course introduces you to advance concepts and design methodologies to design IoT systems and developing IoT applications programming languages and tools optimized for IoT domain. It also exposes participants to communication technologies and legacy protocols as well as newly developed IoT specific application and physical layer protocols. The course covers python languages in great detail with set of packages which makes it obvious choice as a leading IoT language.

Course Pre/Co Requisites

The course has no specific prerequisite and co-requisite.

2. COURSE OUTCOMES (Cos)

After the completion of the course, the student will be able to:

A4431.1. Identify the basic building blocks of IoT and its characteristics

A4431.2. Choose the application-layer protocols and web services architectures for a seamless integration of various components within an IoT ecosystem

A4431.3. Utilize Python standard libraries for implementing various IoT Applications

A4431.4. Examine the communication between a machine or a device with a remote system

A4431.5. Analyze cloud infrastructure, services, APIs and architectures of commercial and industrial cloud platforms

3. Course Syllabus

INTRODUCTION TO INTERNET OF THINGS: Introduction, Physical Design of IoT, Logical Design of IoT, IoT enabled Technologies, IoT Levels and Templates, IoT Platforms Design Methodology.

INTRODUCTION TO PYTHON: Language features of Python, Data types& data structures, Control of flow, Functions, Modules, Packages, File Handling, Data/Time operations, Classes, Python packages of interest for IoT(JSON,XML)

IoT AND M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT, **IoT System Management with NETCONF- YANG**-Need for IoT Systems Management, SNMP, Network Operator Requirements, NETCONF, YANG, IoT Systems Management with NETCONF-YANG

IoT PHYSICAL DEVICES AND ENDPOINTS: Introduction to IoT Device, Exemplary Device: Raspberry Pi, Components of Raspberry Pi Board, Linux on Raspberry Pi, Raspberry Pi Interfaces, Programming – Raspberry Pi with Python

I0T PHYSICAL SERVERS AND CLOUD OFFERINGS: Introduction to Cloud Storage models and communication APIs,WAMP – AutoBahn for IoT, Xively Cloud for IoT, Python web application framework-Django, Designing a RESTful web API

4. Books and Materials

Text Book:

1. ArshdeepBahga and Vijay Madisetti: *Internet of Things,A Hands-on Approach*; University Press, 2016.

Reference Books:

1. Getting Started with Raspberry Pi:Matt Richardson & Shawn Wallace,O'Reilly (SPD),2014.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4432 - PRINCIPLES OF ANALOG AND DIGITAL COMMUNICATIONS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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.

Course Pre/co requisites

The course has no specific prerequisite and co-requisite.

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4432.1. Analyze linear and non - linear modulators and demodulators in time as well as frequency domain.

A4432.2. Design a linear and non linear modulators and demodulators for the analog signals

A4432.3. Outline the basic concepts of digital communications with an insight into practical applications and Differentiate between PCM and DM and identify the applications of these modulation schemes in base band transmission

A4432.4. Estimate a overall digital communication system for the improvement of the system performance.

A4432.5. Analyze the performance of a digital communication system by introducing various spread spectrum modulation techniques.

3. Course Syllabus

UNIT-I: Introduction to communication system, need for modulation, Types of modulation techniques: AM, FM, PM, Generation and detection. Radio Transmitters,Radio Receivers AM,FM Comparison of Radio transmitters and receivers.

UNIT-II: 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, Figure of Merit, Threshold Improvement in Discriminators.

UNIT-III: Analog-to-Digital Conversion: Pulse modulation Techniques, Sampling Process, PAM,PWM and PPM. Time Division Multiplexing, Digital Modulation Techniques: Pulse Code Modulation, Companding, Differential Pulse Code Modulation, Delta Modulation, Noise in Pulse-Code Modulation Systems.

UNIT-IV: Binary Amplitude Shift-Keying, Frequency Shift-Keying, Phase-Shift Keying, Differential Phase-Shift Keying, Quadrature Phase-Shift Keying (QPSK), Comparison of BASK, BFSK and BPSK, Minimum Shift Keying (MSK), Duo binary Encoding.

UNIT- V: 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.

4. Books and Materials

Text Book:

1. Principles of Communications By Taub and Schilling

Reference Books:

1. Communication Systems, Simon Haykins (2nd Edition).
2. Analog and Digital Communication Systems by Martin S. Roden, 3rd edition, Prentice Hall, 1994.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4433 - INTRODUCTION TO SIGNAL PROCESSING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

Signal Processing is an introductory course essentially attempts to cover classification, representation of signals and analysis in time domain and frequency domain of systems. It is a foundation course to advanced courses like Communication Systems, Image and Speech Processing in their undergraduate program. This course provides coherent and comprehensive coverage of signal processing.

Course Pre/co requisites

The course has no specific prerequisite and co-requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4433.1. Understand mathematical description of signals and representation of systems
A4433.2. Identify the spectrum of continuous-time periodic and non-periodic signals
A4433.3. Apply various transforms to analyze continuous and discrete-time systems
A4433.4. Analyze digital systems using various transform techniques
A4433.5. Design and implement FIR and IIR filters for given specifications

3. Course Syllabus

CLASSIFICATION OF SIGNALS: Continuous time (CT) and Discrete time (DT) signals, elementary signals-Unit, Step, Impulse, ramp signals, singularity functions and operations on signals.
SIGNAL TRANSMISSION THROUGH LTI SYSTEMS: Classification of systems, discrete time LTI systems and continuous time LTI systems, properties of LTI system, Convolution

FOURIER TRANSFORM (FT): Fourier series, convergence of Fourier series, Fourier transform (FT), Fourier transform of standard signals, Hilbert transform and its properties
LAPLACE TRANSFORM (LT): The Laplace transform (LT), The Region of convergence (ROC) for Laplace transforms, Properties of Laplace transforms, some Laplace transform pairs, Inverse Laplace transforms

SAMPLING: Sampling of continuous time signals, sampling theorem, reconstruction of signal from its samples, the effect of under sampling- aliasing, practical aspects of sampling.

Z - TRANSFORMS: The Z - Transform, The Region of Convergence (ROC) for Z - transform and its properties, properties of Z –transform

DISCRETE FOURIER TRANSFORM: Frequency domain representation of discrete time signals & Systems, Discrete Fourier transforms: Frequency domain sampling, Relationship of DFT to other transforms, Properties of DFT

FIR & IIR FILTERS: Design of linear phase FIR Digital Filters using Windows, IIR filter design (Butter worth) by suitable mapping technique, comparison of IIR & FIR filters

4. Books And Materials

Text Books:

1. Oppenheim A. V, Willisky (2009), Signals and Systems, 2nd edition, Prentice Hall of India, India.
2. John G. Proakis, Dimitris G. Manolakis (2007), Digital Signal Processing, Principles, Algorithms, and Applications, Pearson Education / PHI, India.

Reference Books:

1. Anand Kumar, Signals and Systems, PHI Learning Pvt. Ltd.
2. B. P. Lathi (2001), Signals, Systems & Communications, BS Publications, New Delhi.
3. M. H. Hayes (2007), Schaums Outlines of Digital Signal Processing, Tata McGraw Hill, India.
4. Dimitris G. Manolakis, Vinay Ingle (2011), Applied Digital Signal Processing, Cambridge University Press, Newyork.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE
A4531 – FUNDAMENTALS OF JAVA

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course provides OOP concepts using Java. The course focuses on different aspect of core Java Environment suitable to write efficient, maintainable, and portable code. It also ignites Object Oriented thinking and explores with the evolution of Java and its basics. It provides strong foundation on Inheritance, Packages, and Interfaces and also illustrates Exception Handling and Multithreaded mechanisms. In depth knowledge to implement Collection frameworks. Emphasis on AWT concepts used for GUI applications is given with event handling. The course plays a vital role in developing front-end interface for Mini and Major Projects.

Course Pre/ co-requisites

- Programming for Problem Solving (A4501)

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4531.1. Understand the principles of Object Oriented Programming to model real world problem.

A4531.2. Use various constructs / concepts to write programs in OOP paradigm.

A4531.3. Analyze the applications for Handling Exceptions and Multithreading in Java runtime environment.

A4531.4. Implement Collection Frameworks to retrieve and process data efficiently.

A4531.5. Build GUI applications using AWT for Interactive applications.

3. Course Syllabus

Introduction to OOP: Evolution of Java, OOP principles, Java Buzzwords, Implementing Java program, JVM, Data Types, Variables, Type conversions and Casting, Operators, Control statements, Arrays**.**CLASS, METHODS, OBJECTS AND CONSTRUCTORS- Classes, Objects, Methods, Constructors, this keyword, Overloading Methods and Constructors, Argument passing, Exploring String class.

Inheritance, Interfaces and Packages:INHERITANCE: Inheritance Basics, Using super, 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 and Implementing interfaces, Extending interfaces.

Exception Handling and Multithreading: EXCEPTION HANDLING-Exception Handling Fundamentals, Exception Types, Using try catch, throw throws and finally keywords, Built-in Exceptions, Creating own exception subclasses. MULTITHREADING- Life cycle of a thread, creating threads, thread priorities, Synchronizing threads, Interthread Communication.

Collections and Event Handling:COLLECTIONS FRAMEWORK-Collection classes- ArrayList, LinkedList, HashSet, and TreeSet. EVENT HANDLING-Delegation Event Model, Event Sources, Event Classes, Event Listener Interfaces, Handling Mouse and Keyboard Events, Adapter classes.

AWT: AWT Hierarchy, AWT controls – Label, Button, TextField, TextArea , Checkbox , CheckboxGroup List and Choice. Layout Managers: FlowLayout, BorderLayout, GridLayout, and CardLayout. Limitations of AWT.

4. Books and Materials

Text Books:

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, 10thEdition, 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.
4. T. Budd (2010), An Introduction to Object Oriented Programming, 3rd Edition, Pearson Education, India.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4532 – OPERATION RESEARCH

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. COURSE DESCRIPTION

Course Overview

Operation Research facilitates the comparison of every possible alternative (courses of action or acts) to Know the potential outcomes, permits examination of the sensitivity of the solution to changes or errors in numerical values, and encourage rational decision-making based on the best available approaches or Techniques.

Course Pre/co requisites

- A4001- Linear Algebra and Ordinary Differential Equations
- A4012- Probability and Statistics.

2. COURSE OUTCOMES (COS)

After the completion of the course, the student will be able to:

A4532.1. Explain the Operations Research features, models, applications and methods such as linear programming, transportation, sequencing, assignment, replacement, games theory.

A4532.2. Build mathematical models for finding optimum solutions for various real world problems and case studies.

A4532.3. Evaluate various alternatives available to aid in decision making situations.

A4532.4. Choose the best strategies to maximize the profit in the presence of a competitor

A4532.5. Devise operating policies for the efficient and effective management of men, materials and machines, production, distribution and service systems.

3. COURSE SYLLABUS

Theory

INTRODUCTION TO OPERATIONS RESEARCH: Basics definition, scope, objectives, phases, models and limitations of Operations Research. Linear Programming Problem, Formulation and Graphical solution of Linear Programming Problem. Simple Method, Artificial variables Techniques, big -M method.

TRANSPORTATION PROBLEM: Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions, North-West corner rule, least cost method and Vogel's approximation method.

Optimality test – MODI method. Assignment Problem-formulation, types, application to maximization cases and travelling salesman problem.

SEQUENCING MODELS: Solution of Sequencing Problem, Processing n Jobs through two machines, Processing n Jobs through three machines, Processing two Jobs through m machines, Processing n Jobs through m Machines.

QUEUING THEORY: Introduction, Single Channel, Poisson arrivals, exponential service times with infinite population and finite population models

REPLACEMENT MODELS and GAME THEORY: Replacement of Items that Deteriorate whose maintenance costs increase with time without change in the money value, Replacement of items that fail suddenly, individual replacement policy, group replacement policy. GAME THEORY: Formulation of games, types, solution of games with saddle point, graphical method of solving mixed strategy games, dominance rule for solving mixed strategy games.

4. BOOKS AND MATERIALS

Text Books:

1. S.D. Sharma (2010), Operations Research – Theory and Applications, 15th edition, Kedar Nath Ram Nath, , India.
2. Frederick S Hillier; Gerald J Lieberman (2015), Introduction to Operations Research,10th Edition, McGraw-Hill , New York

Reference Books:

1. Hamdy Abdelaziz Taha (2015), Operations Research: an Introduction, 9 th edition, Pearson, Boston
2. Prem Kumar Gupta & D S Hira (2015), Operations Research, Revised edition, S. Chand Publishing, New Delhi, India.
3. P Shankara Iyer (2008), Operations Research 1st Edition, Tata McGraw Hill, Publishing Company, New Delhi, India.
4. S Kalavathi (2012), Operations Research, 4th Edition, Vikas Publication.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4533 – FUNDAMENTALS OF DBMS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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, Recovery and various types of databases like distributed database, and intelligent database, Client/Server.

Course Pre/co requisites

A4531- Object oriented Programming

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4533.1: Understand design and implementation of a database for a given problem domain.
A4533.2: Construct Queries in Relational algebra, relational calculus and SQL.
A4533.3: Apply Normalization techniques to reduce data redundancy in data base.
A4533.4: Analyze various transaction control and recovery methods to keep data base consistent

3. Course Syllabus

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.

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

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.

TRANSACTIONS MANAGEMENT: Transaction concept, transaction state, implementation of atomicity and durability, concurrent executions, Anomalies due to interleaved execution of transactions, serializability, recoverability.

CONCURRENCY CONTROL AND RECOVERY SYSTEM: Concurrency control - lock based protocols, timestamp based protocols, validation based protocols, deadlock handling.

4. Books and Materials

Text Books

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

Reference Books

1. ElmasriNavate (2014), Fundamentals of Database Systems, Pearson Education, India
2. C. J. Date, A. Kannan and S. Swamynathan(2009),*An Introduction to Database Systems,*3rd Edition,Pearson Education, India.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4534 – FUNDAMENTALS OF OPERATING SYSTEMS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

Operating Systems is a graduate-level introductory course that teaches the basic concepts in operating systems like abstractions, mechanisms, and their implementations. This course also deals with Process Management & Synchronization, Inter process communication, Memory Management, Virtual Memory, File & Disk Management and Deadlock handling methods.

Course Pre/co requisites

A4505- Digital Design and Computer Organization

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4533.1. Understand the various services provided by the operating system.
A4533.2. Analyze the concepts of Process management and Synchronization in a multi processing system.
A4533.3. Apply the Memory management techniques for efficient usage.
A4533.4. Use File and Disk management schemes for effective storage management.
A4533.5. Demonstrate Deadlock Handling Methods to allocate resources among processes.

3. Course Syllabus

OPERATING SYSTEMS OVERVIEW: Definition, Operating System Types, Operating System operations, Operating system services, System calls and System Programs, Distributed Systems, Special Purpose Systems.

PROCESS MANAGEMENT: Process concepts- Process, Process State Diagram, PCB and Operations on processes, IPC- Pipes, Message Passing and Shared Memory. Process Scheduling- Scheduling Criteria, Scheduler Types and Scheduling Algorithms. PROCESS SYNCHRONIZATION-Concept of Synchronization, Critical section problem, Peterson's solution, Semaphores, Classic problems of Synchronization-The Bounded Buffer Problem, The Readers –Writers Problem, Dining - Philosophers Problem.

MEMORY MANAGEMENT: Introduction to Memory Management, Swapping, Contiguous Memory Allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, Page-replacement algorithms, allocation of frames, thrashing.

FILE SYSTEM AND MASS STORAGE STRUCTURE: Concept of a file – File Attributes, File Types, Access Methods, Directory Structure, File System structure, File System Implementation, directory implementation, File Allocation methods, and Free-Space management. MASS-STORAGE STRUCTURE: Introduction to Magnetic Disks, Disk Structures, Disk Scheduling, Swap Space Management, RAID Structure- Levels and Purpose.

DEADLOCKS: System Model, Deadlock Characterization, Deadlock Prevention, Avoidance, Detection and recovery from deadlock.

4. Books and Materials

Text Books:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2009), *Operating System Concepts*, 8th Edition, Wiley India Private Limited, New Delhi.
2. Dhananjay M. Dhamdhere (2009), Operating Systems, A Concept-Based Approach, 3rd Edition, McGraw Hill, New Delhi.

Reference Books:

1. William Stallings (2006), *Operating Systems, Internals and Design Principles*, 5th Edition, Pearson Education, India.
2. Achyuth S Godbole, Atul Kahate (2017),Operating Systems, 3rd Edition, McGraw Hill, New Delhi.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4631 - PRINCIPLES OF SOFTWARE ENGINEERING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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.

Course Pre/ Co-requisites:

The course has no specific prerequisite and co-requisite.

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4631.1. Understand metrics in the process and project domains.

A4631.2. Identify the right process model to develop the right software system.

A4631.3. Gather requirements and analyze them scientifically in order to develop the right product, besides authoring software requirements documents.

A4631.4. Apply testing strategies for application being developed.

A4631.5. Propose design as per functional and non-functional requirements using design principles.

3. Course Syllabus

INTRODUCTION TO SOFTWARE ENGINEERING: 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, Personal and Team Process Models, the Capability Maturity Model Integration (CMMI).

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, Behavioural Model, Model-Driven Engineering.

DESIGN CONCEPTS: The Design Process, Design Concepts, The Design Models, Architectural Design: Software Architecture, Architectural Genres, Architectural Styles.

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.

PRODUCT METRICS:A Framework for Product Metrics, Metrics for the Requirements Model, Metrics for Design Model, Metrics for Source Code, Metrics for Testing.

PROCESS AND PROJECT METRICS: Metrics in the Process and Project Domains, Software Measurements, Metrics for Software Quality.

RISK MANAGEMENT: Risk versus Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinements, Risk Mitigation Monitoring and Management (RMMM), The RMMM Plan.

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.

4. Books And Materials

Text Book (S)

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 Publishers, 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, 6th edition, Thomson Publications, India.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE
A4632 - E-COMMERCE TRENDS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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 Pre/co requisites:

The course has no specific prerequisite and co-requisite.

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4632.1. Illustrate the components and roles of the E-Commerce environment.

A4632.2. Understand legal and ethical issues related to E-Commerce and web marketing approaches.

A4632.3. Identify how to sell products and services on the web as well as to meet the needs of web site Visitors.

A4632.4. Analyze e-commerce payment systems.

3. Course Syllabus

INTRODUCTION TO E-BUSINESS AND E-COMMERCE: What is the difference between e-commerce and e-business, Anatomy of E-Commerce applications, E-Business risks and barriers to business adoption, Management responses to E-Commerce and E-Business, Electronic Commerce-Frame work.

E-COMMERCE FUNDAMENTALS- Location of trading in the marketplace, Business models for ecommerce, Focus on auction business models, Focus on Internet start-up companies.

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.
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.
E-SECURITY - Securing the Business on Internet- Security Policy, Procedures and Practices, Transaction Security, Cryptology, Digital Signatures, Security Protocols for Web Commerce.

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 eprocurement cost, implementing e-procurement.

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 and its applications, online buying process, focus on marketing communications for customer Acquisition, Customer retention management and Technology solutions for CRM.

4. Books And Materials

Text Book (S)

1. *E-Business and E-Commerce Management, strategy, Implementation and practice*, Dave Chaffey, Fourth Edition, Prentice Hall

Reference Books:

1. *Frontiers of electronic commerce* – Kalakata, Whinston,Pearson.
2. Bharat Bhaskar: *Electronic Commerce*,Tata Mc-Graw-Hill, New Delhi, 2003
3. *E-Commerce — Business, Technology, Society*, Kenneth C.Taudon, Carol Guyerico Traver.
4. *Electronic Commerce* Gary,P.Schneider — Thomson
5. *E-Commerce fundamentals and applications,* Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth - 215 - Chang, JohnWiley.
6. *E-Commerce*, S.Jaiswal –Galgotia.
7. *E-Commerce*, Efrain Turbon, Jae Lee, David King, H.Michael Chang.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4633 - FUNDAMENTAL OF CYBER SECURITY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

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.

Course Pre/co requisites

The course has no specific prerequisite and co-requisite.

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4633.1. Understand how to protect them self and ultimately society from cyber-attacks by studying various case studies.
A4633.2. Summarize different government cyber laws and cyber-forensics techniques.
A4633.3. Apply different techniques to classify different types of cybercrimes
A4633.4. Analyze cyber-attacks on different online web applications
A4633.5. Apply various investigating methods on the new cases using previous case studies

3. Course Syllabus

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.

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.

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.

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.
CASE STUDY: A Government's Approach to Cyber Security Policy

4. Books And Materials

Text Books:

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 SunitBelpure, Publication Wiley.
5. Rick Howard "Cyber Security Essentials" Auerbach Publications 2011

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4031 - NUMERICAL TECHNIQUES

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course offers more advanced topics of mathematics required to analyze the problems in engineering. Topics to be covered in this course include: Solution of Algebraic, Transcendental Equations and System of Linear Equations, Interpolation, Numerical Differentiation and Integration, Curve fitting, Numerical solutions of Ordinary and Partial differential equations. The mathematical skills derived from this course provides necessary base to analytical and theoretical concepts occurring in the program.

Course Pre/co requisites

The course has no specific prerequisite and corequisite.

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4031. 1. Apply appropriate Numerical method to find a root of an equation.

A4031. 2. Make use of interpolation to find approximate values of the function at intermediate points.

A4031. 3. Evaluate definite integral using appropriate Numerical methods.

A4031. 4. Construct curve of best fit for the bivariate data using method of least squares.

A4031. 5. Determine approximate solution of ordinary and partial differential equations.

3. Course Syllabus

Solution of Algebraic, Transcendental Equations and System of Linear Equations: Bisection method, Regula-Falsi method, Iteration method, Newton-Raphson method. Iterative methods of solution of system of equations: Jacobi's iteration method, Gauss-Seidel iteration method.

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

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 $y = ae^{bx}$, $y = ab^{x}$, $y = ax^{b}$ by the method of least squares.

Numerical Solution of Ordinary Differential Equations of First Order: Taylor's series method, Picard's method, Euler's and modified Euler's Method, Runge-Kutta method of fourth order, Predictor and Corrector methods: Milne's method, Adams-Bashforth-Moulton method.

Numerical Solution of Partial Differential Equations: Finite difference approximations to partial derivatives, Elliptic equations: Solution of Laplace equation by Liebmann's iteration process, Parabolic equations: Solution of one dimensional Heat equation by Schmidt explicit method and Crank-Nicolson implicit method.

4. Books And Materials

Text Book:

1. M.K. Jain, S.R.K Iyengar and R.K.Jain, *Numerical Methods for Scientific and Engineering Computation*, 5th Edition, New Age International Publishers, New Delhi, 2007.

Reference Books:

1. B.S.Grewal, *Higher Engineering Mathematics*, 43rd Edition, Khanna Publishers, New Delhi, 2014.
2. B.V. Ramana, *Higher Engineering Mathematics*, 23rd Reprint, Tata Mc-Graw Hill Education Private Limited, New Delhi, 2015.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4032 – MATHEMATICAL PROGRAMMING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The course deals with more advanced engineering mathematical topics which provide students to impart knowledge about various tools in Mathematical Programming to apply and solve real life problems in Engineering. The topics covered are Linear programming problem, Formulation and Graphical solution of Linear programming problem, Simplex method, Big -M method, Two-phase simplex method, Dual simplex method, Degeneracy in simplex and unbound solutions, Transportation problem, Assignment model, Replacement models and Sequencing models. The mathematical skills derived from this course provides necessary base to analytical and theoretical concepts occurring in the program.

Course Pre/co requisites

This course has no specific prerequisite and co requisite.

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4032.1.Identify LPP and express in mathematical form to solve by graphical or simplex method
A4032.2.Apply artificial variable techniques to obtain the optimal solution of an LPP
A4032.3.Interpret various methods under transportation model toget optimal results
A4032.4.Solve travelling salesmen problem using Hungarian method
A4032.5.Develop various replacement and sequencing models toarrive at an optimal decision

3. Course Syllabus

Introduction to Operations Research Basic definition, scope, objectives, phases, models and limitations of Operations Research. Linear Programming Problem, Formulation and Graphical solution of Linear Programming Problem Simplex method

Artificial Variables Techniques Big -M method, Two-phase simplex method, Duality in simplex method, Dual simplex method, degeneracy in simplex and unbound solutions.

Transportation problem Formulation, solution, unbalanced Transportation problem. Finding initial basic feasible solutions, North-West corner rule, lowest cost entry method and Vogel's approximation method. Optimality test- MODI method, degeneracy in transportation, restricted transportation problem, conditional transportation problem.

Assignment Model Formulation, Hungarian method for optimal solution, solving unbalanced problem, restricted assignment, conditional assignment problems, crew assignment problems, Travelling salesman problem, Transportation problem as assignment problem.

Replacement Models and Sequencing Models Replacement Models**:** Replacement of Items that Deteriorate whose maintenance costs increase with time without change in the money value, Replacement of items that fail suddenly, individual replacement policy, group replacement policy.

Sequencing Models: Solution of Sequencing Problem, Processing n Jobs through two machines, Processing n Jobs through three machines, Processing two Jobs through m machines, Processing n Jobs through m Machines.

4. Books and Materials

Text Book:

1. Robert Hisrich, Michael P. Peter, Dean A. Shepherd (2010), Entrepreneurship, 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

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4033 - SPECIAL FUNCTIONS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course offers more advanced topics of mathematics, required to analyze the problems in engineering. Topics to be covered in this course include: series solutions to Differential Equations, Bessel functions, Legendre polynomials, Hermite polynomials and Z - transforms. The mathematical skills derived from this course provides necessary base to analytical and design concepts occurring in the program.

Course Pre/co requisites

This course has no specific prerequisite and co requisite.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to:

A4033.1. Determine series solutions of ordinary differential equations about ordinary and regular singular points.

A4033.2. Solve problems in cylindrical and spherical coordinate systems using Bessel functions.

A4033.3. Relate algebraic polynomials with Legendre and Hermite polynomials.

A4033.4. Apply Z - Transforms to solve difference equations.

3. Course Syllabus

Series Solutions of Second Order Ordinary Differential Equations: Classification of Singularities, series solutions to Differential Equations around zero, Frobenius Method around zero.

Bessel Functions: Bessel's Differential equation, Recurrence formulae for $J_n(x)$, Generating function for $J_n(x)$, Orthogonality of Bessel functions.

Legendre Functions: Legendre's Differential equation, Rodrigue's formula, Legendre Polynomials, Generating function for $P_n(x)$, Recurrence formulae for $P_n(x)$, Orthogonality of Legendre functions.

Hermite Functions: Hermite's equation, Generating function of Hermite Polynomials, Orthogonal Property, Recurrence formulae for $H_n(x)$.

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.

4. Books and Materials

Text Books:

1. B.S. Grewal, *Higher Engineering Mathematics*, 43rdEdition, Khanna Publishers, New Delhi, 2014.

Reference Books:

1. *M.D. Raisinghania, Ordinary and Partial Differential Equations, 6th Edition,* S.Chand& Co. Ltd. New Delhi.
2. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4034 – ENTREPRENEURSHIP DEVELOPMENT

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course aims to provide students with an understanding of the nature of enterprise and entrepreneurship and introduces the role of the entrepreneur, will inculcate the knowledge of government supporting programs like financial assistance by public sector banks. Apart from this, students learn about the women entrepreneurs and success stories of women entrepreneurs, gain the knowledge of project management and profitability appraisal, focus on importance of training the new entrepreneurs as well as existing entrepreneurs.

Course Pre/co requisites

This course has no specific prerequisite and co requisite.

2. Course Outcomes (Cos)

After the completion of the course, the student will be able to:

A4034.1. Understand the role, characteristics, qualities and functions of entrepreneur and use this knowledge to become future entrepreneurs.

A4034.2. Interpret various Institutional supports for setting up a business enterprise and apply this knowledge while approaching these institutions for financial support.

A4034.3. Illustrate role, importance and functions of women entrepreneur and use this knowledge to become future women entrepreneurs.

A4034.4. Infer the concept of Project Management and steps in Project development and analyze while taking future project assignments.

A4034.5. Indicate training programs and different training institutions to impart training and apply this knowledge to train existing and future entrepreneurs.

3. Course Syllabus

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

INSTITUTIONAL SUPPORT: Role of Government: Role of IDBI, SIDBI, SIDO, NIESBUD, DIC, Entrepreneurship Development Institute, T-Hub (Telangana Hub).

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.

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.

ENTREPRENEUR TRAINING: Designing appropriate training programmes to inculcate Entrepreneurial Spirit, significance of entrepreneurial training, Feedback and Performance ofTrainees, NSIC, Pradhan Mantri Kaushal Vikas Yojana (PMKVY), Telangana Academy for Skill and Knowledge (TASK).

4. Books and Materials

Text Book:

1. Robert Hisrich, Michael P. Peter, Dean A. Shepherd (2010), Entrepreneurship, 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

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4035– HUMAN RESOURCE MANAGEMENT

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The Students are able to understand the nature and significance of human resource management in contemporary world, the challenges that HR managers face in performing the HR functions. The Course provides the various Human Resource Development functions that an organization deals with individual employees for employee and Organizational growth. It also addresses the grievances of the employees and settlement of disputes for Industrial relations.

Course Pre/co requisites

This course has no specific pre/co requisites.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to

A4035.1. Identify functions of Human Resource Management
A4035.2. Illustrate the process of Recruitment and selection
A4035.3. Analysis the needs and methods for training
A4035.4. Outline the functional relationship of performance and compensation
A4035.5. Illustrates the importance of Industrial relations through collective bargaining, trade unions and industrial settlement machinery.

3. Course Syllabus

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.

JOB ANALYSIS AND RECRUITMENT: Job analysis- Job description, Job specification, Sources of Recruitment; Selection, process of selection and techniques, Retention of Employees.

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.

COMPENSATION MANAGEMENT: Concepts and components of wages, Factors influencing wage fixation, Job evaluation, Methods of payment, Incentives and Fringe benefits.

INDUSTRIAL RELATIONS: Components of Industrial Relation, Trade Unions, functions of Trade Union, Employee Participation, Collective Bargaining, Grievance Redressal, Industrial Dispute Settlement machinery.

4. Books and Materials

Text Books:

1. BiswajeetPattnayak (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.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

OPEN ELECTIVE

COURSE STRUCTURE

A4036 – LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course addresses the concepts and techniques of Logistics and Supply chain management. It covers Customer services, Bench marking process, Sourcing issues. Apart from Network design and Co-ordination in supply chain, it discusses role of Information Technology and Global logistics & Global supply chain issues.

Course Pre/co requisites

This course has no specific pre/co requisites.

2. Course Outcomes (COs)

After the completion of the course, the student will be able to

A4036.1. Explain the concepts of Logistics & Supply chain management.
A4036.2. Analyze the role of Supply chain drivers & Customer services of supply chain.
A4036.3. Examine the Benchmarking process and role of Sourcing in supply chain.
A4036.4. Analyze Network design in supply chain along with Coordination in supply chain.
A4036.5. Examine the role of IT in supply chain as well as Global logistics & Global supply chain.

3. Course Syllabus

Introduction to 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, Role of Aggregate Planning in Supply Chain, Methods and Managing Supply and Demand.

Logistics Management: Introduction, Difference between Logistics and Supply Chain; Inbound, Inter and Outbound Logistics; Integrated Logistics Management; 3PL, 4PL, Intermodal and Reverse Logistics. 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. 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. 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. 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.

4. Books and Materials

Text Book:

1. K.Shridharabhat, “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.