USHARAMA
COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

(Approved by A.I.C.T.E & Permanently Affiliated to JNTU, Kakinada)
Accredited by NAAC with "A" Grade

on NH 16, Telaprolu, Krishna Dist – 521109

B.TECH

COMPUTER SCIENCE AND ENGINEERING

COURSE STRUCTURE
&
SYLLABUS

(Applicable for the batches admitted from the Academic Year 2019-20)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE STRUCTURE
COMPUTER SCIENCE & ENGINEERING
(Applicable for batches admitted from 2019-2020)

I SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	HMC	UR19HM101	Communicative English	2	0	0	2	2
2	BSC	UR19BSC101	Linear Algebra & Calculus	3	1	0	4	4
3	BSC	UR19BSC104	Numerical Methods & Statistics	3	0	0	3	3
4	BSC	UR19BSC110	Applied Chemistry	3	0	0	3	3
5	ESC	UR19ESC109	Fundamentals of Computer Science	3	0	0	3	3
6	HMC	UR19HML101	Communicative English Lab	0	0	2	2	1
7	BSC	UR19BSCL103	Engineering and Applied Chemistry Lab	0	0	3	3	1.5
8	ESC	UR19ESCL101	Engineering Workshop & IT Workshop	0	0	3	3	1.5
Total				**14**	**1**	**8**	**23**	**19**

II SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	HMC	UR19HM202	Professional English	2	0	0	2	2
2	BSC	UR19BSC205	Differential Equations & Vector Calculus	3	0	0	3	3
3	BSC	UR19BSC208	Applied Physics	3	0	0	3	3
4	ESC	UR19ESC208	Engineering Graphics & Drafting	1	0	3	4	2.5
5	ESC	UR19ESC210	Problem Solving and Programming using C	3	0	0	3	3
6	ESC	UR19ESC211	Digital Logic & Design	3	0	0	3	3
7	HMC	UR19HML202	Professional English Lab	0	0	3	3	1.5
8	BSC	UR19BSCL202	Applied Physics Lab	0	0	3	3	1.5
9	ESC	UR19ESCL202	Problem Solving and Programming Using C Lab	0	0	3	3	1.5
Mandatory Courses								
10	MC	UR19MC200	Engineering Exploration project*	0	0	0	1	0
11	MC	UR19MC202	Applied Physics – Virtual lab*	0	0	0	2	0
12	MC	UR19MC204	Environmental Studies*	0	0	0	2	0
Total				**15**	**0**	**12**	**32**	**21**
***Internal Evaluation**								

COURSE STRUCTURE

COMPUTER SCIENCE & ENGINEERING

(Applicable for batches admitted from 2019-2020)

III SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	PCC	UR19PCCS301	Python Programming	3	0	0	3	3
2	PCC	UR19PCCS302	Data Structures	3	0	0	3	3
3	PCC	UR19PCCS303	Software Engineering	3	0	0	3	3
4	PCC	UR19PCCS304	Object Oriented Programming through C++	3	0	0	3	3
5	PCC	UR19PCCS305	Computer Organization and Architecture	3	0	0	3	3
6	PCC	UR19PCCS306	Mathematical Foundations of Computer Science	3	0	0	3	3
7	PCC	UR19PCCSL301	Python Programming Lab	0	0	3	3	1.5
8	PCC	UR19PCCSL302	Data Structures through C++ Lab	0	0	3	3	1.5
Mandatory Courses								
9	MC	UR19MCCS301	Essence of Indian Traditional Knowledge*	0	0	0	3	0
Total				**18**	**0**	**6**	**27**	**21**
Employability Skills- I*							2	0
Self Learning* (Technical Certificate)							2	0
***Internal Evaluation - Student should complete at-least one technical certificate as self learning mandatory course.**								

IV SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	BSC	UR19BSC401	Statistics With R Programming	3	0	0	3	3
2	PCC	UR19PCCS401	Java Programming	2	1	0	3	3
3	PCC	UR19PCCS402	Operating Systems	3	0	0	3	3
4	PCC	UR19PCCS403	Data Base Management Systems	3	0	0	3	3
5	PCC	UR19PCCS404	Formal Languages and Automata Theory	3	0	0	3	3
6	PCC	UR19PCCSL401	Java Programming Lab	0	0	3	3	1.5
7	PCC	UR19PCCSL402	UNIX Operating Systems Lab	0	0	3	3	1.5
8	PCC	UR19PCCSL403	Data Base Management Systems Lab	0	0	3	3	1.5
Mandatory Courses								
9	MC	UR19MC401	Professional Ethics & Human Values*	0	0	0	3	0
10	PROJ	UR19MPROJCS401	Socially Relevant Mini Project - I*	0	0	0	2	0
Total				**14**	**1**	**9**	**29**	**19.5**
***Internal Evaluation**								

V SEMESTER								
S. No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	PCC	UR19PCCS501	Data Warehousing and Data Mining	3	0	0	3	3
2	PCC	UR19PCCS502	Computer Networks	3	0	0	3	3
3	PCC	UR19PCCS503	Artificial Intelligence	3	0	0	3	3
4	PCC	UR19PCCS504	Compiler Design	3	0	0	3	3
Professional Elective- I								
5	PEC	UR19PECS501	Software Analysis and Design	3	0	0	3	3
		UR19PECS502	Data Storage Technologies & Networks					
		UR19PECS503	Big-Data with Hadoop					
		UR19PECS504	Cloud computing					
		UR19PECS505	Advanced Data Structures					
6	PCC	UR19PCCSL501	Data Mining Lab	0	0	3	3	1.5
7	PCC	UR19PCCSL502	Computer Networks & Compiler Design Lab	0	0	3	3	1.5
8	PCC	UR19PCCSL503	AI Tools & Techniques Lab	0	0	3	3	1.5
Total				**15**	**0**	**9**	**24**	**19.5**
Employability Skills -II*							2	0
Self Learning* (Technical Certificate)							2	0
***Internal Evaluation - Student should complete at-least one technical certificate as self learning mandatory course.**								

VI SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	PCC	UR19PCCS601	Web Technologies	3	0	0	3	3
2	PCC	UR19PCCS602	Internet of Things	1	0	0	1	1
3	PCC	UR19PCCS603	Design and Analysis of Algorithms	3	0	0	3	3
Professional Elective –II								
4	PEC	UR19PECS601	Software Architecture	3	0	0	3	3
		UR19PECS602	Malware Analysis & Reverse Engineering					
		UR19PECS603	Nosql Databases					
		UR19PECS604	Cloud Analytics					
		UR19PECS605	Principles of Programming Language					
5	OEC	---	**Open Elective- I**	3	0	0	3	3
6	HMC	UR19HM601	Managerial Economics and Financial Analysis	3	0	0	3	3
7	PCC	UR19PCCSL601	Web Technologies Lab	0	0	3	3	1.5
8	PCC	UR10PCCSL602	Internet of Things & Application Lab	0	0	3	3	1.5
Mandatory Course								
9	PROJ	UR19MPROJCS602	Socially Relevant Mini Project – II*	0	0	0	2	0
Total				**16**	**0**	**6**	**24**	**19**
***Internal Evaluation**								

VII SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	PCC	UR19PCCS701	UML & Design Patterns	3	0	0	3	3
2	PCC	UR19PCCS702	Cryptography and Network Security	3	0	0	3	3
3	PCC	UR19PCCS703	Machine Learning	3	0	0	3	3
4	OEC	---	**Open Elective -II**	3	0	0	3	3
Professional Elective- III								
5	PEC	UR19PECS701	Software Testing Methodologies	3	0	0	3	3
		UR19PECS702	Digital Forensics					
		UR19PECS703	Big Data Analytics					
		UR19PECS704	Cluster and Grid Computing					
		UR19PECS705	Full Stack Development					
Professional Elective- IV								
6	PEC	UR19PECS706	Software Project Management	3	0	0	3	3
		UR19PECS707	Cyber Security & Forensics					
		UR19PECS708	Python with Data Science					
		UR19PECS709	Soft Computing					
		UR19PECS710	Deep Learning					
7	PCC	UR19PCCSL701	UML Lab	0	0	3	3	1.5
8	PROJ	UR19PROJCS701	Project – Stage-I	0	0	3	3	1.5
9	PROJ	UR19PROJCS702	Internship	0	0	0	0	2
		Total		**18**	**0**	**6**	**24**	**23**

VIII SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	HMC	UR19HM801	Management and Organizational Behavior	3	0	0	3	3
2	OEC	---	**Open Elective- III**	3	0	0	3	3
Professional Elective-V								
3	PEC	UR19PECS801	Software Security Essentials	3	0	0	3	3
		UR19PECS802	Cyber Laws					
		UR19PECS803	Knowledge Discovery					
		UR19PECS804	Cloud Security					
		UR19PECS805	Block Chain Technologies					
4	PROJ	UR19PROJCS801	Project –Stage -II	0	0	18	18	9
		Total		**9**	**0**	**18**	**27**	**18**

Total Credits = (19+21)+(21+19.5)+(19.5+19)+(23+18) = 40.5+40+38.5+41 = 160

List of Open Electives

Open Electives offered by the Dept. of CE

S.No.	Course Code	Open Elective – I
1.	UR19OECE601	Introduction To GIS
2.	UR19OECE602	Environmental Pollution Control
3.	UR19OECE603	Conservation of Water Resources
	Course Code	**Open Elective – II**
4.	UR19OECE701	Metro Systems and Engineering
5.	UR19OECE702	Natural Disaster Mitigation and Management
6.	UR19OECE703	Total Quality Management
	Course Code	**Open Elective – III**
7.	UR19OECE801	Sanitary and Public Health Engineering
8.	UR19OECE802	Environmental and Industrial Hygiene
9.	UR19OECE803	Green Buildings

Open Electives offered by the Dept. of EEE

S.No.	Course Code	Open Elective – I
1.	UR19OEEE601	Neural Networks and Fuzzy Logic
2.	UR19OEEE602	Linear Control Systems
3.	UR19OEEE603	Electrical Safety Management
	Course Code	**Open Elective – II**
4.	UR19OEEE701	Programmable Logic Controllers
5.	UR19OEEE702	Energy Audit and Conservation Management
6.	UR19OEEE703	Electrical Technology
	Course Code	**Open Elective – III**
7.	UR19OEEE801	Non Conventional Energy Sources
8.	UR19OEEE802	Industrial Electrical Operation
9.	UR19OEEE803	Hybrid Electric Vehicles

Open Electives offered by the Dept. of ME

S.No.	Course Code	Open Elective – I
1.	UR19OEME601	Nano Technology
2.	UR19OEME602	Robotics
3.	UR19OEME603	Power Plant Engineering
	Course Code	**Open Elective – II**
4.	UR19OEME701	Operations Research
5.	UR19OEME702	Industrial Engineering & Quality control
6.	UR19OEME703	Advanced materials
	Course Code	**Open Elective – III**
7.	UR19OEME801	Optimization Techniques
8.	UR19OEME802	Green Engineering systems
9.	UR19OEME803	Mechatronics

Open Electives offered by the Dept. of ECE

S.No.	Course Code	Open Elective – I
1.	UR19OEEC601	Consumer Electronics
2.	UR19OEEC602	Digital Electronics
3.	UR19OEEC603	Analog and Digital I.C. Applications
	Course Code	**Open Elective – II**
4.	UR19OEEC701	Embedded Systems
5.	UR19OEEC702	Internet of Things (IoT)
6.	UR19OEEC703	Principles of Computer Communications and Networks
	Course Code	**Open Elective – III**
7.	UR19OEEC801	Microcontrollers
8.	UR19OEEC802	Principles of Electronic Communications
9.	UR19OEEC803	Electronic Measurements and Instrumentation

Open Electives offered by the Dept. of CSE

S.No.	Course Code	Open Elective – I
1.	UR19OECS601	Java Programming
2.	UR19OECS602	Data Base Management Systems
3.	UR19OECS603	C++ Programming
	Course Code	**Open Elective – II**
4.	UR19OECS701	Distributed Computing
5.	UR19OECS702	Deep Learning
6.	UR19OECS703	AI and ML for Robotics
	Course Code	**Open Elective – III**
7.	UR19OECS801	AI Tools & Techniques
8.	UR19OECS802	Information Security
9.	UR19OECS803	Big Data

Open Electives offered by the Dept. of IT

S.No.	Course Code	Open Elective-I
1.	UR19OEIT101	Data Structures
2.	UR19OEIT102	Computer Graphics
3.	UR19OEIT103	Data Science
	Course Code	**Open Elective – II**
4.	UR19OEIT201	Operating Systems
5.	UR19OEIT202	Python Programming
6.	UR19OEIT203	Web Technologies
	Course Code	**Open Elective – III**
7.	UR19OEIT301	Information Security
8.	UR19OEIT302	Mobile Application Development
9.	UR19OEIT303	Block Chain Technologies

I Year - I Semester Course Code : UR19HM101

L	T	P	C
2	0	0	2

Internal: 30 Marks External: 70 Marks

COMMUNICATIVE ENGLISH

(Common to all branches)

Course Objectives:

- Recall and improve the language proficiency of the students in English
- Paraphrase and interpret the ideas and thoughts in a dynamic way
- Prioritize the importance of practical learning of English
- Distinguish the various levels of Listening, Speaking, Reading and writing skills
- Construct statements in writing and speaking in professional manner

UNIT – I
Poem: "Life" by Sarojini Naidu
Grammar: Articles
Vocabulary: Prefixes and Suffixes
Writing: Paragraph Writing
Life-Skills: Attitude

UNIT – II
Essay: A Drawer full of Happiness
Grammar: Prepositions
Vocabulary: Homonyms, Homophones, Homographs
Writing: Letter of Request and Apology
Life-Skills: Self- Management

UNIT – III
Short Story: "Half a Rupee Worth" by R.K. Narayan
Grammar: Tenses
Vocabulary: Idiomatic Expressions; Phrasal Verbs
Writing: Letter of Complaint and Appreciation
Life-Skills: Body Language

UNIT – IV
Text: Stephen Hawking – Positivity 'Benchmark'
Grammar: Question Tags, Conjunctions
Vocabulary: One - Word Substitutes, Collocations
Writing: Dialogue and Speech Writing
Life-Skills: Being Assertive

UNIT – V
Poem: Once Upon a Time by Gabriel Okara
Grammar: Degrees of Comparison
Vocabulary: Technical Abbreviations
Writing: E-mail Writing, Preparation of Resume and Letter of application
Life-Skills: Goal Setting, Working in a Team

TEXT BOOK:
'InfoTech English' – Maruti Publications

REFERENCE BOOKS:

Raymond Murphy, "Murphy's Essential English Grammar" with CD, Cambridge University Press
Practical English Usage, Michael Swan, OUP, 1995

NPTEL ONLINE COURSE:

'Enhancing Soft skills & Personality Development

Course Outcomes:

CO1: Apply critical-thinking to develop writing skills
CO2: Understand and evaluate different kinds of prose tests.
CO3: Describe distinct literary characteristics of poems.
CO4: Analyze the major and minor details of a biography.
CO5: Develop grammar and vocabulary skills
CO6: Evaluate the effectiveness in improving life-skills.

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I Year - I Semester	Course Code : UR19BSC101	L	T	P	C
		3	1	0	4

Internal: 30 Marks External: 70 Marks

LINEAR ALGEBRA & CALCULUS

(Common to all branches)

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

UNIT – I

Matrices: Solving system of homogeneous and non-homogeneous linear equations by Gauss elimination method. Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem.

UNIT – II

Sequences and Series: Convergence and divergence, Ratio test - Comparison test -Cauchy's root test-. Fourier series, Euler's formulae, conditions for Fourier expansion, Even and Odd functions.

UNIT – III

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (single variable & without proofs).

UNIT – IV

Multivariable calculus: Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT – V

Multiple Integrals: Double integrals, change of order of integration, double integration in polar coordinates. Evaluation of triple integrals, change of variables.

TEXT BOOK:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna Publishers

Course Outcomes:

CO1: Develop the use of matrix algebra techniques that is needed by engineers for practical Applications

CO2: Find or compute the Fourier series of Fourier series periodic signals.

CO3: Utilize mean value theorems to real life problems.

CO4: Translate the given function as series of Taylor's and Maclaurin's with remainders.

CO5: Familiarize with functions of several variables which are useful in optimization.

CO6: Apply Double integration in evaluating areas bounded by regions.

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I Year - I Semester Course Code : UR19BSC104

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

NUMERICAL METHODS & STATISTICS

(CSE & IT)

Course Objectives:

- To elucidate the different numerical methods to solve nonlinear algebraic equations.
- To familiarize the students with numerical methods of solving the non-linear equations.
- To familiarize the students with the foundations of probability and statistical methods

UNIT – I

Solution to algebraic equations: Solution of polynomial and transcendental equations: Bisection method, Regula-Falsi method, Iteration method and Newton-Raphson method.

UNIT – II

Interpolation: Finite differences, interpolation using Newton's forward and backward difference formulae, Gauss forward and backward interpolation formulae, Interpolation with unequal intervals, Newton's divided difference and Lagrange's formulae.

UNIT – III

Numerical integration and Solution of ODE: Numerical integration- trapezoidal rule and Simpson's 1/3rd and 3/8 rules. Ordinary differential equations, Taylor's series, Euler and modified Euler's methods. Runge-Kutta method of fourth order for solving first order ODE.

UNIT – IV

Statistical Methods: Coefficient of correlation, lines of regression, Curve fitting Principle of least squares, Method of least squares, fitting of other curves

UNIT – V

Probability Distributions: Random variables (discrete and continuous)**,** probability distribution, Moment generating function, Binomial - Poisson distribution, normal distribution, exponential distribution.

TEXT BOOK:

1.Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers

REFERENCE BOOKS:

1**.**Advanced Engineering Mathematics, Erwin kreyszig,

2.Fundamentals of Mathematical Statistics, S.C.Gupta and V.K.Kapoor,

3. Introductory methods of Numerical Analysis, S.S.Sastry.

Course Outcomes:

CO1: Evaluate approximating the roots of polynomial and transcendental equations by different algorithms

CO2: Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal Intervals

CO3: Apply definite integral of function by using different numerical methods.

CO4: Apply different algorithms for approximating the solutions of ordinary differential equations to Its analytical computations

CO5: Interpret the association of characteristics through correlation and regression tools.

CO6: Apply discrete and continuous probability distributions.

I Year - I Semester Course Code : UR19BSC110

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

APPLIED CHEMISTRY
(CSE/IT)

Course Objectives:

- Importance of usage of Plastics in household appliances and composites (FRP) in aerospace automotive industries.
- Select the fuels as a source of energy are a basic need of any industry, particularly industries like thermal power stations, steel industry, fertilizer industry etc., and hence they are introduced.
- construction of galvanic cells as well as some batteries used in instruments are introduced. Understand the mechanism of corrosion which itself is explained by electrochemical theory
- With the increase in demand, a wide variety of materials are coming up; some of them have excellent engineering properties and a few of these materials are introduced.
- explain the computational chemistry and different applications of analytical instruments.

UNIT – I HIGH POLYMERS AND PLASTICS

Polymerisation : Introduction- Mechanism of polymerization - Stereo regular polymers – methods of polymerization (emulsion and suspension) -Physical and mechanical properties – Plastics as engineering materials : advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (4 techniques)- Preparation, properties and applications of Polyethene, PVC, Bakelite and Teflon Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers : Buna S, Buna N, Thiokol and polyurethanes – Applications of elastomers. Composite materials & Fiber reinforced plastics – Biodegradable polymers – Conducting polymers.

UNIT – II FUEL TECHNOLOGY

Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Bomb calorimeter – Numerical problems – Coal –– Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knocking agents – Power alcohol – Gaseous fuels – Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus – Numerical problems on combustion.

UNIT – III ELECTROCHEMICAL CELLS AND CORROSION

Part-A:

ELECTROCHEMISTRY

Introduction- Galvanic cells - Reversible and irreversible cells – Single electrode potential – Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell – Lead-Acid storage cells-Li cells. Fuel cells: - Hydrogen Oxygen fuel cells – Methanol Oxygen fuel cells.

Part-B

CORROSION

Corrosion:- Definition – Theories of Corrosion (electrochemical and chemical)-Galvanic corrosion,Differential aeration corrosion –Factors which influence the rate of corrosion - Protection from corrosion– Cathodic protection - Protective coatings: – Surface preparation – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).

UNIT – IV CHEMISTRY OF ADVANCED ENGINEERING MATERIALS

Nano materials:- Introduction–Sol-gel method & chemical reduction method of preparation - Carbon nano tubes-Preparation and Applications; **Solar Energy:**- Introduction, application of solar energy, photovoltaic cell: design, working and its importance **Liquid Crystals** :- Types and applications **Non-Elemental Semiconducting Materials:-**Stoichiometric, Controlled valency & Chalcogen photo/semiconductors, Preparation of Semiconductors (Distillation, Zone refining, Czochralski crystal pulling, epitaxy, diffusion, ion implantation) **Superconductors** :- Type-I & Type-2, properties &applications.

UNIT – V

COMPUTATIONAL CHEMISTRY AND SPECTROSCOPIC STUDIES

COMPUTATIONAL CHEMISTRY: Introduction,Ab Initio studies.

SPECTROSCOPIC STUDIES: Electromagnetic spectrum-UV(laws of absorption,instrumentation,theory of electronic spectroscopy,Frank-condon principle,chromophores and auxochromes,intensity shifts,applications), X-Ray difaction method , FT-IR(Instrumentation and IR of some organic compounds,applications)-MRI and CT scan(Procedure & Applications).

TEXT BOOKS:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

REFERENCE BOOKS:

1. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
2. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Applied Chemistry by H.D. Gesser, Springer Publishers
5. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM.

Course Outcomes:

CO1: Understand the advantages and limitations of plastic materials.
CO2: Relate the need of fuels as a source of energy.
CO3: Explain the theory of construction of batteries
CO4: The categorize the reasons for corrosion and study some methods of corrosion control.
CO5: Know the importance of advanced engineering materials like Nanomaterials, Liquid crystals, Semiconductors and superconductors.
CO6: Obtain the knowledge of computational chemistry and understand the principles of different analytical instruments.

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I Year - I Semester Course Code : UR19ESC109

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

FUNDAMENTALS OF COMPUTER SCIENCE
(EEE/CSE/IT)

Course Objectives:

To study different types and working of a digital computer.

- To learn different number systems and representation of floating point numbers.
- To understand the need and working of memory and other peripheral devices.
- To be familiar with the internal organization of a computer.
- To study the interconnection of computers and applications of computer.

UNIT – I INTRODUCTION

History of Digital computers, types of computers, block diagram of a digital computers, various parts of a digital computer. Computer programming — Machine language, assembly language and high-level language programming.

UNIT – II

NUMBER SYSTEMS

Binary, Octal, Decimal and Hexadecimal number systems, conversion of numbers from one system to other system, Fixed point and floating-point representation of numbers, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating - point Arithmetic Operations

UNIT – III

MEMORY AND PERIPHERALS

Memories: Need for memory, Types of computer memories — magnetic, Dynamic and static memories, RAM, ROM, EPROM and EEPROM memories, Cache memory, Concept of Virtual memory.
Peripheral Devices: Working of Keyboard and Mouse. Types of Printers and it's working. I/O Ports, Addressing I/o devices — programmed I/O, interrupt I/O, DMA.

UNIT – IV

COMPUTER ORGANISATION

Organization of a processor - Registers, ALU and Control unit, Register transfer language, micro operations, Instruction codes, Computer instructions, Instruction formats, Instruction cycle, Memory Reference Instructions, Input — Output instructions, Control memory, Address sequencing, Design of control unit-micro programmed control, hard wired control.

UNIT – V

APPLICATIONS

Various applications of Computers, Networking of Computers, LAN, WAN, MAN, Internet. Internet of Things (loT) applications to electrical engineering.

TEXT BOOKS:

1. Computer Fundamentals By PK Sinha, 6th Edition, BPB publications.
2. Fundamentals of Computers by E. Balagurusamy, McGrawHill edition.
3. Computer Fundamentals by Anitha Goel, Pearson education

Course Outcomes:

CO1: Understand the functioning and programming of computers.

CO2: Convert numbers from one type of system to other type of system.

CO3: Distinguish between different types of memories and learn the mapping of I/O devices.

CO4: Understand the functioning of peripheral devices and addressing I/o devices.

CO5: Demonstrate the internal organization of digital computer.

CO6: Apply digital computers for storing electrical engineering problems.

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I Year - I Semester	Course Code : UR19HML101	L	T	P	C
		0	0	2	1

Internal: 20 Marks External: 30 Marks

COMMUNICATIVE ENGLISH LAB

(Common to all branches)

Course Objectives:

To enable the students to learn through practice the communication skills of listening, speaking, reading and writing.

List of Activities

1) Introducing yourself
2) Greeting
3) Thanking and Responding to thanks
4) Requesting and Responding to requests
5) Making and Responding to complaints
6) Apologising and accepting apologies
7) Consonants : Plosives, Affricates and Nasals
8) Consonants: Fricatives, Liquids and Glides
9) Vowels: Pure vowels
10) Vowels: Dipthongs
11) Consonant clusters
12) Word Accent
13) Word Stress
14) Intonation

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Reference Manuals:

'INTERACT: English Lab Manual for Undergraduate Students' Published by Orient Blackswan Pvt Ltd ‘Strengthen Your Communication Skills’ published by Maruthi Publications

Course Outcomes:

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

CO1 Apply expressions in day to day life
CO2 Build language proficiency by using patterns
CO3 Develop communication skills through various language activities
CO4 Outline of Letters and Sounds
CO5 Identify consonants and vowel sounds in phonetic script
CO6 Understand pronunciation, stress and intonation

*****

I Year - I Semester	Course Code : UR19BSCL103	L	T	P	C
		0	0	3	1.5

Internal: 20 Marks External: 30 Marks

Engineering and Applied Chemistry Lab

Course Objectives:

- To gain practical knowledge by applying the experimental methods to correlate with the chemistry theory.
- To learn the usage of electrical systems for various measurements.
- Apply the analytical techniques and graphical analysis to the experimental data.

List of Experiments

1. Introduction to Chemistry laboratory- Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Qualitative analysis, Quantitative analysis etc.
2. Trial experiment-Estimation of HCl by using standard Na_2CO_3solution.
3. Estimation of Total hardness of water by using standard EDTA solution.
4. Estimation of Zinc using standard EDTA solution.
5. Estimation of Copper using standard EDTA solution.
6. Estimation of P^H of the given sample solution using P^H meter.
7. Conductometric titration between Strong acid and Strong base.
8. Conductometric titration between Strong acid and Weak base.
9. Potentiometric titration between Strong acid and Strong base.
10. Potentiometric titration between Strong acid and Weak base.
11. Estimation of $KMnO_4$ using standard Oxalic acid.
12. Determination of Alkalinity of water.
13. Determination of Viscosity of given sample by Ostwald viscometer.
14. Estimation of Ferric iron using standard $K_2Cr_2O_7$ solution.
15. Estimation of Copper using standard $K_2Cr_2O_7$solution.
16. Preparation of Bakelite (Demo).

Reference Books

1. A Textbook of Quantitative Analysis, Arthur J.Vogel.
2. Dr. Jyotsna Cherukuris (2012) Laboratory Manual of engineering chemistry-II, VGS Techno Series
3. Chemistry Practical Manual, Lorven Publications
4. K. Mukkanti (2009) Practical Engineering Chemistry, B.S.Publication.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Course Outcomes:

Upon the completion of course, student will be able to

CO1: Utilize different Analytical tools and execute experiments involving estimation of raw materials, finished products and environmental samples etc.

CO2: Utilize modern instruments like Conductometer PH meter and Potentiometer for the analysis of samples

CO3: Determine the total hardness present in water for its quality in drinking purpose

CO4: Estimate the Viscosity of oil and assess its suitability as a lubricant
CO5: Determine the alkalinity present in water for its quality in drinking purpose
CO6: Identify the adulteration of lemon juice for Vitamin-C

*****

I Year - I Semester	Course Code : UR19ESCL101	L	T	P	C
		0	0	3	1.5

Internal: 20 Marks External: 30 Marks

ENGINEERNG WORK SHOP AND IT WORK SHOP

ENGINEERNG WORK SHOP:

Course Objectives:

- To familiarize with the basics of tools and equipments used in fitting, carpentry, Sheet metal and smithy.
- To familiarize with the production of simple modes in the above trades.

NOTE: At least one exercise to be done from each trade.

Trade: Carpentry:

1. Cross –Lap joint
2. Mortise and Tenon joint
3. T-Lap joint

FITTING:

1. V-fit
2. Square fit
3. Dovetail fit

Black Smithy:

1. S-Hook
2. Round rod to square
3. Round rod to Hexagonal headed bolt
4. Making simple parts like chisel.

House Wiring:

1. Parallel/Series connection of three bulbs
2. Stair Case wiring
3. Florescent lamp fitting
4. Measurement of earth resistance

Tin Smithy:

1. Making rectangular tray
2. Making scoop
3. Making hopper
4. Making funnel

IT WORK SHOP:

Course Objectives:

- IT Workshop is to impart basic computer usage and maintenance skills and to introduce you to a suite of productivity tools that will aid in your day to day activities.
- IT workshop works in a learning-by-doing mode. It concentrates more on hands-on experience for the participants rather theoretical classes.
- It enables the participant to make the best use of Microsoft Office Suite in their day-to-day requirements and make use of it to improve the standards in the educational environment.
- The IT Workshop prepares the participant to have a hands-on experience in maintaining and troubleshooting a PC by themselves.

Task1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor

Task2: Every student should individually install MS windows on the personal computer.

Task3: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals.

Task 4: Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Task 5: Excel Orientation: The importance of MS office 2007/10 tool Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources. Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text.

Task 6: Basic power point utilities and tools which helpful to create basic power point presentation. Topic covered during this includes PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both Latex and Power point.

Task 7: Introduction to HTML &Basic syntax of html Attributes, elements, lists, and basic programs, Homepage using HTML Consisting of photo, name, address and education details as a table.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Course Outcomes:

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

CO1: Identify the peripherals, components of CPU along with the functions of CPU.

CO2: Implement the installation of Windows OS and explain about Hardware Troubleshooting.

CO3: Create HTML Homepage and use MS Office like Word, Excel and Power Point Presentation.

CO4: Apply basic Electrical Engineering knowledge for House-wiring Practice.

CO5: Make different components using Fitting and Carpentry.

CO6: Prepare simple jobs as per specifications using Tinsmithy tools and Blacksmithy Tools.

*****

I Year - II Semester Course Code : UR19HM202

L	T	P	C
2	0	0	2

Internal: 30 Marks External: 70 Marks

PROFESSIONAL ENGLISH

(Common to all branches)

Course Objectives:

- Recall and improve the language proficiency of the students inEnglish
- Paraphrase and interpret the ideas and thoughts in a dynamicway
- Prioritize the importance of practical learning ofEnglish
- Distinguish the various levels of Listening, Speaking, Reading and writingskills
- Construct statements in writing and speaking in professionalmanner

UNIT – I

Poem: "Enterprise" by

Nissim Ezekiel **Grammar:**

Types of Sentences

Vocabulary: Synonyms

Writing: Essay Writing

Life-Skills: Values and Ethics

UNIT – II

Text: Like a tree, unbowed:

WangariMaathai**Grammar:** Active Voice

& Passive Voice **Vocabulary:** Antonyms

Writing: Technical Report Writing **Life-Skills:** Time Management

UNIT – III

Text: Stay Hungry – Stay Foolish

Grammar: Common Errors in Articles and Prepositions

Vocabulary: Words Often Confused

Writing: Describing People, Places, Objects, Events

Life-Skills: Motivation

UNIT – IV

Story: The Cop and the Anthem by O. Henry

Grammar: Common Errors in Subject – Verb agreement

Vocabulary: Technical Vocabulary

Writing: Note- Making **Life-Skills:** Rapid Reading

UNIT – V

Short Story: "A Village School Master" by Oliver Gold Smith

Grammar: CommonErrors

Vocabulary: GRE WordList

Writing: Precise Writing / Information Article

Life-Skills: Career Planning

TEXT BOOK:

1. 'InfoTech English' – MarutiPublications

REFERENCE BOOKS:

1. Raymond Murphy, "Murphy's Essential English Grammar" with CD, Cambridge UniversityPress.
2. Practical English Usage, Michael Swan, OUP,1995
3. Remedial English Grammar, F.T. Wood, Macmillan,2007

Course Outcomes:

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

CO1: Apply critical thinking to develop writing skills
CO2: Evaluate common errors in grammar
CO3: Describe distinct literary characteristics of poems
CO4: Analyze the characteristics of one-act-plays
CO5: Develop correspondence skills and promotional writing skills
CO6: Evaluate the importance of values and ethics for career planning.

*****

I Year - II Semester Course Code : UR19BSC205

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

DIFFERENTIAL EQUATIONS & VECTOR CALCULUS

(Common to all branches)

Course Objectives:

- To enlighten the learners in the concept of differential equations.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

UNIT – I

Linear Differential Equations of Higher Order: Definitions, complete solution, operator D, rules for finding complimentary function, inverse operator, rules for finding particular integral with RHS of the forms e^ax, Sinax, Cosax, x^n, e^ax.V and xV. L-C-R Circuit problems.

UNIT – II

First order Partial Differential Equations: Formation of PDE, solutions of Lagrane's linear equation Method of grouping – Method of multipliers, Solution of non-linear PDEs of the forms f(p,q)=0, f(z,p,q)=0, f(x,p)=g(y,q), Z=px+qy+f(p,q).

UNIT – III

Applications of Partial Differential Equations: Method of Separation of variables-One dimensional Wave equation-Two dimensional Heat equation, Laplaceequation.

UNIT – IV

Vector Differential Calculus: Scalar and vector point functions, Gradient, Directional derivative. Divergence, Curl, Physical interpretation of operators.

UNIT – V

Vector Integral Calculus: Line integral-work done, surface and volume integrals, Green's theorem in the plane (without proof), Stoke's theorem (without proof), Divergence theorem (without proof).

TEXT BOOK:

1. Higher Engineering Mathematics, B. S. Grewal.

REFERENCE BOOKS:

1. Advance Engineering in Mathematics, ErwinKreyszig.
2. Vector calculus, Schaum'sseries.

Course Outcomes:

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

CO1: Solve the differential equations related to various engineering fields.
CO2: Identify solution methods for partial differential equations that model physical processes.
CO3: Apply a range of techniques to find solutions of standard PDEs .
CO4: Classify the nature of the partial differential equations.
CO5: Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO6: Estimate the work done against a field and circulation using vector calculus.

*****

I Year - II Semester Course Code : UR19BSC208

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

APPLIED PHYSICS

(CSE&IT)

Course Objectives:

- Impart Knowledge of Physical Optics phenomena like Interference and Diffraction required to design instruments with higher resolution.
- Understand the physics of Semiconductors and their working mechanism for their utility in sensors.
- Impart the knowledge of materials with characteristic utility in appliances.

UNIT – I

INTERFERENCE: Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry) – Newton's rings.

DIFFRACTION: Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order– resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).

UNIT – II

QUANTUM MECHANICS: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P.Thomson experiment – Heisenberg's Uncertainity Principle –interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.

UNIT – III

FREE ELECTRON THEORY & BAND THEORY OF SOLIDS : Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi-Dirac distribution function - expression for Fermi energy -Density of states.

Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m^*Vs K diagram - concept of hole.

UNIT – IV

SEMICONDUCTOR PHYSICS: Introduction– Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.

UNIT – V

MAGNETISM & DIELECTRICS: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para& Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material.

Introduction - Dielectic polarization **–** Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossoti equation - Frequency dependence of polarization –

Applications of dielectrics.

TEXT BOOKS:

1. “A Text book of Engineering Physics” by M.N.Avadhanulu,P.G.Kshirsagar - S.ChandPublications, 2017.
2. “Engineering Physics” byD.K.Bhattacharya and PoonamTandon, Oxford press (2015).
3. “Engineering Physics” by R.K Gaur. and S.L Gupta., - DhanpatRai publishers, 2012.

REFERENCE BOOKS:

1. Applied Physics by P.K. Palanisamy, Scitech publications (2014).
2. Lasers and Non-Linear optics by B.B. Laud, New Age International Publishers (2008).
3. Engineering Physics by M. Arumugam, Anuradha Publication (2014).
4. Physics for Engineers by M.R. Srinasan, New Age international publishers (2009).

Course Outcomes:

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

CO1: Studythe need of coherent sources and the conditions for sustained interferenceand the resolving power of various optical instruments.

CO2: State the fundamental concepts of quantum mechanics and analyze the physical significance Of wave function.

CO3: Explain the various electron theories and interpret the effects of temperature on Fermi Dirac distribution function

CO4:differentiatethe various energy bands

CO5: Classify the energy bands of semiconductors and outline the properties of n-type and p-type Semiconductors.

CO6: Analyze the applications of dielectric and magnetic materials.

*****

I Year - II Semester	Course Code : UR19ESC208	L	T	P	C
		1	0	3	2.5

Internal: 30 Marks External: 70 Marks

ENGINEERING GRAPHICS & DRAFTING
(ME/CSE/IT)

PRE-REQUISITES: Mathematics, Physics

Course Objective:

- Engineering drawing being the principle method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scalingetc.

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING:

Introduction: Principles of Engineering Graphics and their significance - Drawing Instruments - Geometrical Constructions.

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles.

Curves: Ellipse ,Parabola and Hyperbola by general methods,

Scales: Diagonal scales and Vernier scales

UNIT – II

ORTHOGRAPHIC PROJECTIONS: Principle of orthographic projection-Method of Projections – First and third angle projection methods Projections of Points – Projections of straight lines of different orientations - True lengths and traces.

UNIT – III

PROJECTIONS OF PLANES & SOLIDS: Regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes. Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of theplanes.

UNIT – IV

ISOMETRIC VIEWS: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

UNIT – V

COMPUTER AIDED DRAFTING: Introduction – Computer Aided drafting system –Advantages, Applications of AUTOCAD, Drafting software-AUTOCAD-Advantages, Initial setup commands, utility commands, Drawing Aids, Entity Draw commands, Display commands, Edit commands, Lettering & Dimensioning

TEXT BOOKS:

1.N. D. Bhatt, Engineering Drawing, Revised and Enlarged Edition, Charotar publishers,
2. Engineering Drawing by Agarwal&Agarwal, Tata McGraw HillPublishers
3. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, NewAge

REFERENCE BOOKS:

1. Engineering Drawing by K.L.Narayana& P. Kannaiah, ScitechPublishers
2. Engineering Graphics for Degree by K.C. John, PHIPublishers
3. Engineering Graphics by PI Varghese, McGrawHillPublishers

Course Outcomes:

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

CO1: Use the geometrical objects considering BIS standards.

CO2: Identify the basics of orthographic projections and deduce orthographic projections of a point and a line at different orientations.

CO3: Plan the visualization of geometrical planes of different positions in real life environment.

CO4: Sketch the projection of various of types of solids.

CO5:prepare the orthographic views of various solid objects at different orientations.

CO6: Judge the significance of isometric drawing to relate 2D environment with 3D environment. Learn basics of CAD.

*****

I Year - II Semester	Course Code : UR19ESC210	L	T	P	C
		3	0	0	3

Internal: 30 Marks External: 70 Marks

Problem Solving and Programming Using C

(CE/EEE/ECE/CSE/IT)

Course Objectives:

- The objectives of this course are to make the student familiar with 'problem solving using computers, development of algorithms, usage of basic flowchart symbols and designing flowcharts.
- The students can also understand programming language basic concepts, reading and displaying the data, earn the programming skills using selection, iterative control structures, functions, arrays, pointers and files. After completion of this course the student is expected to analyze the real life problem and write programs in C language to solve theproblems.

UNIT – IINTRODUCTION

Problem Solving: Problem solving aspects, Problem solving techniques, Computer as a Problem solving tool, Algorithms-definition, features, criteria. Flowchart-definition, basic symbols, sample flowcharts. Top down design, Implementation of program verification, The efficiency of algorithms, Analysis of algorithms, computational complexity of algorithm, order(O) notation, Worst case & Average case Analysis.

UNIT – II

Basics of C programming language: Introduction to C, structure of a C program,.basic data types and sizes, constants, variables, unary, binary and ternary operators, expressions, type conversions, conditional expressions, precedence and order of evaluation, Input and Output statements, Sample Programs.

SELECTION-DECISION MAKING CONDITIONAL CONTROL STRUCTURES: simple-if, if- else, nested if-else, if- else ladder and switch-case.

ITERATIVE: while-loop, do-while loop and for loop control structures, goto, break and continue statements. Sample Programs.

UNIT – III

FUNCTIONS-basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for Fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs :

ARRAYS-concepts, declaration, definition, accessing elements, storing 'elements, 1-D arrays, 2-D arrays and character arrays, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix, Passing 1-D arrays, 2-D arrays to functions, Strings and String Manipulations

UNIT – IV

POINTERS-pointers concepts, initialization of pointer variables, pointers and function arguments, passing by address-dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and -multi-dimensional arrays, dynamic memory

management functions, command line arguments

UNIT – V

ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures- declaration, definition and initialization of structures, accessing 'structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, program applications

FILEHANDLING: Concept of a file, text files and binary files, Formatted I/O, File I/O operations

TEXT BOOKS:

1. How to Solve it by Computer, R. G. Dromey, Pearson Education,2019
2. ProgramminginC,AshokNKamthane,AmitAshokKamthane,3rdEdition,PearsonEducation, 2019

Reference Books:

1. The C programming Language by Dennis Richie and BrianKernighan
2. Programming in C, ReemaThareja,OXFORD
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad,Cengage

Course Outcomes:

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

CO1: Design efficient algorithm for solving a problem.
CO2: Identify various constructs of C programming language efficiently.
CO3: Apply programs using modular approach such as functions.
CO4: Create programs to perform matrix and mathematical applications.
CO5: Understand dynamic memory management and problems using pointers and solving the problems.
CO6: Developreal life applications using structures and also learn about handling the files for storing the data permanently.

*****

I Year - II Semester Course Code : UR19ESC211

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

DIGITAL LOGIC DESIGN

(**CSE &IT**)

Course Objectives:

- To introduce the basic tools for design with combinational and sequential digital logic and state machines.
- To learn simple digital circuits in preparation for computer engineering.

UNIT – I

Digital Systems and Binary Numbers : Digital Systems, Binary Numbers, Binary Numbers, Octal and Hexadecimal Numbers, Complements of Numbers, Complements of Numbers, Signed Binary Numbers, Arithmetic addition and subtraction.

UNIT – II

Concept of Boolean algebra & Gate level Minimization : Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms, Map Method, Two-Variable K-Map, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don't – Care Conditions, NAND and NOR Implementation, Exclusive-OR Function.

UNIT – III

Combinational Logic : Introduction, Analysis Procedure, Design Procedure, Binary Adder– Subtractor, Decimal Adder, Binary Multiplier, Decoders, Encoders, Multiplexers, HDL Models of Combinational Circuits.

UNIT – IV

Synchronous Sequential Logic: Introduction to Sequential Circuits, Storage Elements: Latches, Storage Elements: Flip-Flops, Analysis of Clocked Sequential Circuits, Mealy and Moore Models of Finite State Machines.

UNIT – V

Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Ring Counter, Johnson Counter, Ripple Counter.

TEXT BOOKS:

1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA.
2. Fundamentals of Logic Design, 5/e, Roth, Cengage.

REFERENCE BOOKS:

1. Digital Logic and Computer Design, M.Morris Mano, PEA.
2. Digital Logic Design, Leach, Malvino, Saha, TMH.
3. Modern Digital Electronics, R.P. Jain, TMH.

Course Outcomes:

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

CO1: Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.

CO2: Identify the different switching algebra theorems and apply them for logic functions.

CO3: Define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.

CO4: Differentiate combinational logic circuit and sequential logic circutes.
CO5: Identify the usage of different registers.
CO6: Judge the use of different counters.

*****

I Year - II Semester	Course Code : UR19HML202	L	T	P	C
		0	0	3	1.5

Internal: 20 Marks External: 30 Marks

PROFESSIONAL ENGLISH LAB

(Common to all branches)

Course Objectives:

To enable the students to learn through practice the communication skills of listening, speaking, reading and writing.

List of activities:

1) Body Language: facial expressions, body posture, gestures
2) Body Language: eye movement, touch and the use of space
3) JAM
4) Extempore
5) Debate: Lincoln-Douglas debate and dos and don'ts
6) Debate: Formal and Informal debate
7) Interview Skills: Formal and Informal Interview
8) Interview Skills: Telephonic interview
9) Group Discussion: Dos and don'ts, general topics
10) Group Discussion: Science and technical topics
11) Presentation: Elimination of stage fear and preparation
12) Presentation on general topics
13) Presentation: using ppt or visual aids.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Reference Manuals:

'INTERACT: English Lab Manual for Undergraduate Students' Published by Orient Blackswan Pvt Ltd 'Strengthen Your Communication Skills' published by Maruthi Publications

Course Outcomes:

Upon Completion of the course, the student will be able to:

CO1 Understand different types of body language
CO2 Develop communication skills through various language activities
CO3 Apply critical thinking to get main ideas for debate
CO4 Develop audacity to face an interview
CO5 Build knowledge for discussing topics effectively
CO6 Analyze a topic by making a presentation

*****

I Year - II Semester	Course Code : UR19BSCL202	L	T	P	C
		0	0	3	1.5

Internal: 20 Marks External: 30 Marks

APPLIED PHYSICS LAB

Course objectives:

- To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
- To learn the usage of electrical and optical systems for various measurements.
- Apply the analytical techniques and graphical analysis to the experimental data.
- To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

List of Experiments

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
5. Energy Band gap of a Semiconductor p - n junction.
6. Characteristics of Thermistor – Temperature Coefficients
7. Determination of dielectric constant by charging and discharging method
8. Determination of resistivity of semiconductor by Four probe method.
9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
10. Measurement of magnetic susceptibility by Quincke's method.
11. Dispersive power of diffraction grating.
12. Verification of laws of stretched string – Sonometer.
13. Resolving power of grating.
14. Determination of Hall voltage and Hall coefficients of a given semiconductor using Hall effect.
15. Variation of dielectric constant with temperature.

Text book:

1. A Text book of Practical Physics, Balasubramanian S, Srinivasan M.N, S Chand Publishers, 2017

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Course outcomes:

Upon the completion of course, student will be able to

CO1: operate optical instruments like microscope and spectrometer.
CO2: interpret the thickness of a hair/paper with the concept of interference.
CO3: determine the wavelength and resolving power of different colors using diffraction grating.
CO4: estimate the strength of the magnetic field due to a current carrying coil.
CO5: estimate the dielectric constant by charging and discharging method.
CO6: measurement of magnetic susceptibility by Quincke's method.

*****

I Year - II Semester	Course Code : UR19ESCL202	L	T	P	C
		0	0	3	1.5

Internal: 20 Marks External: 30 Marks

Problem Solving and Programming using C Lab

Course Objectives:

- Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming.
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of Functions involving the idea of modularity.

Exercise 1

a) Write a C Program to calculate the area of a triangle.
b) Write a C program to find the largest of three numbers using ternary operator.
c) Write a C Program to swap two numbers without using a temporary variable.

Exercise 2

a) Write a C program to find the 2's complement of a binary number.
b) Write a C program to find the roots of a quadratic equation.
c) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 3

a) Write a C program to find the sum of individual digits of a positive integer and, also, find 'the reverse of the given number.
b) Write a C program to generate the first n terms of the Fibonacci sequence.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Exercise 4

a) Write a C Program to print the multiplication table of a given number.
b) Write a C Program to read a decimal number and find its equivalent binary number.
c) Write a C Program to check whether the given number is Armstrong number or not.

Exercise 5

a) Write a C program to interchange the largest and smallest numbers in the given array.
b) Write a C program to implement a liner search on a given set of values.
c) Write a C program to implement binary search on a given set of values.

Exercise 6

a) Write a C program to implement sorting of an array of elements.
b) Write a C program to input two m x n matrices, check the compatibility and perform 'addition and multiplication of them.

Exercise 7

Write a C program that uses functions to perform the following operations:

i. To insert a sub-string into given main string at a given position.
ii. To delete n characters from a given position in a given string.
iii. To replace a character of string either from beginning or ending or at a specified location.

Exercise 8

Write a C program that uses functions to perform the following operations using Structure:

i) Reading a complex number
ii) Writing a complex number
iii) Addition of two complex numbers
iv) Multiplication of two complex numbers

Exercise 9

Write C Programs for the following string operations without using the built in functions

- to concatenate two strings to append a string to another string
- to compare two strings

Exercise 10

a) Write C Program to find the number of characters in a given string including and excluding spaces.
b) Write C Program to copy the contents of one string to another string without using string handling functions.
c) Write C Program to find whether a given string is palindrome or not.
d) Write a C program to find both the largest and smallest number of an array of integers using call by value and call by reference.

Exercise 11

Write a C program using recursion for the following:

a) To display sum of digits of given number
b) To find the factorial of a given integer
c) To find the GCD (greatest common divisor) of two given integers.
d) To find Fibonacci sequence

Exercise 12

a) Write C Program to reverse a string using pointers
b) Write a C Program to compare two 2D arrays using pojnters
c) Write a C program consisting of Pointer based function to exchange value of two integers using passing by address.

Exercise 13

Examples which explores the use of structures, union and other user defined variables.

Exercise 14

a) Write a C program. which copies one file to another.
b) Write a C program to count the number of characters and number of lines in a file.
c) Write a C Program to merge two files into a third file. The names of the files must be entered using command line arguments.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Course Outcomes:

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

CO1: Apply and practice logical ability to solve the problems.

CO2: Identify C programming development environment, compiling, debugging, and linking and executing a program using the development environment.

CO3: Analyze the complexity of problems, modularize the problems into small modules and then convert them into programs.

CO4: Apply the in-built functions and customized functions for solving the problems.

CO5: Create C programs using pointers, memory allocation techniques.

CO6: Use files for dealing with variety of problems.

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I Year - II Semester Course Code : UR19MC200

L	T	P	C
0	0	0	0

Internal: 20 Marks External: 0 Marks

Semester-end: 30 Marks

ENGINEERING EXPLORATION PROJECT

COURSE OBJECTIVES:

- Build mindsets & foundations essential for designers
- Learn about the Human-Centered Design methodology and understand their real-world applications
- Use Design Thinking for problem solving methodology for investigating illdefined problems.
- Undergo several design challenges and work towards the final design challenge.

Apply Design thinking on the following Streams to

- Project Stream 1: Electronics, Robotics, IOT and Sensors
- Project Stream 2: Computer Science and IT Applications
- Project Stream 3: Mechanical and Electrical tools
- Project Stream4: Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources, Agriculture, Environmental science and other fields of engineering.

HOW TO PURSUE THE PROJECT WORK?

- The first part will be learning-based-masking students to embrace the methodology by exploring all the phases of design thinking through the wallet/ bag challenge and podcasts.
- The second part will be more discussion-based and will focus on building some necessary skills as designers and learning about complementary material for human-centered design.
- The class will then divide into teams and they will be working with one another for about 2 – 3 weeks. These teams and design challenges will be the basis for the final project and final presentation to be presented.
- The teams start with **Design Challenge** and go through all the phases more in depth from coming up with the right question to empathizing to ideating to prototyping and to testing.
- Outside of class, students will also be gathering the requirements, identifying the challenges, usability, importance etc
- At the end, Students are required to submit the final reports, and will be evaluated by the faculty.

TASKS TO BE DONE:

Task 1: Everyone is a Designer

- Understand class objectives & harness the designer mindset

Task 2: The Wallet/Bag Challenge and Podcast

- Gain a quick introduction to the design thinking methodology
- Go through all stages of the methodology through a simple design challenge
- Podcast: Observe, Listen and Engage with the surrounding environment and identify a design challenge.

Task 3: Teams & Problems

- Start Design Challenge and learn about teams & problems through this
- Foster team collaboration, find inspiration from the environment and learn how to identify problems.

Task 4: Empathizing

- Continue Design Challenge and learn empathy
- Learn techniques on how to empathize with users
- Go to the field and interview people in their environments
- Submit Activity Card

Task 5: Ideating

- Continue Design Challenge and learn how to brainstorm effectively
- Encourage exploration and foster spaces for brainstorming
- Submit Activity Card

Task 6: Prototyping

- Continue Design Challenge and learn how to create effective prototypes
- Build tangible models and use them as communication tools
- Start giving constructive feedback to classmates and teammates
- Submit Activity Card

Task 7: Testing

- Finish Design Challenge and iterate prototypes and ideas through user feedback
- Evolve ideas and prototypes through user feedback and constructive criticism
- Get peer feedback on individual and group performance
- Submit Activity Card

Task 8:

- Final Report Submission and Presentation

Note: The colleges may arrange for Guest Speakers from Various Design Fields: Graphic Design, Industrial Design, Architecture, Product Design, Organizational Design, etc to enrich the students with Design Thinking Concept.

REFERENCES:

1. Tom Kelly, *The Art of Innovation: Lessons in Creativity From IDEO, America's Leading Design Firm* (Profile Books, 2002)

2. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation (HarperBusiness, 2009)

3. Jeanne Liedtka, Randy Salzman, and Daisy Azer, Design Thinking for the Greater Good: Innovation in the Social Sector (Columbia Business School Publishing, 2017)

OTHER USEFUL DESIGN THINKING FRAMEWORKS AND METHODOLOGIES:

- Human-Centered Design Toolkit (IDEO); https://www.ideo.com/post/design-kit
- Design Thinking Boot Camp Bootleg (Stanford D-School); https://dschool.stanford.edu/resources/the-bootcamp-bootleg
- Collective Action Toolkit (frogdesign); https://www.frogdesign.com/wpcontent/uploads/2016/03/CAT_2.0_English.pdf
- Design Thinking for Educators (IDEO); https://designthinkingforeducators.com/

I Year - I Semester	Course Code : UR19MC202	L	T	P	C
		0	0	0	0

Internal: 20 Marks External: 0 Marks
Semester-end: 30 Marks

APPLIED PHYSICS - VIRTUAL LAB

(Any 3 of the following listed 12 experiments)

Course objectives:

- To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
- To learn the usage of electrical and optical systems for various measurements.

LIST OF EXPERIMENTS

2. Hall Effect
3. Crystal Structure
4. Brewster's angle
5. Numerical Aperture of Optical fiber
6. Photoelectric Effect
7. LASER – Beam Divergence and Spot size
8. Michelson's interferometer
9. Black body radiation
10. Flywheel –moment of inertia
11. AC Sonometer
12. Resistivity by four probe method
13. Newton's rings –Refractive index of liquid

URL: www.vlab.co.in

Course outcomes:

CO1: Handle optical instruments like microscope and spectrometer
CO2: Determine thickness of a hair/paper with the concept of interference

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I Year - II Semester Course Code : UR19MC204

L	T	P	C
0	0	0	0

Internal: 100 Marks External: 0 Marks

ENVIRONMENTAL STUDIES

(CSE & IT)

Course Objectives:

- Overall understanding of the natural resources
- Basic understanding of the ecosystem and its diversity
- Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities
- An understanding of the environmental impact of developmental activities
- Awareness on the social issues, environmental legislation and global treaties.

UNIT – I

Multidisciplinary nature of Environmental Studies: Definition, Scope andImportance –Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, Carbon Credits, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information Technology in Environment and human health.

Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem. - Producers,consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.

UNIT – II

Natural Resources: Natural resources and associated problems Forest resources–Use and over–exploitation, deforestation–Timber extraction–Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, Sustainable mining of Granite, Literate, Coal, Sea and River sands.

Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity

Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources Vs Oil and Natural Gas Extraction.

Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT – III

Biodiversity and its conservation: Definition: genetic, species and ecosystemdiversity- classification - Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.

UNIT – IV

Environmental Pollution: Definition, Cause, effects and control measures ofAir pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Studies. Impact of Fire Crackers on Men and his well being.

Solid Waste Management: Sources, Classification, effects and control measures of urbanand industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.

UNIT – V

Social Issues and the Environment: Urban problems related to energy -Waterconservation, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act.

–Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act-Issues involved in enforcement of environmental legislation. -Public awareness.

Environmental Management: Impact Assessment and its significance variousstages of EIA, preparation of EMP and EIS, Environmental audit. Ecotourism, Green Campus – Green business and Green politics. The student should Visit an Industry / Ecosystem and submit a report individually on any issues related to Environmental Studies course and make a power point presentation.

TEXT BOOKS:

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada.
2. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
3. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai.

REFERENCE BOOKS:

1. Text Book of Environmental Studies, Deeshita Dave & P. UdayaBhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, ShaashiChawla, TMH, New Delhi.
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi.
4. Perspectives in Environment Studies, AnubhaKaushik, C P Kaushik, New Age International Publishers, 2014.

Course Outcomes:

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

CO1: Identify the natural resources, ecology, Biodiversity, and conservation of natural resources

CO2: Explain various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices

CO3: Judge the social issues both rural and urban environment and the possible means to combat the challenges

CO4: Identify the Environmental Impact Assessment and environmental legislations of India and global initiatives towards sustainable development.

CO5: Analyze the concept of Biodiversity and its conservation

CO6: Survey the concept of Solid Waste Management.

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II Year –I Semester **COURSE CODE: UR19PCCS301** **L T P C**
3 0 0 3

Internal Marks: 30 **External Marks: 70**

PYTHON PROGRAMMING

COURSE OBJECTIVES:

- Introduction to Scripting Language.
- Exposure to various problems solving approaches of computer science.

UNIT – I:

Introduction: History of Python, Need of Python Programming, – Python Interpreter and its environment. Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while, break, continue, pass

UNIT – II:

Data Structures: Lists, Tuples, Sets, Dictionaries, Sequences, Comprehensions.

UNIT – III:

Functions: Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values),

Modules: Creating modules, import statement, from. Import statement, name spacing.

Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages

UNIT – IV:

Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, Datahiding,

Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions

UNIT – V:

Brief Tour of the Standard Library: Operating System Interface - String Pattern Matching, Mathematics, Internet Access, Dates and Times, Data Compression, Multithreading, GUI Programming, Turtle Graphics.

TEXT BOOKS:

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

2. Learning Python, Mark Lutz, Orielly.

REFERENCE BOOKS:

1. Think Python, Allen Downey, Green Tea Press

2. Core Python Programming, W.Chun, Pearson.

3. Introduction to Python, Kenneth A. Lambert, Cengage.

4. Mark Lutz ,"Programming Python ", O Reily, 4thEdition.

COURSE OUTCOMES:

At the end of the course, the student will be able to:

CO1. Understand the history of python, need for python, types and operators of python.
CO 2. Using python functions and arguments, students able to create modules.
CO 3. Understand the concepts of lists, tuples, sets, dictionaries, sequences, comprehensions.
CO 4. Using object oriented features of Python, student able to evaluate the errors and exceptions.
CO 5. Understand the concepts of os interface, string pattern matching, data compression, multithreading,
CO 6. Understand the concepts of GUI programming, and turtle graphics.

II Year –I Semester **COURSE CODE: UR19PCCS302** **L T P C**

3 0 0 3

Internal Marks: 30 **External Marks: 70**

DATA STRUCTURES

Course Objectives:

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithms

UNIT - I

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

UNIT – II

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching. Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT - III

Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

UNIT – IV

Graphs: Graph Implementation Methods. Graph Traversal Methods. Sorting: Heap Sort, External Sorting-Model for external sorting, Merge Sort.

UNIT – V

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

TEXTBOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

REFERENCE BOOK:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning

Course Outcomes:

At the end of the course, the student will be able to:

CO1. Analyze the concepts of algorithm evaluation and find time and space complexities for searching and sorting algorithms.
CO2. Implement linear data structure such as stacks, queues, linked lists and their applications.

CO3. Implement basic operations on binary trees.
CO4. Demonstrate the representation and traversal techniques of graphs and their applications
CO5. Ability to select the data structures that efficiently model the information in a problem.
CO6. Ability to assess efficiency trade-offs among different data structure implementations or combinations.

II Year –I Semester **COURSE CODE: UR19PCCS303** **L T P C**

3 0 0 3

Internal Marks: 30 **External Marks: 70**

SOFTWARE ENGINEERING

COURSE OBJECTIVES:

- To understand the software life cycle models, software requirements and SRS document, importance of modeling and modeling languages and to design and develop correct and robust software products
- To understand the quality control and how to ensure good quality software, planning and estimation of software projects, implementation issues, validation and verification procedures, the implementation issues, validation and verification procedures and the maintenance of software.

UNIT-I:

Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps, Software Engineering, Software Process, Software Engineering Practice, Software Myths. Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process.

UNIT-II:

Requirements Analysis And Specification: Requirements Gathering and Analysis, Software Requirement Specification (SRS), Formal System Specification.
Software Design: Overview of the Design Process, How to Characterise of a Design?, Cohesion and Coupling, Layered Arrangement of Modules, Approaches to Software Design

UNIT – III:
Function-Oriented Software Design: Overview of SA/SD Methodology, Structured Analysis, Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review, over view of Object Oriented design.
User Interface Design: Characteristics of Good User Interface, Basic Concepts, Types of User Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology.

UNIT – IV:
Coding And Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing

UNIT – V:

Software Reliability And Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity Model.

Software Maintenance: Software maintenance, Maintenance Process Models, Effort Estimation Techniques, Maintenance Cost, Software Configuration Management.

Software Reuse: What can be Re-used? Why almost No Reuse So Far? Basic Issues in Reuse Approach, Reuse at Organization Level.

TEXT BOOKS:

1. Software Engineering - Concepts and Practices: Ugrasen Suman, Cengage Learning
2. Software Engineering - A Practitioner's Approach, Roger S. Pressman, Seventh Edition McGrawHill International Edition.

REFERENCE BOOKS:

1. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
2. Software Engineering, A Precise Approach, PankajJalote, Wiley India,2010.
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
4. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
5. Fundamentals of Software Engineering, Rajib Mall, Third Edition, PHI.
6. Software Engineering, Ian Sommerville, Ninth edition, Pearson education

COURSE OUTCOMES:

At the end of the course, the student will be able to

CO1. Define and develop a software project from requirement gathering to implementation.
CO2. Analyzing the software requirements and system specifications used for design.
CO3. Understanding the concepts of functional oriented software design and user interface design.
CO4. Understanding the coding, testing, and issues associate with testing.
CO5. Evaluate software quality, software maintenance, and its reusability.
CO6. Understand different reuse methods of software's at different levels

II Year –I Semester **COURSE CODE: UR19PCCS304** **L T P C**

3 0 0 3

Internal Marks: 30 **External Marks: 70**

OBJECT ORIENTED PROGRAMMING THROUGH C++

Course Objectives:

- This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable and portable code.
- The nature of C language is emphasized in the wide variety of examples and applications.
- To learn and acquire art of computer programming and to know about some popular programming languages and how to choose Programming language for solving a problem.

UNIT-I

Introduction to C++ Difference between C and C++- Evolution of C++- The Object Oriented Technology Disadvantage of Conventional Programming- Key Concepts of Object Oriented Programming Advantage of OOP- Object Oriented Language.

UNIT-II

Classes and Objects &Constructors and Destructor Classes in C++-Declaring Objects- Access Specifies and their Scope- Defining Member Function-Overloading Member Function- Nested class, Constructors and Destructors, Introduction- Constructors and Destructor- Characteristics of Constructor and Destructor Application with Constructor- Constructor with Arguments (parameterized Constructor Destructors- Anonymous Objects.

UNIT-III

Operator Overloading and Type Conversion & Inheritance The Keyword Operator- Overloading Unary Operator- Operator Return Type- Overloading Assignment Operator (=)- Rules for Overloading Operators, Inheritance, Reusability- Types of Inheritance- Virtual Base Classes- Object as a Class Member- Abstract Classes- Advantages of Inheritance-Disadvantages of Inheritance,

UNIT-IV

Pointers & Binding Polymorphisms and Virtual Functions Pointer, Features of Pointers- Pointer Declaration- Pointer to Class- Pointer Object- The this Pointer- Pointer to Derived Classes and Base Class, Binding Polymorphisms and Virtual Functions, Introduction- Binding in C++- Virtual Functions- Rules for Virtual Function- Virtual Destructor.

UNIT-V

Generic Programming with Templates & Exception Handling Generic Programming with Templates, Need for Templates- Definition of class Templates Normal Function Templates- Over Loading of Template Function-Bubble Sort Using Function Templates- Difference Between Templates and Macros- Linked Lists with Templates, Exception Handling- Principles of Exception Handling- The Keywords try throw and catch- Multiple Catch Statements –Specifying Exceptions.

TEXT BOOKS:

1. A First Book of C++, Gary Bronson, Cengage Learing.
2. The Complete Reference C++, Herbert Schildt, TMH.

REFERENCE BOOKS:

1. Object Oriented Programming C++, Joyce Farrell, Cengage.
2. C++ Programming: from problem analysis to program design, DS Malik, Cengage Learing.
3. Programming in C++, Ashok N Kamathane, Pearson 2nd Edition.

COURSE OUTCOMES:

At the end of the course, the student will be able to

CO1: Understand the basic terminology used in computer programming
CO2: Write, compile and debug programs in C language.
CO3: Use different data types in a computer program.
CO4: Design programs involving decision structures, loops and functions.
CO5: Difference between call by value and call by reference.
CO6: Understand how to handle the exception.

II Year –I Semester **COURSE CODE: UR19PCCS305** **L T P C**
3 0 0 3

Internal Marks: 30 **External Marks: 70**

COMPUTER ORGANIZATION AND ARCHITECTURE

Course Objectives:

- Understand the architecture of a modern computer with its various processing units. Also the Performance measurement of the computer system.
- Understand the concept of memory management system and processing unit of computer.

UNIT -I:

Basic Structure Of Computers: Functional unit, Basic Operational concepts, Bus structures, System Software, Performance, The history of computer development.

Machine Instruction and Programs: Instruction and Instruction Sequencing: Register Transfer Notation, Assembly Language Notation, Basic Instruction Types, Addressing Modes, Basic Input/output Operations, The role of Stacks and Queues in computer programming equation. Component of Instructions: Logic Instructions, shift and Rotate Instructions

UNIT -II:

Type of Instructions: The ARM Example- Registers, Memory Access and Data Transfer, ARM Arithmetic and Logic Instructions, Branch Instructions, Assembly language, Input/output Operations, subroutines, program examples- vector dot product and Byte-Sorting programs, linked list insertion and deletion subroutines.

UNIT -III

INPUT/OUTPUT ORGANIZATION: Accessing I/O Devices, Interrupts: Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access, Buses: Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interface: Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB)

UNIT -IV:

The MEMORY SYSTEMS: Basic memory circuits, Memory System Consideration, Read-Only Memory: ROM, PROM, EPROM, EEPROM, Flash Memory, Cache Memories: Mapping Functions, INTERLEAVING **Secondary Storage:** Magnetic Hard Disks, Optical Disks,

UNIT -V:

Processing Unit: Fundamental Concepts: Register Transfers, Performing An Arithmetic Or Logic Operation, Fetching A Word From Memory, Execution of Complete Instruction, Hardwired Control,

Micro programmed Control: Microinstructions, Micro program Sequencing, Wide Branch
Addressing Microinstructions with next –Address Field. Pipelining- Basic concepts, Data hazards, Instruction hazards

TEXT BOOKS:

1. Computer Organization, Carl Hamacher, Zvonks Vranesic, Safea Zaky, 5th Edition, McGraw Hill.
2. Computer Architecture and Organization, John P. Hayes, 3rd Edition, McGraw Hill.

REFERENCE BOOKS:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int.Edition.

COURSE OUTCOMES:

At the end of the course, the student will be able to

CO1: Understand the architecture of modern computer.
CO2: Analyze the Performance of a computer using performance equation.
CO3: Understanding of different instruction types.
CO4: Understanding the way to access I/O devices.
CO5: Understanding the memory management system of computer,
CO6: Understanding the activity of processing unit.

II Year –I Semester **COURSE CODE: UR19PCCS306** **L T P C**

3 0 0 3

Internal Marks: 30 **External Marks: 70**

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Course Objectives:

- To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
- To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

UNIT -I:

Mathematical Logic: Propositional Calculus: Statements and Notations, Connectives, Well Formed Formulas, Truth Tables, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises, Indirect Method of Proof. Predicate Calculus: Predicative Logic, Statement Functions, Variables and Quantifiers, Free and Bound Variables, Inference Theory for Predicate Calculus.

UNIT -II:

Set Theory: Introduction, Operations on Binary Sets, Principle of Inclusion and Exclusion, *Relations:* Properties of Binary Relations, Relation Matrix and Digraph, Operations on Relations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams, *Functions:* Bijective Functions, Composition of Functions, Inverse Functions, Permutation Functions, Recursive Functions, Lattice and its Properties.

UNIT- III:

Algebraic Structures and Number Theory: *Algebraic Structures:* Algebraic Systems, Examples, General Properties, Semi Groups and Monoids, Homomorphism of Semi Groups and Monoids, Group, Subgroup, Abelian Group, Homomorphism, Isomorphism, *Number Theory:* Properties of Integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem).

UNIT -IV:

Combinatory: Basic of Counting, Permutations, Permutations with Repetitions, Circular Permutations, Restricted Permutations, Combinations, Restricted Combinations, Generating Functions of Permutations and Combinations, Binomial and Multinomial Coefficients, Binomial and Multinomial Theorems, The Principles of Inclusion–Exclusion, Pigeonhole Principle and its Application.

UNIT -V:

Recurrence Relations: Generating Functions, Function of Sequences, Partial Fractions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations.

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill.
2. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rdEdition, Tata McGraw Hill.

REFERENCE BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T.P. Baker, 2nd Edition, Prentice Hall of India.

2. Discrete Mathematical Structures, BernandKolman, Robert C. Busby, Sharon Cutler Ross, PHI.
3. Discrete Mathematics, S. K. Chakraborthy and B.K. Sarkar, Oxford, 2011.
4. Discrete Mathematics and its Applications with Combinatorics and GraphTheory, K. H. Rosen, 7th Edition, Tata McGraw Hill.

COURSE OUTCOMES:

At the end of the course, the student will be able to

CO1: Demonstrate skills in solving mathematical problems.

CO2: Comprehend mathematical principles and logic.

CO3: Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software.

CO4: Analyze data numerically and/or graphically using appropriate Software.

CO5: Communicate effectively mathematical ideas/results verbally or in writing.

CO6: Applies different functionalities as per its relations and it correlation occurrences'

II Year –I Semester **COURSE CODE: UR19PCCSL301** **L T P C**

0 0 3 1.5

Internal Marks: 20 **External Marks: 30**

PYTHON PROGRAMMING LAB

OBJECTIVES:

- Introduction to Scripting Language and provides Exposure to various problems solving approaches of computer science
- Analyze the features of Python, Use of operators and control structures in python, python data structures, Analyze the packages of Python and its functions, Object oriented features in python and Sockets of Python..

Exercise 1 - Basics

a) Running instructions in Interactive interpreter and a Python Script

b) Write a program to purposefully raise Indentation Error and Correct it

Exercise 2 - Operations

a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)

b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

Exercise - 3 Control Flow

a) Write a Program for checking whether the given number is a even number or not.

b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . 1/10

c) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

Exercise 4 - Control Flow - Continued

a) Find the sum of all the primes below two million. Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

b) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

Exercise - 5 - DS

a) Write a program to count the numbers of characters in the string and store them in a dictionary data structure

b) Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure.

Exercise - 6 DS - Continued

a) Write a program combine lists that combines these lists into a dictionary.

b) Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?

Exercise - 7 Files

a) Write a program to print each line of a file in reverse order.

b) Write a program to compute the number of characters, words and lines in a file.

Exercise - 8 Functions

a) Write a function ball collide that takes two balls as parameters and computes if they are Colliding. Your function should return a Boolean representing whether or not the balls are Colliding. Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius If (distance between two balls centers) <= (sum of their radii) then (they are colliding)

b) Find mean, median, mode for the given set of numbers in a list.

Exercise - 9 Functions - Continued
a) Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.
b) Write a function dups to find all duplicates in the list.
c) Write a function unique to find all the unique elements of a list.

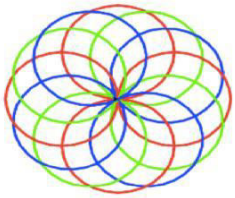
Exercise - 10 - Functions - Problem Solving
a) Write a function cumulative product to compute cumulative product of a list of numbers.
b) Write a function reverse to reverse a list. Without using the reverse function.
c) Write function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

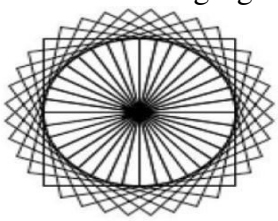
Exercise 11 - Multi-D Lists
a) Write a program that defines a matrix and prints
b) Write a program to perform addition of two square matrices
c) Write a program to perform multiplication of two square matrices

Exercise - 12 - Modules
a) Install packages requests, flask and explore them. Using (pip)
b) Write a script that imports requests and fetch content from the page. Eg. (Wiki)
c) Write a simple script that serves a simple HTTPResponse and a simple HTML Page

Exercise - 13 OOP
a) Class variables and instance variable
i) Robot ii) ATM Machine

Exercise - 14 GUI, Graphics
1. Write a GUI for an Expression Calculator using tk.
2. Write a program to implement the following figures using turtle.





Exercise – 15 SOCKETS
1. Develop interactive Chat Room Server using Python Socket Programming.

Exercise – 16 NUMPY MODULE
1. Multiplication of two Matrices in Single line using Numpy in Python.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations.

In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Web Reference:

[1]. https://realpython.com/installing-python/

[2].MadhavanMukund, (12, may, 2018). Programming, Data Structures &

Algorithms using Python [NPTEL]. Available: http://nptel.ac.in/

Requirements:

Software Requirements:

- Python versions: 2.7, 3.7
- Operating systems: Windows 7

Hardware Requirements:

- Processors: Intel(R) Pentium(R) CPU G2010 @ 2.80GHz

COURSE OUTCOMES:
At the end of the course, the student will be able to

CO1: Implement python programming constructs to build small to large scale applications.
CO2: Implement the problems in terms of real-world objects using OOPs technology.
CO3: Be Able to Analyze the packages of Python and its functions
CO4: Be Able to Use various python data structures.
CO5: Evaluate and handle the errors during runtime involved in a program.
CO6:Extract and import packages for developing different solutions for real time problems.

II Year –I Semester **COURSE CODE: UR19PCCSL302** **L T P C**

0 0 3 1.5

Internal Marks: 20 **External Marks: 30**

DATA STRUCTURES THROUGH C++ LAB

DATA STRUCTURES LAB

Course Objectives:

- To develop skills to design and analyze simple linear and non linear data structures
- To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
- To Gain knowledge in practical applications of data structures

LIST OF EXPERIMENTS

1. Implementation of Singly linked list.
2. Implementation of Doubly linked list.
3. Implementation of Multi stack in a Single Array.
4. Implementation of Circular Queue
5. Implementation of Binary Search trees.
6. Implementation of Hash table.
7. Implementation of Heaps.
8. Implementation of Breadth First Search Techniques.
9. Implementation of Depth First Search Techniques.
10. Implementation of Prim's Algorithm.
11. Implementation of Dijkstra's Algorithm.
12. Implementation of Kruskal's Algorithm
13. Implementation of MergeSort
14. Implementation of Quick Sort
15. Implementation of Data Searching using divide and conquer technique

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations.

In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Requirements:

Software Requirements: Turbo C++

Operating systems: Windows 7

Hardware Requirements:

Processors: Intel(R) Pentium(R) CPU G2010 @ 2.80GHz

COURSE OUTCOMES:

CO1: Implement various operations of stack, queue and linked list data types.
CO2: Be able to design and analyze the time and space efficiency of the data structure.
CO3: Be able to analyze simple linear and non linear data structures
CO4: Be capable to identity the appropriate data structure for given problem
CO5: Ability to have practical knowledge on the application of data structures
CO6: Ability to implement searching and sorting algorithms.

II Year –I Semester **COURSE CODE: UR19MCCS301** **L T P C**

0 0 0 0

Essence of Indian Traditional Knowledge

Course Objectives:

- The course aims at imparting basic principles of thought process, reasoning and inferencing. Sustainability is at the core of Indian Traditional Knowledge Systems connecting society and nature.
- Holistic life style of Yogic-science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions.
- The course focuses on introduction to Indian Knowledge System, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care system.

Course Outcomes:

- Ability to understand , connect up and explain basics of Indian Traditional knowledge modern scientific perspective.

Course Content

- Basic Structure of Indian Knowledge System (i) वेद, (ii) उपवेद (आयुर्वेद, धनुर्वेद, गन्धर्वेद, स्थापत्य आदि) (iii) वेदांग (शिक्षा, कल्प, निरुत, व्याकरण, ज्योतिष छंद), (iv) उपाइग (धर्म शास्त्र, मीमांसा, पूराण, तर्कशास्त्र)
  - Modern Science and Indian Knowledge System
  - Yoga and Holistic Health care
  - Case Studies.

Suggested Text/Reference Books

1. V. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2. Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan
3. Fritzof Capra, Tao of Physics
4. Fritzof Capra, The wave of Life
5. V N Jha (Eng. Trans,), Tarkasangraha of Annam Bhatta, Inernational Chinmay Foundation, Velliarnad, Amaku,am
6. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkatta
7. GN Jha (Eng. Trans.) Ed. R N Jha, Yoga-darshanam with Vyasa Bhashya, Vidyanidhi Prakasham, Delhi, 2016
8. RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham, Delhi, 2016
9. P R Sharma (English translation), Shodashang Hridayam

II Year –II Semester **COURSE CODE: UR19BSC401** **L T P C**

3 0 0 3

Internal Marks: 30 **External Marks: 70**

STATISTICS WITH R PROGRAMMING

Course Objectives:

- Use R for statistical programming, computation, graphics, and modeling and to Write functions and use R in an efficient way to Fit in some basic types of statistical models for research.

UNIT I

Introduction, Installation and execution process of R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Conclusion, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes.

UNIT II

R Programming Structures, Control Statements, Loops, - Looping Over Nonvector Sets,- If-Else, Arithmetic and Boolean Operators and values, Default Values for Argument, Return Values, Deciding Whether to explicitly call return- Returning Complex Objects, Functions are Objective, No Pointers in R, Recursion, A Quicksort Implementation-Extended Extended Example: A Binary Search Tree.

UNIT III

Doing Math and Simulation in R, Math Function, Extended Example Calculating Probability Cumulative Sums and Products-Minima and Maxima- Calculus, Functions Fir Statistical Distribution, Sorting, Linear Algebra Operation on Vectors and Matrices, Extended Example: Vector cross Product- Extended Example: Finding Stationary Distribution of Markov Chains, Set Operation, Input /out put, Accessing the Keyboard and Monitor, Reading and writer Files,

UNIT IV

Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot() Function – Customizing Graphs, Saving Graphs to Files.

Probability Distributions, Normal Distribution- Binomial Distribution- Poisson Distributions Other Distribution, Basic Statistics, Correlation and Covariance, T-Tests,-ANOVA.

UNIT V

Linear Models, Simple Linear Regression, -Multiple Regression Generalized Linear Models, Logistic Regression, - Poisson Regression- other Generalized Linear Models-Survival Analysis, Nonlinear Models, Splines- Decision- Random Forests

TEXT BOOKS

1. The Art of R Programming, A K Verma, Cengage Learning.

2. R for Everyone, Lander, Pearson 3) The Art of R Programming, Norman Matloff, No starch Press.

REFERENCE BOOKS

1. R Cookbook, Paul Teetor, Oreilly.

2. R in Action, Rob Kabacoff, Manning
3. Probability and Statistics Dr. T.K.V. Iyengar, B. Krishna Gandhi S Chand

COURSE OUTCOMES:

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

CO1: Remember: basic concept for learning r programming language.
CO2: Understand: resources for r and develop new function packages into the r workspace.
CO3: Apply : could able to evaluate, manipulate and summarize math functions.
CO4: Create: explore data-sets to create testable hypotheses and identify appropriate statistical tests.
CO5: Perform: appropriate statistical tests using r create and edit visualizations.
CO6: Able to know how to use linear and non-linear regressions.

II Year –I I Semester **COURSE CODE: UR19PCCS401** **L T P C**

2 1 0 3

Internal Marks: 30 **External Marks: 70**

JAVA PROGRAMMING

Course Objectives:

- Understanding the OOP's concepts, classes and objects, threads, files, applets, swings and act.
- This course introduces computer programming using the JAVA programming language with object-oriented programming principles.
- Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using Java for network level programming and middleware development

UNIT I

Introduction to OOP, procedural programming language and object oriented language, principles of OOP, applications of OOP, history of java, java features, JVM, program structure. Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control.

UNIT II

Classes and objects, class declaration, creating objects, methods, constructors and constructor overloading, garbage collector, importance of static keyword and examples, this keyword, arrays, command line arguments, nested classes.

UNIT III

Inheritance, types of inheritance, super keyword, final keyword, overriding and abstract class. Interfaces, creating the packages, using packages, importance of CLASSPATH and java.lang package. Exception handling, importance of try, catch, throw, throws and finally block, user- defined exceptions, Assertions.

UNIT IV

Multithreading: introduction, thread life cycle, creation of threads, thread priorities, thread synchronization, communication between threads. Reading data from files and writing data to files, random access file,

UNIT V

Applet class, Applet structure, Applet life cycle, sample Applet programs. Event handling: event delegation model, sources of event, Event Listeners, adapter classes, inner classes.

AWT: introduction, components and containers, Button, Label, Checkbox, Radio Buttons, List Boxes, Choice Boxes, Container class, Layouts, Menu and Scrollbar.

TEXT BOOKS

1. The complete Reference Java, 8th edition, Herbert Schildt, TMH.
2. Programming in JAVA, Sachin Malhotra, SaurabhChoudary, Oxford.

REFERENCE BOOKS

1. Swing: Introduction, JFrame, JApplet, JPanel, Componets in Swings, Layout Managers in
2. Swings, JList and JScrollPane, Split Pane, JTabbedPane, JTree, JTable, Dialog Box.
3. Introduction to java programming, 7th edition by Y Daniel Liang, Pearson.

COURSE OUTCOMES:

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

CO1: Understand Java programming concepts and utilize Java Graphical User Interface in Program writing.
CO2: Write, compile, execute and troubleshoot Java programming for networking concepts.
CO3: Build Java Application for distributed environment.
CO4: Design and Develop multi-tier applications.
CO5: Identify and Analyze Enterprise applications.
CO6: Able to know how to use AWT components.

II Year –II Semester **COURSE CODE: UR19PCCS402** **L T P C**

3 0 0 3

Internal Marks: 30 **External Marks: 70**

OPERATING SYSTEMS

Course Objectives:

• Understand the structure and functions of OS and Study the basic concepts and functions of operating systems.

• Learn about Processes, Threads and Scheduling algorithms, various memory management schemes, I/O management and File systems, and Understanding the principles of concurrency and Deadlocks.

• Learn the basics of Linux system and perform administrative tasks on Linux Servers.

UNIT I

Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.

UNIT II

Process Management – Process concept, The process, Process State Diagram , Process control block **Thread:** Definition, Benefits of threads, Types of threads, Concept of multithreads **Process Scheduling-** Scheduling Queues, Schedulers, Operations on Processes, Interprocess Communication, Threading Issues, Scheduling-Basic Concepts, Scheduling Criteria, Scheduling Algorithms.

UNIT III

Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation **Virtual Memory Management:** Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing.

UNIT IV

Concurrency: Process Synchronization, The Critical- Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples **Principles of deadlock** – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock.

UNIT V

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management **Mass-storage structure** overview of Mass-storage structure, Disk scheduling, Device drivers.

TEXT BOOKS:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.

2.Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second Edition 2016 .

REFERENCES:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.
2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.
3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata Mc Graw-Hill Education, 2007.

COURSE OUTCOMES:

At the end of the course, the student will be able to

CO1: Design various Scheduling algorithms.

CO2: Apply the principles of concurrency.

CO3: Design deadlock, prevention and avoidance algorithms.

CO4: Compare and contrast various memory management schemes.

CO5: Design and Implement a prototype file systems.

CO6: Perform administrative tasks on Linux Servers

II Year –II Semester **COURSE CODE: UR19PCCS403** **L T P C**

3 0 0 3

Internal Marks: 30 **External Marks: 70**

DATA BASE MANAGEMENT SYSTEMS

Course Objectives:

- The main objective of this course is to enable students to the fundamental concepts of database analysis and design.
- To recognize the importance of database analysis and design in the implementation of any Database application and to understand the process of drawing the ER-Diagrams.
- It also gives the knowledge of the roles of transaction processing and concurrency control.

UNIT I:

Introduction to Databases: Characteristics of the Database Approach, Advantages of using the DBMS Approach, A Brief History of Database Applications. Overview of Database Languages and Architectures: Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, Database System environment, Centralized and Client-Server Architecture for DBMS.

Relational Model: The Relational Model Concepts, Relational Model Constraints and Relational Database Schemas.

UNIT II:

SQL: Data Definition, Constraints, and Basic Queries and Updates, Views(Virtual Tables) in SQL.

Conceptual Data Modeling: High-Level Conceptual Data Models for Database Design, A Sample Database Application,

UNIT III:

Data Modeling : Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types.

ER-Diagrams: Refining the ER Design, ER Diagrams, Naming Conventions and Design Issues, Relationship Types of Degree Higher Than Two.

UNIT-IV:

Database Design Theory: Functional Dependencies, Normal forms based on Primary Keys, Second and Third Normal Forms, Boyce-Codd Normal Form. Transaction Processing: Introduction, Transaction and System Concepts, Desirable Properties of Transactions.

UNIT V:

Introduction to Protocols for Concurrency Control in Databases: Two-Phase Locking Techniques for Concurrency Control-Types of Locks and System Lock Tables. Overview of Storages and Indexing, Data on External Storage- File Organization and Indexing – Clustered Indexing – Primary and Secondary Indexes, Index Data Structures, Hash-Based Indexing – Tree-Based Indexing, Comparison of File Organization.

TEXT BOOKS:

1. DATABASE SYSTEMS Models, Languages, Design and Application Programming, 6 th Edition, Ramez Elmasri, Shamkant B.Navathe , Pearson.

2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, and TATA McGraw Hill 3rd Edition

REFERENCES BOOKS:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.

2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education 3. Introduction to Database Systems, C.J.Date Pearson Education

COURSE OUTCOMES:

At the end of the course, the student will be able to

CO1: Understand the basic principles of database management systems.

CO2: Draw Entity-Relationship diagrams to represent simple database application scenarios

CO3: Write SQL queries for a given context in relational database.

CO4: Discuss normalization techniques with simple examples.

CO5: Describe transaction processing and concurrency control concepts.

CO6: Examine issues in data storage and query processing and can formulate appropriate solutions.

II Year –I I Semester **COURSE CODE: UR19PCCS404** **L T P C**

3 0 0 3

Internal Marks: 30 **External Marks: 70**

FORMAL LANGUAGES AND AUTOMATA THEORY

Course Objectives:

- To understand the fundamental models of computation
- To determine Chomsky classification of languages.
- To classify machines by their power to recognize language
- Understand the concepts of decidability, NP-Completeness and NP Hard Problems

UNIT – I: Finite Automata

Importance of Automata Theory, the Central Concepts of Automata Theory, Automation, Finite

Automation, Transition Systems, Acceptance of a String by a Finite Automation, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with E-Transition, Minimization of Finite Automata, Mealy and Moore Machines, Applications and Limitation of Finite Automata.

UNIT – II: Regular Expressions

Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Manipulations of Regular Expressions, Finite Automata, and Regular Expressions, Inter Conversion, Equivalence between Finite Automata and Regular Expressions Closers Properties, Applications of Regular Expressions, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.

UNIT – III: Context Free Grammars

Formal Languages, Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars-Elimination of Useless Symbols, E Productions and Unit Productions, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Closure Properties, Applications of Context Free Grammars.

UNIT – IV: Pushdown Automata

Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description Language Acceptance of pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars Conversion, Two Stack Pushdown Automata, Application of Pushdown Automata

UNIT – V: Turning Machine

Turing Machine, Definition, Model, Representation of Turing Machines-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a Turing Machine, Design of Turing Machines, Techniques for Turing Machine Construction, Types of Turing Machines, Church's Thesis, Universal Turing Machine, Restricted Turing Machine.

TEXT BOOKS:

1. Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008.

2. Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N.Chandrasekharan, 3rd Edition, PHI, 2007.

REFERENCE BOOKS:

1. Formal Language and Automata Theory, K.V.N.Sunitha and N.Kalyani, Pearson, 2015.
2. Introduction to Automata Theory, Formal Languages and Computation, Shyamalendu Kandar, Pearson, 2013.

COURSE OUTCOMES:

At the end of the course, the student will be able to

CO1 : Analyze and design Finite Automata

CO2 : Classify the devices according to their computational power

CO3: Understand the concept of the Formal grammars and languages

CO4: Understand Turing machine concept and the techniques applied in computers

CO5: Understand basic complexity classes like P & NP

CO6 : Able to know how to use Pushdown automata.

II Year –II Semester **COURSE CODE: UR19PCCSL401** **L T P C**

0 0 3 1.5

Internal Marks: 20 **External Marks: 30**

JAVA PROGRAMMING LAB

OBJECTIVES:

- Understanding the OOP's concepts, classes and objects, threads, files, applets, swings and act.
- This course introduces computer programming using the JAVA programming language with object-oriented programming principles.
- Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using Java for network level programming and middleware development

Exercise: 1

a). Write a program to display default value of all primitive data type of JAVA

b). Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.

c). Five Bikers Compete in a race such that they drive at a constant speed which may or may not be the same as the other. To qualify the race, the speed of a racer must be more than the average speed of all 5 racers. Take as input the speed of each racer and print back the speed of qualifying racers.

d) Write a case study on **public static void main (250words)**

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

a). Write a JAVA program to search for an element in a given list of elements using binary search mechanism.

b). Write a JAVA program to sort for an element in a given list of elements using bubble sort

c). Write a JAVA program to sort for an element in a given list of elements using merge sort.

d). Write a JAVA program using StringBufferto delete, remove character.

Exercise - 3 (Class, Objects)

a). Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.

b). Write a JAVA program to implement constructor.

Exercise - 4 (Methods)

a). Write a JAVA program to implement constructor overloading.

b). Write a JAVA program implement method overloading.

Exercise - 5 (Inheritance)

a) Write a JAVA program to implement Single Inheritance

b) Write a JAVA program to implement multi level Inheritance.

c) Write a java program for abstract class to find areas of different shapes

Exercise - 6 (Inheritance - Continued)

a). Write a JAVA program give example for "super" keyword.

b). Write a JAVA program to implement Interface. What kind of Inheritance can be achieved

Exercise - 7 (Exception)

a).Write a JAVA program that describes exception handling mechanism

b).Write a JAVA program Illustrating Multiple catch clauses

Exercise – 8 (Runtime Polymorphism)

a). Write a JAVA program that implements Runtime polymorphism
b). Write a Case study on run time polymorphism, inheritance that implements in above problem

Exercise – 9 (User defined Exception)

a). Write a JAVA program for creation of Illustrating throw b). Write a JAVA program for creation of Illustrating finally

c). Write a JAVA program for creation of Java Built-in Exceptions d).Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)

a).Write a JAVA program that creates threads by extending Thread class .Firstthreaddisplay "Good Morning" every 1 sec, the second thread displays "Hello "every 2 seconds and the third display "Welcome" every 3 seconds , (Repeat the same by implementing Runnable)

b). Write a program illustrating **isAlive** and **join ()**
c). Write a Program illustrating Daemon Threads.

Exercise - 11 (Threads continuity)

a).Write a JAVA program Producer Consumer Problem
b).Write a case study on thread Synchronization after solving the above producer consumer problem

Exercise – 12 (Packages)

a).Write a JAVA program illustrate class path
b).Write a case study on including in class path in your os environment of your package.
c).Write a JAVA program that import and use the defined your package in the previous Problem

Exercise - 13 (Applet)

a).Write a JAVA program to paint like paint brush in applet.
b) Write a JAVA program to display analog clock using Applet.
c). Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 14 (Event Handling)

a).Write a JAVA program that display the x and y position of the cursor movement using Mouse.

b).Write a JAVA program that identifies key-up key-down event user entering text in a Applet.

Exercise - 15 (Swings)

a).Write a JAVA programto build a Calculator in Swings

b). Write a JAVA program to display the digital watch in swing tutorial.

Exercise – 16 (Swings - Continued)

a). Write a JAVA program that to create a single ball bouncing inside a JPanel.

b). Write a JAVA program JTree as displaying a real tree upside down

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations.

In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Web References:

- Introduction to Computer Science using Java by Bradley Kjell
- Learn Java - ad-supported site with tutorials for many languages
- Java Certification Mock Exams 500+ questions with exam simulator
- SwingWiki - Open documentation project containing tips, tricks and best practices for Java Swing development
- JavaTips - Blog project containing best JAVA tips and tricks

Requirements of Lab:

Software Requirements:

- Jdk and jre

Hardware Requirements:

- Processors: Intel(R) Pentium(R) CPU G2010 @ 2.80GHz
- Operating systems: Windows 7/8/10

COURSE OUTCOMES:

At the end of the course, the student will be able to

CO1:Understand Java programming concepts and utilize Java Graphical User Interface in Program writing.

CO2:Write, compile, execute and troubleshoot Java programming for networking concepts.

CO3:Build Java Application for distributed environment.

CO4:Design and Develop multi-tier applications.

CO5:Identify and Analyze Enterprise applications.

CO6:Able to understand about AWT components.

II Year –II Semester **COURSE CODE: UR19PCCSL402** **L T P C**
0 0 3 1.5

Internal Marks: 20 **External Marks: 30**

UNIX OPERATING SYSTEMS LAB

OBJECTIVES:
- To understand the design aspects of operating system.
- To study the process management concepts & Techniques and the storage management concepts.
- To familiarize students with the Linux environment and basic Unix administration
- To learn the fundamentals of shell scripting/programming

Operating Systems

1. Simulate the following CPU scheduling algorithms

a) Round Robin b) SJF c) FCFS d) Priority

2. Multiprogramming-Memory management- Implementation of fork (), wait (), exec() and

exit (), System calls

3. Simulate the following

a) Multiprogramming with a fixed number of tasks (MFT)

b) Multiprogramming with a variable number of tasks (MVT)

4. Simulate Bankers Algorithm for Dead Lock Avoidance

5. Simulate Bankers Algorithm for Dead Lock Prevention.

6. Simulate the following page replacement algorithms.

a) FIFO b) LRU c) LFU

7. Simulate the following File allocation strategies

a) Sequenced b) Indexed c) Linked

UNIX Programming

List of Experiments:

1. Basic Shell Commands Shell Programs:
2. Fibonacci Series, Designing Calculator
3. File Operations, Base conversion
4. Usage of cut and grep commands, Usage of user defined functions Administration
5. Managing User Accounts And User Quota Management
6. Installation of RPM software and Zipping, tar
7. Configuring RAID, Web server

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations.

In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Web Reference:

[1]. https://numato.com/blog/how-to-install-putty-on-linux/

[2]. Video Lectures on "Operating Systems" by Prof. P.K. Biswas Available: http://www.satishkashyap.com/2013/02/video-lectures-onoperating-systems-by.html

Requirements:

Software Requirements: Turbo c, Putty

Operating systems: Windows 7

Hardware Requirements:

Processors: Intel(R) Pentium(R) CPU G2010 @ 2.80GHz

COURSE OUTCOMES:

At the end of the course, the student will be able to

CO1: To use Unix utilities and perform basic shell control of the utilities

CO2: To use the Unix file system and file access control.

CO3: To use of an operating system to develop software

CO4: Work confidently in Unix/Linux environment

CO5: Write shell scripts to automate various tasks

CO6: Master the basics of Linux administration

II Year –II Semester **COURSE CODE: UR19PCCSL403** **L T P C**

0 0 3 1.5

Internal Marks: 20 **External Marks: 30**

DATA BASE MANAGEMENT SYSTEMS LAB

Objectives:

- To provide a sound introduction to the discipline of database management as a subject in its own right, rather than as a compendium of techniques and product specific tools.
- To familiarize the participant with the nuances of database environments towards an information-oriented data-processing oriented framework
- To give a good formal foundation on the relational model of data and present SQL and procedural interfaces to SQL comprehensively
- To give an introduction to systematic database design approaches covering, conceptual design, logical design and an overview of physical design

SQL:

1. DDL and DML Commands.

2. Queries to facilitate acquaintance of Built-In Functions, String Functions, Numeric Functions, Date Functions and Conversion Functions.

3. Queries using operators in SQL

4. Queries to Retrieve and Change Data: Select, Insert, Delete, and Update

5. Queries using Group By, Order By, and Having Clauses

6. Queries on Controlling Data: Commit, Rollback, and Save point

7. Queries to Build Report in SQL *PLUS

8. Queries for Creating, Dropping, and Altering Tables, Views, and Constraints

9. Queries on Joins and Correlated Sub-Queries

10. Queries on Working with Index, Sequence, Synonym, Controlling Access, and Locking Rows for Update, Creating Password and Security features

PL/SQL :

11. Write a PL/SQL Code using Basic Variable, Anchored Declarations, and Usage of

    Assignment Operation

12. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL

13. Write a PL/SQL block using SQL and Control Structures in PL/SQL

14. Write a PL/SQL Code using Cursors, Exceptions and Composite Data Types

15. Write a PL/SQL Code using Procedures, Functions, and Packages FORMS

16. Demonstration of database connectivity

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations.

In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Web Reference:

[1]. http://people.cs.ksu.edu/~hankley/d764/tut06/Taylor_InstallOra.htm

Requirements Of Lab:

Software Requirements:

Front end : VB/VC ++/JAVA or Equivalent

Back end : Oracle10g

Hardware Requirements:

Processors: Intel(R) Pentium(R) CPU G2010 @ 2.80GHz

Operating systems: Windows 7

COURSE OUTCOMES:

At the end of the course, the student will be able to

CO1:Understand, appreciate and effectively explain the underlying concepts of database technologies

CO2:Design and implement a database schema for a given problem-domain

CO3:Normalize a database

CO4:Populate and query a database using SQL DML/DDL commands.

CO5:Declare and enforce integrity constraints on a database using a state-of-the-artRDBMS

CO6:Understand PL/SQL stored functions, cursors, packages.

II Year –II Semester **COURSE CODE: UR19MC401** **L T P C**

0 0 0 0

Internal Marks: 20 **External Marks: 30**

PROFESSIONAL ETHICS AND HUMAN VALUES

Course Objectives:

- To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.
- Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.

UNIT I: Human Values:
Morals, Values and Ethics – Integrity –Trustworthiness - Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty -Courage – Value Time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT: II: Principles for Harmony:
Truthfulness – Customs and Traditions -Value Education – Human Dignity – Human Rights – Fundamental Duties - Aspirations and Harmony (I, We & Nature) – Gender Bias – Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness.

UNIT III: Engineering Ethics and Social Experimentation:
History of Ethics - Need of Engineering Ethics - Senses of Engineering Ethics- Profession and Professionalism —Self Interest - Moral Autonomy – Utilitarianism – Virtue Theory - Uses of Ethical Theories - Deontology- Types of Inquiry –Kohlberg's Theory - Gilligan's Argument – Heinz's Dilemma - Comparison with Standard Experiments — Learning from the Past – Engineers as Managers – Consultants and Leaders – Balanced Outlook on Law - Role of Codes – Codes and Experimental Nature of Engineering.

UNIT IV: Engineers' Responsibilities towards Safety and Risk:
Concept of Safety - Safety and Risk – Types of Risks – Voluntary v/sInvoluntary Risk – Consequences - Risk Assessment – Accountability – Liability - Reversible Effects – Threshold Levels of Risk - Delayed v/sImmediate Risk - Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

UNIT V: Engineers' Duties and Rights:
Concept of Duty - Professional Duties – Collegiality - Techniques for Achieving Collegiality – Senses of Loyalty - Consensus and Controversy - Professional and Individual Rights – Confidential and Proprietary Information - Conflict of Interest-Ethical egoism – Collective Bargaining – Confidentiality - Gifts and Bribes - Problem solving-Occupational Crimes- Industrial Espionage- Price Fixing-Whistle Blowing.

Globalization and MNCs –Cross Culture Issues - Business Ethics – Media Ethics -Environmental Ethics – Endangering Lives - Bio Ethics - Computer Ethics - War Ethics – Research Ethics -Intellectual Property Rights. Related Cases Shall be dealt where ever necessary.

References:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Ethics in Engineering by Mike W. Martin and Roland Schinzinger - Tata McGraw-Hill –2003.
3. Professional Ethics and Morals by Prof.A.R.Aryasri, DharanikotaSuyodhana – Maruthi Publications.
4. Engineering Ethics by Harris, Pritchard and Rabins, Cengage Learning, New Delhi.
5. Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd., Noida.

6. Engineering Ethics & Human Values by M.Govindarajan, S.Natarajan and V.S. Senthil Kumar-PHI Learning Pvt. Ltd – 2009.

7. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman and M.Jaya kumaran – University Science Press.

8. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill - 2013

9. Human Values And Professional Ethics by Jayshree Suresh and B. S. Raghavan, S.Chand Publications

COURSE OUTCOMES:

At the end of the course, the student will be able to

CO1: It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.
CO2: It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.
CO3: Understands about Need of Engineering Ethics, Profession and Professionalism and Balanced Outlook on Law
CO4: Demonstrates the risk factors and also the Designing facts for Safety.

CO5: Understand the Concepts of Duty and Problem solving-Occupational Crimes.

CO6: Understands the different ethics like Bio Ethics, Computer Ethics, War and research Ethics

B.Tech. IV & VI Semester **COURSE CODE: UR19MPROJCS401, 602**

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0	0	0	0

SOCIALLY RELEVANT MINI PROJECT-I & II

Internal Marks: 20
Semester-end Marks: 30
External Marks: 0

Guidelines:

- Students should select a problem which addresses real life applications.
- Group of maximum three students can be permitted to work on a single mini project.
- Student should select the current trending technologies to develop the project.
- The mini project can be either mobile/web based applications.
- Student should know the functional requirements, existing system and proposed system of the project.
- Student should have the knowledge about the algorithms that are going to apply for the project.
- At the end of the project, students should be able to run the project in any Operating System.
- Student should be able to find the bugs and fix.
- 10-20 pages report to be submitted by students.
- Department may arrange demonstration with poster presentation of all mini projects developed by the students at the end of semester.