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.

www.vardhaman.org

BACHELOR OF TECHNOLOGY

INFORMATION TECHNOLOGY

(Accredited by NBA)

CURRICULUM AND SYLLABI (VCE R19)

UNDER CHOICE BASED CREDIT SYSTEM

B. Tech. - Regular Four Year Degree Program

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

&

B. Tech. - Lateral Entry Scheme

(For batches admitted from the Academic Year 2020 - 2021)

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

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PROGRAM CURRICULUM STRUCTURE
B. TECH – INFORMATION TECHNOLOGY

REGULATIONS: VCE-R19

I YEAR I SEMESTER									
Induction Program for Two Weeks (Phase – I)									
Code	**Course**	**Category**	**Periods per Week**			**Credits**	**Assessment Tools Maximum Marks**		
			L	**T**	**P**		**CIE**	**SEE**	**Total**
A5001	Linear Algebra and Ordinary Differential Equations	BS	3	0	2	4	30	70	100
A5004	Applied Chemistry	BS	3	0	2	4	30	70	100
A5501	Python Programming	ES	1	0	4	3	30	70	100
A5201	Basic Electrical Engineering	ES	3	0	2	4	30	70	100
A5007	Engineering Exploration	ES	0	0	2	1	30	70	100
A5008	Co-Engineering Laboratory	ES	0	0	4	2	30	70	100
	TOTAL		10	0	16	18	180	420	600
I YEAR II SEMESTER									
Induction Program for One Week (Phase – II)									
Code	**Course**	**Category**	**Periods per Week**			**Credits**	**Assessment Tools Maximum Marks**		
			L	**T**	**P**		**CIE**	**SEE**	**Total**
A5002	Advanced Calculus	BS	3	1	2	5	30	70	100
A5003	Applied Physics	BS	3	0	2	4	30	70	100
A5005	Communicative English	HS	2	0	2	3	30	70	100
A5502	Data Structures	ES	3	0	2	4	30	70	100
A5301	Engineering Graphics & Computer Aided Drafting	ES	1	0	4	3	30	70	100
A5006	Social Innovation	ES	0	0	2	1	30	70	100
	TOTAL		12	1	14	20	180	420	600

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II YEAR I SEMESTER									
Code	Course	Category	Periods per Week				Assessment Tools Maximum Marks		
			L	T	P		CIE	SEE	Total
A5503	Discrete Mathematical Structures	PC	3	0	0	3	30	70	100
A5015	Managerial Economics and Financial Analysis	HS	3	0	0	3	30	70	100
A5506	Database Management Systems	PC	3	0	2	4	30	70	100
A5010	Probability and Statistics	BS	3	0	0	3	30	70	100
A5601	Object Oriented Programming	PC	3	0	2	4	30	70	100
A5505	Digital Design and Computer Organization	PC	3	0	0	3	30	70	100
A5014	Quantitative Aptitude	HS	1	0	0	1	30	70	100
A5012	Environmental Science	MC	2	0	0	0	-	100*	100*
TOTAL			**21**	**0**	**04**	**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
A5602	Formal Languages and Automata Theory	PC	3	0	0	3	30	70	100
A5510	Basics of IoT and Robotics	PC	3	0	2	4	30	70	100
A5508	Design and Analysis of Algorithms	PC	3	0	0	3	30	70	100
A5603	Web Technologies	PC	3	0	2	4	30	70	100
A5507	Operating Systems	PC	3	0	2	4	30	70	100
A5013	Verbal Ability and Logical Reasoning	HS	1	0	0	1	30	70	100
A5604	Advanced Data visualization techniques	PC	1	0	2	2	30	70	100
A5011	Gender Sensitization	MC	2	0	0	0	-	100*	100*
TOTAL			**19**	**0**	**8**	**21**	**210**	**490**	**700**

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III YEAR I SEMESTER

Code	Course	Category	Periods per Week			Credits	Assessment Tools Maximum Marks		
			L	T	P		CIE	SEE	Total
A5605	Software Engineering	PC	3	0	2	4	30	70	100
A5509	Computer Networks	PC	3	0	2	4	30	70	100
A5606	Mobile Application Development	PC	3	0	2	4	30	70	100
A5512	Machine Learning with Python	PC	3	0	2	4	30	70	100
	Professional Elective – I	PE	3	0	0	3	30	70	100
A5607	Internship – I	PW	0	0	4	2	100	-	100
A5016	Engineering Design Thinking	ES	0	0	2	1	30	70	100
A5019	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
A5516	Cloud Computing and Virtualization	PC	3	0	2	4	30	70	100
A5514	Big Data Analytics	PC	3	0	2	4	30	70	100
A5608	Information Security	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
A5517	Dynamic Web Application Development	PC	0	0	2	1	30	70	100
A5017	Product Realization	ES	0	0	2	1	30	70	100
A5609	Mini Project	PW	0	0	4	2	100	0	100
A5018	Essence of Indian Traditional Knowledge	MC	2	0	0	0	-	100*	100*
TOTAL			**17**	**0**	**14**	**22**	**310**	**490**	**800**

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IV YEAR I SEMESTER									
Code	Course	Category	Periods per Week			Credits	Assessment Tools Maximum Marks		
			L	T	P		CIE	SEE	Total
A5520	Artificial Intelligence	PC	3	0	0	3	30	70	100
A5610	Full Stack Development	PC	3	0	2	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
A5611	Project Work Phase – I	PW	0	0	8	4	100	-	100
A5612	Internship-II	PW	0	0	4	2	100	-	100
TOTAL			**12**	**0**	**14**	**19**	**320**	**280**	**600**

IV YEAR II SEMESTER									
Code	Course	Category	Periods per Week			Credits	Assessment Tools Maximum Marks		
			L	T	P		CIE	SEE	Total
A5020	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
A5613	Project Work Phase – II	PW	0	0	16	8	100	100	200
TOTAL			**9**	**0**	**16**	**17**	**190**	**310**	**500**

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Professional Elective –I			
Code	**Course**	**Code**	**Course**
A5651	Image Processing	A5652	C # and .Net Frame Work
A5555	Compiler Design	A5653	Computer Graphics
Professional Elective –II			
Code	**Course**	**Code**	**Course**
A5654	Computer Vision	A5553	Robotic Process Automation Design & Development
A5554	Routing and Switching Networks	A5655	Software Testing Methodologies
Professional Elective –III			
Code	**Course**	**Code**	**Course**
A5656	Block Chain Technology	A5556	DevOps
A5557	Data Mining	A5657	Design Patterns
Professional Elective –IV			
Code	**Course**	**Code**	**Course**
A5658	Digital Forensics	A5659	Human Computer Interaction
A5660	Deep Learning	A5661	Software Project Management
Open Electives			
Code	**Course**	**Code**	**Course**
A5131	Project Planning and Management	A5531	Fundamentals of Java
A5132	Air Pollution and Control	A5532	Fundamentals of DBMS
A5133	Disaster Management	A5533	Fundamentals of Operating Systems
A5231	Transducers and Measurements	A5631	Principles of Software Engineering
A5232	Solar Energy and Applications	A5632	E-Commerce Trends
A5233	Energy Management and Audit	A5633	Fundamental of Cyber Security
A5331	Basic Mechanical Engineering	A5031	Numerical Techniques
A5332	Introduction to 3D Printing	A5032	Mathematical Programming
A5333	Fundamentals of Robotics	A5033	Special Functions
A5431	Fundamentals of IoT	A5034	Entrepreneurship Development
A5432	Principles of Analog and Digital Communications	A5035	Human Resource Management
A5433	Introduction to Signal Processing	A5036	Logistics and Supply Chain Management

SYLLABI FOR I YEAR I SEMESTER

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I B.TECH I SEMESTER

COURSE STRUCTURE

A5001 - 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	0	2	42	0	28	4	30	70	100

1. Course Description

Course Overview

This course provides mathematical knowledge required to analyze problems encountered in engineering. In this course, the students are acquainted with the solution of system of linear equations, Eigen values and eigen vectors, ordinary differential equations of first and higher order and Laplace transforms. In addition, this course can be applied in many areas of engineering such as computer graphics, cryptography, wireless communication, signal processing, robotics and animation.

Course Pre/Co-requisites

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5001.1. Solve system of linear equations using rank of a matrix.

A5001.2. Examine the nature of Quadratic form using Eigen values and Eigen vectors.

A5001.3. Solve ordinary differential equations of first and higher order.

A5001.4. Make use of ordinary differential equations to solve engineering problems.

A5001.5. 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, Consistency of system of linear equations using the rank of a matrix.

Eigen Values, Eigen Vectors and Quadratic Forms: Linear transformation, Eigen values and Eigenvectors of a matrix, Properties of Eigen values and Eigen vectors of real and complex matrices (without proof), 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. 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, Solution of non-homogeneous Linear differential equations with constant coefficients of the form $f(D)y = Q(x)$ when $Q(x) = e^{ax}$, $\sin(ax+b)$ or $\cos(ax+b)$, x^n, $e^{ax}V(x)$, $x^nV(x)$ Equations reducible to linear differential

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.

Practice:

1. Study of Basic Scilab/ Matlab Commands
2. Matrix Constructors and Operations
3. Matrix Bitwise, Relational & Logical Operations
4. Solution of System of Linear Equations
5. Eigen values and Eigenvectors of a matrix
6. Rank, index, signature and nature of quadratic forms
7. Graphics – 2D Plots
8. Solution of ordinary differential equations of first order
9. Solution of ordinary differential equations of higher order
10. Laplace transforms
11. Inverse Laplace transforms
12. Solution of ordinary differential equations using Laplace transforms

4. Books: and Materials

Text Book

1. B S Grewal, *Higher Engineering Mathematics*, 43rd Edition, Khanna Publishers, New Delhi, 2014.

Reference Books:

1. B.V. Ramana, *Higher Engineering Mathematics*, 23rd Reprint, Tata Mc-Graw Hill Education Private Limited, New Delhi, 2015.
2. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.

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I B.TECH I SEMESTER

COURSE STRUCTURE

A5004 – APPLIED CHEMISTRY

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 offers a strong base in physical, organic, inorganic and general chemistry to spread over an orientation towards the molecules, general properties of materials and various instrumental techniques. In addition this course also focuses on fundamental principles of chemistry, potential applications, practical utility in order to understand engineering problems and synthesis of organic compounds.

Course Pre/Co-requisites

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5004.1. Extend the fundamental concepts of chemistry to describe various chemical Phenomena and application.

A5004.2. Compare the properties and applications of engineering substances.

A5004.3. Apply various reactions and fundamentals of stereo chemistry to understand organic chemistry.

A5004.4. Analyze the impurities present in the water for industrial and domestic applications.

A5004.5. Utilize the instrumental techniques and titrations to measure physical and chemical properties.

3. Course Syllabus

Theory

Electrochemistry and Batteries Electrochemistry: Introduction, Electrode- electrode potential, standard electrode potential, types of electrodes – Construction and functioning of Standard hydrogen, Calomel and Quinhydrone electrodes. Engineering Applications: Batteries: Cell and battery – Primary battery (dry cell) and Secondary battery (Lithium ion cell, lead acid battery, Nickel – Cadmium battery).Fuel cells: Hydrogen –Oxygen fuel cell – Applications.

Stereochemistry of 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. R, S nomenclature, Cahn-Ingold-Prelog rules. Geometrical isomerism of alkenes– cis, trans and E, Z configuration.

Organic Reactions and Drug Molecules: Introduction, Types of organic reactions. Substitution reactions – SN^1, SN^2.Addition reactions – hydrogenation (H_2), halogenation (X_2) and hydrogen halide (Markownikoff and Anti-Markownikoff rule) to olefins.Elimination reactions – E1 and E2.
Drugs: Structure, preparation and uses of commonly used drug molecules- paracetamol, aspirin and ibuprofen.

Engineering Materials:
A) High Polymers: Introduction, Types of Polymerization. Plastics: Thermoplastic resins & Thermosetting resins, preparation, properties and engineering applications of plastics: polyethylene, Poly vinyl chloride, Teflon, Nylon. Rubbers: Natural rubber and vulcanization. Synthetic rubbers: Buna-S, Buna-N. Fibers: Polyester- applications. Conducting Polymers: Classification, doping and applications.
B) Material Chemistry: Cement- Composition and manufacture of Port land Cement. Lubricants: Criteria of a good lubricant, classification. Refractory: Criteria of a good refractory, classification

Water Treatment: Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent – expression and units of hardness. Numerical problems. Boiler troubles: Sludges, scales and Caustic embrittlement. Internal treatment of boiler feed water – Calgon conditioning – Phosphate conditioning – Colloidal conditioning – Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis. Sewage water – Steps involved in treatment of sewage.

Practice:

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 Rf 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 methyl acetate.

4. Laboratory Equipment/Software/Tools Required

1. Digital Conductometer
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 Book

1. Jaya Shree Anireddy, Textbook of Engineering Chemistry, Wiley Precise Textbook Series, 2018.

Reference Books:

1. Jain & Jain. Engineering Chemistry: Dhanapathrai Publications., 2015.
2. S.S.Dara, Experiments and Calculations in Engineering Chemistry: S-Chand Publications, Revised edition, 2008

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I B.TECH I SEMESTER

COURSE STRUCTURE

A5501– PYTHON PROGRAMMING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
1	0	4	14	0	56	3	30	70	100

1. Course Description

Course Overview

As an introductory course for the B. Tech, the student will be learning 'PYTHON', which is a pre-requisite to many Programming Languages. The purpose of the course is to provide the Basic programming methodology and writing programs in python This course will enable one to learn programming skills necessary to implement all the basic mathematical , scientific calculations and various operations. Python is a general-purpose interpreted, interactive, object-oriented, and high-level programming language. This course will give the foundation required to learn other programming languages easily**.**

Course Pre/Co-requisites

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5501.1. Understand fundamentals of Python language.

A5501.2. Identify and construct common programming idioms: variables, loop, branch, Subroutine and input/output.

A5501.3. Use and manipulate Python lists, tuples, and dictionaries for compound data.

A5501.4. Build functions to increase code reusability.

A5501.5. Read and write data from/to files in Python.

3. Course Syllabus

Theory

Introduction to Python Programming: Features of Python, History of Python Downloading and Installing Python, Writing and Executing First Python Program. 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, if- elif-else statements. Loop Structures/Iterative Statements: while, for, Nested loops, continue, break, pass statements.

Strings and Its Operations: Concatenating, Appending, Multiplying strings, Built-in String methods and functions, Slice Operation, Iterating String, String Module.

Data Structures: Lists, Tuple, Sets, Dictionaries

Functions and File Handling: Declaration and Definition, Variable Scope and Lifetime, Return Statements, Types of Arguments, Lambda function, Recursion, , Random module. File Handling: Types of files, Opening, Closing, Reading, Writing, Merge Operations on files

Practice:

Week 1:

1. Write a python program to find the area of triangle
2. Write a python program to Take in the Marks of 5 Subjects and Display the average.

Week 2:

1. Write a program that asks the user 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 asks the user 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. There are 2.54 centimeters in an inch.

Week 3:

1. Ask the user 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. The GCD (greatest common divisor) of two numbers is the largest number that both are divisible

by. For instance, gcd(18, 42) is 6 because the largest number that both 18 and 42 are divisible by is 6. Write a program that asks the user for two numbers and computes their gcd. Shown below is a way to compute the GCD, called Euclid's Algorithm.

- First compute the remainder of dividing the larger number by the smaller number
- Next, replace the larger number with the smaller number and the smaller number with the remainder.
- Repeat this process until the smaller number is 0. The GCD is the last value of the larger number.

Week 4:

1. Write a program to print all Armstrong numbers between given range using for loop.

2. Write a program that asks the user to enter a string. The program should then print the following:

(a) The total number of characters in the string
(b) The string repeated 10 times
(c) The first character of the string (remember that string indices start at 0)
(d) The first three characters of the string
(e) The last three characters of the string
(f) The string backwards
(g) The seventh character of the string if the string is long enough and a message otherwise
(h) The string with its first and last characters removed
(i) The string in all caps
(j) The string with every a replaced with an e
(k) The string with every letter replaced by a space.

Week 5:

1. Write a program that asks the user 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 ask the user 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 of the system. If the

username is in the dictionary, but the user does not enter the right password, the program should say that the password is invalid. If the password is correct, then the program should tell the user that they are now logged in to the system.

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) Write a python program to read contents from a file and display the contents
2) Write a python program to display the number of characters, digits and special characters present in the given file content

Week 10:

1. You are given a file called grades.txt, where each line of the file contains a one-word student username and three test scores separated by spaces, like below:.
   Rathan 83 77 54
   Adams 86 69 90
2. Write code that scans through the file and determines how many students passed all three tests.

4. Laboratory Equipment/Software/Tools Required

- A Comupter System with Uuntu Operating System
- Python IDE

5. Books: and Materials

Text Books:

1. Python Programming using Problem solving Approach – Reema Thareja, Oxford University Press
2. Budd, Exploring Python. McGraw Hill, 2008
3. Zelle, Python Programming: An Introduction to Computer Science. Franklin, Beedle & Assoc., 2010
4. Pearson Education Publishing Starting Out with Python 3rd (2015)

Reference Books:

1. Dive into Python 3, Mark Pilgrim, http://www.diveintopython3.net/
2. Think Python, 2nd Edition, Allen B. Downey, http://greenteapress.com/wp/think- python-2e/
3. Algorithm Design, Jon Kleinberg and Eva Tardos, Pearson (2013)

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I B.TECH I SEMESTER

COURSE STRUCTURE

A5201 – BASIC ELECTRICAL 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

Basic Electrical Engineering is an integrated course intended to enhance the knowledge of students in electric circuits, DC & AC machines and develop analytical skills. The course addresses the underlying concepts and methods behind Electrical Engineering. The course presents the knowledge of the Fundamentals of Electrical Engineering, basic principles, types of electrical circuit and network theorems. The principle and operating conditions of D.C. Machines (Motor & Generator), Transformers, Induction Motors and alternators will be discussed.

Course Pre/Co-requisites

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5201.1. Apply network reduction techniques and knowledge of alternating quantities to calculate current, Voltage and Power for complex circuits.

A5201.2. Analyze the electrical circuits using Nodal Analysis, Mesh Analysis and Network Theorems.

A5201.3. Plot and analyze the characteristics of DC machines ,AC Machines and 1-Phase Transformers

A5201.4. Test the performance of DC Machines, 1-Phase Transformers and AC Machines.

3. Course Syllabus

Theory

DC Circuits: Electrical circuit elements (R, L and C), Types of sources, KVL & KCL, Network reduction Techniques (Series, Parallel & Star-Delta), Mesh and Nodal Analysis, Thevenins, Nortons and Superposition Theorems (DC Excitation)

Network Parameters: Two port network parameters - Z, Y and hybrid parameters (DC Excitation)AC Circuits: Representation of sinusoidal waveforms, Average & RMS value, Peak factor, Form factor for

sinusoidal waveforms, j-notation, Analysis of single-phase AC circuits consisting of R, L, C, RL, RC, RLC combinations (series), Active power, Reactive power, Apparent power and power factor.

Single Phase Transformers: Types, Principle & constructional details, EMF equation, operation on NO load and ON Load Condition, Phasor diagrams. Equivalent circuit, losses and efficiency, OC and SC Test.

DC Machines: Dc Generators - Principle of operation, E.M.F Equation, Methods of Excitation – separately excited and self excited generators. DC Motors – Types-Principle of operation - Back E.M.F, Torque equation, torque-speed characteristics and speed control of separately excited dc motor.

AC Machines: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, torque-slip characteristics. Construction and working of synchronous generator, No-Load Characteristics.

Practice:

(Any 12 Experiments)

1. Verification of Ohm's Law.
2. Verification of KVL and KCL.
3. Verification of superposition theorem.
4. Verification of Thevenin's and Norton's theorems.
5. Determination of Z and Y parameters.
6. Determination of hybrid parameters.
7. Calculation and Verification of Impedance, Voltage and Current of RL, RC and RLC series circuits.
8. Measurement of Voltage, Current and Real Power in primary and secondary circuits of a single phase Transformer.
9. Load Test on Single Phase Transformer.
10. OC & SC Tests on Single phase Transformer.
11. Torque-Speed Characteristics of a DC Compound Motor.
12. Brake test on a 3 phase Induction Motor.
13. Performance Characteristics of a Separately Excited DC Motor.
14. 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. 3 Phase induction motor.
5. Separately Excited DC motor.

6. 3 Phase Alternator.
7. Resistors.
8. Bread boards.
9. Regulated Power Supply.

5. Books: and Materials

Text Books:

1. William Hart Hayt, Jack Ellsworth Kemmerly, Steven M. Durbin (2007), *Engineering Circuit Analysis,* 7th edition, McGraw-Hill Higher Education, New Delhi, India.
2. Vincent Deltoro, *Electrical Engineering Fundamentals*, 2nd edition, Prentice Hall India, 1989.

Reference 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.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

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I B.TECH I SEMESTER

COURSE STRUCTURE

A5007– 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

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5007.1: Compare and contrast the contributions of different types of engineers in the development of a product, **process** or system.

A5007.2: Apply the common engineering design process to solve complex problems and arrive at viable solution

A5007.3: Explore various contemporary software and hardware tools to provide solutions for the problems.

A5007.4: Apply skills needed for successful team work including the basics of project management and written and oral communication.

A5007.5: 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

Practice::

- 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, WilliamD. Keat, GeorgeWise, 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, McGraw-Hill Education, 2016.
3. W. Richard Bowen, Engineering Ethics – Outline of an aspirational approach, Springer London.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

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I B.TECH I SEMESTER

COURSE STRUCTURE

A5008 – CO-ENGINEERING LABORATORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	4	0	0	56	2	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 surveying instruments and types of building material sand its identification. Mechanical engineering 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 has no specific prerequisite

2. Course Outcomes (COs)

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

A5008.1. Identify various surveying tools and choose building materials according to field conditions.

A5008.2. Analyze the basic circuit connections, maintenance and troubleshooting of house hold equipments.

A5008.3. Make use of various electrical and electronic components to construct simple mentscircuit sand measure various physical quantities.

A5008.4. Explain basic components used in different trades.

A5008.5.Identify the associated tools used in different trades.

3. Course Syllabus

Civil Workshop

1. Field tests on cement
2. Demonstration of surveying chains
3. Different types of brick bonds
4. Types of Construction materials and identification
5. Demonstration of the odolite and total station

Electrical Workshop

1. One Lamp controlled by one way switch.
2. One Lamp controlled by two two-way switches.
3. Two Lamps controlled by two way switch (parallel connection).
4. Two Lamps controlled by one way switch (series connection).
5. Tube Light controlled by one way switch

Mechanical Workshop

1. Fitting Trade: To make a L- fit from the given M.S Flat material piece.
2. Carpentry Trade: To make a cross lap joint as per specification.
3. Tin Smithy: To make a open scoop with the given sheet metal
4. Foundry: To prepare a sand mould using a single piece pattern.
5. Plumbing: To make external threading on a given pipe

Electronics Workshop

1. Study of Basic Electronic Components (resistors, capacitors and inductors, switches, relay, breadboard), Resistor color coding, Difference between AC and DC Signals.
2. Demonstrate the use of DC Voltmeter, DC Ammeter, Multimeter and Regulated Power Supply. Verify Voltage Division and Current Division Principles by connecting simple circuits on Breadboard. Measure voltage and current using meters
3. Demonstrate the use of Cathode Ray Oscilloscope and Function Generator. Measure amplitude, time period, and frequency of an AC signal
4. Introduction to Multisim Electronic Workbench Practice: - DC Operating Point and DC Analysis
5. Multisim - Transient Analysis, Use of Virtual Instruments like Meters, Function Generator and CRO

4. Laboratory Equipment/Software/Tools Required

Civil Workshop

1. Cement, Sieve
2. 30 m chain, 20 m chain
3. Bricks, Sprit level, Mason level, Straight level
4. Stone, Tiles, Bricks, Aggregates
5. The odolite, Total station

Electrical Workshop

1. One way switch, two way switch, tube light with frame, choke, connecting wires, holders, bulbs, Energy meter, Indicator

Mechanical Workshop

1. Follow a sequence of operations like filing, marking, punching, cutting and finishing.

2. Follow a sequence of operations like planning, marking, cutting, chiseling and finishing.
3. Follow a sequence of operations like marking, shearing, bending, folding, squeezing, pressing and finishing.
4. Follow a sequence of operations like preparing moulding sand, placing the pattern, filling the sand, ramming, gate cutting, placing the sprue pins and finishing.
5. Follow a sequence of operations like marking, cutting, threading and testing.

Electronics Workshop

1. Resistors, Capacitors, Inductors, Switches, Relays, Breadboard
2. DC Voltmeter and Ammeter, Multimeter and RPS
3. CRO and Function Generator
4. NI Multisim Software
5. NI Multisim Software

5. Books: and Materials

Text Books:

1. B.C.Punmia,AshokKJain,ArunKJain,SurveyingVol.I,LaxmiPublications, 2016.
2. B. L. Juneja, "*Workshop Practice:*", 1st Edition, Cengage Learning India Private Limited, New Delhi, 2015.
3. P. Kannaiah and K.L. Narayana, *Workshop Manual*, 2nd Edition 2009, SCITECH Publications Pvt Ltd.
4. Paul Scherzand Simon Monk, "Practica electronics for Inventors", McGrawHill,4th Edition.

Reference Books:

1. S.K. Duggal, Building Materials, 4th edition New age Publication,2012.
2. Varghese , P.C. Building construction, Prentice Hall of India Pvt. Ltd, New Delhi, 2nd revised edition, 2016
3. K.Venkata Reddy," *Workshop Manual*", 6th Edition Reprint, BSP Publications, Hyderabad, 2018.

SYLLABI FOR I YEAR II SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

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I B.TECH II SEMESTER

COURSE STRUCTURE

A5002– ADVANCED CALCULUS

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

This course provides mathematical knowledge required to analyze problems encountered in engineering. This course covers Evaluation of integrals, Functions of several variables, Vector Calculus and Transform Calculus. Further, this course can be applied in many areas of engineering such as electromagnetic, gravitational fields, signal analysis and image processing.

Course Pre/Co-requisites

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5002.1. Examine the extremum of a function of several variables.
A5002.2. Evaluate definite and indefinite integrals
A5002.3. Determine Divergence and Curl of a vector point function
A5002.4. Make use of vector integral theorems to evaluate area, surface area and volumes
A5002.5. Build Fourier series and Fourier transforms of a given function

3. Course Syllabus

Theory

Mean Value Theorems And Multivariable Calculus: Rolle's Theorem, Lagrange's mean value theorem and Cauchy's mean value theorem, Taylor's and Maclaurin's series. 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 curve by double integration, Triple integrals, Change of variables, Volume of solid by triple integration. Evaluation of improper integrals: Beta and Gamma functions and their properties

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 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 transforms, Fourier sine and cosine transforms, Inverse Fourier transforms.

Practice:

1. Partial derivative of a given function
2. Area between curves of one variable
3. Double Integral in a rectangular domain
4. Change of variables in double integrals
5. Area using double integrals (Cartesian and Polar Coordinates)
6. Vector operations
7. Position vector, Centre of mass of a system of discrete particles
8. Equation of a plane in space, Cartesian and polar representations of vectors in the xy-plane
9. Line integrals independent of path
10. Work of a force as a line integral
11. Calculating Fourier coefficients
12. Calculating and Plotting Fourier series

4. Books: and Materials

Text Book(s)

1. B.S. Grewal, *Higher Engineering Mathematics*, 43rdEdition, Khanna Publishers, New Delhi, 2014.

Reference Book(s)

1. R.K.Jain and S.R.K.Iyengar, *Advanced Engineering Mathematics*, 4th Edtion, Alpha Science International Limited, 2014.
2. B.V. Ramana, *Higher Engineering Mathematics*, 23rd Reprint, Tata Mc-Graw Hill Education Private Limited, New Delhi, 2015.
3. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.

I B.TECH II SEMESTER

COURSE STRUCTURE

A5003– APPLIED PHYSICS

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

Applied Physics course is an integrated course which introduces fundamental Physics with applications to semiconductors and other electronic devices focusing on the principles of their operation. A part of the course is focused on current transport across semiconductor junctions. This interdisciplinary knowledge which includes lasers, wave optics, optical fibres and nanomaterials encourages an understanding of technological applications of physics and its importance as a subject of social and industrial relevance enabling the students to design and innovate. This course demonstrates various semiconductor materials behaviour through experiments.

Course Pre/Co-requisites

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5003.1. Classify materials based on their crystal structures.
A5003.2. Utilize quantum mechanics to interpret the properties of semiconducting materials.
A5003.3. Apply wave property of light to study different optical phenomenon.
A5003.4. Develop communication systems by means of lasers and optical fibers.
A5003.5. Analyze the principles of nanotechnology for electronic applications.

3. Course Syllabus

Theory

Quantum Mechanics: Introduction, Planck's constant and Photo Electric Effect, de-Broglie hypothesis, dual nature of matter, matter waves.

Crystal Structures: 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. Bragg's law. Crystal structures of ZnS, Silicon (diamond).

Semiconductor Physics: Types of electronic materials: Metals, semiconductors, and insulators based on Band theory of solids, Density of states, Position of Fermi level in Intrinsic and Extrinsic semiconductor, Fermi-Dirac distribution function, Carrier concentration in Intrinsic and Extrinsic semiconductors, Carrier transport: Diffusion and Drift, Hall Effect, P-N junction diode – V-I Characteristics, LED – working principle and characteristics.

Wave Optics: Huygens' Principle, superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Fraunhofer diffraction from a single slit and a circular aperture, diffraction gratings and their resolving power.
Lasers: Absorption, spontaneous and Stimulated emission, Einstein's coefficients, population inversion, pumping processes, three and four level laser systems, Ruby Laser, He-Ne laser, Semiconductor laser (homo junction), Applications of lasers

Optical Fibres: Introduction to Optical fibres, total internal reflection, Acceptance angle, Numerical aperture, step and graded index fibre, Losses in optical fibres, Applications of optical fibres.

Nanoscience: Characteristics and Types (1-D, 2-D, 3-D) of nano-materials, surface to volume ratio, Top down (Ball Milling) and Bottom up (Sol-Gel - chemical Synthesis), Sputtering (Physical deposition), Graphene, CNT, Quantum Dots and applications of nanomaterials.

Practice:

1. Determination of the value of Planck's constant 'h' and work function (w) by using Photo cell.
2. Determination of the energy gap of a given semiconductor.
3. Study the PN junction diode characteristics under Forward & Reverse bias conditions.
4. Verification of the type of semi-conductor material, and estimate the density of majority carriers by using Hall-Effect.
5. Determination of threshold voltage and study the V-I characteristics of LED.
6. To determine the radius of curvature of a Plano convex lens and the wavelength of Sodium light by
   Newton's rings method.
7. To identify the number of lines on plane transmission grating and also to measure the wavelengths
   of spectral lines of a Mercury (Hg) source using diffraction grating and a spectrometer.
8. Determination of the wavelength of a given source of Laser light and to identify the number of lines on plane transmission grating.
9. Evaluate the numerical aperture (NA) and acceptance angle (θa) of a given optical fiber and Estimate the transmission loss in a given optical fiber.
10. Measure the bending loss in a given optical fiber and to estimate transmission or propagation loss
    in a given optical fiber.

4. Laboratory Equipment/Software/Tools Required

1. Photo Emissive Cell
2. Regulated power supply (DC and AC)
3. Hall Effect Setup
4. Light Emitting Diode Kit
5. Semiconductor Laser Source
6. Spectrometer
7. Plane diffraction grating
8. Optical fiber trainer kit
9. Meters - Ammeter, Voltmeter, Digital Multimeter
10. Diodes, Resistors, Capacitors, Bread Board

5. Books: and Materials

Text Book

1. Pandey, B. K. and Chaturvedi, S. (2014), *Engineering Physics*, New Delhi: Cengage Learning India Pvt. Ltd.

Reference Books:

1. N. Subrahmanyam, BrijLal, A Textbook of Optics, S Chand, New Delhi, 2015
2. P.K. Palanisamy. Engineering Physics. Scitech, Fouth Edition, 2014.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

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I B.TECH II SEMESTER

COURSE STRUCTURE

A5005– COMMUNICATIVE ENGLISH

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 has been designed to develop linguistic and communicative competencies among engineering students. Focus has been given to all the four skills of language; Listening, Speaking, Reading and Writing. Listening and speaking skills of the students are designed to be honed in the ELCS lab with the help of a lab manual focusing on Communicative English Skills: phonetics, word accent and intonation, making effective oral presentations, role- play, telephonic skills, asking for and giving directions, etc. In the ELCS lab the students are trained 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. The Reading and Writing skills of students are polished in the theory classrooms with the help of prescribed textbooks which additionally focus on grammar and vocabulary. The students are encouraged to read texts/poems which are aimed at developing their comprehension skills as well their idea of language analysis.

Course Pre/corequisites

This course has no specific prerequisite and co requisite.

2. Course Outcomes (COs)

A5005.1. Build competence in grammar and vocabulary

A5005.2. Develop competence in vocabulary to enable effective written and spoken and listening comprehension.

A5005.3. Develop effective academic reading skills

A5005.4. Identify learner problems in written communication to build the language skills.

A5005.5. Construct effective academic writing skills.

3. Course Syllabus

VOCABULARY

Word Formation – Prefixes – Suffixes – Guessing the meanings of the words using prefixes and suffixes- Standard Abbreviations - Synonyms – Antonyms - **:** Homonyms, Homophones, Homographs, and Foreign Words - Redundancies – Clichés - Idiomatic Expressions One Word Substitutes.

GRAMMAR

Articles – Prepositions - Changing words from one form to another – Concord – Tenses: Present, Past and Future Active and Passive Voice - Noun-Pronoun Agreement – Misplaced Modifiers

READING

Presidential Address by APJ Abdul Kalam: Techniques for effective comprehension -Skimming and Scanning-Types of texts – Summarizing - **The Road Not Taken (Robert Frost):** Reading using different strategies: Types of Reading – Extensive and Intensive-Do's and Donts of 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 - Exercises for practice

WRITING

Sentences – Paragraphs – Cohesion – Coherence – Logical, Lexical and Grammatical Devices – Punctuation – Types of Paragraphs: Description – Definition – Classification - Letter Writing – Formats, Styles, Parts – Letters of Requisition, Letters of Inquiry, Letters of Apology - Information Transfer: Bar Charts – Flow Charts – Tree Diagrams **-** Essay writing: Introduction – Conclusion- Précis Writing: Introduction – Steps to Effective Précis writing – Guidelines.

	PRACTICE
S. No	**Title of the Experiment**
1	**CALL:** Introduction to Phonetics - Speech Sounds – Vowels and Consonants **ICS:** Ice-Breaking activity and JAM session.
2	**Module – 2:** **CALL:** Past Tense Marker and Plural Marker – Syllable Structure – Consonant Clusters - Minimal
3	**Module – 3:** **ICS:** Situational Dialogues – Role-Play – Expressions in Various Situations: Greetings: Self-introduction and Introducing others – Apologies – Requests – Complaints– Congratulating – Expressing sympathy/ condolences.
4	**Module – 4:** **CALL:** Basic Rules of Word Accent – Stress Shift – Weak Forms and Strong Forms
5	**Module – 5:** **ICS:** Asking for and Giving Directions – Giving Instructions – Seeking Clarifications – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice –

	PRACTICE
S. No	**Title of the Experiment**
	Making Suggestions
6	**Module – 6:** **CALL:** Neutralization of Mother Tongue Influence-Common Indian Variants in Pronunciation – Differences between British and American pronunciation
7	**Module – 7:** **CALL:** Intonation Patterns-Types of Tones - Sentence Stress
8	**Module – 8:** **ICS:** Social and Professional Etiquette - Telephone Etiquette
9	**Module – 9:** **ICS:** Oral Presentation Skills (short presentations) - Making a Presentation-Prepared – Extempore
10	**Module – 10:** **ICS:** Listening-Types of Listening-Steps to effective Listening –Business Listening Comprehension exercises

4. Books and Materials

Text Book(s)

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 Book(s)

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

I B.TECH II SEMESTER

COURSE STRUCTURE

A5502– 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	0	14	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. Data structures like linked lists, stacks and queues will be discussed to implement real time applications. The course also includes non-linear data structures like Trees and Graphs which are especially used to handle large amount of data. Study of the C programming language that covers the syntax and constructs of data types, control statements, arrays, functions, pointers and structures. C programming language Concepts are used to implement the concepts of Data Structures.

Course Pre/Co-requisites

- A5501 - Python Programming

2. Course Outcomes (COs)

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

A5502.1. Understand the fundamentals of C Concepts and its Constructs.

A5502.2. Apply the concepts of Arrays, functions, pointers and structures in real world applications.

A5502.3. Perform various operations on linear data structures.

A5502.4. Implement various Non Linear data structures.

A5502.5. Select appropriate searching and sorting techniques for given application.

3. Course Syllabus

Theory

C Overview: Structure of a C program, data types, operators, type conversion, formatted input/out functions, Control statements.

Arrays, Functions, Structures and Pointers: Arrays: one dimensional arrays, two dimensional arrays, string manipulation functions. Functions- categories of user defined functions, parameter passing

techniques, recursion. Pointers- declaration, initialization, pointer to pointer, dynamic memory allocation, command line arguments. Structures- declaration, initialization, accessing the members, pointers to structures.

Introduction to data structures: Introduction, Classification of Data Structures, Operations on Data Structures, Time, Space Complexity and Asymptotic Notations. Stacks: Introduction, Array Representation of Stack, Operationson Stack. Applications of Stacks: towers of Hanoi, Infix-to- Postfix conversion, evaluating Postfix expressions. Queues: Introduction, Array representation of Queue, Operations on a Queue, Circular Queue.

Linked Lists, Trees and Graphs: Introduction, Singly Linked List: Representation of a Singly Linked List, Operations on a Singly Linked List and Doubly linked list. Trees-Definition, Basic Terminologies, Representation of a Binary Tree using Array and Linked List, Operations on a Binary Tree: create, insert, Tree Traversals. Graphs: Definition, Basic Terminologies and Representation.

Searching and Sorting Techniques: linear search, binary search, bubble sort, selection sort, insertion sort, merge sort.

Practice:

Week-1:

a. Write a C program to print your name and address in line by line.
b. Write a C program to calculate simple interest
c. Write C program for Swapping of two numbers using a third variable.

Week-2:

a. Write C program to find the largest and smallest number among a list of integers.
b. Write a C program to find multiplication of two matrices.
c. Write a C program to demonstrate the string handling functions.
d. Write a C program to Check whether the given string is palindrome or not with string functions.

Week-3:

a. Write a C program to find the factorial of a number using non recursion.
b. Write a C program to find the n^{th} Fibonacci term using non recursion.
c. Write a C program to find the factorial of a number using recursion.
d. Write a C program to find the n^{th} Fibonacci term using recursion.

Week-4:

a. Write a C program to Read an array of integers whose size will be specified interactively at rum time
b. Write a C program to Pass n number of arguments at the command line and display total number of arguments and their names.

c. Write a C program to Create a Student structure containing name, rollNo and grade as structure members. Display the name, rollNo and grade of a student.

Week-5:

a. Implement stack operations using arrays.
b. Implementing towers of Hanoi.

Week-6:

a. Converting infix expression to postfix expression
b. Evaluate the postfix expression

Week-7:

a. Implement Queue using arrays
b. Implement Circular Queue using arrays

Week-8:

Implement single linked list.

Week-9:

Implement double linked list.

Week-10:

Implement Traversals on Binary Tree using linked list.

Week-11:

a. Implement Linear Search
b. Implement Binary search

Week-12:

a. Implement Bubble sort
b. Implement Selection sort
c. Implement Insertion sort

4. Laboratory Equipment/Software/Tools Required

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

5. Books: and Materials

Text Book

1. ReemaThareja (2014), Data Structures Using C, 2nd Edition, Oxford University Press India

Reference Books:

1. SamantaDebasis (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

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I B.TECH II SEMESTER

COURSE STRUCTURE

A5301– 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
1	0	4	14	0	56	3	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 and their relationships based on certain basic principles and standard conventions. It can be regarded as a powerful tool to convey 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 is common for all disciplines where they don't undergo these courses except CE and ME students.

Course Pre/Co-requisites

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5301.1. Construct various types of curves commonly used in engineering Practice:.
A5301.2. Distinguish between first, second, third and fourth angle projections of systems
A5301.3. Estimate lateral surface of the sheet metal requirement for making regular solids
A5301.4. Compare isometric and orthographic views of an object.
A5301.5. 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, Lettering and dimensioning, Conic Sections – General method only.

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of points, lines and planes - inclined to one plane and inclined to both the principal planes.

Projections of Regular Solids: Orthographic projections of Prism, Cylinder, Pyramid and Cone inclined to one of the principal plane.

Development of Lateral Surfaces: Development of lateral surfaces of Regular Solids – Prism, Cylinder, Pyramid and Cone.

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple Solids. Conversion of Isometric Views to Orthographic Views and Vice-versa.

Practice::

1. Introduction to engineering drawing: Introduction to engineering drawing: Introduction - Principles of Engineering Graphics and their significance- Usage of Drawing instruments.
2. Lettering, dimensions- Geometrical Constructions (Construction of different Polygons):Lettering and dimensions- Geometrical Constructions (Construction of different Polygons).
3. Conic section: Construction of Ellipse – definition -General Method- Construction of Parabola – definition -General Method- Construction of Hyperbola –definition -General Methods.
4. Projection of points: Principles of Orthographic Projections – Introduction- Conventions – First and Third Angle projections- Projection of Points.
5. Projection of Lines: Parallel, Perpendicular to one of the reference plane inclined to one plane and inclined to both the planes.
6. Projection of planes: Projection of Regular Planes - Plane parallel, perpendicular to one of the reference plane- Projection of Regular Planes - inclined to one reference plane.
7. Projection of planes: Projection of Regular Planes - inclined to both reference planes.
8. Projections of regular Solids: Projections of regular Solids: Introduction -parallel to one of the plane.
9. Projections of regular Solids: Regular solids inclined to one plane and parallel to other plane.
10. Development of surfaces: Development of surfaces of right regular solids –Introduction - Development of Prisms- Development of cylinder.
11. Development of surfaces: Development of Pyramids - Development of Cones.
12. Isometric Projections: Principles of Isometric Projections –Introduction - Isometric Scale – Isometric Views conventions- Isometric Views of Lines and Planes- Isometric Projection of Simple Solids.
13. Isometric Projections: Conversion of Isometric Views to Orthographic Views-simple objects.
14. Isometric Projections: Conversion of orthographic views to isometric views – simple objects.

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

I B.TECH II SEMESTER

COURSE STRUCTURE

A5006 – 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

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5006.1. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions and redox potentials.
A5006.2. Apply various titrations for the estimation of strengths of solutions and hardness of water.
A5006.3. Identify different samples from a mixture by using various separation techniques.
A5006.4. Estimate rate constants of reactions from concentration of reactants/products as a function of time.
A5006.5. 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, prototyping 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. Robin Murray, 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 : A deliverable of the project:"The theoretical, empirical and policy foundations for building social innovation in Europe" (TEPSIE), European Commission–7th Framework 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 II YEAR I SEMESTER

II B.TECH I SEMESTER

COURSE STRUCTURE

A5503 – 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

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5503.1. Understand the importance of statements and predicate calculus in deriving valid inferences.

A5503.2. Use relations and ordering methods to identify the relationship among the elements in the system.

A5503.3. Select suitable algebraic systems to find solutions for real time problems.

A5503.4. Apply the graph theoretical concepts to solve network related problems.

A5503.5. 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 Subgraphs, 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 Books:

1. J. P. Trembly, R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, India.
2. 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.

Reference Book

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, 7th Edition, Tata McGraw Hill, India.

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II B.TECH I SEMESTER

COURSE STRUCTURE

A5015– 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

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5015.1. Explain the concepts of Managerial Economics and Financial Accounting.
A5015.2. Analyze interrelationship among various economic variables and it's impact.
A5015.3. Classify the market structure to decide the fixation of suitable price.
A5015.4. Analyze financial statements to assess financial health of business.
A5015.5. 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 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.

Reference Books:

1. A.R. Aryasri (2011), *Managerial Economics and Financial Analysis*, TMH, India.
2. D.M.Midhani (2009), *Managerial Economics*, Himalaya Publishing House, Mumbai.

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II B.TECH I SEMESTER

COURSE STRUCTURE

A5506 – 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

- A5503 - Discrete Mathematical Structures
- A5601 - Object oriented Programming

2. Course Outcomes (COs)

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

A5506.1. Understand design and implementation of a database for a given problem domain.
A5506.2. Construct Queries in Relational algebra, relational calculus and SQL.
A5506.3. Apply Normalization techniques to reduce data redundancy in data base.
A5506.4. Analyze various transaction control and recovery methods to keep data base consistent
A5506.5. Construct the file of data records by using appropriate storage and access structure.

3. Course Syllabus

Theory

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

the E-R model .SQL - PART I- database languages- DDL , DML, DCL and TCL commands ,Overview, the form of a basic SQL query, basic SQL queries examples, union, intersect and except operators, aggregate operators.

The Relational Model: Introduction to the relational model, integrity constraints over relations, querying relational data, logical database design: E-R to relational. SQL-PART II: joins, nested queries, null values, PL/SQL basics for writing triggers, cursors, stored procedures, SQL Vs NoSQL. RELATIONAL ALGEBRA AND CALCULUS - relational algebra and relational calculus.

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

Transactions Management and Concurrency Control: Transaction concept, transaction state, implementation of atomicity and durability, concurrent executions, Anomalies due to interleaved execution of transactions, serializability, 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 Same day.
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 two sailors.
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 of 10.
20. Find the average age of sailors for each rating level that has at least two sailors.

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

1. 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.
2. 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%

3. Write a PL/SQL Block to read employee name from a user if it is exist display its salary other wise 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 Dupval_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 and Clark by 2000 and1500. The check to see that the total salary does not exceed 20000. If total >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 item ID 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 item id 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, trans type, 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 trans type='w' then balance = bank. balance-trans. amount . Take precaution in case of withdrawals.

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 sailors details.
- Create pl/sql program to insert and update record in customer table using cursors.
- Write a PL/SQL program for deletion of row from employee table using Triggers.
- Write a PL/SQL program to update a row from employee table using Triggers.

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

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II B.TECH I SEMESTER

COURSE STRUCTURE

A5010 – 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

2. Course Outcomes (COs)

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

A5010.1. Solve basic concepts of probability and perform probability theoretical distributions.
A5010.2. Identify the types of random variables and various distributions.
A5010.3. Make use of probability distributions to analyze and solve a given problem.
A5010.4. Build practical understanding of various concepts of statistics.
A5010.5. Inspect scientific hypothesis and theories.

3. Course Syllabus

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, Mean and Variance of Random Variables.

Discrete and Continuous Distributions: Discrete distributions: Binomial distribution, Poisson Distribution, Continuous Distribution: Normal distribution.

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 Book

1. S.C. Gupta and V. K. Kapoor**,** *Fundamentals of Mathematical statistics*, Tenth Revised Edition, S Chand & Sons, New Delhi, 2000.

Reference Books:

1. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.
2. T.K.V.Iyengar, *Probability and Statistics* ,S Chand Publications**,** 2015.

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II B.TECH I SEMESTER

COURSE STRUCTURE

A5601– 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. Emphasis on AWT and Swing concepts used for GUI applications is given with event handling. The course plays a vital role in develop front-end interface for Mini and Major Projects.

Course Pre/Co-requisites

- A5501 - Python Programming
- A5502 - Data structures

2. Course Outcomes (COs)

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

A5601.1. Understand the principles of Object Oriented Programming.
A5601.2. Use various constructs / concepts to write programs in OOP paradigm.
A5601.3. Analyze the applications for Handling Exceptions and Multithreading.
A5601.4. Implement Collection Frameworks to retrieve and process data efficiently.
A5601.5. Build GUI applications using AWT and Swings.

3. Course Syllabus

Theory

INTRODUCTION TO OOP: 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 and Date class.

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

AWT: AWT Hierarchy, AWT controls, Layout Managers: Flow Layout, Border Layout, Grid Layout, Card Layout, Limitations of AWT.
APPLETS- Definition, Life Cycle and Execution.
SWINGS: JFrame, JPanel, JComponent- JLabel and ImageIcon, JTextField, JTabbedPane , Swing Buttons, JScrollPane, JComboBox, JTable.

Practice:

Week-1

Implement Control statements

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, balnce Check.
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 ncharacters 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 shape Area (). Derive two specific classes Triangle and Rectangle which override the function shape Area (). 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 displayGrade()
   and attendance(). Implement two classes PG_Student and UG_Student with necessary inputs of data.

Week-7

Implement Exception Handling.

a. Read two integers as strings Num1 and Num2 to perform division. The program would throw a Number Format Exception if Num1 or Num2 cannot be converted to integers nad If Num2 is Zero throw an Arithmetic Exception. Display the exception message.
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.

b. The threads will execute concurrently and display "Java is object oriented" in console window.

c. 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 HashSet 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 Roll No, Name, Branch, Year, Percentage etc.

4. Laboratory Equipment/Software/Tools Required

1. A Computer System With UBUNTU OS
2. JDK Of 8 Or Above Versions

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.

II B.TECH I SEMESTER

COURSE STRUCTURE

A5505– 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. A further, Sequential circuit, 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

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5505.1. Illustrate the number system, Boolean algebra, Computer Arithmetic and Logical Gates concepts to construct and simplify digital circuit

A5505.2. Apply K-Maps to minimize the Boolean expression to construct Combinational and Sequential circuits

A5505.3. Design Combinational and Sequential by using logic gates and memory units

A5505.4. Analyze the computer arithmetic algorithms

3. Course Syllabus

Number System and Boolean Algebra: 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 and Combinational Logic : 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 and Computer Organization: Sequential Logic: Flip-Flops (SR, JK, D, T), shift registers, ripple counters. Register Transfer: Register transfer language, bus and memory transfers. Micro-Operations: 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 (2009), Switching and Logic Design, 3rd edition, Pearson Education, India.
2. Carl Hamacher, ZvonksVranesic, SafeaZaky (2002), Computer Organization, 5th Edition, McGraw-Hill, New Delhi, India.

II B.TECH I SEMESTER

COURSE STRUCTURE

A5014– 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

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5014.1. Interpret data using graphs and charts.

A5014.2. Apply the concepts of ratios, proportions and percentages to solve problems.

A5014.3. Solve problems on Logarithms, permutations, combinations, clocks, and calendars.

3. Course Syllabus

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.SAggarwal ,*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 Aptitude for Competitive Examinations*, 3rd Edition, Pearson Education.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

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II B.TECH I SEMESTER

COURSE STRUCTURE

A5012– ENVIRONENTAL SCIENCE

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	-	100*	100*

1. Course Description

Course Overview

This course enables the students engage with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world. The course requires that students should identify and analyze natural and human-made environmental problems, evaluate the relative risks associated with these problems. It provides the scope to examine alternative solutions for resolving or preventing them. It is essentially a multidisciplinary approach that brings out an appreciation of our natural world and human impact on its existence and integrity. Its components include Biology, Geology, Chemistry, Physics, Engineering, Sociology, Health, Anthropology, Economics, Statistics, Computers and Philosophy.

Course Pre/Co-requisites

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5012.1. Outline the important components of environment.

A5012.2. Identify global environmental problems to come out with best possible solutions.

A5012.3. Make use ofenvironmental laws for the protection of forest and wildlife.

A5012.4. Apply environmental ethics to maintain harmonious relation between nature and human being.

A5012.5. Analyze the major environmental effects of exploiting natural resources.

3. Course Syllabus

Introduction: Environment Definition, The multidisciplinary nature of environmental studies, importance of environmental education.

Ecosystems: Ecosystem Definition. 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.

Natural Resources: Classification of resources: Renewable and Non-renewable resources.

Forest Resources: Uses and over exploitation of forests. Dams and their effects on forest and tribal people.

Water Resources: Use and over utilization of surface and ground water, conflicts over water.

Food Resources: Problems with Chemical fertilizers and pesticides. Bio fertilizers (organic farming) and their importance.

Energy Resources: Renewable energy resources: solar energy, wind energy and geothermal energy.

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. Man-wildlife conflicts. In-situ conservation of biodiversity. Ex-situ conservation of biodiversity.

Environmental Pollution: Definition, causes, effects and control measures of Air Pollution, Water pollution, Noise pollution, Global warming, Acid rains and Ozone layer depletion. Role of an individual in prevention of pollution.

Social Issues and the Environment: Concept of sustainable development: Sustainable development goals. Threats to sustainability: Population explosion, crazy consumerism. Water conservation, Rainwater harvesting.

A Brief Study About: Mission Kakatiya, water man of India Dr. Rajendra singh, Anna hazare watershed management development programme and environmental ethics. Environment Protection Act.

4. Books: and Materials

Text Book

1. Anubha Kaushik, C.P. Kaushik. Perspectives in Environmental Studies. 4th edition, New age international publishers, 2014.

Reference Books:

1. Erach Bharucha. Textbook of Environmental Studies for Undergraduate Courses. 1st edition, Universities press, 2005.
2. Benny joseph. Environmental studies. 3rd edition, McGraw Hill Education (India) Private Limited, 2018.

SYLLABI FOR II YEAR II SEMSETR

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

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II B.TECH II SEMESTER

COURSE STRUCTURE

A5602– 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

Automata mean that which is self-acting. The word **automaton** itself, closely related to the word "automation", denotes automatic processes carrying out the production of specific processes. Simply stated, automata theory deals with the logic of computation with respect to simple machines, referred to as **automata**. Through automata, computer scientists are able to understand how machines compute functions and solve problems and more importantly, what it means for a function to be defined as *computable* or for a question to be described as *decidable.*

Automatons are abstract models of machines that perform computations on an input by moving through a series of states or configurations. The most general and powerful automata is the **Turing machine**. Turing machine is a model of the computer.

A **formal language** consists of words whose letters are taken from an alphabet and are well-formed according to a specific set of rules. The alphabet of a formal language consists of symbols, letters, or tokens that concatenate into strings of the language.

Course Pre/Co-requisites

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5602.1. Interpret the core concepts in automata theory and formal languages.

A5602.2. Identify regular expressions for different formal languages

A5602.3. Construct context-free grammar& push down automata for various programming constructs.

A5602.4. Categorize various formal languages.

A5602.5. 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, Applications of Finite Automata, Finite Automata with Epsilon Transitions, Eliminating epsilon transitions, Minimization of Deterministic Finite Automata, 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, applications of Regular Expressions. Proving languages to be non-regular -Pumping lemma, applications. 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, applications. 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, universal Turing machine, the Halting problem, undecidable problems about TMs.
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.

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II B.TECH II SEMESTER

COURSE STRUCTURE

A5510 – BASICS OF IOT AND ROBOTICS

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 purpose of the course is to provide the importance of IoT, to introduce students to the field of Robotics, the current components of typical IoT devices and trends for the future. IoT design considerations, constraints and interfacing between the physical world and devices will be covered in this course. The key components of networking are also covered to ensure students to connect their devices to the Internet.

Course Pre/Co-requisites

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5510.1. Understand the concepts of Internet of Things in real world applications.
A5510.2. Implement basic IoT applications on embedded platform using Arduino.
A5510.3. Understand the fundamentals of Robotics
A5510.4. Develop programs for interfacing using Raspberry Pi.

3. Course Syllabus

Theory

Introduction to IOT: Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs.

Domain Specific Applications of IOT: Home automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health and lifestyle.

IOT Physical Devices and Endpoints: Introduction to Raspberry Pi-Interfaces (serial, SPI, I2C), Programming Raspberry PI with Python- Controlling LED with Raspberry PI, interfacing an LED and Switch with Raspberry PI and Interfacing a light sensor (LDR) with Raspberry PI.

Programming Arduino: Introduction, Arduino Boards, Programming-variables, if, loops, functions, digital inputs and outputs, the serial monitor, arrays and strings, analog inputs and outputs, using libraries, Arduino data types and commands. Programming Arduino Unowith Arduino- Controlling LED with Arduino, interfacing an LED and Switch with Arduino and Interfacing a light sensor (LDR) with Arduino.

Introduction to Robotics: Classification, Advantages and Disadvantages, Components, Robot Joints, Robot Coordinates, Characteristics, Applications. Robotics Kinematics-Matrix representations. Actuators-Characteristics, Types of Actuators. Sensors-characteristics, types of sensors.

Practice:

1. Write program using Raspberry Pi for Blink LED.
2. Write program using for Arduino IDE Blink LED.
3. Implement IoT based weather monitoring system using Raspberry Pi.
4. Write Arduino program for monitor temperature and humidity usingDHT (Digital Humidity and Temperature) sensor.
5. Implement Raspberry Pi based Automated Street Lighting System.
6. Implement Arduino based Automated Street Lighting System.
7. Write an Arduino program for Distance Measurement Using Ultrasonic Sensor and displaying on LCD.
8. Implement Raspberry Pi program for Distance Measurement Using Ultrasonic Sensor and displaying on LCD.
9. Study and Implement Zigbee Protocol using Arduino.
10. Study and Implement Zigbee Protocol using Raspberry Pi.
11. Study and Install IDE of Arduino and different types of Arduino.
12. Write Program for RGB LED using Arduino.
13. Study the Temperature sensor and Write Program foe monitor temperature using Arduino.
14. Study and Implement RFID, NFC using Arduino.
15. Study and implement MQTT protocol using Arduino.
16. Study and Configure Raspberry Pi.

4. Laboratory Equipment/Software/Tools Required

- A Computer System with Ubuntu Operating System (Open source / Free Ware)
- Python(open source/ Freeware)
- Arduino IDE(open source/ Freeware)
- Multimeter, Electric Soldering Kit
- Breadboards, Raspberry PI 4 - 2GB RAM , Type C org power supply from pi foundation, HDMI TO VGA CONVERTER,16GB CALSS 10 MEMORY CARD, Node MCU (ESP8266).
- Jumper wires (Male-Male, Male-Female, Female-Female) 120 Pieces (20 cm)
- Resisters pack

- DHT11 (Digital Humidity and Temperature)sensor
- LDR (Light Dependent Resistors) Sensor
- LCD display
- Ultrasonic Range Finder Module Sensor
- USBcables for Node MCU
- Red LED Lights , Green LED Lights , Yellow LED Lights

5. Books: and Materials

Text Books:

1. Arshdeep Bahga and Vijay Madisetti, Internet of Things - A Hands-on Approach, Universities Press, 2015.
2. Simon Monk,Programming Arduino Next Steps: Going Further with Sketches, Second Edition,2019.
3. Saeed B. Niku, Introduction to Robotics Analysis, Application, Pearson Education Asia, 2001.

Reference Books:

1. The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press).
2. Matt Richardson & Shawn Wallace, Getting Started with Raspberry Pi, O'Reilly (SPD), 2014.
3. R.K.Mittal and I J Nagrath, Robotics and Control, TMH, 2003.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

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II B.TECH II SEMESTER

COURSE STRUCTURE

A5508 – 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	0	42	0	0	3	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

- A5502 - Data Structures

2. Course Outcomes (COs)

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

A5508.1. Understand the asymptotic notations, divide and conquer techniques to decompose complex problems into small and simple problems.

A5508.2. Choose Greedy method to find out feasible solutions of problems.

A5508.3. Analyze the complex engineering problems to find out the optimal solutions.

A5508.4. Apply the backtracking and branching methods to solve the problems by verifying all possibilities of solutions.

A5508.5. Analyze nondeterministic algorithms to solve polynomial and non polynomial problems.

3. Course Syllabus

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

Divide and Conquer, 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, 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.

4. 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

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II B.TECH II SEMESTER

COURSE STRUCTURE

A5603– 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

- A5601 - Object oriented Programming

2. Course Outcomes (COs)

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

A5603.1. Understand the importance of various technologies for web development.
A5603.2. Apply the concepts of HTML and JavaScript to create web pages.
A5603.3. Validate XML document using DTD or XML Schema.
A5603.4. Construct server side components using Servlets, PHP and JSP.
A5603.5. 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

References 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

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II B.TECH II SEMESTER

COURSE STRUCTURE

A5507– OPERATING SYSTEMS

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

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. The basic understanding of protection mechanism is also described. Using these concepts the student will be able to understand the internal working of various operating systems. The course provides the concepts and terminology required for advanced courses.

Course Pre/Co-requisites

- A5501 - Python Programming
- A5502 - Data Structures
- A5505 - Digital Design and Computer Organization

2. Course Outcomes (COs)

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

A5507.1. Understand the various services provided by the operating system.

A5507.2. Analyze the concepts of Process management and Synchronization in a multi processing system.

A5507.3. Apply the Memory management techniques for efficient usage.

A5507.4. Use File and Disk management schemes for effective storage management.

A5507.5. 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: 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 and Protection: System Model, Deadlock Characterization, Deadlock Prevention, Avoidance, Detection and recovery from deadlock. PROTECTION: Introduction to Protection and Security, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Revocation of Access Rights.

Practice:

Week-1
Practice: linux commands like mkdir, rmdir, cat,nl, ls, cp, mv, rm, man.
Week-2
Practice: linux commands like wc, uniq, comm, cmp, diff, ln, unlink,chmod,du,df.
Week-3
Practice: linux commands head, tail, sort, grep, egrep, fgrep ,cut, paste, join.
Week-4
Process Management System calls fork (), exec () and wait () system calls.
Week-5
a. Two-way Communication using Pipes.
b. Process Communication using FIFOs.
Week-6
Implement Shared Memory form of IPC.
Week-7
Implement Message Queue form of IPC.
Week-8
Implement Semaphore operations for process synchronization (Producer-Consumer problem)

Week-9

Simulate cp, ls and

Week-10

Simulate head and tail utilities using file handling system calls.

Week-11

Shell Script programs using control statements

Week-12

Shell Script programs using control statements

Week-13

Program to implement FIFO Page replacement algorithm

Week-14

Program to implement FIFO Page replacement algorithm

4. Laboratory Equipment/Software/Tools Required

1. A Computer System with Linux/Ubuntu Operating System
2. C-Compiler
3. Python IDE and Runtime Environment.

5. 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.

Reference Books::

1. William Stallings (2006), *Operating Systems, Internals and Design Principles*, 5th Edition, Pearson Education, India.
2. Sumitabha Das (2007), Your Unix The Ultimate Guide , Tata Mc Graw Hill , New Delhi , India.
3. Unix System Programming using C++, T.Chan, PHI.

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II B.TECH II SEMESTER

COURSE STRUCTURE

A5013– 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

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5013.1. Identify efficient and appropriate methods to solve logical reasoning problems.

A5013.2. Choose the techniques to solve puzzles on analytical reasoning.

A5013.3. Apply the grammar rules for effective sentence formation

3. Course Syllabus

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.

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II B.TECH II SEMESTER

COURSE STRUCTURE

A5011– 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	-	100	100

1. Course Description

Course Overview

Gender Sensitization is a course that introduces students to different dimensions of gender issues. It 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

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5011.1. Interpreting gender sensitization and problems of other genders.

A5011.2. Identifying the reasons for the female feticide.

A5011.3. Interpreting the role of women in domestic, political and economic spheres.

A5011.4. Developing sensitivity towards sexual and domestic violence.

A5011.5. Understanding the women's place in Telangana History.

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 Labour
"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. Laboratory Equipment/Software/Tools Required

1. Computer System.
2. Audio Visual Equipment.

5. Books: and Materials

Text Book

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

Reference Book

1. www.worldofequals.org.in

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II B.TECH II SEMESTER

COURSE STRUCTURE

A5604- ADVANCED DATA VISUALIZATION TECHNIQUES

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

This course is all about addressing today's data driven world, in visualizing the data graphically. Though its foundations are rooted in statistics, many advanced fields of science are practicing it to explore their large volumes of data and to throw deeper insights of the data. The main aim of this course is to give better understandings of data and making sense of hidden information. Visualizing enormous data using graphics can run all possible unknown stories about data. Data visualization skills learned through this course may raise the student creativity in presenting projects he encountered. The course uses some of the open source data Visualization tools.

Course Pre/Co-requisites

- (A4501) Python Programming

2. Course Outcomes (COs)

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

A5604.1. Know the data description and distribution

A5604.2. Understand the importance of data visualizations

A5604.3. Implement various visualizations using advanced libraries.

A5604.4. Design suitable visualizations for the given data and infer data insights.

3. Course Syllabus

Theory

Introduction: Importance of Data Visualization, Visualization plots-Bar, Pie, Histogram, Box, Line, scatter plots, Importance of each plot. Correlation-Importance of correlation of variables

Working with data: creating Python-Lists, Tuples, Data Frames. Creating a CSV file, loading a csv file into python Data Frame. Analyzation of Datasets- IRIS, TITANIC

Matplotlib plotting: Visualization of IRIS data-line,Bar, Pie,Histogram, Box, Scatter plots, correlation plots-Heatmaps

Seaborn plotting: Visualization of Titanic data-Strip, Box, Swarm, Joint plots, correlation plots-Heatmaps

Dataset:

IRIS dataset available at Link: https://gist.github.com/netj/8836201

Titanic Dataset available at Link:

https://github.com/mwaskom/seaborn-data/blob/master/raw/titanic.csv

Practice:

Week-1:

Price= {10,1.2,4.3,3.4,7.5,2.5}. The half yearly price of a an item is given. Create a bar or column chart with months on x-axis and price on y-axis.

Note:

Prerequisite-Concepts & Tools/ Expected Skill/Ability

Bar graphs/Understand data

Week-2:

You are required to collect 30 students averages. Visualize the averages using a suitable plot bar charts and histograms

Note:

Prerequisite-Concepts & Tools/ Expected Skill/Ability

Bar graphs, Histograms/ Build and analyze the data

Week-3:

The table given shows the sales of books (in thousand number) from six branches of a publishing company during two consecutive years 2000 and 2001. Use bar graphs to infer the sales. Use pie chart to visualize the percentage of sales. On an average which branch has more sales.

Sales table:

Branches	Sales-2000	Sales-2001
B1	80	105
B2	70	75
B3	60	75
B4	87	120
B5	90	130
B6	79	85

Note:

Prerequisite-Concepts & Tools/ Expected Skill/Ability

Bar and Pie charts/ Think to compare the data.

Week-4:

Jerry recorded the temperature in his room (in Degrees Fahrenheit) every two hours over a 12 hour period from noon to midnight, as Temp={40, 42,45,46,38,36,34}. Visualize the recorded temperatures as line graph.

Note:

Prerequisite-Concepts & Tools/ Expected Skill/Ability

Line graph/ Ability to analyze the data

Week-5:

The population (in thousands) of a town was recorded every twenty years from 1900 to 2000. Population ={3, 4,2,5,7,7,7}. Visualize a line graph by taking years on x-axis. What can you infer about population change.

Note:

Prerequisite-Concepts & Tools/ Expected Skill/Ability

Line graph/ Ability to compare

Week-6:

You are required to construct two datasets with the GPA of two classes each of 60 students. Compare the GPA distribution of each using a suitable Visualization approach and what can you infer from the distributions. Use Boxplots

Note:

Prerequisite-Concepts & Tools/ Expected Skill/Ability

Box plots**/** Build data

Week-7:

Take the IRIS Data set from :

https://gist.github.com/curran/a08a1080b88344b0c8a7

Visualize the petal length, petal width, sepal length, sepal width. Visualize average of each. What can you infer from the visualization. Throw the major insights you have observed from the visualizations

Note:

Prerequisite-Concepts & Tools/ Expected Skill/Ability

Use Pandas profiling/ Think to identify suitable plot

Week-8:

Visualize the correlations between various numeric features of iris data using heat maps

Note:

Prerequisite-Concepts & Tools/ Expected Skill/Ability

Use heat maps/ Ability to compare and analyze

Week-9:

Visualize the correlations between various numeric features of the Titanic data and analyze which features are more important.

Note:

Prerequisite-Concepts & Tools/ Expected Skill/Ability

Use heat maps**/** Ability to analyze

Wee-10:

Using seaborn violin plot to plot the iris species

Note:

Prerequisite-Concepts & Tools/ Expected Skill/Ability

Violin plots/Ability to compare

4. Laboratory Equipment/Software/Tools Required

- Anaconda working environment

5. Books: and Materials

Text Books:

1. Bajaj Chandrajit, ” Data Visualization Techniques”, John willey and sons.
2. Dr.Ossama Embark,” Data Analysis and Visualization using Pthon”, Apress

Reference Book

1. Anthony Banfield ,”Thinking Statistically”.

Useful Links:

1. https://newprediction.com/free-data-visualization-Books:/
2. https://www.kaggle.com/learn/data-visualization
3. https://www.kaggle.com/sanikamal/data-visualization-using-matplotlib
4. https://www.kaggle.com/saduman/eda-and-data-visualization-with-seaborn
5. https://www.kaggle.com/ravichaubey1506/complete-data-visualization-tutorial-seaborn

Links to explore:

1. https://public.tableau.com/en-us/s/download
2. https://www.tableau.com/products/desktop/download

SYLLABI FOR III YEAR I SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

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III B.TECH I SEMESTER

COURSE STRUCTURE

A5605 – 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

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

- A5601 - Object oriented Programming

2. Course Outcomes (COs)

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

A5605.1. Illustrate the right process model to develop the right software system.

A5605.2. Choose requirements and analyze them scientifically in order to develop the right product, besides authoring software requirements documents.

A5605.3. Design as per functional and non-functional requirements using design principles.

A5605.4. Evaluate testing strategies for application being developed.

A5605.5. Classify the right set of umbrella activities for quality management and assurance.

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 ISO9000QualityStandards.

Practice:

Do the following 8 exercises for any two projects given in the list of sample projects or any other projects:

Wek-1
Development of problem statement.

Week-2
Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.

Week-3
Preparation of Software Configuration Management and Risk Management related documents.

Week-4
Design Structural Diagrams using CASE tool

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:

1. Withdrawal 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. PCs installed with operating system
2. Object oriented programming(UML): Rational Rose, star UML.
3. Open CV: Open source software for object oriented concepts.

5. Books: and Materials

Text Books:

1. Roger S. Pressman (2010), Software Engineering, A Practitioner's Approach, 7thEdition, 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, pearsonedition.

Reference Books:

1. Pankaj Jalote (2010), Software Engineering, A Precise Approach, WileyIndia.
2. Rajib Mall (2005), Fundamentals of Software Engineering,PHI.

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III B.TECH I SEMESTER

COURSE STRUCTURE

A5509 - 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

- A5502 - Data Structures

2. Course Outcomes (COs)

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

A5509.1. Understand the concepts of OSI and TCP/IP reference models and their applications.
A5509.2. Compare different types of network topologies, protocols and their functionalities.
A5509.3. Apply various control mechanisms to resolve data transmission problems.
A5509.4. Analyze various sub netting and routing techniques.
A5509.5. 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 SUBLAYER: 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

1. A computer System with C- Language software, 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.

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III B.TECH I SEMESTER

COURSE STRUCTURE

A5606– 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. Students are expected to work on a project that produces a professional-quality mobile application.

Course Pre/Co-requisites

- A5601 - Object Oriented Programming
- A5603 - Web Technologies

2. Course Outcomes (COs)

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

A5606.1. Understand architecture, the ecosystem, features and tools to design mobile applications.
A5606.2. Create effective user interfaces that leverage evolving mobile device capabilities.
A5606.3. Design, customize and enhance mobile applications with various widgets.
A5606.4. Develop various user friendly mobile applications with different application components.
A5606.5. Build database applications to provide complete mobile development solutions.

3. Course Syllabus

Theory

ANDROID INTRODUCTION: Features of Android, Android versions, Android architecture, Applications of Android, Installing Android SDK tools, Creating Android Virtual Devices (AVD)
iOS INTRODUCTION: Features of iOS, iOS versions, iOS architecture, Differences between iOS and Android, Role of swift programming language in iOS App development, Xcode IDE features for iOS App development

WORKING WITH ANDROID COMPONENTS: 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

WORKING WITH FRAGMENTS AND UI WIDGETS: Introduction to fragments, Fragments life cycle, Layouts in Android (Linear, Relative, Table, Absolute, Constraint), Managing changes to screen orientation

WORKING WITH VIEWS (UI WIDGETS): Toast, EditText, Button, ToggleButton, Checkbox, RadioButton, Spinner, DatePicker, TimePicker, WebView, ListView, ProgressBar, Analog and Digital clock, Handling UI events

WORKING WITH MENUS: Option menu, Context menu

WORKING WITH IMAGES: Image View, Image Switcher Working with Alert Dialog, Alarm manager, SMS messaging, Sending E-mail, Media Player, Recording video, Using camera for taking pictures, , Handling Telephony Manager

WORKING WITH DATABASE AND PUBLISH APK: Introducing the Data Storage Options: The preferences, The Internal Storage, The External Storage, The Content Provider

DATABASE: The SQLite database, Connecting with the SQLite database and CRUD (Create, Read, Update and Delete) 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)

Wek-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 plyer

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
3. Beginning IPhone Development with Swift 5, By Wallace Wang, Apress Publisher

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

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III B.TECH I SEMESTER

COURSE STRUCTURE

A5512– MACHINE LEARNING WITH PYTHON

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

- A5010 - Probability and statistics

2. Course Outcomes (COs)

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

A5512.1. Understanding the fundamental issues and challenges of machine Learning: data, model selection, model complexity, etc.

A5512.2. Understand the importance of Reinforcement algorithms.

A5512.3. Implement machine learning solutions to regression and Clustering problems.

A5512.4. Apply supervised and unsupervised techniques on various data sets.

A5512.5. Implement various machine learning algorithms in a range of real-world applications using Supervised Learning concepts.

3. Course Syllabus

Theory

Introduction: History of Machine Learning, Programs vs learning algorithms, Machine Learning definition, Components of a learning, Different Types of Learning, FIND-S and Candidate-Elimination algorithm, Linear regression, Logistic Regression,

Decision Trees, Basic decision trees learning algorithm, inductive bias in decision tree learning, Random Forest algorithm, over fitting.

Artificial Neural Networks: Introduction, Neural Network representation, appropriate problems, Perceptrons, Back propagation algorithm.

Bayesian Learning and Reinforcement Learning: Introduction, Bayes theorem, Bayes theorem, Naive Bayes classifier, Bayesian belief networks, EM algorithm, Gibbs algorithm. Instance Based Learning and Reinforcement Learning: Introduction, k-nearest neighbor learning, locally weighted regression, radial basis function, cased-based reasoning, Introduction to Reinforcement Learning, Learning Task, Q Learning

Clustering: Unsupervised learning, k-means, K mediods, adaptive hierarchical clustering, and Gaussian mixture model.

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

A5651– 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

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

- A5001 - Linear Algebra and Ordinary Differential Equations
- A5002 - Advanced Calculus
- A5501 - Python Programming

2. Course Outcomes (COs)

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

A5651.1. Understand the basics and fundamentals of digital signal and image processing, such as digitization, sampling, quantization.

A5651.2. Manipulate images using the computer: reading, writing, printing, and operating on them.

A5651.3. Apply image transforms like DFT, FFT, Walsh, HADAMARD, DCT.

A5651.4. Operate on images using the processing techniques of smoothing, sharpening, enhancing, reconstructing geometrical alterations, filtering, restoration, segmentation, features extraction, compression, encoding and color/multichannel.

A5651.5. Apply and relate the basic imaging techniques to practical cases, such as, multimedia and image compression.

3. Course Syllabus

Theory

Fundamentals of Image Processing : Image acquisition, image model, sampling, quantization, relationship between pixels, distance measures, connectivity, and image geometry. Introduction to OpenCV, image reading and operations.
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 for 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, Fundamentals of image compression, image compression models, and color image compression.

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, Prentice Hall.
2. Fundamentals of digital image processing by Anil K. jain, Low Price Edition, Pearson Education.
3. Arthur R. Weeks (1996), Fundamentals of Electronic Image Processing, Prentice Hall of India, New Delhi.
4. Milan Sonka, Vaclav Hlavac, Roger Boyle (2008), Image processing, Analysis and Machine vision, Thomson Publications, India.

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III B.TECH I SEMESTER

COURSE STRUCTURE

A5652 - C# AND. NET FRAMEWORK (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 provides a comprehensive coverage of all components required to develop anNet 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

- A5601 - Object Oriented Programming

2. Course Outcomes (COs)

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

A5652.1. Understand the basic constructs of C# and .NET Framework.

A5652.2. Apply object oriented features of C# to solve real world problems.

A5652.3. Use ADO.NET to create window applications for database access.

A5652.4. Design ASP.NET web applications using Visual Studio environment.

A5652.5. Analyze the features like security, assemblies and CLR in .NET Framework.

3. Course Syllabus

Introducing c# and the. Net platform: The Anatomy of Simple C# Program, Environment Class, The System. Console Class, Data Types, Working with String data, Narrowing and Widening of variables.

C# Control Statements: Conditional, Iteration and Jumping. Introduction to .Net platform, Building Blocks of the .NET plat form (the CLR, CTS, and CLS), Understanding the CTS, CLS, and CLR, The Assembly / namespace, Exploring an Assembly Using ildasm.exe.

C# Concepts: Methods and Parameter Modifiers, Understanding C# Array, Enum, Structure and Understanding Value Types and Reference Types, C# Null able Type.

Building C# Application on Visual Studio: The Role of the .NET Framework 4.7 and SDK, Building C# Applications Using csc.exe, Building .NET Applications Using Notepad++, Building windows

application having forms with events and controls, menu creation, inheriting window forms, SDI and MDI application, Dialog Box(Modal and Modeless).

Understanding Inheritance: Inheritance, Implicit inheritance, "is a" relationship, Designing the base class and derived classes, Designing abstract base classes and their derived classes.

Understanding Polymorphism: Overview, Versioning with the Override and New Keywords, Knowing When to Use Override and New Keywords, Override the To String Method.

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.

Understanding Structured Exception Handling: Bugs, and Exceptions, Exception handling using .Net, Configuring the State of an Exception, System-Level Exceptions, application-Level Exceptions, and Processing Multiple Exceptions.

Programming with. Net Assemblies: An Overview of .NET Assemblies, The role of .NET Assemblies, Building and Consuming a Single-File Assembly, Multi-file Assembly, Private Assembly and Shared Assembly, Consuming a Shared Assembly, Configuring Shared assemblies, Publisher Policy assemblies.

ADO.Net Part – I : The Connected Layer: Definition of ADO.NET, ADO.NET Data Providers, Connected Layer of Ado.NET, Working with Data Readers, Building a reusable Data Access Library, Creating a Console UI-Based Front End, Database Transactions.

ADO.Net Part – II : Disconnected Layer: Disconnected Layer of ADO.NET, Dataset, Working with Data Columns, Working with Data rows, Working with Data Tables, Binding with Data Adapters, Programming with LINQ to Dataset.

4. Books and Materials

Text Books:

1. Andrew Troelsen (2010), Pro C# 6.0 and the. NET 4.6 Framework, 7th edition, Springer (India) Private Limited, New Delhi, India.
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,6th edition 2010.
3. Milan Sonka, Vaclav Hlavac, Roger Boyle (2008), Image processing, Analysis and Machine vision, Thomson Publications, India.

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III B.TECH I SEMESTER

COURSE STRUCTURE

A5653 - COMPUTER GRAPHICS (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 focuses on giving introduction about computer graphics and its wide range of application areas. It also gives information about the graphics hardware, working of hardware and software which are needed for producing graphics. This course gives information about basic algorithms for drawing basic shapes which includes lines, circles, ellipse, also for filling shapes with colors and applying 2D, 3D transformations on them. Different types of objects which are used for representing 2D-objects, 3D-objects in computer are mentioned here. Curve Generation Techniques, viewing mechanism of 2D-objects, 3D-objects is also taught and also focuses on Animation.

Course Pre/Co-requisites

- A5001 - Linear Algebra And Ordinary Differential
- A5502 - Data Structure

2. Course Outcomes (COs)

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

A5653.1. Understand computer graphics Hardware, Software and Applications.

A5653.2. Apply basic geometric primitive algorithms to compute transformations for producing custom shaped objects.

A5653.3. Analyse various curve generation techniques by different projection methods.

A5653.4. Distinguish the various animation sequences of motion.

A5653.5. Choose an appropriate visible surface detection algorithm.

3. Course Syllabus

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 McGraw Hill, New Delhi, India.
2. Steven Harrington (1987), Computer Graphics,2nd edition, TATA McGraw Hill, New Delhi, India.

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III B.TECH I SEMESTER

COURSE STRUCTURE

A5555 - COMPILER DESIGN (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 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

- A5502 - Data Structures
- A5602 - Formal Languages and Automata Theory

2. Course Outcomes (COs)

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

A5555.1. Use finite automata to recognize the tokens by lexical analyzer.

A5555.2. Interpret various parsing techniques to construct syntax analyzer.

A5555.3. Write SDT for various transformations of programming language construct.

A5555.4. Discuss various runtime environment and symbol table implementations.

A5555.5. Demonstrate the various code optimization techniques for improving efficiency of target code.

3. Course Syllabus

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

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III B.TECH I SEMESTER

COURSE STRUCTURE

A5019 – INDIAN CONSTITUTION

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	-	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

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5019.1. Identify the important components of Indian Constitution.

A5019.2. Apply the fundamental rights in right way and become a more responsible citizen.

A5019.3. Illustrate the evolution of Indian Constitution.

A5019.4. Explain the basic structure of Indian Constitution.

A5019.5. 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

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III B.TECH I SEMESTER

COURSE STRUCTURE

A5016 – 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 is the extension of engineering exploration course; it 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. Everything learned in this course will be applied to the "Design Challenge" which enables you to apply learning's 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 design engineers seeking to broaden their engineering knowledge to design concepts to their current work.

Course Pre/Co-requisites

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5016.1. Interpret the problem-solving skills and product design skills.

A5016.2. Apply foundational knowledge of the primary fields of engineering and scientific concepts to find the solution.

A5016.3. Identify various techniques and applications of the engineering design process.

A5016.4. Inspect the design and assess a prototype that solves an engineering problem.

A5016.5. Interpret the solutions and document the findings/reflections.

3. 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 2nd Editon.
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,2nd edition.

SYLLABI FOR III YEAR II SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

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III B.TECH II SEMESTER

COURSE STRUCTURE

A5516 – CLOUD COMPUTING AND VIRTUALIZATION

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 hands-on comprehensive study of Cloud concepts and capabilities across the various Cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). In IaaS mainstream Cloud infrastructure services and related vendor solutions are covered in detail. PaaS topics cover a broad range of Cloud vendor platforms including AWS, Google App Engine, Microsoft Azure, Eucalyptus, Open Stack and others as well as a detailed study of related platform services. The SaaS and PaaS topics covered in the course will familiarize students with the use of vendor-maintained applications and processes available on the Cloud on a metered on-demand basis in multi-tenant environments. The course also covers the Cloud migration and security model. Students will gain hands-on experience on virtual box and advanced open source tools like Cloud Foundry, Open stack and Eucalyptus. The major motto of this course is to not just stick with the academic portion but also to encourage students to for cloud certifications to brighten their future endeavours in IT sectors.

Course Pre/Co-requisites

- A5507 - Operating Systems

2. Course Outcomes (COs)

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

A5516.1. Understand the basic ideas of Cloud Computing, deployment models and its architecture and services.

A5516.2. Understand the Cloud migration model, Cloud challenges architecture, and Service level agreement in cloud sectors.

A5516.3. Demonstrate on virtualization concepts in cloud.

A5516.4. Analyse cloud computing security, federation, presence, identity, and privacy.

A5516.5. Implement and work on IaaS / PaaS service and also to create a public / private cloud using any open source tool.

3. Course Syllabus

Theory

Introduction to Cloud Computing: Historical Development - Cloud Computing Architecture – The Cloud Reference Model – Cloud Characteristics – Cloud Deployment Models: Public, Private, Community, Hybrid Clouds - Cloud Delivery Models: IaaS, PaaS, SaaS – Open Source Private Cloud Software: Eucalyptus, Open Nebula, Open Stack.

Broad Approaches to Migrating Into Cloud: Why Migrate? Deciding on cloud migration - The seven step model of Migration into Cloud: Migration Risks and Mitigation - Introduction: The promise of the cloud, the cloud service offerings and Deployment model, Challenges in the cloud - Managing Cloud Services: Organizational Issues. Administering Cloud Services: Service Level Agreements (SLA) and Monitoring Support, Billing and Accounting, Technical Interface, Managing Cloud Resources, Maintaining Connections.

Data Centre Technology & Virtualization: Characteristics of Virtualized Environments - Taxonomy of Virtualization Techniques – Virtualization and Cloud Computing – Pros and Cons of Virtualization - Implementation Levels of Virtualization.

Cloud Security Fundamentals: Vulnerability assessment tool for cloud, Privacy and Security in cloud, Identity Access Management in Cloud. (IAM) Cloud computing security architecture: Architectural Considerations- General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access control Identity management, Access control, Autonomic Security. Cloud computing security challenges: Virtualization security management virtual threats, VM Security Recommendations, VM-Specific Security techniques.

Enterprise Cloud Computing Ecosystem: Introduction, Public Cloud Providers, Cloud Management Platforms and Tools, Tools for Building Private Cloud: IaaS using Eucalyptus, PaaS on IaaS –AppScale. Roadmap for Enterprise Cloud Computing: Introduction, Quick wins using Public Clouds, Future of Enterprise Cloud Computing: Commoditization of the data center, Inter-operating Virtualized Data Centers, Convergence of private and public clouds, Generalized 'cloud' services.

Practice:

Week-1

Installation and Introduction to Virtual Box

a. Install virtual box.
b. Create and run Virtual machines on Open source Operating systems.

Week-2

Installing Cloud Foundry in a local host and exploring CF commands

a. Learn about Cloud Foundry installation.
b. Implement Cloud services in it.

Week-3

Implementing Security and Networking in Cloud Foundry.

a. Create security groups in CF.
b. Manage container security and network traffic rules.

Week-4

Installation and Understanding features of IaaS using Open stack

a. Install Openstack.
b. Implement IaaS in openstack.

Week-5

Installing and Understanding Eucalyptus cloud -I

a. Install Eucalyptus cloud.
b. Understand the concepts of Cluster Controller, and Cloud Controller (CLC).

Week-6

Installing and Understanding Eucalyptus cloud –II

a. Understand the concepts of Walrus Storage controller and Storage Controller (CLC) and in back end Node Controller (NC)

Week-7

Create and Manage AWS Users and Groups, And Use Permissions to Allow and Deny their Access to AWS Resources by using IAM. Learn and Practice: AWS MFA for extra layer security on user authentication**.**

Week-8

Write Case study on Amazon S3.

a. Discuss technical description and organizational usage with its impact.

Week-9

Installation and Understanding the features of Google app engine.

a. Understand how Google App Engine is to be installed and work with Python.

4. Laboratory Equipment/Software/Tools Required

- A computer System with Windows / Ubuntu Operating System.
- Technology / Tools Used – Virtualbox, Cloud Foundry, Open Stack, Eucalyptus Cloud AWS Amazon and google app engine.

5. Books: and Materials

Text Book

1. RajkumarBuyya, Cloud Computing: Principles and Paradigms, John Wiley & Sons, First Edition.

Reference Books:

1. Barrie Sosinsky, Cloud Computing Bible, Wiley India, First Edition
2. Tim Malhar, S.Kumaraswammy, S.Latif, Cloud Security & Privacy, O'Really Publications, First Edition

3. RajkumarBuyya, Christian Vecchiola, S. ThamaraiSelvi, —Mastering Cloud Computing‖, Tata McGraw-Hill, 2013.

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III B.TECH II SEMESTER

COURSE STRUCTURE

A5514– BIG DATA ANALYTICS

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

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

- A5506 - Database Management Systems

2. Course Outcomes (COs)

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

A5514.1. Understand the fundamental concepts of big data analytics.

A5514.2. Apply various Frameworks to meet Challenges in Big Data analytics.

A5514.3. Apply the HADOOP -Map Reduce to analyze the data.

A5514.4. Apply MangoDB on Unstructured data

A5514.5. 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

Perform setting up and Installing Hadoop.

Week-2

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

Week-3

Implement the following file management tasks in Hadoop:

a. Adding files and directories
b. Retrieving files
c. Deleting files

Week-4

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

Perform Incremental Map-Reduce using MangoDB

Week-6

Write and execute simple queries to perform indexing and aggregation

Week-7

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

Week-8

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

Week-9

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

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

4. Laboratory Equipment/Software/Tools Required

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

(Or)

b. 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

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III B.TECH II SEMESTER

COURSE STRUCTURE

A5608– INFORMATION SECURITY

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

- A5509 - Computer Networks

2. Course Outcomes (COs)

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

A5608.1.Understand different Security Attacks, Services, Mechanisms and classical encryption techniques.

A5608.2. Apply classical encryption algorithms (Substitution and Transposition ciphers) and DES, AES algorithms to encrypt plain text.

A5608.3. Articulate different key management techniques (RSA, DiffieHellman).

A5608.4. Examine the problems of authentication techniques (SHA, Digital signature).

A5608.5. 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 Modes, Substitute Techniques, Transposition Techniques

Block Cipher and Data Encryption Standards: Traditional Block Cipher Structure, The Data Encryption Standard, A DES Example, The Strength of DES, Block Cipher Design Principles

Advanced Encryption Standards: Advanced Encryption Standard, Finite Field Arithmetic, AES Structure, AES Transformation Functions, AES Key Expansion, An AES Example, AES Implementation

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, Diffie-Hellman Key Exchange.

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

Key Management and Distribution: Symmetric Key Distribution Using Symmetric Encryption, Symmetric Key Distribution Using Asymmetric Encryption, Distribution of Public Keys, X.509 Certificates, Public-Key Infrastructure
Transport-Level Security: Web Security Considerations, Secure Sockets Layer, Transport Layer Security
Email Security: Pretty Good Privacy (PGP)

Practice:

Week-1
Implement the Caesar Cipher substitution technique.

Week-2
Implement the Play fair Cipher substitution technique.

Week-3
Implement the Hill Cipher substitution technique.

Week-4
Implement Rail fence – row & Column Transformation Technique

Week-5
Implement DES algorithm.

Week-6
Demonstrate AES Transformation logic.

Week-7
Implement public- key cryptography with RSA algorithm.

Week-8

Implement Diffie-Hellman Key exchange algorithm.

Week-9

Calculate the message digest of a text using the SHA-1.

Week-10

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.

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III B.TECH II SEMESTER

COURSE STRUCTURE

A5654– 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

- A5001 - Linear Algebra and Ordinary Differential Equations
- A5002 - Advanced Calculus
- A5651 - Image Processing
- A5501 - Python Programming

2. Course Outcomes (COs)

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

A5654.1. Understand Image formation process, fundamental image processing techniques required for computer vision.

A5654.2. Analysis of Images, extract features form Images and shape analysis.

A5654.3. To develop applications using computer vision techniques, Object Detection and Pattern Recognition.

A5654.4. Understand video processing, motion computation and 3D vision and geometry.

3. Course Syllabus

Introduction: What is computer vision?

Image Formation: Geometric primitives and transformations, 2D transformations, 3D transformations, 3D rotations, 3D to 2D projections, Lens distortions, Photometric image formation, Lighting, Reflectance and shading, Optics, The digital camera, Sampling and aliasing, Color, Compression.

Model Fitting and Optimization: Scattered data interpolation, Radial basis functions, Overfitting and under fitting, Robust data fitting, Variational methods and regularization, Discrete energy minimization, Total variation, Bilateral solver, Application: Interactive colorization, Markov random fields, Conditional random fields, Application: Interactive segmentation

Deep Learning: Supervised learning- Nearest neighbors, Bayesian classification, Logistic regression, Support vector machines, Decision trees and forests. Unsupervised Learning- Clustering, K-means and mixtures of Gaussians, Principal component analysis, Manifold learning, Semi-supervised learning, Deep neural networks, Weights and layers, Activation functions, Regularization and normalization, Loss functions, Back propagation, Training and optimization,

Convolutional Neural Networks- Pooling and unpooling. Application: Digit classification, Network architectures, Model zoos, Visualizing weights and activations, Adversarial examples, Self-supervised learning

Recognition: Instance recognition, Image classification, Feature-based methods, Deep networks, Application: Visual similarity search, Face recognition, Object detection, Face detection, Pedestrian detection.

4. Books and Materials

Text Book:

1. Richard Szeliski, Computer Vision: Algorithms and Applications (CVAA), 2nd Edition, Richard Szeliski.

Reference Books:

1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, Second Edition, PrenticeHall.
2. R. Jain, R. Kasturi, and B. G. Schunk, Machine Vision, McGraw-Hill.
3. Milan Sonka,VaclavHlavac, Roger Boyle, .Image Processing, Analysis, and Machine Vision. Thomson Learning.
4. Richard Harley, Multiple view geometry in computer vision, second edition, Cambridge university press.

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III B.TECH II SEMESTER

COURSE STRUCTURE

A5655 – 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

- A5501 - Python Programming
- A5605 - Software Engineering

2. Course Outcomes (COs)

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

A5655.1. Understand various basic concepts, test processes, continuous quali improvement.

A5655.2. Analyze different kinds of testing techniques like path testing, transaction flow testing, data flow testing, etc their application in different scenarios and their limitations.

A5655.3. Make use of test tools for automated test management.

A5655.4. Illustrate various types of errors and fault models.

3. Course Syllabus

Introduction: Purpose of testing, some dichotomies, a model for testing, some bug statistics

Taxonomy for Bugs: Consequences of bugs, Requirements, Features, and functionality bugs, Structural bugs, Data bugs, Coding bugs, Interface, Integration and system bugs, Test and Test design bugs.

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: **Selenium Ide Basics:** Capture Playback – Recording a script
Install And Run Selenium Rc: Overview of the contents of the selenium archive, command line, Start and stop Selenium server, Run IDE Tests in different browsers

Creating A Junit Test Using Selenium IDE: Export an IDE script as a JUnit test, Run the JUnit test, Run the test in debug mode. MyFirstSeleniumTests.java Annotated

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.

Mooc

1. https://swayam.gov.in/nd1_noc19_cs71/preview
2. https://www.edx.org/course/software-testing-fundamentals

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III B.TECH II SEMESTER

COURSE STRUCTURE

A5553– 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

- A5501 - Python Programming
- A5603 - Web Technologies

2. Course Outcomes (COs)

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

A5553.1. Recall the fundamental concepts of programming languages and platforms.

A5553.2. Analyse the RPA tool concepts and learn how to apply in various business applications.

A5553.3. Apply the advanced automation concepts to enhance the UI interaction in different application software.

A5553.4. Apply the automation in real time applications like E-mail and exception handling.

3. Course Syllabus

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 Practice:s-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 Practice:s - 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 Practice:s - 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

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III B.TECH II SEMESTER

COURSE STRUCTURE

A5554– ROUTING AND SWITCHING NETWORKS (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

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

- A5509 - Computer Networks.

2. Course Outcomes (COs)

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

A5554.1. Understand the basics of routing, switching, and advanced technologies to prepare for the Cisco CCENT and CCNA certification exams

A5554.2. Emphasize critical thinking, problem solving, collaboration, and the practical application of skills.

A5554.3. Determine how a router will forward traffic based on the contents of a routing table.

A5554.4. Implement access control lists (ACLs) to filter traffic.

A5554.5. Implement network address translation (NAT).

3. Course Syllabus

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

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III B.TECH II SEMESTER

COURSE RUCTURE

A5517– 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	1	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

- A5603 - Web Technologies

2. Course Outcomes (COs)

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

A5517.1. Understand the programming model of AngularJS framework.

A5517.2. Implement two way data binding for web application.

A5517.3. Design single page dynamic web applications using AngularJS MVW pattern.

A5517.4. 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, OrderBy 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

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III B.TECH II SEMESTER

COURSE STRUCTURE

A5017 - PRODUCT REALISATION

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

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5017.1. Interpret the specifications of product and solve it for Practical realization

A5017.2. Analyze the Costumers mindset and accordingly designing of the product.

A5017.3. Applying Gantt Charts to define timeline for Product Realization.

A5017.4. Conceptualize the terms called Product, Purchase, Production and Monitoring of products.

A5017.5. Communicate the process of converting an idea to physical Product

3. Course Syllabus

Theory

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.

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III B.TECH II SEMESTER

COURSE STRUCTURE

A5018 - 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

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5018.1. Interpret the nature and characteristics of traditional knowledge.
A5018.2. Understand the essence of protecting traditional knowledge through various acts.
A5018.3. Utilize the traditional knowledge in the contemporary world.
A5018.4. Create an awareness of traditional medicine and health Practice:s.
A5018.5. Apply the knowledge of traditional art forms and culture in the present scenario.

3. Course Syllabus

Basic Structure of Indian Knowledge System: 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.

Role of Government In Harnessing TK: 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.

Modern Science and Indian Knowledge System: Modern Science and Indian Knowledge System: Historical Background- the global problem today-Indian contributions to global science.

Yoga and Holistic Health Care: AYUSH, The role of traditional medicine and its impact on the contemporary society.

Indian Artistic Tradition: Traditional art forms and culture- the journey of Indian art from traditional to modern era.

4. Books: and Materials

Text Book

Nil

Reference Books:

1. V. Sivaramakrishnan (Ed.), *Cultural Heritage of India-course material*, Bharatiya Vidya Bhavan, Mumbai. 5th Edition, 2014
2. Swami Jitatmanand, *Modern Physics and Vedant*, BharatiyaVidyaBhavan
3. Swami Jitatmanand, *Holistic Science and Vedant*, BharatiyaVidyaBhavan
4. Fritzof Capra, *The Wave of life Yoga Sutra of Patanjali*, Ramakrishna Mission, Kolkata
5. GN Jha (Eng. Trans.), Ed. RN Jha, *Yoga-darshanam with Vyasa Bhashya*, VidyanidhiPrakashan, Delhi 2016
6. RN Jha, Science of Consciousness *Psychotherapy and Yoga Practice:s*, VidyanidhiPrakashan, Delhi 2016 P B Sharma (English translation), ShodashangHridayan
7. Krishna Chaitanya, *Arts of India*, Abhinav Publications, 1987
8. R. Nagaswamy, *Foundations of Indian Art*, Tamil Arts Academy, 2002

SYLLABI FOR IV YEAR I SEMESTER

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IV B.TECH I SEMESTER

COURSE STRUCTURE

A5520 – ARTIFICIAL INTELLIGENCE

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 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, and robotics, reasoning and problem-solving. ANN will focus on both theory and Practice:, we cover models for various applications, how they are trained and tested.The course examines NLP models and algorithms using both the traditional symbolic and the more recent statistical approaches.

Course Pre/co-requisites

- A5503 - Discrete Mathematical Structures

2. Course Outcomes (COs)

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

A5520.1. Understand the concepts of AI Agents and Environment

A5520.2. Apply the propositional logic to AI designs.

A5520.3. Demonstrate the role of searching strategies in AI environment.

A5520.4. Analyze the constraint satisfaction problems and the solutions for problem solving.

A5520.5. Design the solution to the problems by applying planning and learning methods.

3. Course Syllabus

Introduction to Artificial Intelligence & Searching: AI techniques, General Problem Solving, Solving problem by searching: Problem Solving Agent, Problem Formulation, Example Problems, Search Strategies(Breadth-first search, Depth-first search, Depth-limited search, Iterative deepening search, Bidirectional search),Heuristic search(Hill Climbing, Simulated annealing, Best First Search, Iterative deepening A* search) and Constrain satisfaction problem.

Knowledge Representation & Reasoning: Knowledge-Based Agent, the Wumpus World, Logic, Propositional Logic. First-Order Logic: Syntax and Semantics of First-Order Logic, Extensions and Notational Variations. Inference in First-Order Logic: Inference Rules Involving Quantifiers, Generalized Modus Ponens, Forward and Backward Chaining.

Intelligent Agents and Planning: Structure of Intelligent Agents and Environments. Simple Planning Agent, From Problem Solving to Planning, Planning in Situation Calculus, Basic Representations for Planning, A Partial-Order Planning Algorithm and examples.

Learning and Neural Networks: Learning from Observations, Inductive Learning and Learning Decision Trees. Learning in Neural and Belief Networks': neural networks, perceptrons, multilayer feed-forward networks and Bayesian methods for learning belief networks.

Expert Systems: Introduction to expert system, the expert system Development process, knowledge acquisition, Expert System Tools.

4. Books and Materials

Text Books:

1. Stuart Russel, Peter Norvig, (2009), Artificial Intelligence – A Modern Approach,3rd Edition, Pearson Education
2. Artificial Intelligence, Saroj Kaushik, Cengage Learning India Private Limited.

Reference Books:

1. E.Rich and K.Knight, (2008), Artificial Intelligence, 3rd Edition, Tata McGraw Hill.
2. Patrick Henry Winston (2001), Artificial Intelligence, 3rd edition, Pearson Education Private Limited, India.
3. P. Jackson, Introduction to Expert Systems, Third Edition, Pearson Education

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IV B.TECH I SEMESTER

COURSE STRUCTURE

A5610– FULL STACK 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 popularity of JavaScript's has brought lot of changes and completely changed the face of web development. Real world applications are looking at the web design with push capabilities. The purpose of this course is to study the concepts of JAVASCRIPT, ReactJS and NodeJS to build user interface web based applications to meet real world needs.

Course Pre/Co-requisites

- A5603 - Web Technologies

2. Course Outcomes (COs)

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

A5610.1. Understand the fundamentals of scripting languages.
A5610.2. Use react concepts to design forms.
A5610.3. Use different node.js modules to connect with database.
A5610.4. Build web application using Node.js

3. Course Syllabus

Theory

Introduction: Introduction to scripting language, motivation , applications; scripting languages vs non-scripting languages; overview of popular scripting languages-JavaScript, Perl, Python; environments - Node.js and react.js, java scripting language constructs

React JS: JSX and its use case, DOM, Virtual DOM and its working, ES6, Difference between ES5 and ES6, NPM Modules, React Elements, Render Function, Redux ,ReactJS with Redux

ReactJS-Components, Class Component, Props, Events, Forms, CSS, Hooks & Context API, MaterialUI.

Node.JS: Concepts-modules, packages, working with HTTP, streams and file systems, events, REST API, Express JS.

Node.JS: Database connectivity-Mysql, create connection, create database, working with Database operations-create table, insert, select, update, delete, etc.

Practice:

1. Create a simple react application (Hello world)
2. Create basic calculator application using react js
3. Build a music store application using react components.
4. Create simple web server application using Node js
5. Create a basic Express website using Node js
6. Design a simple user login system using Node js
7. Design Node blog system
8. Design book store system
9. Design a Portfolio App
10. Design Node E learning system

4. Laboratory Equipment/Software/Tools Required

1. **PCs installed with operatingsystem**
2. **Wamp or xampp server.**
3. **Eclipse, Atom.**

5. Books: and Materials

Text Books:

1. Learning Node.js A Hands on Guide to Building Web Applications in JavaScript, Marc Wandschneider**,** Second Edition, Addinson-Wesley
2. React.js Book: Learning React JavaScript Library From Scratch, Greg Sidelnikov, Learning Curve, 2017

Reference Books:

1. Beginning Node.js, Basarat Ali Syed, Apress, 2004.
2. The Node Beginner Book: A Comprehensive Node.js Tutorial, Manuel Kiessling, Leanpub, 2011.
3. FullStack React: The Complete Guide to ReactJS and Friends, Anthony Accomazzo, Anthony Accomazzo, Nate Murray, Ari Lerner, Clay Allsopp, David Guttman, and Tyler McGinnis.
4. Learning React: Functional Web Development with React and Redux, Alex Banks & Eve Porcello, O'Reily.

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IV B.TECH I SEMESTER

COURSE STRUCTURE

A5656 – 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

- A5608 - Information Security

2. Course Outcomes (COs)

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

A5656.1. Understand the basics of blockchain like consensus, proof of work, etc.
A5656.2. Make use of Bitcoin as cryptocurrency
A5656.3. Analyse Ethereum block chain
A5656.4. Design smart contracts as per the requirements and deploy on Testnet works.

3. Course Syllabus

Introduction to Cryptocurrencies: Cryptographic Hash Functions, Hash Pointers and Data Structures, Digital Signatures, Public Keys as Identities, A Simple Cryptocurrency
How Bitcoin 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 Bitcoin Network, Limitations & Improvements

Store & Usage: How to Store and Use Bitcoins, 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-anonymizeBitcoin, Mixing, Decentralized Mixing, Zerocoin and Zerocash, Tor and the Silk Road

Ethereum: What is Ethereum, smart contracts, Solidity & Ethereum Virturalmachine. 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 cryptocurrency 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 Cryptocurrencies, O'Reilly Media; 1st edition

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IV B.TECH I SEMESTER

COURSE STRUCTURE

A5556 – 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

- A5603 - Web Technologies
- A5655 - Software Testing Methodologies

2. Course Outcomes (COs)

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

A5556.1. Understand the DevOps Concepts and DevOps Tools
A5556.2. Deploy the main DevOps tools
A5556.3. Manage and keep a track of different versions of the source code using Git
A5556.4. Build and Automate Test using Jenkins and Maven, containerization using Docker
A5556.5. 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 Openshift 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… By Gene Kim, Jez Humble, Patrick Debois, John Willis
2. Practical DevOps By Joakim Verona

Reference Book

1. DevOps for Developers By Michael Huttermann.

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IV B.TECH I SEMESTER

COURSE STRUCTURE

A5657– 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

- A5605 - Software Engineering
- A5601 - Object oriented Programming

2. Course Outcomes (COs)

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

A5657.1. Identify the appropriate design patterns to solve object oriented design problems.
A5657.2. Develop design solutions using Creational patterns.
A5657.3. Apply structural patterns to solve design problems.
A5657.4. Construct design solutions by using behavioral patterns.

3. Course Syllabus

Theory

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, Facade, 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 Book:

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 MedaSrinivasaRao, NarsimhaKarumanchi, Career Monk Publication.
6. Design Patterns Explained By Alan Shallowy, Pearson Education.

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IV B.TECH I SEMESTER

COURSE STRUCTURE

A5557– 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

- A5506 - Database Management System

2. Course Outcomes (COs)

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

A5557.1. Apply pre-processing techniques on various data sets.

A5557.2. Develop data warehouse using various schemas for enterprise applications.

A5557.3. Apply supervised learning techniques on given data sets.

A5557.4. Apply unsupervised techniques on various data sets.

A5557.5. 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.

SYLLABI FOR IV YEAR II SEMSETR

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

Autonomous Institute Affiliated to JNTUH

IV B.TECH II SEMESTER

COURSE STRUCTURE

A5020– 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 Practice:s, Quality control techniques and Project Management which plays a vital role in the organization.

Course Pre/Co-requisites

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5020.1. Explain and infer the concepts and aspects of management

A5020.2. Analyze the different organizational structures, plant layouts, work study tools for enhancement of productivity in an organization

A5020.3. Apply Inventory control and statistical quality control techniques for better management.

A5020.4. Use Human resource management techniques for better people management.

A5020.5. Apply the project management techniques to decide the optimum time and cost for completion of a project.

3. Course Syllabus

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.

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IV B.TECH II SEMESTER

COURSE STRUCTURE

A5658 – 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

The course has no specific prerequisite

2. Course Outcomes (COs)

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

A5658.1. Acquire knowledge of various digital forensic tools.

A5658.2. Understand the limitations imposed by data privacy laws.

A5658.3. Interpret security issues in Information Communication Technology (ICT) world, and apply digital forensic tools for security and investigations.

A5658.4. Achieve adequate perspectives of digital forensic investigation in various applications /devices like Windows/Unix system, mobile, email etc.

A5658.5. Generate legal evidences and supporting investigation reports.

3. Course Syllabus

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 PastEvents: 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

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IV B.TECH II SEMESTER

COURSE STRUCTURE

A5660 – 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

- A5512 - Machine Learning with Python

2. Course Outcomes (COs)

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

A5660.1. Understand the constructs of Neural Networks.
A5660.2. Design Neural Network APIs.
A5660.3. Build Deep Neural Networks using APIs.
A5660.4. Building Deep variants of Neural Networks.

3. Course Syllabus

Theory

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, Tensorflow , 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 Study2: Customized multi class image classification (use pre trained CNNs-VGG-16, ResNET, 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.

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IV B.TECH II SEMESTER

COURSE STRUCTURE

A5659– 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

- A5502 - Data Structures

2. Course Outcomes (COs)

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

A5659.1.Choose the basic components that which interact devices with computers.

A5659.2. Select the window, device and screen based control navigation schemes.

A5659.3. Identify the elements of good user interface design and effective gui.

A5659.4. Analyse screen design principles for making good decisions based on technological constraints in interface design.

A5659.5. Determine the importance of human characteristics and understanding business functions.

3. Course Syllabus

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. SorenLauesen (2005), User Interface Design, Pearson Education.

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IV B.TECH II SEMESTER

COURSE STRUCTURE

A5661– 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

- A5605 - Software Engineering
- A5655 - Software Testing Methodology

2. Course Outcomes (COs)

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

A5661.1. Understand different models for development of the software.

A5661.2. Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.

A5661.3. Analyze organizational structure and project structure.

A5661.4. 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 Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in Practice:, PankajJalote, Pearson Education.2005.

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OPEN ELECTIVE

COURSE STRUCTURE

A5131 - 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-requisites.

2. Course Outcomes (COs)

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

A5131.1 Identify project characteristics and various phases of a project.
A5131.2 Explain project organization, staffing and feasibility of projects.
A5131.3 Apply the techniques of Project planning, scheduling and Execution Control.
A5131.4 Analyse the role of stakeholders.
A5131.5 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.

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OPEN ELECTIVE

COURSE STRUCTURE

A5132 – AIR POLLUTION AND CONTROL

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 introduction to major aspects of air pollution and its control technologies, with an emphasis on outdoor rather than indoor air pollution. In this course, students will learn effects of air pollutants on human beings, materials and environment; sources of air pollution and behavior of pollutants in the atmosphere; a presentation of the models that are used to predict dispersion and air pollutant concentrations; and finally a review of the strategies and key technologies for controlling emissions of gaseous pollutants and particulate matter.

Course Pre/ co-requisites

- A5012-Environmental Science

2. Course Outcomes (COs)

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

A5132.1. Select sampling technique and appropriate methods to control air pollution.

A5132.2. Develop a broad overview of the strategies to manage air pollution.

A5132.3. Examine various particulate and gaseous pollutant removal mechanisms to reduce emissions.

A5132.4. Explain how atmospheric and chemical composition drives changes in the environment

A5132.5. Predict the ground level concentration of air pollutants using mathematical formulation.

3. Course Syllabus

Air pollution & Global issues: Definitions, scope, significance and episodes, air pollutants – classifications - Effects of air pollutants on man, material and vegetation - Global effects of air pollution - Green House Effect, Heat Islands, Acid Rains, Photochemical Smog, and Ozone Depletion.

Properties of Atmosphere: Meteorological Aspects of Air Pollution Dispersions, Temperature Lapse Rates and Stability, Wind Velocity and Turbulence, Plume Behavior, Dispersion of Air Pollutants, Solutions to the Atmospheric Dispersion Equation, the Gaussian Plume Model.

Air pollution Sampling and Measurement: Types of Pollutant Sampling and Measurement, Ambient Air Sampling, Collection of Gaseous Air Pollutants, Collection of Particulate Pollutants, Stock

Sampling, Analysis of Air Pollutants, Sulphur Dioxide, Nitrogen Dioxide, Carbon Monoxide, Oxidants and Ozone, Hydrocarbons, Particulate Matter.

Air Pollution Control Methods: Sources, Correction Methods, Cleaning of Gaseous Effluents, Particulate Emission Control, Gravitational Settling Chambers, Cyclone Separators, Fabric Filters, Electrostatic Precipitators, Wet Scrubbers, Selection a Particulate Collector, Control of Gaseous Emissions, Adsorption by Solids, Absorption by Liquids, Combustion - Behavior and Fate of Air Pollutants.

Air Quality Management: Monitoring of SPM, SO; NO and CO Emission Standards. Air pollution laws and standards.

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.

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OPEN ELECTIVE

COURSE STRUCTURE

A5133 – DISASTER MANAGMENT

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:

A5133.1. Identify concepts, hazards and vulnerabilities of different types of disasters.
A5133.2. Examine the components of disaster management mechanism.
A5133.3. Select suitable capacity building frame work for disaster management
A5133.4 Interpret various disaster coping strategies
A5133.5. 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)

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OPEN ELECTIVE

COURSE STRUCTURE

A5231 – 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-requisites

2. Course Outcomes (COs)

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

A5231.1. Aware the basic concepts of measurement parameters as well as instrument standards, characteristics and errors.

A5231.2. Construct and design various measuring devices like voltmeters, Ammeters, Ohmmeters, analog, digital multi-meters and analyze different types of cathode ray oscilloscopes.

A5231.3. Design different bridge networks and analyze balanced condition for finding out values of resistance, capacitance and inductance.

A5231.4.Analyze different physical parameters like pressure, force, velocity, acceleration, sound, torque, strain and stress etc. using non-electrical transducers.

A5231.5. 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

Autonomous Institute Affiliated to JNTUH

OPEN ELECTIVE

COURSE STRUCTURE

A5232 – SOLAR ENERGY AND APPLICATIONS

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-requisites"

2. Course Outcomes (COs)

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

A5232.1 Compare the present and future available electrical power from solar energy in the world based on the knowledge of global solar horizontal irradiation.

A5232.2 Assimilate and acquire the skills for design and engineering of solar thermal and solar photovoltaic technology and systems.

A5232.3 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.

A5232.4 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.

A5232.5 Analyze the techno economics interaction of developments in the solar energy systems

3. Course Syllabus

PRINCPLES 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

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OPEN ELECTIVE

COURSE STRUCTURE

A5233 – 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-requisites"

2. Course Outcomes (Cos)

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

A5233.1 Analyze the influence of energy availability on the development of Industries and various other organizations.

A5233.2 Discuss the concepts and technologies used for energy conservation.

A5233.3 Develop methods for evaluating worth of project.

A5233.4 Investigate the schemes for demand side management.

A5233.5 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.

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OPEN ELECTIVE

COURSE STRUCTURE

A5331 - 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

- Engineering Physics (A5008)
- Linear Algebra and Ordinary Differential Equations (A5001)

2. COURSE OUTCOMES (COS)

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

A5331.1. Develop the general energy equations for thermal systems by laws of thermodynamics.

A5331.2. Compare types of fluids, fluid flows, pressure and flow measuring devices, losses in pipes, laminar and turbulent boundary layer concepts.

A5331.3. Evaluate design parameters of hydraulic turbines at given efficiency and discharge

A5331.4. Analyze an expression for force, workdone and efficiency of vane, turbines and pumps.

A5331.5. 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 Books:

1. M.P. Poonia, S.C. Sharma (2018), “Basic Mechanical Engineering”, 1st Edition, Khanna Book Publishing.
2. S.Trymbaka Murthy, (2011), “A Text Book of Elements of Mechanical Engineering”, 3rd New edition, I K International Publishing House Pvt. Ltd.

Reference Books:

1. K.P. Roy, S.K. Hajra Choudhury, NirjharRoy(2012), “Elements of Mechanical Engineering”, 7th Edition, Media Promoters & Publishers Pvt Ltd,Mumbai.
2. Pravin Kumar 2013,“Basic Mechanical Engineering”, Edition, Pearson, India.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

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OPEN ELECTIVE

COURSE STRUCTURE

A5332 - 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:

A5332.1. Understand the fundamental concepts of Additive Manufacturing (i.e. Rapid Prototyping) and 3-D printing, its advantages and limitations.

A5332.2. Apply engineering knowledge, techniques, skills and modern tools to analyze problems in 3D PRINTING.

A5332.3. Appraise additive manufacturing through 3d printing.

A5332.4. Solve Complex manufacturing problems for significant technological and societal development

A5332.5. 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

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OPEN ELECTIVE

COURSE STRUCTURE

A5333 - 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-requisites

2. Course Outcomes (Cos)

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

A5333.1. Understand the basic concepts and components of a robotic system.

A5333.2. Identify theuse of actuators and sensors for designing robot mobility system.

A5333.3. Solve transformation problems to describe the robot position and orientation of robot.

A5333.4. Apply the concepts of robot work cell design and control.

A5333.5. 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

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OPEN ELECTIVE

COURSE STRUCTURE

A5431 - 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-requisites.

2. Course Outcomes (Cos)

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

A5431.1. Identify the basic building blocks of IoT and its characteristics

A5431.2. Choose the application-layer protocols and web services architectures for a seamless integration of various components within an IoT ecosystem

A5431.3. Utilize Python standard libraries for implementing various IoT Applications

A5431.4. Examine the communication between a machine or a device with a remote system

A5431.5. 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 Book:

1. Getting Started with Raspberry Pi:Matt Richardson & Shawn Wallace,O'Reilly (SPD),2014.

VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

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OPEN ELECTIVE

COURSE STRUCTURE

A5432 - 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-requisites.

2. Course Outcomes (Cos)

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

A5432.1. Analyze linear and non - linear modulators and demodulators in time as well as frequency domain.

A5432.2. Design a linear and non linear modulators and demodulators for the analog signals

A5432.3. 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

A5432.4. Estimate a overall digital communication system for the improvement of the system performance.

A5432.5. 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

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OPEN ELECTIVE

COURSE STRUCTURE

A5433 - 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-requisites.

2. Course Outcomes (COs)

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

A5433.1. Understand mathematical description of signals and representation of systems
A5433.2. Identify the spectrum of continuous-time periodic and non-periodic signals
A5433.3. Apply various transforms to analyze continuous and discrete-time systems
A5433.4. Analyze digital systems using various transform techniques
A5433.5. 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

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OPEN ELECTIVE

COURSE STRUCTURE

A5531 – 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

- Python Programming (A5501)
- Data Structures (A5502)

2. COURSE OUTCOMES (COS)

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

A5531.1. Understand the principles of Object Oriented Programming to model real world problem.

A5531.2. Use various constructs / concepts to write programs in OOP paradigm.

A5531.3. Analyze the applications for Handling Exceptions and Multithreading in Java runtime environment.

A5531.4. Implement Collection Frameworks to retrieve and process data efficiently.

A5531.5. 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 Book:

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

Reference Books:

1. Michael Ernest (2013), Java SE 7 Programming Essentials, John Wiley & Sons Inc.
2. Y. Daniel Liang (2014), Introduction to Java Programming, Comprehensive Version, 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

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OPEN ELECTIVE

COURSE STRUCTURE

A5532 – 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

- Object oriented Programming (A5531)

2. Course Outcomes (COs)

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

A5532.1. Understand design and implementation of a database for a given problem domain.

A5532.2. Construct Queries in Relational algebra, relational calculus and SQL.

A5532.3. Apply Normalization techniques to reduce data redundancy in data base.

A5532.4. 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:

3. Raghurama Krishnan, Johannes Gehrke (2007), Database Management Systems, 3rd Edition, Tata McGraw-Hill, New Delhi, India.
4. 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

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OPEN ELECTIVE

COURSE STRUCTURE

A5533 – 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

- Digital Design and Computer Organization (A5505)

2. Course Outcomes (COs)

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

A5533.1. Understand the various services provided by the operating system.

A5533.2. Analyze the concepts of Process management and Synchronization in a multi processing system.

A5533.3. Apply the Memory management techniques for efficient usage.

A5533.4. Use File and Disk management schemes for effective storage management.

A5533.5. 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.

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OPEN ELECTIVE

COURSE STRUCTURE

A5631 - 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:

This course has no specific pre/co-requisitess.

2. Course Outcomes (COs)

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

A5631.1. Understand metrics in the process and project domains.

A5631.2. Identify the right process model to develop the right software system.

A5631.3. Gather requirements and analyze them scientifically in order to develop the right product, besides authoring software requirements documents.

A5631.4. Apply testing strategies for application being developed.

A5631.5. 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: TheObjectOriented 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 Books:

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.

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OPEN ELECTIVE

COURSE STRUCTURE

A5632 - 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:

This course has no specific pre/co-requisitess.

2. Course Outcomes (Cos)

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

A5632.1. Illustrate the components and roles of the E-Commerce environment.

A5632.2. Understand legal and ethical issues related to E-Commerce and web marketing approaches.

A5632.3. Identify how to sell products and services on the web as well as to meet the needs of web site Visitors.

A5632.4. 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:

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.MichaelChang.

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OPEN ELECTIVE

COURSE STRUCTURE

A5633 - 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

This course has no specific pre/co-requisitess.

2. Course Outcomes (Cos)

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

A5633.1. Understand how to protect them self and ultimately society from cyber-attacks by studying various case studies.

A5633.2. Summarize different government cyber laws and cyber-forensics techniques.

A5633.3. Apply different techniques to classify different types of cybercrimes

A5633.4. Analyze cyber-attacks on different online web applications

A5633.5. 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 Book:

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

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OPEN ELECTIVE

COURSE STRUCTURE

A5031 - 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 co-requisites.

2. Course Outcomes (COs)

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

A5021.1. Apply appropriate Numerical method to find a root of an equation.

A5021.2. Make use of interpolation to find approximate values of the function at intermediate points.

A5021.3. Evaluate definite integral using appropriate Numerical methods.

A5021.4. Construct curve of best fit for the bivariate data using method of least squares.

A5021.5. 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.

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OPEN ELECTIVE

COURSE STRUCTURE

A5032 - 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-requisites.

2. Course Outcomes (Cos)

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

A5022.1. Identify LPP and express in mathematical form to solve by graphical or simplex method.
A5022.2. Apply artificial variable techniques to obtain the optimal solution of an LPP.
A5022.3. Interpret various methods under transportation model to get optimal results.
A5022.4. Solve travelling salesmen problem using Hungarian method.
A5022.5. Develop various replacement and sequencing models to arrive 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. S. D. Sharma, *Operation Research*, Tata McGraw Hill, New Delhi, 2009.

Reference Books:

1. J. K. Sharma, *Operations Research – Theory and Applications*, 5th Edition, Macmillan India Ltd, India, 2007.
2. R. Panneerselvam, *Operations Research*, 2nd Edition, Prentice Hall of India, India, 2008.

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OPEN ELECTIVE

COURSE STRUCTURE

A5033 - 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 analyzethe 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-requisites.

2. Course Outcomes (Cos)

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

A5023.1. Determine series solutions of ordinary differential equations about ordinary and regular singular points.

A5023.2. Solve problems in cylindrical and spherical coordinate systems using Bessel functions.

A5023.3. Relate algebraic polynomials with Legendre and Hermite polynomials.

A5023.4. 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.

OPEN ELECTIVE

COURSE STRUCTURE

A5034– 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 pre/co-requisitess.

2. Course Outcomes (COs)

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

A5034.1. Understand the role, characteristics, qualities and functions of entrepreneur and use this knowledge to become future entrepreneurs.

A5034.2. Interpret various Institutional supports for setting up a business enterprise and apply this knowledge while approaching these institutions for financial support.

A5034.3. Illustrate role, importance and functions of women entrepreneur and use this knowledge to become future women entrepreneurs.

A5034.4. Infer the concept of Project Management and steps in Project development and analyze while taking future project assignments.

A5034.5. 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 of Trainees, NSIC, Pradhan Mantri Kaushal Vikas Yojana (PMKVY), Telangana Academy for Skill and Knowledge (TASK).

4. Books and Materials

Text Book(s)

1. Robert Hisrich, Michael P. Peter, Dean A. Shepherd (2010), Entrepreneurship, Tata Mc Graw Hill, New Delhi

Reference Book(s)

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

Autonomous Institute Affiliated to JNTUH

OPEN ELECTIVE

COURSE STRUCTURE

A5035– 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-requisitess.

2. Course Outcomes (COs)

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

A5035.1. Identify functions of Human Resource Management

A5035.2. Illustrate the process of Recruitment and selection

A5035.3. Analysis the needs and methods for training

A5035.4. Outline the functional relationship of performance and compensation

A5035.5. 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 Book(s)

1. Biswajeet Pattnayak (2009), Human Resource Management, Prentice hall of India, New Delhi, India.
2. R. Wayne Mondy and Robert M. Noe (2009), Human Resource Management, Pearson, India.

Reference Book(s)

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.

OPEN ELECTIVE

COURSE STRUCTURE

A5036– 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

2. 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-requisitess.

2. Course Outcomes (COs)

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

A5036.1. Explain the concepts of Logistics & Supply chain management.
A5036.2. Analyze the role of Supply chain drivers & Customer services of supply chain.
A5036.3. Examine the Benchmarking process and role of Sourcing in supply chain.
A5036.4. Analyze Network design in supply chain along with Coordination in supply chain.
A5036.5. 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.Shridhara bhat, “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.