

# **VARDHAMAN COLLEGE OF ENGINEERING**

**(AUTONOMOUS)**

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

**Shamshabad - 501 218, Hyderabad, Telangana, India.  
[www.vardhaman.org](http://www.vardhaman.org)**

## **BACHELOR OF TECHNOLOGY**

**INFORMATION TECHNOLOGY  
(Accredited by NBA)**

## **ACADEMIC REGULATIONS (VCE-R19)**

### **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)**

## **COURSE STRUCTURE (VCE-R19)**

**B. TECH – INFORMATION TECHNOLOGY**

**REGULATIONS: VCE-R19**

<b>I YEAR I SEMESTER</b>									
Induction Program for Two Weeks (Phase – I)									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination 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
A5008	Co-Engineering Laboratory	ES	0	0	4	2	30	70	100
A5007	Engineering Exploration	ES	0	0	2	1	30	70	100
<b>TOTAL</b>			<b>10</b>	<b>0</b>	<b>16</b>	<b>18</b>	<b>180</b>	<b>420</b>	<b>600</b>
<b>I YEAR II SEMESTER</b>									
Induction Program for One Week (Phase – II)									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination 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
<b>TOTAL</b>			<b>12</b>	<b>1</b>	<b>14</b>	<b>20</b>	<b>180</b>	<b>420</b>	<b>600</b>

**B. TECH – INFORMATION TECHNOLOGY**

**REGULATIONS: VCE-  
R19**

<b>II YEAR I SEMESTER</b>									
<b>Code</b>	<b>Course</b>	<b>Category</b>	<b>Periods per Week</b>			<b>Credits</b>	<b>Scheme of Examination Maximum Marks</b>		
			<b>L</b>	<b>T</b>	<b>P</b>		<b>CIE</b>	<b>SEE</b>	<b>Total</b>
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	0	100*	100*
<b>TOTAL</b>			<b>21</b>	<b>0</b>	<b>4</b>	<b>21</b>	<b>210</b>	<b>490</b>	<b>700</b>
<b>II YEAR II SEMESTER</b>									
<b>Code</b>	<b>Course</b>	<b>Category</b>	<b>Periods per Week</b>			<b>Credits</b>	<b>Scheme of Examination Maximum Marks</b>		
			<b>L</b>	<b>T</b>	<b>P</b>		<b>CIE</b>	<b>SEE</b>	<b>Total</b>
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
A5011	Gender Sensitization*	MC	2	0	0	0	0	100*	100*
A5604	Advanced Data visualization techniques	PC	1	0	2	2	30	70	100
<b>TOTAL</b>			<b>18</b>	<b>0</b>	<b>10</b>	<b>21</b>	<b>280</b>	<b>420</b>	<b>700</b>

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

**SYLLABI FOR  
I YEAR I SEMESTER**

**WARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT I Year I Sem.**

**VCE-R19**

**LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS**

**Course Code: A5001**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>

**SYLLABUS**

**UNIT-I**

**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.

**UNIT-II**

**Eigen Values, Eigen Vectors and Quadratic Forms:** Linear transformation, Eigen values and Eigen vectors 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.

**UNIT-III**

**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.

**UNIT-IV**

**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.

**UNIT-V**

**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			
S. No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
1	Study of Basic Scilab/ Matlab Commands	Scilab/Matlab Software	Able to understand the commands and constructors of Scilab/ Matlab
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		Able to perform the matrix operations
6	Rank, index, signature and nature of quadratic forms		Able to express a system of simultaneous linear equations in matrix form
7	Graphics – 2D Plots		
8	Solution of ordinary differential equations of first order		Able to solve ordinary differential equations
9	Solution of ordinary differential equations of higher order		
10	Laplace transforms		Able to analyze Laplace transforms and inverse Laplace transforms
11	Inverse Laplace transforms		
12	Solution of ordinary differential equations using Laplace transforms		

### Text Book

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

### Reference Books

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

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT I Year I Sem.**

**VCE-R19**

**APPLIED CHEMISTRY**

**Course Code: A5004**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>

**SYLLABUS**

**UNIT-I**

**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.

**UNIT-II**

**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.

**UNIT-III**

**Organic Reactions and Drug Molecules:**

Introduction, Types of organic reactions. Substitution reactions – SN<sup>1</sup>, SN<sup>2</sup>. Addition reactions – hydrogenation (H<sub>2</sub>), halogenation (X<sub>2</sub>) 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.

**UNIT-IV**

**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.

**UNIT-V**

**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			
No	Title of the Experiment	Tools and Techniques	Expected Skill / Ability
1	Estimation of strength of hydrochloric acid by conductometric titration.	Conductometer	Comparison between simple acid base titrations and Instrumental titrations.
2	Estimation of strength of hydrochloric acid by potentiometric titration.	Potentiometer	
3	Estimation of Iron in Mohr's salt by potentiometric titration.		
4	Estimation of hardness of water by complexometry using EDTA.	Complexometric Titration	Differentiate temporary and permanent hardness of water
5	Determination of chloride content in water by Argentometry	Precipitation Titrations	
6	Determination of viscosity of a given fluid by Ostwald's viscometer.	Ostwald's viscometer	Differentiate the viscosity and surface tension.
7	Determination of surface tension of a given liquid by using Stalagmometer.	Stalagmometer	
8	Synthesis of Aspirin and Paracetamol.	Synthesis	Uses and Side effects of drugs
9	Thin layer chromatography calculation of R <sub>f</sub> values. Eg. ortho and para nitro phenols.	Adsorption	Study the progress of the reaction.
10	Verification of Freundlich adsorption isotherm of acetic acid on Charcoal.		Various applications related to adsorption.
11	Determination of partition coefficient of acetic acid between butanol and water.	Distribution Law	Distribution of drugs in the body.
12	Determination of the rate constant of acid catalyzed hydrolysis of methyl acetate.	Chemical kinetics	Kinetic study of various reactions.

#### 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.

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT I Year I Sem.**

**VCE-R19**

**PYTHON PROGRAMMING**

**Course Code: A5501**

**L T P C  
1 0 4 3**

**SYLLABUS**

**UNIT-I**

**Introduction to Python programming:** Features of Python, History of Python

**Python Basics:** Literal Constants, Variables and Identifiers, Data Types, Input/Output Operations, Comments, Reserved Words, Indentation

**UNIT-II**

**Operators and Expressions:** 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.

**UNIT-III**

**Basic 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.

**UNIT-IV**

**Data Structures:** Sequence, Lists, Tuple, Sets, Dictionaries

**Introduction to Functions:** Declaration and Definition, Variable Scope and Lifetime, Return Statements, Types of Arguments, Lambda function, Recursion, Random module.

**UNIT-V**

**File Handling:** Types of files , Opening, Closing, Reading, Writing, Merge Operations on files

**Academic Project Work Submission using the Above Concepts**

Session #	Experiment
1.	<b>Input/output Operations</b> Write a python program for demonstrating different ways of taking input from console and displaying output.
2.	Write a python program for taking strings as input from console and displaying them
3.	Write a python program for demonstrating the usage of command line arguments
4.	<b>Variables and Identifiers</b>

	Write a python program for demonstrating different ways of using variables and identifiers.
5.	<b>Arithmetic, Comparison, Assignment Operators</b> Write a python program to find the area of triangle
6.	Write a python program to Take in the Marks of 5 Subjects and Display the average.
7.	Write a python program for demonstrating the usage of comparison operators
8.	<b>Relational, Unary, Bitwise, Shift Operators, Logical, Membership, Identity Operators</b> 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.]
9.	Write a python program for demonstrating the usage of unary, shift, logical, membership and identity operators.
10.	<b>Selection/Conditional Branching Statements - if, if-else with examples, Nested if, if elif</b> 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.
11.	Write a python program for reading two strings from console. Find whether to strings are equal or not.
12.	Write a python program to find whether given number is positive or not.
13.	Ask the user to enter a temperature in Celsius. The program should print a message based on the temperature: <ul style="list-style-type: none"> <li>• If the temperature is less than -273.15, print that the temperature is invalid because it is below absolute zero.</li> <li>• If it is exactly -273.15, print that the temperature is absolute 0.</li> <li>• If the temperature is between -273.15 and 0, print that the temperature is below freezing.</li> <li>• If it is 0, print that the temperature is at the freezing point.</li> <li>• If it is between 0 and 100, print that the temperature is in the normal range.</li> <li>• If it is 100, print that the temperature is at the boiling point.</li> <li>• If it is above 100, print that the temperature is above the boiling point.</li> </ul>
14.	<b>While Loop, Problems on while loop and For Loop, Problems on for loop</b> 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. <ul style="list-style-type: none"> <li>• First compute the remainder of dividing the larger number by the smaller number</li> </ul>

	<ul style="list-style-type: none"> <li>• Next, replace the larger number with the smaller number and the smaller number with the remainder.</li> <li>• Repeat this process until the smaller number is 0. The GCD is the last value of the larger number.</li> </ul>
15.	Write a python program to display all prime numbers between 0 to n.
16.	<b>continue, break, pass statements</b> Write a program to print all Armstrong numbers between given range using for loop.
17.	<b>Concatenating, Appending, Multiplying strings, Problems on Strings, Built-in String methods and functions, Slice Operation</b> 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.
18.	<b>List, basic programs on lists</b> 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.
19.	<b>Dictionaries, Simple programs on dictionary</b> Write a python program for demonstrating the creation of dictionary , accessing dictionary elements, modifying dictionary elements, finding length and other operations.
20.	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.
21.	<b>Tuples, basic programs on tuples</b> Write a python program to demonstrate various operations on tuples
22.	Write a python program to demonstrate various operations on sets
23.	<b>Simple programs on functions, Recursion</b> Write a python program to find factorial of a given number using recursion.
24.	Write a python program to find sum of individual digits of a given number using recursion
25.	<b>Types of Files, Opening and closing a file, reading and writing operations on files</b> Write a python program to read contents from a file and display the contents
26.	Write a python program to display the number of characters, digits and special characters present in the given file content
27.	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
28.	Write code that scans through the file and determines how many students passed all three tests.

### Text Book

1. Reema Thareja, *Python Programming using Problem solving Approach*, Oxford University Press, 2017

### Reference Books

1. Budd, Exploring Python. McGraw Hill, 2008
2. Zelle, Python Programming: An Introduction to Computer Science. Franklin, Beedle & Assoc., 2010
3. Pearson Education Publishing Starting Out with Python 3rd (2015)
4. Dive into Python 3, Mark Pilgrim, <http://www.diveintopython3.net/>
5. Think Python, 2nd Edition, Allen B. Downey
6. Algorithm Design, Jon Kleinberg and Eva Tardos, Pearson (2013)
7. Learning Python (5th Edition) - Mark, Lutz (O'Reilly, 2008)
8. Learn Python in Hard way -3<sup>rd</sup> Edition

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT I Year I Sem.**

**VCE-R19**

**BASIC ELECTRICAL ENGINEERING**

**Course Code: A5201**

**L T P C  
3 0 2 4**

**SYLLABUS**

**UNIT-I**

**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)

**UNIT-II**

**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.

**UNIT-III**

**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.

**UNIT-IV**

**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.

**UNIT-V**

**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.

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
1	Verification of Ohm's Law	Bread Board, Resistors of different values, Regulated Power supply, CRO, Function Generator	Analyze complex networks and measure electrical quantities using network theorems, two port networks and laws for DC excitations.
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	Single phase Transformer, Voltmeter, Ammeter, Wattmeters (LPF and UPF)	Testing of transformer by conducting OC, SC and load test to plot the performance characteristics of single phase transformers.
9	Load Test on Single Phase Transformer		
10	OC & SC Tests on Single phase Transformer		
11	Torque-Speed Characteristics of a DC Compound Motor.	DC Compound Motor, 3 phase Induction Motor, Separately Excited DC Motor, Voltmeter, Ammeter, Tachometer, Rheostat,	Analyze the performance of DC and AC machines at different loading conditions
12	Brake test on a 3 phase Induction Motor		
13	Performance Characteristics of a Separately Excited DC Motor.		

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
14	No-Load Characteristics of a Three-phase Alternator.	3 phase Alternator, Voltmeter, Ammeter, tachometer, Rheostat, Wattmeter	Perform NO load test on an Alternator to analyze its characteristics

### Text Books

1. D. P. Kothari and I.J. Nagrath, *Basic Electrical Engineering*, 3rd edition 2010, Tata McGraw Hill, 2010.
2. B.L. Theraja, A.K. Theraja, *A text book of Electrical Technology*, (Vol 1 & 2), S.Chand Publishers, New Delhi.

### Reference Books

1. D. C. Kulshreshtha, *Basic Electrical Engineering*, McGraw Hill, 2009.
2. L. S. Bobrow, *Fundamentals of Electrical Engineering*, Oxford University Press, 2011.
3. William Hart Hayt, Jack Ellsworth Kemmerly, Steven M. Durbin (2007), *Engineering Circuit Analysis*, 7<sup>th</sup> edition, McGraw-Hill Higher Education, New Delhi, India.



**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

B. Tech. IT I Year I Sem.

VCE-R19

**CO-ENGINEERING LABORATORY**

Course Code: A5008

**L T P C  
0 0 4 2**

**SYLLABUS**

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
<b>Civil Workshop</b>			
1	Field tests on cement	Cement, Sieve	Inspect quality of cement in field
2	Demonstration of surveying chains	30 m chain, 20 m chain	Select chain according to field condition
3	Different types of brick bonds	Bricks, Sprit level, Mason level, Straight level	Build brick bond for given type of wall
4	Types of Construction materials and identification	Stone, Tiles, Bricks, Aggregates	Identify construction material for given work
5	Demonstration of theodolite and total station	Theodolite, Total station	Select instrument according to field condition
No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
<b>Civil Workshop</b>			
1	Field tests on cement	Cement, Sieve	Inspect quality of cement in field
2	Demonstration of surveying chains	30 m chain, 20 m chain	Select chain according to field condition
3	Different types of brick bonds	Bricks, Sprit level, Mason level, Straight level	Build brick bond for given type of wall
4	Types of Construction materials and identification	Stone, Tiles, Bricks, Aggregates	Identify construction material for given work
5	Demonstration of theodolite and total station	Theodolite, Total station	Select instrument according to field condition
<b>Electrical Workshop</b>			
1	One Lamp controlled by one way switch.	one way switch, two way switch, tube light with frame, choke,	

<b>Electrical Workshop</b>			
2	One Lamp controlled by two two-way switches.	connecting wires, holders, bulbs, Energy meter, Indicator	Basic knowledge towards electrical wiring installations
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		
<b>Mechanical Workshop</b>			
1	Fitting Trade: To make a L- fit from the given M.S Flat material piece.	Follow a sequence of operations like filing, marking, punching, cutting and finishing.	Able to design and model a prototype in fitting trade
2	Carpentry Trade: To make a cross lap joint as per specification.	Follow a sequence of operations like planning, marking, cutting, chiseling and finishing.	Able to design and model a prototype in carpentry trade.
3	Tin Smithy: To make a open scoop with the given sheet metal	Follow a sequence of operations like marking, shearing, bending, folding, squeezing, pressing and finishing.	Able to design and model a prototype in Tin-Smithy.
4	Foundry: To prepare a sand mould using a single piece pattern.	Follow a sequence of operations like preparing moulding sand, placing the pattern, filling the sand, ramming, gate cutting, placing the sprue pins and finishing.	Able to make a sand mould using different tools and processes.
5	Plumbing: To make external threading on a given pipe	Follow a sequence of operations like marking, cutting, threading and testing.	Able to make an external threading on a PVC pipe.
<b>Electronics Workshop</b>			

<b>Electrical Workshop</b>			
1	Study of Basic Electronic Components (resistors, capacitors and inductors, switches, relay, breadboard), Resistor color coding, Difference between AC and DC Signals.	Resistors, Capacitors, Inductors, Switches, Relays, Breadboard	Identify and categorize the various types of passive components
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	DC Voltmeter and Ammeter, Multimeter and RPS	Measure voltage, current and resistance using measuring instruments
3	Demonstrate the use of Cathode Ray Oscilloscope and Function Generator. Measure amplitude, time period, and frequency of an AC signal	CRO and Function Generator	Measure amplitude, time-period and frequency of a test signal using CRO
4	Introduction to Multisim Electronic Workbench Practice - DC Operating Point and DC Analysis	NI Multisim Software	Analyze circuits for DC operating point using Multisim software
5	Multisim - Transient Analysis, Use of Virtual Instruments like Meters, Function Generator and CRO	NI Multisim Software	Analyze circuits for transient analysis using Multisim software

### **Text Books**

1. B.C.Punmia, Ashok K Jain, Arun K Jain, Surveying Vol.I, Laxmi Publications, 2016.
2. B. L. Juneja, "*Workshop Practice*", 1<sup>st</sup> 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 Scherz and Simon Monk, "*Practical Electronics for Inventors*", McGraw Hill, 4<sup>th</sup> 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*", 6<sup>th</sup> Edition Reprint, BSP Publications, Hyderabad, 2018.

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT I Year I Sem.**

**VCE-R19**

**ENGINEERING EXPLORATION**

**Course Code: A5007**

**L T P C  
0 0 2 1**

S. No.	Title of the Activity	Tools and Techniques	Expected Skill/Ability
1	Introduction to Engineering and Engineering Study: Difference between science and engineering, scientist and engineer needs and wants.	<ul style="list-style-type: none"> <li>• Differentiating Engineering and Science with examples</li> <li>• Activity: Build tallest tower to stand still with waste papers</li> <li>• Introducing Engineering with sciences by Conducting of graphite as a sample example (activity)</li> <li>• Group Formation Activity Brainstorming Session on Engineering Exploration in teams</li> </ul>	<ul style="list-style-type: none"> <li>• Awaken the fundamentals and sciences and relating with Engineering</li> <li>• Connect this course to Mini Project, Capstone Project &amp; Campus Placements</li> </ul>
2	Various disciplines of engineering, some misconceptions of engineering, Expectation for the 21st century engineer and Graduate Attributes.	<ul style="list-style-type: none"> <li>• Elaborating a Candy manufacturing Industry to define various Disciplines of Engineering</li> <li>• Activity in which student will present a gadget and elaborate on different disciplines in building it.</li> <li>• Enlightening students about Washington Accord and GA or PEO</li> </ul>	<ul style="list-style-type: none"> <li>• Train the multi disciplinary culture in Engineering</li> <li>• Making students aware of Graduate attribute</li> </ul>
3	Engineering Design Process, Multidisciplinary facet of design, Importance of analysis in engineering design, general analysis procedure.	<ul style="list-style-type: none"> <li>• Discussion on Engineering Design Cycle</li> </ul>	Differentiate the normal design process and Engineering Design Process

4	Introduction to mechatronics system, generation of multiple solution, decision matrix, Concepts of reverse engineering.	<ul style="list-style-type: none"> <li>• Activity on car defining a Mechatronics system</li> <li>• Impact of Engineering design on success and failure by two case studies of Tipping of the Titanic and Toppling of the Tacoma Narrows Bridge</li> </ul> <p><b><u>Presentations</u></b></p> <ul style="list-style-type: none"> <li>• Individual Project Presentations</li> </ul>	Habituate the role of engineering thinking ability towards decide the best design
5	Introduction to various platform based development (Arduino) programming and its essentials.	<ul style="list-style-type: none"> <li>• Arduino UNO development tool, sensors with its IDE</li> </ul>	Connecting hardware and also Coding skills on Arduino to develop various applications
6	Introduction to sensors, transducers and actuators and its interfacing with arduino.		
7	Engineering Ethics: Identifying Engineering as a Profession, Significance of Professional Ethics, Code of Conduct for Engineers.	<ul style="list-style-type: none"> <li>• Impact of Engineering Ethics on society by case studies</li> </ul> <p><b><u>Presentations</u></b></p> <ul style="list-style-type: none"> <li>• CEP Review-I Presentations</li> </ul>	Familiarize with Ethics in the profession life of Engineers
8	Identifying Ethical Dilemmas in different tasks of engineering, Applying Moral Theories and codes of conduct for resolution of Ethical Dilemmas.	<ul style="list-style-type: none"> <li>• Story board-demonstrating the Ethical Dilemmas</li> <li>• Brain storming</li> <li>• Activity on Code of Conduct</li> </ul>	Manage the risk during Ethical Dilemmas
9	Sustainability: Introduction to sustainability, Sustainability	<ul style="list-style-type: none"> <li>• Impact of Sustainability on project or products</li> <li>• Listing the global and local sustainable goals</li> </ul>	Identify the various community partners

	leadership, Life cycle assessment.		
10	Project Management: Introduction, Significance of team work, Importance of communication in engineering profession.	<ul style="list-style-type: none"> <li>• Handout on Project management and skills</li> <li>• <b><u>Presentations</u></b></li> <li>• CEP Review-II Presentations After Implementation</li> </ul>	Create a team and working on project
11	Project management tools: Checklist, Timeline, Gantt Chart, Significance of documentation.	<ul style="list-style-type: none"> <li>• Gantt Chart</li> <li>• Templates for Document</li> <li>• <b><u>Class Presentations</u></b></li> <li>• CEP Review-III Presentations</li> </ul>	Importance of Documents and preparing the schedule using Gant Chart

#### **Text Book**

- 1 Philip Kosky, Robert T. Balmer, William D. Keat, George Wise, Exploring Engineering: An Introduction to Engineering and Design, Academic Press, 3rd edition, 2012. 3.
- 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/Resources:**

- 1 Neerparaj Rai, Arduino Projects for Engineers, 1st edition, BPB Publications, 2016. 2.
- 2 Simon Monk, Programming Arduino : Getting Started with Sketches, 2nd Edition, McGraw-Hill Education, 2016.

**SYLLABI FOR  
I YEAR II SEMESTER**



**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

B. Tech. IT I Year II Sem.

VCE-R19

**ADVANCED CALCULUS**

Course Code: A5002

**L T P C**  
**3 1 2 5**

**SYLLABUS**

**UNIT-I**

**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.

**UNIT-II**

**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 using beta-gamma functions.

**UNIT-III**

**Vector Differentiation:** Scalar and vector point functions, Gradient, Directional derivative, Divergence, Curl and their related properties, Scalar potential function, Laplacian operator.

**UNIT-IV**

**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.

**UNIT-V**

**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.

<b>Practice (Scilab/Matlab Software)</b>	
<b>S. No</b>	<b>Title of the Experiment</b>
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

<b>Practice (Scilab/Matlab Software)</b>	
<b>S. No</b>	<b>Title of the Experiment</b>
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

**Text Book**

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

**Reference Books**

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

**VARDHAMAN COLLEGE OF ENGINEERING**  
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B. Tech. IT I Year II Sem.

VCE-R19

**APPLIED PHYSICS**

Course Code: A5003

**L T P C**  
**3 0 2 4**

**SYLLABUS**

**UNIT-I**

**Quantum Mechanics:** Introduction, Planck's constant and photo electric effect, de-Broglie's 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).

**UNIT-II**

**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.

**UNIT-III**

**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, 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

**UNIT-IV**

**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.

**UNIT-V**

**Nanoscience:** Characteristics and types (1-D, 2-D, 3-D) of nanomaterials, 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.

<b>Practice</b>			
<b>S. No.</b>	<b>Title of the Experiment</b>	<b>Tools and Techniques</b>	<b>Expected Skill /Ability</b>
1	Determine the value of Planck's constant ( $h$ ) and work function ( $\phi$ ) by using Photo cell.	Photo emissive cell mounted in a box provided with a wide slit.	Verify Einstein's theory of the photoelectric effect.
2	Determine the energy gap of a given semiconductor.	Semiconductor diode (Diode used OA 79 (Germanium)).	Evaluate the energy gap of a semi-conducting material.

<b>Practice</b>			
<b>S. No.</b>	<b>Title of the Experiment</b>	<b>Tools and Techniques</b>	<b>Expected Skill /Ability</b>
3	Study the PN junction diode characteristics under Forward & Reverse bias conditions.	PN Junction Diode	Analyze the characteristics of PN junction diode.
4	Verify the type of semi-conductor material, and estimate the density of majority carriers by using Hall Effect.	Semi-conductor sample, with Digital Gauss meter and IC regulated power supply.	Determine the semiconductor type from the polarity of the Hall voltage.
5	Determine the threshold voltage and study the V-I characteristics of LED.	Light Emitting Diode kit.	Understand the construction, working principle of LED and find its operating voltage.
6	Determine the radius of curvature of a Plano convex lens and the wavelength of Sodium light by Newton's rings method.	Optical arrangement for Newton's rings and Sodium Vapor lamp.	Estimate the radius of curvature of a given convex lens and wavelength of a given light source.
7	Measure the wavelength of spectral lines of Mercury (Hg) source using diffraction grating and a spectrometer.	Spectrometer and Mercury source (Hg) arrangement.	Determine the wavelengths of different light spectra.
8	Determine the wavelength of a given source of Laser light.	Plane diffraction grating and Laser source.	Understand the fundamentals of the Laser.
9	Evaluate the numerical aperture (NA) and acceptance angle ( $\theta_a$ ) of the given optical fiber.	Optical fiber trainer kit with NA measurement jig.	Measure the numerical aperture and acceptance angle of optical fibers.
10	Measure the bending loss and transmission or propagation loss in the given optical fiber.	Optical fiber trainer kit with cables of different lengths (each of 1 m & 3 m length cable).	Measure the losses in optical fibers, and the effect of impurities in optical fiber.

#### **Text Book**

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

#### **Reference Books**

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

**VARDHAMAN COLLEGE OF ENGINEERING**  
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B. Tech. IT I Year II Sem.

VCE-R19

**COMMUNICATIVE ENGLISH**

Course Code: A5005

**L T P C**  
**2 0 2 3**

**SYLLABUS**

**UNIT-I**

**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.

**UNIT-II**

**Grammar**

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

**UNIT-III**

**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 Don'ts of reading

**UNIT-IV**

**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

**UNIT-V**

**Writing**

Sentences – Paragraphs – Cohesion – Coherence – Logical, Lexical and Grammatical Devices – 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.

*\*Reading material from Text books and Reference book*

Practice			
S. No.	Title of the Experiment	Tools and Techniques	Expected Skill / Ability
1	<b>ICS:</b> Listening- Types of Listening-Steps to effective Listening -Business Listening Comprehension exercises <b>ICS:</b> Ice-Breaking activity and JAM session.	K-VAN Solutions Software	Learn to articulate speech sounds and identify the phonetic symbols.
2	<b>CALL:</b> Introduction to Phonetics - Speech Sounds - Vowels and Consonants		Rectify the pronunciation errors and understand word structure.
3	<b>CALL:</b> Past Tense Marker and Plural Marker - Syllable Structure - Consonant Clusters - Minimal pairs		Improving public speaking skills through group activity methods.
4	<b>ICS:</b> Situational Dialogues - Role-Play - Expressions in Various Situations: Greetings: Self-introduction and Introducing others - Apologies - Requests - Complaints- Congratulating - Expressing sympathy/ condolences.		Differentiate between Indian and British accents.
5	<b>CALL:</b> Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms		Improving day-to-day communication skills using different expressions.
6	<b>ICS:</b> Asking for and Giving Directions - Giving Instructions - Seeking Clarifications - Thanking and Responding - Agreeing and Disagreeing - Seeking and Giving Advice - Making Suggestions		Neutralizing MTI and differentiating between pronunciations.
7	<b>CALL:</b> Neutralization of Mother Tongue Influence-Common Indian Variants in Pronunciation - Differences between British and American pronunciation		Identify tones and sentences stress in order to make their communication intelligible.
8	<b>CALL:</b> Intonation Patterns-Types of Tones - Sentence Stress		Learning etiquette through activities in spoken language.
9	<b>ICS:</b> Social and Professional Etiquette - Telephone Etiquette		Understanding the basics of presentation skills.
10	<b>ICS:</b> Oral Presentation Skills (short presentations) - Making a Presentation- Prepared -Extempore		Understanding the importance of listening as a skill

### Text Books

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

### Reference Books

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

**VARDHAMAN COLLEGE OF ENGINEERING  
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**B. Tech. IT I Year II Sem.**

**VCE-R19**

**DATA STRUCTURES**

**Course Code: A5502**

**L T P C  
3 0 2 4**

**SYLLABUS**

**UNIT-I**

**C Overview:**

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

**Arrays:** one dimensional arrays, two dimensional arrays, string manipulation functions.

**UNIT-II**

**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.

**UNIT-III**

**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, Operations on 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.

**UNIT-IV**

**Linked Lists:** Introduction, Singly Linked List: Representation of a Singly Linked List, Operations on a Singly Linked List. 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.

**UNIT-V**

**Graphs:** Definition, Basic Terminologies and Representation.

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

Practice			
No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
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 a C program for Swapping of two numbers using a third variable.	Linux OS, C ++Compiler	Design of algorithms using formatted input/output statements.
2.	a) Write a 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 without using string functions.		Design of algorithms using arrays and strings.
3.	a) Write a C program to find the factorial of a number using non recursion. b) Write a C program to find the $n^{\text{th}}$ 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 $n^{\text{th}}$ Fibonacci term using recursion.		Develop solutions for applications using Functions and dynamic memory allocation.
4.	a) Write a C program to Read an array of integers whose size will be specified interactively at run 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.		Solve the different problems using stack and queue.
5.	a) Implement stack operations using arrays. b) Implementing towers of Hanoi.		
6.	a) Converting infix expression to postfix expression b) Evaluate the postfix expression		



7.	a) Implement Queue using arrays b) Implement Circular Queue using arrays		
8.	Implement single linked list.		Solve the different problems using the linked list.
9.	Implement double linked list.		
10.	Implement Traversals on Binary Tree using linked list.		Solve different problems using tree Data structure.
11.	a) Implement Linear Search b) Implement Binary search		Analyze the time and space complexities of searching and Sorting Techniques.
12.	a) Implement Bubble sort b) Implement Selection sort c) Implement Insertion sort		

### Text Books

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

### Reference Books

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

**VARDHAMAN COLLEGE OF ENGINEERING**  
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**B. Tech. IT I Year II Sem.**

**VCE-R19**

**ENGINEERING GRAPHICS AND COMPUTER AIDED DRAFTING**

**Course Code: A5301**

**L T P C**  
**1 0 4 3**

**SYLLABUS**

**UNIT-I**

**Introduction to Engineering Drawing:** Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Lettering and dimensioning, Conic Sections – General method only.

**UNIT-II**

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

**UNIT-III**

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

**UNIT-IV**

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

**UNIT-V**

**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.

<b>Practice (CAD)</b>			
<b>S. No</b>	<b>Title of the Experiment</b>	<b>Tools and Techniques</b>	<b>Expected Skill /Ability</b>
1	Projections of a point in all quadrants.	AUTOCAD software	Able to understand the commands and construct of lines, planes and solids. Conversion of Isometric view to orthographic views and vice versa.
2	Projections of a line in first quadrant.		
3	Orthographic projections of a plane parallel to one of the principal plane.		
4	Orthographic Projections of a plane inclined to both the principal planes.		
5	Orthographic Projections of a solid parallel to one of the principal planes.		

<b>Practice (CAD)</b>			
<b>S. No</b>	<b>Title of the Experiment</b>	<b>Tools and Techniques</b>	<b>Expected Skill /Ability</b>
6	Orthographic Projections of a solid inclined to one of the principal planes.		
7	Development of Lateral surface of a regular prism and a cylinder		
8	Development of Lateral surface of a pyramid and a cone.		
9	Isometric projections of a plane.		
10	Isometric projections of a simple solid.		
11	Conversion of Isometric view to Orthographic views.		
12	Conversion of Orthographic views to Isometric view.		

#### **Text Book**

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

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

B. Tech. IT I Year II Sem.

VCE-R19

**SOCIAL INNOVATION**

Course Code: A5006

**L T P C**  
**0 0 2 1**

**SYLLABUS**

S. No	Title of the Activity	Tools and Techniques	Expected Skill/Ability (Able to)
1	<b>Introduction to Social Innovation:</b> Core definitions, core elements and common features of social innovation, a typology of social innovation, Awakening social consciousness.	<ul style="list-style-type: none"> <li>• Behavioral Blocks to Innovation</li> <li>• Introducing oneself with three Adjectives- Appreciating diversity and discovering self</li> <li>• Group Formation Activity</li> <li>• Brainstorming Session on Social Innovators in teams</li> </ul>	<ul style="list-style-type: none"> <li>• Awaken the social consciousness</li> <li>• Connect this course to Mini Project, Capstone Project &amp; Campus Placements</li> </ul>
2	<b>Create Mindsets:</b> Seven mindsets – Empathy, Optimism, Iteration, Creative confidence, Making it, Embracing ambiguity, Learning from failures.	<ul style="list-style-type: none"> <li>• Watching a video in/out of Class a TED Talk on “How to build your Creative Confidence by David Kelley – IDEO Founder)</li> <li>• How to train the Dragon? (Common Video for all the mindsets)</li> <li>• Activity on survey at college or nearby students residence</li> </ul>	Train the life cycle management of human at all levels
3	<b>Wicked Problems:</b> Distinguish between simple, complicated and complex problems; describe the characteristics of wicked problems, breakdown a given problem by unpacking its complexity.	<ul style="list-style-type: none"> <li>• Activity on the spectrum of process complexity based on MY CAR example</li> <li>• Discussion on a theory of wicked problems (top 5 wicked problems) characterized by Horst Rittel</li> <li>• Activity on How to make a TOAST?</li> </ul>	Differentiate the types of problems in society based on priority

4	<p><b>Critical Thinking for Social Innovation:</b> Definition, engineering thinking and learning, distinguish between creativity and innovation.</p>	<ul style="list-style-type: none"> <li>• Activity on Creativity, Invention &amp; Innovation by Systems Thinking</li> </ul>	<p>Habituate the role of engineering thinking ability towards society</p>
5	<p><b>Models for Creative Thinking:</b> Appreciative Inquiry (AI), Asset Based Community Development (ABCD) and Concept of Bricolage.</p>	<p>Discussion on different models for creative thinking</p>	<p>Focuses on divergent thinking</p>
6	<p><b>Process of Social Innovation:</b> Community study, develop questionnaire, identifying the causes of a particular problem.</p>	<ul style="list-style-type: none"> <li>• Handout on Community Study and Issue Identification</li> <li>• Activity on Observation skills to know how to use one's observation skills in understanding the social conditions</li> <li>• Experience sharing by senior students</li> <li>• Brainstorming Deliberations on the initial observations and arrive at the "Social Issue"</li> <li>• Familiarization of the respective templates with the help of sample case study</li> </ul> <p><b>Note Use template provides to you : Frame your Design Challenge</b></p>	<ul style="list-style-type: none"> <li>• Initialize the observations being made by the group</li> <li>• Detail the interaction/ engagements with the society and finalize the social issue for intervention</li> </ul>
7	<p><b>Process of Social Innovation:</b> Identify needs, record your learning's.</p>	<ul style="list-style-type: none"> <li>• Handout on Overview of Inspiration</li> </ul> <p><b><u>Presentations</u></b></p> <ul style="list-style-type: none"> <li>• Entirety of the Social Issue</li> <li>• Identification of the Stake Holders</li> <li>• Interview Questions (Role Play on Interview with Stakeholders)</li> <li>• Categorize the learnings captured</li> </ul>	<p>Familiarize to the respective templates with the help of sample case study</p>

8	<b>Process of Social Innovation:</b> Generate ideas, select promising ideas, prototyping and testing.	<ul style="list-style-type: none"> <li>• Handout on Overview of Ideation-Synthesis &amp; Ideation-Prototyping</li> <li>• Create insights on “How might we” questions</li> <li>• Story board-demonstrating the possible solutions</li> <li>• Brain storming</li> <li>• Activity on Risk management, Resource management</li> </ul>	Manage the resource with risk
9	<b>Social Innovation across Four Sectors</b> - The non-profit sector, public sector, the private sector, the informal sector, links between and cross sectors.	<ul style="list-style-type: none"> <li>• Handout on Overview of Implementation <b><u>Presentations</u></b></li> <li>• Pilot implementation plan with required resources and Budget indicating stake holders &amp; their engagement</li> </ul>	Identify the various community partners
10	<b>Stages of Innovation:</b> Social organizations and enterprises, social movements, social software and open source methods, common patterns of success and failure.	<ul style="list-style-type: none"> <li>• Handout on Overview of stages of social models <b><u>Presentations</u></b></li> <li>• Final Presentation- After Implementation</li> </ul>	Create an action plan for budgeting & fund raising

### 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/Resources

- 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 – <http://www.nurturedevelopment.org/asset-based-community-development/>
- 3 Diana Whitney & Amanda Trosten-Bloom, “The Power of Appreciative inquiry – A Practical Guide to Positive Change”, 2<sup>nd</sup> Edition, Berrett-Koehler Publishers, Inc, 2010.

**SYLLABI FOR  
II YEAR I SEMESTER**

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT II Year I Sem.**

**VCE-R19**

**DISCRETE MATHEMATICAL STRUCTURES**

**Course Code: A5503**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**SYLLABUS**

**UNIT - I**

**PROPOSITIONAL LOGIC:** Statements and Notation, Connectives, Well-formed formulas Tautologies, Equivalence of formulas and Tautological implications, Rules of Inference.

**PREDICATE LOGIC:** Predicates, The statement Functions, Variables and Quantifiers, Free and Bound Variables

**UNIT - II**

**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.

**UNIT - III**

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

**UNIT - IV**

**GRAPH THEORY:** Basic Concepts, Isomorphisms and Sub graphs, Planar Graphs, Euler Circuits, Hamiltonian graphs, Chromatic Numbers.

**UNIT - V**

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

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

1. Kenneth H. Rosen (2007), Discrete Mathematics and its Applications, 7th Edition, Tata McGraw Hill, India.
2. C.L. Liu, D.P. Mohapatra (2009), Elements of Discrete Mathematics, 3rd Edition, McGraw Hill,India.



**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT II Year I Sem.**

**VCE-R19**

**MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

**Course Code: A5015**

L	T	P	C
3	0	0	3

**SYLLABUS**

**Unit – I:**

**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.

**Unit – II:**

**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.

**Unit – III:**

**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.

**Unit – IV:**

**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.

**Unit – V:**

**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).

**TEXT BOOKS:**

1. Varshney & Maheswari(2003), *Managerial Economics*, Sultan Chand.
2. Ambrish Gupta (2011), *Financial Accounting for Management: An Analytical Perspective*, 4<sup>th</sup> 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.

**VARDHAMAN COLLEGE OF ENGINEERING**  
**(AUTONOMOUS)**

**B. Tech. IT II Year I Sem**

**VCE-R19**

**DATABASE MANAGEMENT SYSTEMS**

**Course Code: A5506**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>

**UNIT - I**

**INTRODUCTION:** introduction to database management systems, database system applications, database systems versus file systems, view of data, Database users and administrators, database system structure. (T2: Ch-1)

**DATABASE DESIGN:** E-R diagrams, entities, attributes and entity sets, relationships and relationship sets, additional features of the E-R model (T1: Ch-2)

**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. (T1: Ch-5)

**UNIT - II**

**THE RELATIONAL MODEL:** Introduction to the relational model, integrity constraints over relations, querying relational data, logical database design: E-R to relational (T1: Ch-3)

**SQL-PART II:** Joins, Nested Queries, Null values, PL / SQL Basics for writing Triggers, Cursors, Stored Procedures. (T1: Ch-5).

**RELATIONAL ALGEBRA AND CALCULUS:** relational algebra and relational calculus. (T1: Ch-4) .

**UNIT - III**

**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. (T1: Ch-19)

**UNIT - IV**

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

**CONCURRENCY CONTROL:** Concurrency control - lock based protocols, time-stamp based protocols, validation based protocols, deadlock handling. (T2: Ch-15)

**UNIT - V**

**OVERVIEW OF RECOVERY AND INDEXING:** Recovery system - Failure classification, log-based recovery, shadow paging, recovery with concurrent transactions, ARIES Algorithm (T2: Ch-16).RAID, Overview of File organization, Tree index structures: ISAM and B+ trees. (T1: Ch-8,9,10)

## LIST OF EXPERIMENTS

### WEEK 1 and WEEK 2: PRACTICE OF DDL, DML COMMANDS ON EMPLOYEE AND DEPARTMENT DATABASE:

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

#### Consider the table structure as follows:

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

Department(deptno, dname,location)

#### Answer to the following Queries

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 Of 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 3 and WEEK 4:**

#### **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  $\geq 10$ ),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 than 30.
12. Find the sids ,names of sailors who have reserved a red or a green boat
13. Find the sids of sailors with age over 20 who have not reserved a red boat
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 overall ratings
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 5 and WEEK 6:**

#### **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 whose 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 Perryridge 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 assets greater than all branches located in Brooklyn
12. Find names of all branches that have assets 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 7:**

**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

### **PL/SQL PROGRAMS**

#### **WEEK 8:**

1. Write a PL/SQL program to read number from a user and find out whether it is Odd or Even.
2. Write a PL/SQL program to insert a row into emp table using variables
3. Write a PL/SQL program to get the name and salary of employee whose eno is 501.(use %type)
4. 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.

#### **WEEK 9:**

1. 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%	

2. Write a PL/SQL Block to read employee name from a user if it is exist display its salary otherwise display appropriate message using exception handling.
3. Write a PL/SQL Block to insert add one row in employee table. Display appropriate message using exception handling on duplication entry of employee number.(use Dup\_val\_on\_index exception)
4. Write a PL/SQL program to read number from a user and find out whether it is Odd or Even.

#### **WEEK 10:**

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

#### **WEEK 11: CURSORS**

1. Write a PL/SQL block that will display the name, dept no, salary of fist highest paid employees.
2. Update the balance -stock in the item master table each time a transaction takes place in the item transaction table. The change in item master table depends on the itemID is already present in the item master then update operation is performed to decrease the balance stock by the quantity specified in the item transaction in case the itemid is not present in the item master table then the record is inserted in the item master table.
3. The table trans has the following structure acno, transtype, trans date. The table bank has acno, bal, minbal.

Assuming that the same acno exists in both tables update the bank table. If trans.type='d' then Balance=bank.balance + trans.amount. if transtype='w' then balance = bank.balance-trans.amount . Take precaution in case of withdrawals.

### **WEEK 12: TRIGGERS**

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

### **TEXT BOOK(S):**

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 BOOK(S):**

1. Elmasri Navate (2014), Fundamentals of Database Systems, Pearson Education, India

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. IT II Year I Semester

VCE-R19

**PROBABILITY AND STATISTICS**

Course Code: A5010

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**SYLLABUS**

**UNIT-I**

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

**UNIT - II**

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

**UNIT - III**

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

**UNIT - IV**

**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.

**UNIT - V**

**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.

**TEXT BOOKS**

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

**REFERENCE BOOKS**

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
**(AUTONOMOUS)**

**B. Tech. IT II Year I Semester**

**VCE-R19**

**OBJECT ORIENTED PROGRAMMING**

**Course Code: A5601**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>

**SYLLABUS**

**UNIT – I**

**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 and String Tokenizer class.

**UNIT – II**

**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.

**UNIT – III**

**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.

**UNIT – IV**

**COLLECTIONS FRAMEWORK:** Collection classes- ArrayList, LinkedList, HashSet, TreeSet, Date.

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

**UNIT – V**

**AWT:** AWT Hierarchy, AWT controls, Layout Managers: FlowLayout, BorderLayout, GridLayout, CardLayout, Limitations of AWT, Moving beyond Applets.

**SWINGS:** JFrame, JPanel, JComponent- JLabel and ImageIcon, JTextField, JTabbedPane , Swing Buttons, JScrollPane, JComboBox, JTable.

## LABORATORY EXPERIMENTS

### Week – 1 (Control Statements)

1. Write Java programs for the following:
  - a. Read the marks of a student in 4 subjects and find grade.
  - b. Program to check a number is Armstrong or not.
  - c. Program to display prime numbers from m to n.

### Week – 2 (OOP First Principle- Encapsulation)

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

### Week – 3 (OOP Second Principle- Polymorphism , Arrays)

3. Write Java programs for the following:
  - 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  $m \times n$  ,  $p \times q$  , perform the multiplication of matrices.

### Week – 4 (Strings)

4. Write Java programs for the following:
  - a. Check a string is palindrome or not.
  - b. Given a string and an int n, return a string made of n repetitions of the last n characters of the string. You may assume that n is between 0 and the length of the string, inclusive. Write a Java program.  
repeatEnd("Hello",3)→"lollollo"  
repeatEnd("Hello",2)→"lolo"  
repeatEnd("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.  
countTriple("abcXXXabc")→1,  
countTriple("xxxabyyyycd")→3  
countTriple("a") → 0
  - d. Read array of City names and Sort in dictionary order.(Ascending order).

### Week – 5 (OOP Third Principle - Inheritance)

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

b. Write a Java program that create an abstract base class Shape with two members base and height, a member function for initialization and a function to compute shapeArea(). Derive two specific classes Triangle and Rectangle which override the function shapeArea(). Write a driver classes (main) to display the area of the triangle and the rectangle.(Use super keyword).

### **Week – 6 (Implement Packages and Interfaces)**

6. Write Java programs for the following:

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 (Exception Handling)**

7. Write Java programs for the following:

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

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

### **Week – 8 (Multithreaded Programming and Thread Synchronization)**

8. Write Java programs for the following:

a. Create a multithreaded java program by creating a subclass of Thread and then creating, initializing, and starting two Thread objects from your class. 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)**

9. Write Java programs for the following:

a. Use an ArrayList to manage Employee objects for insertion, display and remove.

b. Use HashSet methods to perform operations on collection of data.

### **Week – 10 (Event Handling)**

10. Write Java programs for the following:

a. Implement ActionListener and MouseMotionListener to handle various mouse events.

b. Implement KeyListener to handle key events.

### **Week – 11(Develop GUI applications using AWT)**

11. Write Java programs for the following:

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(GUI applications using Swing Controls)**

12. Write Java programs for the following:

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

### **TEXT BOOKS:**

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

### **REFERENCE BOOKS:**

1. Michael Ernest (2013), Java SE 7 Programming Essentials, John Wiley & Sons Inc.
2. Y. Daniel Liang (2014), Introduction to Java Programming, Comprehensive Version, 10thEdition, Pearson Education, India.
3. Kathy Sierra, Bert Bates (2014), OCA/OCP Java SE 7 Programmer I & II Study Guide (Exams 1Z0-803 & 1Z0-804), 1st Edition, McGraw-Hill Education Publisher, USA.
4. T. Budd (2010), An Introduction to Object Oriented Programming, 3rd Edition, Pearson Education, India.

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT II Year I Semester**

**VCE-R19**

**DIGITAL DESIGN AND COMPUTER ORGANIZATION**

**Course Code: A5505**

**L T P C  
3 0 0 3**

**SYLLABUS**

**UNIT – I**

**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.

**UNIT – II**

**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.

**UNIT – III**

**Sequential Logic:** Flip-Flops (SR, JK, D, T), shift registers, ripple counters.

**Register Transfer:** Register transfer language, bus and memory transfers

**UNIT – IV**

**Micro-Operations:** arithmetic micro-operations, logic micro-operations, and shift micro-operations.

**Basic computer Organization:** Instruction formats, instruction cycle, addressing modes.

**UNIT – V**

**Computer Arithmetic:** Addition and subtraction, multiplication (normal and Booth's) and digital division algorithm and floating point addition and subtraction.

**TEXT BOOKS:**

1. M. Morris Mano, Michael D. Ciletti (2008), Digital Design, 4th edition, 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.

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT II Year I Semester**

**VCE-R19**

**QUANTITATIVE APTITUDE**

**Course Code: A5014**

**L T P C  
1 0 0 1**

**SYLLABUS**

**UNIT - I**

**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 alligation

**UNIT - II**

**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

**UNIT - III**

**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.

**UNIT - IV**

**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.

**UNIT - V**

**Clocks:** Introduction, Finding angle between hands of clock, Gain/Loss of time, Finding time, Gain or loss time

**Calendar:** Calendars method- 1, Calendars method -2

**TEXT BOOK**

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

**REFERENCE BOOKS**

1. Abhijit Guha, *Quantitative Aptitude for competitive examinations*, 6<sup>th</sup> Edition, MCGraw Hill Education.

Dinesh Khattar, *The Pearson guide to Quantitative Aptitude for Competitive Examinations*, 3<sup>rd</sup> Edition, Pearson Education.

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT II Year I Semester**

**VCE-R19**

**ENVIRONMENTAL SCIENCE**

**Course Code: A5012**

**L T P C  
2 0 0 0**

**SYLLABUS**

**UNIT - I**

**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.

**UNIT - II**

**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.

**UNIT - III**

**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.

**UNIT - IV**

**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.

**UNIT - V**

**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. Rajendrasingh, Anna hazare watershed management development programme and environmental ethics. Environment Protection Act.

**TEXT BOOK**

1. AnubhaKaushik, C.P. Kaushik. Perspectives in Environmental Studies. 4<sup>th</sup> edition, New age international publishers, 2014.

**REFERENCE BOOKS**

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

**SYLLABI FOR  
II YEAR II SEMESTER**



**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT II Year II Sem.**

**VCE-R19**

**FORMAL LANGUAGES AND AUTOMATA THEORY**

**Course Code: A5602**

**L T P C  
3 0 0 3**

**SYLLABUS**

**Unit-I**

**FINITE AUTOMATA (FA):** Introduction, model and behavior, Deterministic Finite Automata (DFA) - Formal definition, simpler notations (state transition diagram, transition table), language of a DFA. Nondeterministic Finite Automata (NFA)-definition of NFA, language of an NFA, Equivalence of Deterministic and Nondeterministic Finite Automata, Finite Automata with Epsilon Transitions, Eliminating epsilon transitions, Minimization of DFA, Finite automata with output (Moore and Mealy machines)

**Unit-II**

**REGULAR EXPRESSIONS (RE):** Introduction, algebraic laws for Regular Expressions, Finite Automata and Regular Expressions-from DFA's to Regular Expressions, converting Regular Expressions to Automata. Proving languages to be non-regular -Pumping lemma. Closure properties of regular languages (Proofs not required).

**Unit-III**

**CONTEXT- FREE GRAMMARS (CFG):** Formal definition, sentential forms, leftmost and rightmost derivations, parse tree, ambiguous grammar.

**SIMPLIFICATION OF CFG:** Removing useless symbols, Null (epsilon) productions and unit productions. Normal forms –CNF, GNF. Proving that some languages are not context free -Pumping lemma for CFLs, closure properties of CFLs (Proofs not required).

**Unit- IV**

**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. NPDA.

**Unit- V**

**TURING MACHINES (TM):** Formal definition and behavior, languages of a TM, TM as accepters, computable functions, Types of TMs.

**RECURSIVE AND RECURSIVELY ENUMERABLE LANGUAGES (REL):** Properties of recursive and recursively enumerable languages.

**COMPUTABILITY THEORY:** Context sensitive language and linear bounded automata (LBA), Chomsky hierarchy, post's correspondence problem (PCP).

**Text Book:**

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2007), Introduction to Automata Theory Languages and Computation, 3rdEdition, Pearson Education, India.
2. Sipser, *Introduction to Theory of Computation, 2nd edition Thomson.*

**Reference Books:**

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

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT II Year II Sem**

**VCE-R19**

**BASICS OF IOT AND ROBOTICS**

**Course Code: A5510**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>

**SYLLABUS**

**UNIT-I**

**Introduction to IoT:** Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs. **(8 hours)**

**UNIT-II**

**Domain specific applications of IoT:** Home automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health and lifestyle. **(4 hours)**

**UNIT-III**

**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. **(10 hours)**

**UNIT-IV**

**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 Uno with Arduino- Controlling LED with Arduino, interfacing an LED and Switch with Arduino and Interfacing a light sensor (LDR) with Arduino. **(10 hours)**

**UNIT-V**

**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. **(10 hours)**

**LABORATORY EXPERIMENTS**

**Week-1:**

1. Write program using Raspberry Pi for Blink LED.

**Week-2:**

2. Write program using for Arduino IDE Blink LED.

**Week-3:**

3. Implement IoT based weather monitoring system using Raspberry Pi.

**Week-4:**

4. Write Arduino program for monitor temperature and humidity using DHT (Digital Humidity and Temperature) sensor.

**Week-5:**

5. Implement Raspberry Pi based Automated Street Lighting System.

**Week-6:**

6. Implement Arduino based Automated Street Lighting System.

**Week-7:**

7. Write an Arduino program for Distance Measurement Using Ultrasonic Sensor and displaying on LCD.

**Week-8:**

8. Implement Raspberry Pi program for Distance Measurement Using Ultrasonic Sensor and displaying on LCD.

**Week-9:**

9. Study and Implement Zigbee Protocol using Arduino.

**Week-10:**

10. Study and Implement Zigbee Protocol using Raspberry Pi.

**PRACTICE:**

1. Study and Install IDE of Arduino and different types of Arduino.
2. Write program using Arduino IDE for Blink LED.
3. Write Program for RGB LED using Arduino.
4. Study the Temperature sensor and Write Program for monitor temperature using Arduino.
5. Study and Implement RFID, NFC using Arduino.
6. Study and implement MQTT protocol using Arduino.
7. Study and Configure Raspberry Pi.
8. WAP for LED blink using Raspberry Pi.

**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**  
(AUTONOMOUS)

B. Tech. IT II Year II Semester

VCE-R19

**DESIGN AND ANALYSIS OF ALGORITHMS**

Course Code: A5508

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**SYLLABUS**

**UNIT - I**

**INTRODUCTION** - Performance Analysis-Space Complexity, Time Complexity, Asymptotic Notations-Big-Oh, Omega, and Theta, recurrence method, substitution Method

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

**UNIT - II**

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

**UNIT - III**

**DYNAMIC PROGRAMMING** - All pairs shortest path, Matrix Chain Multiplication, Optimal Binary search trees, 0/1 Knapsack, the travelling salesman problem.

**UNIT - IV**

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

**UNIT - V**

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

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

**TEXT BOOKS:**

1. Ellis Horowitz, Satraj Sahni, Rajasekharam (2007), Fundamentals of Computer Algorithms, 2nd edition, University Press, New Delhi.

**REFERENCE BOOKS:**

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

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B.Tech IT II Year. II Semester**

VCE-R19

**WEB TECHNOLOGIES**

Course Code: A5603

L	T	P	C
3	0	2	4

**SYLLABUS**

**UNIT -I:**

**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

**UNIT-II:**

**BOOTSTRAP:** Introduction, Bootstrap with CSS, Images, Tables

**XML:** Introduction, DTD, XML Schema, XSLT, Types of parsers:DOM,SAX

**UNIT-III:**

**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.

**UNIT-IV:**

**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.

**UNIT-V:**

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

## Title of the Experiment

- 1
  - HTML Program to work with Lists.
  - HTML Program to work with tables.
2.
  - HTML Program to design login page, registration page.
  - HTML program to design feedback form.
  - 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)
3.
  - Apply Various Bootstrap CSS Properties
- 4
  - Create a DTD document to validate the XML document.
  - Create a XML Schema document to validate the XML document.
- 5
  - JDBC Program to create a student table in the database.
  - JDBC Program to perform various DML Operations on the database using Statement.
  - JDBC Program to perform various DML operations using Prepared Statement.
- 6
  - JDBC Program to execute stored procedure using Callable Statement.
  - JDBC Program to execute stored function using Callable Statement.
  - Servlet program to read the parameters from user interface and display welcome message.
- 7
  - Servlet program to read initialization parameters using ServletConfig and ServletContext object.
  - Servlet program to work with HttpSession Object.
- 8
  - Servlet program to work with Cookie.
  - Servlet program to insert the form contents into the database using JDBC.
- 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.
  - JSP Program to access bean information using useBean tag.
- 10
  - JSP Program to authenticate the login details. If user is valid forward the control to **success.html** otherwise forward to **fail.html**.
  - 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.
- 11
  - PHP Program to perform various DDL operations on MySQL database.
- 12
  - PHP Program to perform various DML operations on MySQL database.

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 (AUTONOMOUS)

II B. Tech. II Semester

VCE-R19

## OPERATING SYSTEMS

Course Code: A5507

L	T	P	C
3	0	2	4

### SYLLABUS

#### UNIT - I

##### **OPERATING SYSTEMS OVERVIEW:**

Definition, Operating System Types, Operating System operations, Operating system services, Operating System Structures, System calls- types, implementation and System Programs, Distributed Systems, Special Purpose Systems, UNIX Architecture.

#### UNIT - II

**PROCESS MANAGEMENT:** Introduction to Process Management, Process concepts- Process, Process State Diagram and PCB, Operations on processes, IPC- Message Passing, Shared Memory and Pipes. Process Scheduling- Scheduling Criteria, Scheduler Types and Scheduling Algorithms. Multithreading – Models and Benefits.

**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, Monitors (Definition, Structure and Example).

#### UNIT - III

**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.

#### UNIT - IV

**FILE SYSTEM:** Concept of a file – File Attributes, File Types, Access Methods, Directory Structure, file system mounting, File system structure, File System Implementation, directory implementation, File Allocation methods, and Free-Space management.

**MASS-STORAGE STRUCTURE:** Introduction to Magnetic Disks, Disk Structure, Disk Attachment, Disk Scheduling, Swap Space Management.

#### UNIT - V

**DEADLOCKS:** 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.

### LAB EXPERIMENTS

#### Week -1:

1. Study and Practice on various commands like mkdir, rmdir, cat, ls, cp, mv, rm, man.

#### Week -2:

2. Study and Practice on various commands like wc, uniq, comm, cmp, diff, ln, unlink, chmod.



**Week -3:**

3. Study and Practice on various commands head, tail, sort, grep, egrep, fgrep, cut, paste, join.

**Week-4:**

4. a) Programs using Process Management System calls fork (), exec () and wait () system calls.  
b) Implement two way process communication using pipes.

**Week-5:**

5. Implement message queue form of IPC.

**Week-6:**

6. Simulate the following CPU Scheduling Algorithms:  
a) FCFSScheduling  
b) SJF Scheduling

**Week-7:**

7. Simulate the following CPU Scheduling Algorithms:  
a) Priority Scheduling  
b) Round Robin Scheduling

**Week-8:**

8. Implement Producer- Consumer Problem using Semaphores.

**Week-9:**

9. Simulate a program to implement  
a) head command  
b) tail command

**Week-10:**

10. Simulate all FIFO Page Replacement Algorithm.

**Week-11:**

11. Simulate LRU Page Replacement Algorithms.

**Week-12:**

12. Simulate Bankers algorithm for Deadlock Avoidance.

**Week-13:**

13. Implement SSTF disk scheduling algorithm. (Additional Practice)

**Week-14:**

14. Program to implement Shared Memory form of IPC. (Additional Practice)

**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. Andrew S. Tanenbaum (2007), *Modern Operating Systems*, 2nd Edition, Prentice Hall of India, India.
3. Deitel&Deitel (2008), *Operating systems*, 3rd Edition, Pearson Education, India.
4. Dhamdhare (2008), *Operating Systems*, 2nd Edition, Tata Mc graw Hill, New Delhi.
5. Sumitabha Das (2007), *Your Unix The Ultimate Guide*, Tata Mc Graw Hill, New Delhi, India.

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT II Year I Semester**

**VCE-R19**

**VERBAL ABILITY AND LOGICAL REASONING**

**Course Code: A5013**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>

**SYLLABUS**

**UNIT - I**

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

**UNIT - II**

**a) Articles and Tenses:** Introduction, usage of articles, Omission of Articles, Types of tenses, Forms and Usage of tenses

**b) Direction Sense:** Introduction, Distance method, Facing Method and Shadow Method

**UNIT - III**

**a) Blood Relations:** Introduction, Direct, Puzzle and Coded models

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

**UNIT - IV**

**a) Data Arrangements:** Linear Arrangement, Circular Arrangement, Multiple Arrangements

**b) Syllogisms:** Introduction, Tick-Cross method, Inferential Technique, Venn-Diagram method

**UNIT - V**

**a) Visual Reasoning:** Patterns, Folded Images, Cubes and Analytical Reasoning

**b) Sentence Correction:** Subject-Verb Agreement, Pronoun Antecedent, Parallelism, Verb-Time Sequence Error, Determiners and Modifiers

**REFERENCE BOOKS:**

1. A Modern Approach to Logical Reasoning Book by R.S. Aggarwal and Vikas Aggarwal.
2. Test of Reasoning Paperback by Edgar Thorpe and Logical Reasoning by Arun Sharma.

**VARDHAMAN COLLEGE OF ENGINEERING**  
**(AUTONOMOUS)**

**B. Tech. IT IV Semester**

**VCE-R19**

**GENDER SENSITIZATION**

**Course Code: A5011**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>

**UNIT-I**

- 1. Gender Sensitization: Why should we study it?**
- 2. Socialization: Making Women, Making Men**  
Introduction  
Preparing for womanhood  
Growing up male  
First lessons in caste  
Different masculinities
- 3. Just Relationships: Being Together as Equals**  
Mary Kom and Onler  
Love and Acid just do not mix  
Love letters  
Mothers and fathers  
Further Reading: Rosa Parks-The Brave heart

**UNIT-II**

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

**UNIT-III**

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

**UNIT-IV**

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

**2. Domestic Violence: Speaking Out**

Is home a safe place?

When women unite (Film)

Rebuilding lives

Further Reading: New Forums for justice.

**3. Thinking about Sexual Violence**

Blaming the Victim- “ I Fought for my life...”

Further Reading: The caste face of violence.

**UNIT-V**

**1. Knowledge: Through the Lens of Gender**

Point of view

Gender and the structure of knowledge

Further Reading: Unacknowledged women artists of Telangana

**2. Whose History? Questions for Historians and Others**

Reclaiming a Past

Writing other Histories

Further Reading: Missing pages from modern Telangana history

**TEXT BOOK:**

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

**ADDITIONAL RESOURCES:**

[www.worldofequals.org.in](http://www.worldofequals.org.in)

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**B. Tech. IT IV Semester**

**VCE-R19**

**Course Code: A5604**

**L T P C  
1 0 2 2**

**ADVANCED DATA VISUALIZATION TECHNIQUES**

<b>S. No</b>	<b>Module / Week</b>	<b>Title of the Experiment</b>	<b>Prerequisite- Concepts &amp; Tools</b>	<b>Expected Skill/Ability</b>																					
1	Module 1 & 2	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.	Bar graphs.	Understand data																					
2	Module 3 & 4	You are required to collect 30 students averages. Visualize the averages using a suitable plot bar charts and histograms	Bar graphs, Histograms	Build and analyze the data																					
3	Module 5 & 6	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:	Bar and Pie charts	Think to compare the data.																					
		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Branches</th> <th>Sales-2000</th> <th>Sales-2001</th> </tr> </thead> <tbody> <tr> <td>B1</td> <td>80</td> <td>105</td> </tr> <tr> <td>B2</td> <td>70</td> <td>75</td> </tr> <tr> <td>B3</td> <td>60</td> <td>75</td> </tr> <tr> <td>B4</td> <td>87</td> <td>120</td> </tr> <tr> <td>B5</td> <td>90</td> <td>130</td> </tr> <tr> <td>B6</td> <td>79</td> <td>85</td> </tr> </tbody> </table>	Branches	Sales-2000	Sales-2001	B1	80	105	B2	70	75	B3	60	75	B4	87	120	B5	90	130	B6	79	85		
Branches	Sales-2000	Sales-2001																							
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B4	87	120																							
B5	90	130																							
B6	79	85																							
4	Module 7 & 8	Mr X, Y ,Z spent 17%, 26% and .2% of the day playing. Visualize how many hrs they really spent in playing.	Pie Charts	Think and analyze the graph																					
5	Module 9 & 10	Measure the heights of 30 students of your class and visualize them using frequency histograms.	Histograms	Build the data																					
6	Module 11 & 12	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.	Line graph	Ability to analyze the data																					
7	Module 13 & 14	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.	Line graph	Ability to compare																					
8	Module 15 & 16	The data shows population of parrots (in hundreds) on an island declined over the ten year period from 2001 to 2010. Measurements were taken at the beginning of each year. Between which two years was the decline greatest? Use line graphs. Population of parrots={60, 55,34,37,39,32,40,45,46,50}	Line graph	Ability to analyze																					

S. No	Module / Week	Title of the Experiment	Prerequisite- Concepts & Tools	Expected Skill/Ability
9	Module 17 & 18	You are required to create a data sets, of 30 records with 6 columns: Roll,M1,M2,M3,M4 ( 4 subject marks), and percentage. Visualize average of each subject using pie charts, which subject has highest average. Visualize percentage of marks secured by students as line graph and scattered plot	EXCEL/PYTHON	Build data
10	Module 19 & 20	Imagine you survey your 30 friends to find the kind of movie they like best (give ratings): Action, Drama, Comedy, fiction. Build a data set of your survey. Identify the category which has highest average rating, use suitable plot.	EXCEL/PYTHON	Ability to choose the better plot
11	Module 21 & 22	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	Box plots	Build data
12	Module 23 & 24	Take the IRIS Data set from : <a href="https://gist.github.com/curran/a08a1080b88344b0c8a7">https://gist.github.com/curran/a08a1080b88344b0c8a7</a> 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	Use suitable plot	Think to identify suitable plot

#### Text Book:

1. Bajaj Chandrajit, " Data Visualization Techniques", John Willey and Sons.

#### Reference Books:

1. Anthony Banfield, "Thinking Statistically".
2. Mario Dobler, Tim Großmann, Data Visualization with Python: Create an impact with meaningful data insights using interactive and engaging visuals, Publisher, Packt.
3. Kevin Jolly, Hands-On Data Visualization with Bokeh: Interactive web plotting for Python using Bokeh, Publisher Packt