COMPUTER SCIENCE & ENGINEERING

COURSE STRUCTURE

B. TECH I SEMESTER

S.No.	Course Code	Course Category	Course Title	Hours per week			Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	20CS1T01	BSC	Linear Algebra and Differential Equations	3	-	-	3	3
2	20CS1T02	BSC	Applied Chemistry	3	-	-	3	3
3	20CS1T03	HSMC	English	3	-	-	3	3
4	20CS1L04	ESC	Computer Engineering Workshop	1	-	4	3	3
5	20CS1T05	ESC	Problem Solving through C	3	-	-	3	3
6	20CS1L06	HSMC	English Communication Skills Lab	-	-	3	3	1.5
7	20CS1L07	BSC	Applied Chemistry Lab	-	-	3	3	1.5
8	20CS1L08	ESC	Problem Solving through C Lab	-	-	3	3	1.5
9	20CS1M09	MC	Environmental Science	2	-	-	2	-
							Total Credits	**19.5**

B. TECH II SEMESTER

S.No.	Course Code	Course Category	Course Title	Hours per week			Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	20CS2T01	BSC	Transform Techniques	3	-	-	3	3
2	20CS2T02	BSC	Applied Physics	3	-	-	3	3
3	20CS2T03	ESC	Digital Logic Design	3	-	-	3	3
4	20CS2T04	ESC	Data Structures	3	-	-	3	3
5	20CS2T05	ESC	Python Programming	3	-	-	3	3
6	20CS2L06	BSC	Applied Physics Lab	-	-	3	3	1.5
7	20CS2L07	ESC	Data Structures Lab	-	-	3	3	1.5
8	20CS2L08	ESC	Python Programming Lab	-	-	3	3	1.5
							Total Credits	**19.5**

B. TECH III SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	20CS3T01	BSC	Numerical Methods and Vector Calculus	3	0	0	3	3
2	20CS3T02	PCC	Object Oriented Programming through Java	3	0	0	3	3
3	20CS3T03	PCC	Data Base Management Systems	3	0	0	3	3
4	20CS3T04	PCC	Software Engineering	3	0	0	3	3
5	20CS3T05	PCC	Computer Organization	3	0	0	3	3
6	20CS3L06	PCC	Object Oriented Programming through Java Lab	0	0	3	3	1.5
7	20CS3L07	PCC	Data Base Management Systems Lab	0	0	3	3	1.5
8	20CS3L08	PCC	Software Engineering Lab	0	0	3	3	1.5
9	20CS3S09	SC	Python NumPy & Pandas	0	0	4	4	2
11	20CS3M10	MC	Constitution of India	2	0	0	2	-
Total number of credits								**21.5**

B. TECH IV SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	20CS4T01	BSC	Probability and Statistics	3	0	0	3	3
2	20CS4T02	ESC	Discrete Mathematical Structures	3	0	0	3	3
3	20CS4T03	PCC	Operating Systems	3	0	0	3	3
4	20CS4T04	PCC	Advanced Data Structures	3	0	0	3	3
5	20CS4T05	HSMC	Managerial Economics and Financial Analysis	3	0	0	3	3
7	20CS4L06	ESC	R Programming Lab	0	0	3	3	1.5
6	20CS4L07	PCC	Operating Systems Lab	0	0	3	3	1.5
8	20CS4L08	PCC	Advanced Data Structures Lab	0	0	3	3	1.5
9	20CS4S09	SC	Basic Web Programming	0	0	4	4	2
Total number of credits								**21.5**
Honors/Minor courses				**4**	**0**	**0**	**-**	**4**

B.TECH V SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	20CS5T01	PCC	Formal Languages & Automata Theory	3	0	0	3	3
2	20CS5T02	PCC	Data Warehousing & Data Mining	3	0	0	3	3
3	20CS5T03	PCC	Design and Analysis of Algorithms	3	0	0	3	3
Program Elective-I				3	0	0	3	3
4	20CS5T04	PE-I	Object Oriented Analysis and Design					
5	20CS5T05		Advanced Computer Architecture					
6	20CS5T06		Artificial Intelligence					
7	**Open Elective-I**			3	0	0	3	3
8	20CS5L10	PCC	Data Warehousing and Mining Lab Through Python	0	0	3	3	1.5
9	20CS5L11	PCC	Design and Analysis of Algorithms Lab	0	0	3	3	1.5
10	20CS5S12	SC	Mobile Application Development	0	0	4	4	2
11	20CS5M13	MC	Professional Ethics and Human Values	2	0	0	2	-
12	20CS5I14	I	Summer Internship	0	0	0	1.5	1.5
Total number of credits								**21.5**
Honors/Minor courses				**4**	**0**	**0**	**-**	**4**

B.TECH VI SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	20CS6T01	PCC	Machine Learning	3	0	0	3	3
2	20CS6T02	PCC	Computer Networks	3	0	0	3	3
3	20CS6T03	PCC	Big Data Analytics	3	0	0	3	3
Program Elective-II				3	0	0	3	3
4	20CS6T04	PE-II	Software Testing Methodologies					
5	20CS6T05		Mean Stack Technologies					
6	20CS6T06		Compiler Design					
7	**Open Elective-II**			3	0	0	3	3
8	20CS6L10	PCC	Machine Learning Lab	0	0	3	3	1.5
9	20CS6L11	PCC	Computer Networks Lab	0	0	3	3	1.5
10	20CS6L12	PCC	Big Data Analytics Lab	0	0	3	3	1.5
11	20CS6S13	SC	Soft Skills	0	0	4	4	2
12	20CS6M14	MC	Essence of Indian traditional knowledge	2	0	0	2	-
Total number of credits								**21.5**
Honors/Minor courses				**4**	**0**	**0**	**-**	**4**

B.TECH VII SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Contact Hours	Credits
				Lecture	Tutorial	Practical		
Program Elective-III				3	0	0	3	3
1	20CS7T01	PE-III	Software Project Management					
2	20CS7T02		Cloud Computing					
3	20CS7T03		Cryptography & Network Security					
Program Elective-II				3	0	0	3	3
4	20CS7T04	PE-IV	Human Computer Interaction					
5	20CS7T05		Mobile Computing					
6	20CS7T06		High-Performance Computing					
Program Elective-V				3	0	0	3	3
7	20CS7T07	PE-V	Software Architecture and Design Patterns					
8	20CS7T08		Adhoc & Sensor Networks					
9	20CS7T09		Social Network Analysis					
10	**Open Elective-III**			3	0	0	3	3
11	**Open Elective-IV**			3	0	0	3	3
8	20CS5L16	HSMC	Universal Human Values: Understanding Harmony	0	0	3	3	3
10	20CS5S17	SC	Data Visualization using Tableau	0	0	4	4	2
11	20CS5I18	I	Industrial Internship	-	-	-	-	3
Total number of credits								**23**
Honors/Minor courses				**4**	**0**	**0**	**-**	**4**

B.TECH VIII SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	20CS8T01	PCC	MOOCs	0	0	0	2	2
2	20CS8P02	P	Project	0	0	0	10	10
Total number of credits								**12**

OPEN ELECTIVE –I:

S. No.	Course Code	Course Name	L	T	P	C	Offered by
1	20CE5T04	Architecture and Town Planning	3	0	0	3	CE
2	20CE5T05	Elements of Civil Engineering	3	0	0	3	CE
3	20EE5T04	Basics of Control Systems	3	0	0	3	EEE
4	20EE5T05	Special Electrical Machines	3	0	0	3	EEE
5	20ME5T04	Design Thinking & Product Innovation	3	0	0	3	ME
6	20ME5T05	Nanotechnology	3	0	0	3	ME
7	20EC5T04	Linear System Analysis	3	0	0	3	ECE
8	20EC5T05	Digital Logic Design	3	0	0	3	ECE
9	20EC5T06	Solid State Devices	3	0	0	3	ECE
10	20CS5T07	Introduction to Artificial Intelligence	3	0	0	3	CSE
11	20CS5T08	Information Theory	3	0	0	3	CSE
12	20CS5T09	Software Engineering	3	0	0	3	CSE
13	20IT5T07	Computer Networks	3	0	0	3	IT
14	20IT5T08	Computer Graphics	3	0	0	3	IT
15	20IT5T09	Software Engineering	3	0	0	3	IT
16	20HS5T01	Complex variables	3	0	0	3	BED
17	20MB5T01	Principles of Management	3	0	0	3	DMS
18	20MB5T02	Technology Management	3	0	0	3	DMS

OPEN ELECTIVE –II:

S. No.	Course Code	Course Name	L	T	P	C	Offered by
1	20CE6T05	Remote Sensing and GIS	3	0	0	3	CE
2	20CE6T06	Environmental Impact Assessment	3	0	0	3	CE
3	20EE6T08	Renewable Energy Sources	3	0	0	3	EEE
4	20EE6T09	Energy Auditing Conservation and Management	3	0	0	3	EEE
5	20ME6T07	Industrial Robotics	3	0	0	3	ME
6	20ME6T08	Additive manufacturing	3	0	0	3	ME
7	20EC6T07	Electronic Circuits and Networks	3	0	0	3	ECE
8	20EC6T08	Principles of Communications	3	0	0	3	ECE

9	20EC6T09	Microcontrollers & its Applications	3	0	0	3	ECE
10	20CS6T07	Introduction to Machine Learning	3	0	0	3	CSE
11	20CS6T08	Information Security	3	0	0	3	CSE
12	20CS6T09	Agile Technologies	3	0	0	3	CSE
13	20IT6T07	Ad-hoc and Wireless Sensor Networks	3	0	0	3	IT
14	20IT6T08	Image Processing	3	0	0	3	IT
15	20IT6T09	Agile Technologies	3	0	0	3	IT
16	20HS6T01	Operations Research	3	0	0	3	BED
17	20MB6T01	Organizational Behaviour	3	0	0	3	DMS
18	20MB6T02	Project Management	3	0	0	3	DMS

OPEN ELECTIVE –III:

S. No.	Course code	Course Name	L	T	P	C	Offered by
1	20CE7T04	Construction Technology and Management	3	0	0	3	CE
2	20CE7T05	Green Buildings	3	0	0	3	CE
3	20EE7T13	Concept of Power System Engineering	3	0	0	3	EEE
4	20EE7T14	Instrumentation	3	0	0	3	EEE
5	20ME7T10	Green Engineering Systems	3	0	0	3	ME
6	20ME7T11	Mechatronics	3	0	0	3	ME
7	20EC7T10	Data Communications	3	0	0	3	ECE
8	20EC7T11	Mechatronics	3	0	0	3	ECE
9	20EC7T12	Bio Medical Instrumentation	3	0	0	3	ECE
10	20CS7T10	Neural Networks and Deep Learning	3	0	0	3	CSE
11	20CS7T11	Cyber Security	3	0	0	3	CSE
12	20CS7T12	Software Testing Methodologies	3	0	0	3	CSE
13	20IT7T10	Internet of Things	3	0	0	3	IT
14	20IT7T11	Computer Vision	3	0	0	3	IT
15	20IT7T12	Software Testing Methodologies	3	0	0	3	IT
16	20HS7T01	Fuzzy set	3	0	0	3	BED
17	20MB7T01	Digital Media management	3	0	0	3	DMS
18	20MB7T02	Entrepreneurship Development	3	0	0	3	DMS

OPEN ELECTIVE –IV:

S. No.	Course Code	Course Name	L	T	P	C	Offered by
1	20CE7T06	Waste water treatment	3	0	0	3	CE
2	20CE7T07	Repair and Rehabilitation of Concrete Structures	3	0	0	3	CE
3	20EE7T15	Power Quality	3	0	0	3	EEE
4	20EE7T16	Electric Vehicles	3	0	0	3	EEE
5	20ME7T12	Micro-Electro- Mechanical Systems	3	0	0	3	ME
6	20ME7T13	Solar Energy Systems	3	0	0	3	ME
7	20EC7T13	Introduction to Embedded Systems	3	0	0	3	ECE
8	20EC7T14	Internet of Things	3	0	0	3	ECE
9	20EC7T15	Analog and Digital IC applications	3	0	0	3	ECE
10	20CS7T13	Data Analytics	3	0	0	3	CSE
11	20CS7T14	Block Chain Technology	3	0	0	3	CSE
12	20CS7T15	Software Project Management	3	0	0	3	CSE
13	20IT7T13	Cloud Computing	3	0	0	3	IT
14	20IT7T14	Business Intelligence	3	0	0	3	IT
15	20IT7T15	Software Project Management	3	0	0	3	IT
16	20HS7T02	Polymer Chemistry	3	0	0	3	BED
17	20MB7T03	Total Engineering Quality Management	3	0	0	3	DMS
18	20MB7T04	Stress Management	3	0	0	3	DMS

HONOR COURSES

S.No.	Course code	Course Name	L	T	P	C
Pool-1						
1	20CSHN01	Unix and Shell Programming	3	1	0	4
2	20CSHN02	NOSQL databases	3	1	0	4
3	20CSHN03	Advanced web programming	3	1	0	4
Pool-2						
4	20CSHN05	Management Information Systems	3	1	0	4
5	20CSHN06	Distributed Systems	3	1	0	4
6	20CSHN07	Advanced Operating Systems	3	1	0	4
Pool-3						
7	20CSHN09	Neural Networks & Deep Learning	3	1	0	4
8	20CSHN10	Soft Computing	3	1	0	4
9	20CSHN11	Parallel Computing	3	1	0	4
Pool-4						
10	20CSHN13	Pattern Recognition	3	1	0	4
11	20CSHN14	Natural Language Processing	3	1	0	4
12	20CSHN15	Data Analytics	3	1	0	4

MINOR COURSES

S. No.	Course code	Course Name	L	T	P	C	Offered by
1	20CSMN01	Fundamentals of Data Structures using python	3	1	0	4	CSE
2	20CSMN02	Web Programming	3	1	0	4	CSE
3	20CSMN03	Software Engineering	3	1	0	4	CSE
4	20CSMN04	Database Management Systems	3	1	0	4	CSE
5	20CSMN05	Operating Systems	3	1	0	4	CSE
6	20CSMN06	Introduction to Machine Learning	3	1	0	4	CSE

B.TECH I SEMESTER	BSC	L	T	P	C
		3	0	0	3

20CS1T01 LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

Pre-requisite: Basic knowledge about matrices, differentiation and integration

Course Objective: Objective of the course is to impart

- Basic understanding of mathematical methods to solve simultaneous linear systems
- Understanding of formation and solutions of ordinary differential equations
- Knowing the mathematical methods to solve applications of differential equations

Course Outcomes:

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

CO1: Apply the knowledge to solve a system of homogeneous and non homogeneous linear equations

CO2: Illustrate the methods of computing eigen values and eigen vectors

CO3: Able to analyze the real life situations, formulate the differential equations and then applying the methods

CO4: Determine the solutions of linear differential equations

CO5: Optimize functions of several variables and able to find extreme values of constrained functions

SYLLABUS

UNIT-I: Linear systems of equations:

Rank of a matrix, Echelon form, Normal form, PAQ is in normal form, linear dependence and independence of vectors, Consistency of linear system of equations, System of linear homogeneous equations, Gauss-elimination and Gauss -Jordan methods.

UNIT-II: Eigen values & Eigen vectors:

Eigen values, Eigen vectors, Properties of Eigen values (without proofs), Cayley-Hamilton theorem (without proof), finding inverse and powers of a matrix using C-H theorem, Reduction to diagonal form, reduction of quadratic form to canonical form using orthogonal reduction, nature of quadratic forms.

UNIT-III: Ordinary Differential Equations of first order:

Linear equations, Bernoulli's equation, Exact differential equations. Equations reducible

to exact equations, **Applications:** Orthogonal Trajectories, Newton's Law of cooling, Rate of decay & growth, R-L series circuits.

UNIT-IV: Linear Differential Equations higher order:

Definitions, Complete solution (without proof), Operator D, Rules to find complementary function, Inverse operator, Rules to find the particular integral(nonhomogeneous term of the form e^{ax} , sin(ax+b), cos(ax+b), polynomials in x^m, $e^{ax}V(x)$, any other function), Method of variation of parameters.

UNIT-V: Partial Differentiation:

Functions of two variables, Partial derivatives, Homogeneous functions, Euler's theorem, Total derivative, Jacobian and functional dependence, Taylor's theorem for functions of two variables. **Applications:** Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

Text Books:

1. B. S. GREWAL, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014.
2. B. V. RAMANA, Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.
2. N. P. BALI & Dr. MANISH GOYAL**,** A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.

B.TECH I SEMESTER	BSC	L	T	P	C
		3	0	0	3

20CS1T02 APPLIED CHEMISTRY

Pre-requisite: Knowledge of basic concepts of Chemistry for Engineering students will help them as professional engineers later in design and material selection, as well as utilizing the availableresources

Course Objective: Objective of the course is to impart

- Importance of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
- Outline the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
- Explain the preparation of semiconductors and nanomaterials, engineering applications of nanomaterials, superconductors and liquid crystals.
- Recall the increase in demand for power and hence alternative sources of power are studied due to depleting sources of fossil fuels. Advanced instrumental techniques are introduced.
- Outline the basics of green chemistry and molecular switches

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

CO1: Analyze the different types of composite plastic materials and interpret the mechanism ofconduction in conducting polymers.

CO2: Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning newengineering products and categorize the reasons for corrosion and study methods to control corrosion.

CO3: Synthesize nanomaterials for modern advances of engineering technology. Summarize the preparation of semiconductors; analyze the applications of liquid crystalsand superconductors.

CO4: Design models for energy by different natural sources.
Analyze the principles of different analytical instruments and their applications.

CO5: Obtain the knowledge of green chemistry and molecular machines

SYLLABUS

UNIT-I: Polymer Technology

Polymerisation: Introduction, methods of polymerization (addition and Condensation), Physical and mechanical properties.

Plastics: Compounding, fabrication (compression, injection, blown film and extrusion), preparation, properties and applications (PVC, polycarbonates and Bakelite), mention some examples of plastic materials used in electronic gadgets.

Elastomers: Natural rubber-Drawbacks-vulcanization, preparation, properties and applications (Buna S, thiokol and polyurethanes).

Composite materials: Fiber reinforced plastics – GFRP and Aramid FRP

Conducting polymers: Intrinsic and extrinsic conducting polymers

Biodegradable polymers: preparation and applications

UNIT-II: Electrochemical Cells And Corrosion

Part I: ELECTROCHEMICAL CELLS: Single electrode potential, electrochemical series and uses of series, standard hydrogen electrode,calomel electrode, batteries (Dry cell, Li ion battery and zinc air cells), fuel cells (H_2-O_2, CH_3OH-O_2, phosphoric acid and molten carbonate).

Part II: Corrosion: Definition, theories of corrosion (chemical and electrochemical), galvanic corrosion, differential aeration corrosion, stress corrosion, galvanic series, factors influencing rate of corrosion, corrosion control (cathodic protection), Protective coatings (cathodic coatings, anodic coatings, electroplating and electroless plating)

UNIT-III: Material Chemistry

Part I: Non-elemental semiconducting materials: Stoichiometric, controlled valency & chalcogen photo/semiconductors-preparation of semiconductors (distillation, zone refining, Czochralski crystal pulling technique) - Semiconductor devices (p-n junction diode as rectifier, junction transistor).

Super conductors:-Type –I, Type II-characteristics and applications

Part II: Nano materials: Introduction, sol-gel method, characterization by (Brunauer Emmet Teller[BET]), (scanning electron microscopy [SEM]) and (transmission electron microscopy [TEM]),applications of graphene and fullerenes, carbon nanotubes (types, preparation and applications)

Liquid crystals: Introduction-types-applications.

UNIT-IV: Non-Conventional Energy Sources & Spectroscopy

Part I: NON-CONVENTIONAL ENERGY SOURCES

Design, working, schematic diagram, advantages and disadvantages of photovoltaic cell, hydropower, geothermal power, tidal and wave power, ocean thermal energy conversion.

Part II: **SPECTROSCOPY**

UV spectroscopy- Basic principle-Instrumentation-Applications

IR spectroscopy- Basic principle-Instrumentation-Applications

NMR spectroscopy- Basic principle-Instrumentation-Applications

UNIT-V: Advanced Concepts/Topics In Chemistry

Part-I: Green chemistry: Introduction, Principles of green chemistry, Green synthesis-Aquaeous Phase method-Microwave method-Phase transfer catalysis method, R4M4 principles (Econoburette).

PART-II: Molecular switches: characteristics of molecular motors and machines, Rotaxanes and Catenanes as artificial molecular machines, prototypes – linear motions in rotaxanes, an acid- base controlled molecular shuttle, a molecular elevator, an autonomous light-powered molecular motor.

Text Books:

1. P.C. Jain and M. Jain "Engineering Chemistry", 15/e, Dhanpat Rai & Sons, Delhi,(Latest edition).
2. Shikha Agarwal, "Engineering Chemistry", Cambridge University Press, New Delhi,(2019).
3. S.S. Dara, "A Textbook of Engineering Chemistry", S.Chand & Co, (2010).
4. Shashi Chawla, "Engineering Chemistry", Dhanpat Rai Publicating Co. (Latest edition).

References:

1. K. Sesha Maheshwaramma and Mridula Chugh, "Engineering Chemistry", Pearson India
2. O.G. Palana, "Engineering Chemistry", Tata McGraw Hill Education Private Limited,(2009).
3. CNR Rao and JM Honig (Eds) "Preparation and characterization of materials" Academic press, New York (latest edition)
4. B. S. Murthy, P. Shankar and others, "Textbook of Nanoscience and Nanotechnology",University press (latest edition)

B.TECH I SEMESTER **HSMC**

L	T	P	C
3	0	0	3

20CS1T03 ENGLISH

Pre-requisite:

Course Objective:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

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

CO1 understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information

CO2 ask and answer general questions on familiar topics

CO3 employ suitable strategies to master the art of letter writing and email writing

CO4 recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs

CO5 form sentences using proper grammatical structures and correct word forms

SYLLABUS

UNIT-I A Drawer full of happiness (Detailed Study)
Deliverance (Non-detailed Study)

UNIT-II Nehru's letter to his daughter Indira on her birthday(Detailed Study)
Bosom Friend (Non-detailed Study)

UNIT-III Stephen Hawking-Positivity 'Benchmark' (Detailed Study)
Shakespeare's Sister(Non-detailed Study)

UNIT-IV Liking a Tree, Unbowed: Wangari Maathai-biography (Detailed Study)

Telephone Conversation(Non-detailed Study)

UNIT-V Stay Hungry-Stay foolish (Detailed Study)
Still I Rise(Non-detailed Study)

Text Books

1. "Infotech English", Maruthi Publications. (Detailed)
2. "The Individual Society", Pearson Publications.(Non-detailed)

Reference Books

1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.

B.TECH I SEMESTER	ESC	L	T	P	C
		1	0	4	3

20CS1L04 COMPUTER ENGIENERING WORKSHOP

Course Objectives:

Skills and knowledge provided by this subject are the following:

- **PC Hardware:** Identification of basic peripherals, Assembling a PC, Installation of system software like MS Windows, device drivers, etc. Troubleshooting of PC Hardware and Software issues.
- **Internet & World Wide Web:** Different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet, web browsers, email, newsgroups and discussion forums. Awareness of cyber hygiene (protecting the personal computer from getting infected with the viruses), worms and other cyber attacks.
- **Productivity Tools:** Understanding and practical approach of professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite office tools.

Course Outcomes:

CO1: Identify, assemble and update the components of a computer

CO2: Configure, evaluate and select hardware platforms for the implementation and execution of computer applications, services and systems

CO3: Make use of tools for converting pdf to word and vice versa

CO4: Develop presentation, documents and small applications using productivity tools such as word processor, presentation tools, spreadsheets, HTML, LaTex

LIST OF EXERCISES

Task 1: Identification of the peripherals of a computer - Prepare a report containing the block diagram of the computer along with the configuration of each component and its functionality. Describe about various I/O Devices and its usage.

Task 2: Practicing disassembling and assembling components of a PC

Task 3: Installation of Device Drivers, MS Windows, Linux Operating systems and Disk Partitioning, dual boating with Windows and Linux.

Task 4: Introduction to Memory and Storage Devices, I/O Port, Assemblers, Compilers, Interpreters, Linkers and Loaders.

Task 5: Demonstration of Hardware and Software Troubleshooting

Task 6: Demonstrating Importance of Networking, Transmission Media, Networking Devices- Gateway, Routers, Hub, Bridge, NIC, Bluetooth Technology, Wireless Technology, Modem, DSL, and Dialup Connection.

Task 7: Surfing the Web using Web Browsers, Awareness of various threats on the Internet and its solutions, Search engines and usage of various search engines, Need of anti-virus, Installation of anti-virus, configuring personal firewall and windows update.

(Students should get connected to their Local Area Network and access the Internet. In the process they should configure the TCP/IP setting and demonstrate how to access the websites and email. Students customize their web browsers using bookmarks, search toolbars and popup blockers)

Productivity Tools:

Task 8: Basic HTML tags, Introduction to HTML5 and its tags, Introduction to CSS3 and its properties. Preparation of a simple website/ homepage,

Assignment: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Features to be covered:- Layouts, Inserting text objects, Editing text objects, Inserting Tables, Working with menu objects, Inserting pages, Hyper linking, Renaming, deleting, modifying pages, etc.,

Task 9: Demonstration and Practice of various features of Microsoft Word

Assignment:

1. Create a project certificate.

2. Creating a news letter

Features to be covered:-Formatting Fonts, Paragraphs, Text effects, Spacing, Borders and Colors, Header and Footer, Date and Time option, tables, Images, Bullets and Numbering, Table of Content, Newspaper columns, Drawing toolbar and Word Art and Mail Merge in word etc.,

Task 10: Demonstration and Practice of various features Microsoft Excel

Assignment: 1. Creating a scheduler

2. Calculating GPA

3. Calculating Total, average of marks in various subjects and ranks of students

based on marks

Features to be covered:Format Cells, Summation, auto fill, Formatting Text, Cell Referencing, Formulae in excel, Charts, Renaming and Inserting worksheets, etc.,

Task 11: Demonstration and Practice of various features Microsoft Power Point

Features to be covered:Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Hyperlinks Tables and Charts, Master Layouts, Types of views, Inserting – Background, textures, Design Templates, etc.,

Task 12: Demonstration and Practice of various features LaTeX – document preparation, presentation (Features covered in Task 9 and Task 11 need to be explored in LaTex)

Task 13: Tools for converting word to pdf and pdf to word

Task 14: Internet of Things (IoT): IoT fundamentals, applications, protocols, communication models, architecture, IoT devices

Reference Books:

1. Computer Fundamentals, Anita Goel, Pearson India Education, 2017

2. PC Hardware Trouble Shooting Made Easy, TMH

3. Introduction to Information Technology, ITL Education Solutions Limited, 2nd Edition, Pearson, 2020

4. Upgrading and Repairing PCs, 18th Edition, Scott Mueller, QUE, Pearson, 2008

5. LaTeX Companion – Leslie Lamport, PHI/Pearson

6. Introducing HTML5, Bruce Lawson, Remy Sharp, 2nd Edition, Pearson, 2012

7. Teach yourself HTML in 24 hours, By Techmedia

8. HTML 5 and CSS 3.0 to the Real World by Alexis Goldstein, Sitepoint publication.

9. Internet of Things, Technologies, Applications, Challenges and Solutions, B K Tripathy, J Anuradha, CRC Press

10. Comdex Information Technology Course Tool Kit, Vikas Gupta, Wiley Dreamtech.

11. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme, CISCO Press, Pearson Education.

12. Essential Computer and IT Fundamentals for Engineering and Science Students, Dr. N. B. Venkateswarlu, S. Chand Publishers

B.TECH I SEMESTER	ESC	L	T	P	C
		3	0	0	3

20CS1T05 PROBLEM SOLVING THROUGH C

Pre-requisite:

Course Objective:

- To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program
- To gain knowledge of the operators, selection, control statements and repetition in C. To learn about the design concepts of arrays, strings, enumerated structure and union types and their usage. To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor. To assimilate about File I/O and significance of functions

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

CO1: Understand the basic concepts of programming

CO2: Understand and Apply loop construct for a given problem

CO3: Demonstrate the use pointers

CO4: Understand the use of functions and develop modular reusable code

CO5: Understand File I/O operations

SYLLABUS

UNIT-I:

INTRODUCTION TO COMPUTERS: Functional Components of computer, computer software, categories of memory, types of programming languages, Development of algorithms, flow charts, software development process, Computer Numbering system

BASICS OF C PROGRAMMING: Introduction to programming paradigms, Structure of C program, Data Types, C Tokens, Operators: Precedence and Associativity, Expressions Input/output statements, Assignment statements

UNIT-II:

Decision making statements: if, if else, nester if. Multi way decision making statements: else if, Switch statement. **Loop statements**: while, do while, for, Compilation process.

UNIT-III:

Introduction to Arrays: Declaration, Initialization, One dimensional array, Example Programs on one dimensional array, Selection sort, linear and binary search, two

dimensional arrays, Matrix Operations, Multi-dimensional Arrays

Strings: Declaration, String operations: length, compare, concatenate, copy, String handling functions.

UNIT-IV:

FUNCTIONS: Introduction to functions: Function prototype, function definition, function call, Built-in functions, Recursion, Storage classes, Passing Arrays & Strings to the functions, Preprocessor directives

POINTERS: Pointers, Pointer operators, Pointer arithmetic, Arrays and pointers, Array of pointers, Parameter passing: Pass by value, Pass by reference, Dynamic Memory Allocation

UNIT-V:

STRUCTURES AND UNIONS: Structure, Nested structures, Pointer and Structures, Array of structures, Example Program using structures and pointers, Self-referential structures, Unions.

FILE PROCESSING: Files, Types of file processing: Sequential access, Random access, Sequential access file, Random access file, Command line arguments

Text Books:

1. Krnighan. B.W and Ritche, D.M, "The C Programming Language", Second Edition, Pearson Education, 2006
2. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.

References:

1. Pradepdey, Manas Ghosh, "Fundamentals of Computing and programming in C", First Edition, Oxford University Press, 2009.
2. Paul Deitel and Harvey Deitel, "C How to Program", Seventh Edition, Pearson Publication.
3. E Balagursamy, "Programming in C, Sixth Edition, Tata McGraw Hill.
4. Ajay Mittal, "Programming in C A practical Approach", Pearson education

B.TECH I SEMESTER	HSMC	L	T	P	C
		0	0	3	1.5

20CS1L06 ENGLISH COMMUNICATION SKILLS LAB

Course Objectives:

- Facilitate effective usage of functional English through role plays
- Focus on vocabulary enhancement
- Foster various nuances of phonetics and accent neutralization

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

CO1: Acquire basic proficiency in English by learning functional aspects of English language

CO2: Learn the methods of enhancing vocabulary

CO3: Acquaint himself/herself with nuances of Phonetics

LIST OF EXPERIMENTS

1 Greetings and Introductions
2 Requesting Permission & Giving Directions
3 Inviting/Complaining/Congratulating
4 Root Words
5 Phonetics-Sounds and Symbols
6 Pronunciation Rules

References:

1. Strengthen Your Steps, Maruti Publications
2. Interact, Orient Blackswan
3. Word Power Made Easy, Pocket Books

B.TECH I SEMESTER	BSC	L	T	P	C
		0	0	3	1.5

20CS1L07 APPLIED CHEMISTRY LAB

Pre-requisite: Acquire some experimental skills.

Course Objective: Objective of the course is to impart

- The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations.
- A few instrumental methods of chemical analysis.

Course Outcomes:

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

CO1: The student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

LIST OF EXPERIMENTS

1 Determination of HCl using standard Na2CO3 solution.

2 Determination of alkalinity of a sample containing Na2CO3 and NaOH.

3 Determination of Mn+2 using standard oxalic acid solution.

4 Determination of ferrous iron using standard K2Cr2O7 solution.

5 Determination of Cu+2 using standard hypo solution.

6 Determination of temporary and permanent hardness of water using standard EDTA solution.

7 Determination of Fe+3 by a colorimetric method.

8 Determination of the concentration of acetic acid using sodium hydroxide (pH-metry method).

9 Determination of iso-electric point of amino acids using pH-metry method/conductometric method

10 Determination of the concentration of strong acid vs strong base (by conductometric method).

11 Determination of strong acid vs strong base (by potentiometric method).

12 Determination of Mg+2 present in an antacid.

13 Determination of CaCO3 present in an egg shell.

14 Estimation of Vitamin C.

15 Determination of phosphoric content in soft drinks.

16 Adsorption of acetic acid by charcoal.

17 Preparation of nylon-6, 6 and Bakelite (demonstration only).

B.TECH I SEMESTER

	L	T	P	C
ESC	0	0	3	1.5

20CS1L08 PROBLEM SOLVING THROUGH C LAB

Course Objectives:

- Apply the principles of C language in problem solving.
- To design flowcharts, algorithms and knowing how to debug programs.
- To design & develop of C programs using arrays, strings pointers &functions.
- To review the file operations, preprocessor commands.

Course Outcomes:

- Demonstrate Knowledge on various concepts of a C language.
- Able to draw flowcharts and write algorithms.
- Able design and development of C problem solving skills.
- Able to design and develop modular programming skills.
- Able to trace and debug a program

Exercise 1:

1. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.
2. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches and width of 5inches.
3. Write a C program to display multiple variables.

Exercise 2:

1. Write a C program to calculate the distance between the two points.
2. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrong values".

Exercise 3:

1. Write a C program to convert a string to a long integer.
2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
3. Write a C program to calculate the factorial of a given number.

Exercise 4:

1. Write a program in C to display the n terms of even natural number and their sum.

2. Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms.
3. Write a C program to check whether a given number is an Armstrong number or not.

Exercise 5:

1. Write a program in C to print all unique elements in an array.
2. Write a program in C to separate odd and even integers in separate arrays.
3. Write a program in C to sort elements of array in ascending order.

Exercise 6:

1. Write a program in C for multiplication of two square Matrices.
2. Write a program in C to find transpose of a given matrix.

Exercise 7:

1. Write a program in C to search an element in a row wise and column wise sorted matrix.
2. Write a program in C to print individual characters of string in reverse order.

Exercise 8:

1. Write a program in C to compare two strings without using string library functions.
2. Write a program in C to copy one string to another string.

Exercise 9:

1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
2. Write a program in C to demonstrate how to handle the pointers in the program.

Exercise 10:

1. Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.
2. Write a program in C to add two numbers using pointers.

Exercise 11:

1. Write a program in C to add numbers using call by reference.
2. Write a program in C to find the largest element using Dynamic Memory Allocation.

Exercise 12:

1. Write a program in C to swap elements using call by reference.
2. Write a program in C to count the number of vowels and consonants in a string using a pointer.

Exercise 13:

1. Write a program in C to show how a function returning pointer.
2. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc( )function.

Exercise 14:

1. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc( ) function. Understand the difference between the above two programs
2. Write a program in C to convert decimal number to binary number using the function.

Exercise 15:

1. Write a program in C to check whether a number is a prime number or not using function.
2. Write a program in C to get the largest element of an array using the function.

Exercise 16:

1. Write a program in C to append multiple lines at the end of a text file.
2. Write a program in C to copy a file in another name
3. Write a program in C to remove a file from the disk.

B.TECH I SEMESTER

	L	T	P	C
MC	2	0	0	--

20CS1M09 ENVIRONMENTAL SCIENCE

Course objective:

To understand the importance of Environment and the importance of biodiversity

Course outcomes:

- The importance of environment, Natural resources and current global environmental challenges for the sustenance of the life on planet earth.
- The concepts of the ecosystem and its function in the environment.
- 3.The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
- The various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices.
- The environmental legislations of India and Social issues and the possible means
- Environmental assessment and the stages involved in EIA.

SYLLABUS

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Introduction- Scope of Environmental Studies- Importance of Environmental Studies- Need for public awareness, Environmental ethics- Contemporary Environmentalists- Environmental Global moves: Stockholm conference, Earth summit

Concept of an ecosystem - Structure of an ecosystem- function of an ecosystem- Food chains, food webs- ecological pyramids- Energy flow in the ecosystem- Ecological succession- Nutrient cycling- 1^{o}production& 2^{o}production- Major ecosystems: Forest ecosystem- Grassland ecosystem, Desert ecosystem- Aquatic ecosystem: pond, Lake Ecosystem- Streams, river ecosystem, Oceans

UNIT-II: NATURAL RESOURCES AND CONSERVATION

Introduction and classification of natural resources-Forest resources**:** Use and over-exploitation- Deforestation-Timber extraction-Mining- Conservation-Water resources**:** Use and over utilization of surface and ground water,- Floods, drought, Dams and associated problems- Water conservation, rain water harvesting, water shed management-Energy resources**:** renewable energy sources –solar-wind-hydro-

tidal- Ocean thermal-geo thermal-bio mass-bio gas-bio fuels- Hydrogen.- Non-renewable energy sources-coal-petroleum-natural gas-Nuclear energy

UNIT-III: **BIODIVERSITY AND ITS CONSERVATION**

Definition, classification- Value of biodiversity-Threats to biodiversity: habitat loss, man-wildlife conflicts- Endangered and endemic species of India-Conservation of biodiversity- Biodiversity at national and local levels, Hot-sports of biodiversity

UNIT-IV: ENVIRONMENTAL PROBLEMS

Global warming, Climate change- Acid rain, Ozone depletion- Air pollution- Water pollution- Soil pollution- Noise pollution, Nuclear hazards- Solid Waste Management: Causes, Consequences and Control methods- Solid Waste Management- Population growth and explosion, effects, control measures- Pollution case studies- Role of an individual in prevention of pollution

UNIT-V: ENVIRONMENTALLEGISLATION & MANAGEMENT

Sustainable development- Air (Prevention and Control of Pollution) Act-Drawbacks- Water (Prevention and control of Pollution) Act- Drawbacks- Wildlife Protection Act- Drawbacks- Forest Conservation Act- Drawbacks- Environmental Protection Act- Drawbacks- Environmental Impact Assessment and its significance- Preparation of Environmental Management Plan and Environmental Impact Statement- Ecotourism

TEXT BOOKS:

1. Environmental Studies, Anubha Kaushik, C P Kaushik, New Age Publications, New Delhi

2. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada

3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.

4. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

REFERENCES:

1. Text Book of Environmental Studies, Deeshita Dave & P. UdayaBhaskar, Cengage Learning.

2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi

3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi

4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Delhi

B.TECH II SEMESTER	BSC	L	T	P	C
		3	0	0	3

20CS2T01 TRANSFORM TECHNIQUES

Pre-requisite: Linear Algebra and Differential Equations

Course Objective: Objective of the course is to impart

- Learning the techniques of Laplace transforms to solve ordinary differential equations
- knowledge of Fourier series & Fourier transforms for piecewise continuous functions
- knowledge of solving boundary valued problems

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

CO1: Able to analyze a class of integrals in terms of beta and gamma functions

CO2: Provide the techniques of Laplace transformations and able to solve problems related to digital signal processing

CO3: Analyze the general periodic functions in the form of an infinite convergent sine and cosine series

CO4: Illustrate the methods to solve the boundary value problems

CO5: Determine a solution of a discrete system using Z- transforms

SYLLABUS

UNIT-I: Special functions:

Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

UNIT-II: Laplace Transforms (all properties without proofs):

Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t, Evaluation of improper integrals.
Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). **Application:** Application to differential equations.

UNIT-III: Fourier Series & Fourier Transforms:

Euler's formulae (without proof), Conditions of Fourier expansion, Functions having points of discontinuity, Change of inerval, Even and odd functions, Half-range series. Fourier Integral theorem (without proof), Fourier cosine & sine integral, complex form of Fourier integral, Fourier transform, Fourier sine & cosine transforms, properties of Fourier transforms (without proof), Convolution theorem(without proof), finite & infinite Fourier sine & cosine transforms.

UNIT-IV: Partial Differential Equations:

Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations. Method of separation of Variables, Applications: One-dimensional wave and heat equations, two-dimensional heat equation.

UNIT-V: Z-Transforms: (all properties without proofs)

Introduction, definition, some standard z-transforms, linearity property, damping rule, some standard results, shifting U_n to the right, multiplication by n, initial and final value theorems, Inverse z-transforms, convolution theorem, evaluation of inverse z-transforms by partial fractions, applications to difference equations.

Text Books:

1. B. S. GREWAL, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014.
2. B. V. RAMANA, Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.
2. N. P. BALI & Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.

B.TECH II SEMESTER **BSC**

L	T	P	C
3	0	0	3

20CS2T02 APPLIED PHYSICS

Pre-requisite: Knowledge of basic concepts of waves, Optics, Electricity and Magnetism

Course Objective: Objective of the course is to impart

- ***Knowledge*** of fundamentals of Physics which helps them in the study of advanced topics of Engineering.
- ***Develop*** analytical capability and understand various Engineering concepts.

Course Outcomes:

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

CO1: ***Impart*** knowledge of Physical Optics phenomenon Polarization and identify these phenomenon in natural processes

CO2: ***Gain*** knowledge of applications of lasers and optical fibers in various fields .

CO3: ***Classify*** magnetic and dielectric materials and their Engineering applications.

CO4: ***Understand*** basic quantum mechanics and free electron theories.

CO5: ***Obtain*** the concept of concept of holes and electrons in semiconductors.

SYLLABUS

UNIT-I: Wave Optics:

Interference*:* Introduction-Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry) – Colors in thin films-Newton's rings-Determination of wave length nd refractive index.

Diffraction: C Introduction- Fresnel and Fraunhofer diffraction - Fraunhofer Diffraction due to Single slit, Double slit, N –slits(Qualitative) - Diffraction Grating – Resolving Power of Grating(Qualitative).

Polarizations: Introduction- Types of polarization-polarization by reflection, refraction and Double refraction-Nicol's prism –Half and Quarter wave plates.

UNIT-II: Lasers and Fiber Optics:

Lasers:: Introduction – Characteristics of laser – Spontaneous and Stimulated emissions of radiation – Einstein's coefficients – Population inversion – Lasing action - Pumping Schemes – Ruby laser – He-Ne laser - Applications of lasers.

***Fiber optics*:** Introduction –Principle of optical fiber-Construction- - Acceptance Angle - Numerical Aperture -Classification of optical fibers based on refractive index profile and modes .

UNIT-III: Magnetic and Dielectric Materials:

***Magnetic Materials*:** Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para ferro, anti ferro & ferri – Domain concept of Ferromagnetism(Qualitative) - Hysteresis – soft and hard magnetic materials .

***Dielectric Materials*:** 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.

UNIT-IV: Quantum Mechanics,Free Electron Theory:

***Quantum Mechanics*:** Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

***Free Electron Theory*:** Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory– Equation for electrical conductivity based on quantum free electron theory- Fermi-Dirac distribution- Density of States(3D),Fermi energy.

UNIT-V: Band Theory of Solids and Semiconductors:

Band theory of Solids: Introduction- Bloch's Theorem (Qualitative) - Kronig - Penney model (Qualitative)- E vs K diagram - V vs K diagram - effective mass of electron – Classification of crystalline solids–concept of hole.

***Semiconductors:*:**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 – Drift and Diffusion currents – Einstein's equation-Hall effect- Hall coefficient - Applications of Hall effect.

Text Books

1. "A Text book of Engineering Physics" by M.N. Avadhanulu, P.G. Kshirsagar - S. Chand Publications, 2019.
2. "Engineering Physics" by D.K. Bhattacharya and Poonam Tandon, Oxford press (2015).

3. “Engineering Physics” by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.

Reference Books

1. Applied Physics by P.K. Palanisamy, Scitech publications (2014).
2. Engineering Physics by M. Arumugam, Anuradha Publication (2014).
3. Physics for Engineers by M.R. Srinivasan, New Age international publishers (2009).

B.TECH II SEMESTER	ESC	L	T	P	C
		3	0	0	3

20CS2T03 DIGITAL LOGIC DESIGN

Course Objectives:

- To represent numbers and conversion between different representations.
- To analyze logic processes and implement logical operations.
- To develop the combinational logic circuits.
- To design and analyze the concepts of sequential circuits.
- To understand concept of programmable logic devices like PROM, PLA,PAL.

Course Outcomes

CO1: Understand different number systems and their conversions.
CO2: Analyze the logical operations and Boolean algebra
CO3: Develop combinational circuits and perform logical operations.
CO4: Design the sequential logic functions.
CO5: Know finite state machines and different programmable logic devices.

SYLLABUS

UNIT I

Number Systems: Binary- Octal- Decimal- Hexadecimal Number Systems- Conversion of Numbers from One Radix to Another Radix- r's Complement- (r-1)'s Complement- Subtraction of Unsigned Numbers- Problems- Signed Binary Numbers- Weighted and Non weighted codes.

UNIT II

Logic Gates and Boolean Algebra: Basic Gates- Universal Gates- Ex-Or and Ex-Nor Gates- SOP- POS- Boolean Theorems- Dual of Logical Expressions- Minimizations of Logic Functions Using Boolean Theorems- K Map Method- Minimization of Boolean Functions.

UNIT III

Combinational Logic Circuits: Design of Half Adder- Full Adder- Half Subtractor- Full Subtractor- Ripple Adder, Carry Look Ahead adder and Subtractors- Design of Decoders- Encoders- Multiplexers- Demultiplexers- Priority Encoder- Code Converters- Magnitude Comparator. Cascading of Decoders & Multiplexers

Introduction to Programmable Logic Devices (PLDs): PLA- PAL- PROM- Realization of Switching Functions Using PROM- Comparison of PLA, PAL and PROM.

UNIT IV

Introduction to Sequential Logic Circuits: Basic Sequential Logic Circuits- Latch and Flip-Flop- RS- Latch Using NAND and NOR Gates- RS, JK, T and D Flip Flops- Conversion of Flip Flops- Flip Flops With Asynchronous Inputs (Preset and Clear).

Registers and Counters: Design of Registers- Control Buffer Registers- Bidirectional Shift Registers- Universal Shift Register- Design of Ripple Counters- Synchronous Counters and Variable Modulus Counters- Ring Counter- Johnson Counter.

UNIT V

Finite state Machine: Analysis of clocked sequential circuits- state diagrams- state tables- design procedures- Realization of circuits using various flip-flops- ASM- Meelay to Moore conversion and vice-versa.

TEXT BOOKS

1. Digital Design, M.Morris Mano, Michael D Ciletti, 4thEdition,PEA,2003.
2. Fundamentals of Logic Design, Roth, 5thEdition,Cengage2004

REFERENCE BOOKS

1. Switching and Finite Automata Theory,Kohavi, 3rd Edition, Jha, Cambridge2005
2. Digital Logic Design, Leach, Malvino, Saha,TMH,2000.

B.TECH II SEMESTER	ESC	L	T	P	C
		3	0	0	3

20CS2T04 DATA STRUCTURES

Course Objectives:

- Introduce the fundamental concept of data structures and abstract data types
- Emphasize the importance of data structures in developing and implementing efficient algorithms
- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms

Course Outcomes:

CO1: Understand the properties, interfaces, and behaviors of basic abstract data types.

CO2: Understand and apply linked lists

CO3: Apply Stacks and Queue data structures.

CO4: Demonstrate different methods for traversing trees.

CO5: Demonstrate the application of Graphs

SYLLABUS

UNIT I

Data Structures - Definition, Classification of Data Structures, Operations on Data Structures, Abstract Data Type (ADT), Preliminaries of algorithms. Time and Space complexity.

Searching - Linear search, Binary search, Fibonacci search.

Sorting- Insertion sort, Selection sort, Exchange (Bubble sort, quick sort), distribution (radix sort), merging (Merge sort) algorithms.

UNIT II

Linked List: Introduction, Single linked list, Representation of Linked list in memory, Operations on Single Linked list-Insertion, Deletion, Search and Traversal, Reversing Single Linked list, Applications on Single Linked list- Polynomial Expression Representation, Addition and Multiplication, Sparse Matrix Representation using Linked List, Advantages and Disadvantages of Single Linked list, Double Linked list-Insertion, Deletion, Circular Linked list-Insertion, Deletion.

UNIT III

Queues: Introduction to Queues, Representation of Queues-using Arrays and using Linked list, Implementation of Queues-using Arrays and using Linked list, Application of Queues- Circular Queues

Stacks: Introduction to Stacks, Array Representation of Stacks, Operations on Stacks, Linked list Representation of Stacks, Operations on Linked Stack, Applications- Infix to Postfix Conversion, Evaluating Postfix Expressions.

UNIT IV

Trees: Basic Terminology in Trees, Binary Trees-Properties, Representation of Binary Trees sing Arrays and Linked lists. Binary Search Trees- Basic Concepts, BST Operations: Insertion, Deletion, Tree Traversals, Applications-Expression Trees, Heap Sort, Balanced Binary Trees- AVL Trees, Insertion, Deletion and Rotations.

UNIT V

Graphs: Basic Concepts, Representations of Graphs-Adjacency Matrix and using Linked list, Graph Traversals (BFT & DFT), Applications- Minimum Spanning Tree Using Prims &Kruskals Algorithm, Dijkstra's shortest path, Transitive closure, Warshall's Algorithm.

Text Books:

1. Data Structures Using C. 2nd Edition. Reema Thareja, Oxford.
2. Data Structures and algorithm analysis in C, 2nd ed, Mark Allen Weiss.

Reference Books:

1. Fundamentals of Data Structures in C, 2nd Edition, Horowitz, Sahni, Universities Press.
2. Data Structures: A PseudoCode Approach, 2/e, Richard F.Gilberg, Behrouz A. Forouzon, Cengage.
3. Data Structures with C, Seymour Lipschutz TMH

B.TECH II SEMESTER	ESC	L	T	P	C
		3	0	0	3

20CS2T05 PYTHON PROGRAMMING

Course Objectives:

- Identify/characterize/define a problem
- Design a program to solve the problem
- Create executable code
- Read most Python code

Course Outcomes:

CO1: Understand the fundamentals of Python programming language.

CO2: Understand Data Structures

CO3: Understand the use of functions in Python

CO4: Understand the Object-Oriented Programming concepts of Python

CO5: Apply regular expressions for different situations.

SYLLABUS

UNIT – I:

Introduction: History of Python, Need of Python Programming, Applications of Python Programming Variables, Assignment, Keywords, Input-Output, Indentation.

Types, Operators, and Expressions: 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 – Operations, Slicing, Methods; 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), Scope of the Variables in a Function- Global and Local Variables. Modules: Creating modules, import statements, from. The 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, Data hiding, Error, and Exceptions: Difference between an error and Exception, Handling Exception, try except for block, Raising Exceptions, User Defined Exceptions

UNIT – V:

Regular expressions: Power of pattern matching and searching using regex in python, Meta characters and Sequences used in Patterns, Password, email, URL validation using regular expression, Pattern finding programs using regular expression.

Text Books:

1. Learning Python, Mark Lutz, Orielly
2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. Reema Thareja, "Python Programming using Problem Solving Approach", ISBN-13:978-0-19- 948017-3, Oxford University Press, 2017.

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. "Python in easy steps In Easy Steps", Mike MC Grath, illustrated edition, In easy steps 2013 publishers.
5. Professional Python Frameworks: Web 2.0 Programming, Dana Moore, Raymond Budd, William Wright, Wrox Publication, ISBN: 978-0-470-13809-0, October 2007.

B.TECH II SEMESTER	BSC	L	T	P	C
		0	0	3	1.5

20CS2L06 APPLIED PHYSICS LAB

Pre-requisite: Fundamental understanding of usage of an instrument with proper care.

Course Objective: Objective of the course is to impart

- Training Engineering graduates to handle instruments and their usage methods to improve the accuracy of measurements.

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

CO1: **Outcomes**: The student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

CO2: Implement the basic principles of Mechanics to measure different physical parameters.

CO3: Enhance the knowledge of Usage of electronic devices in various applications

SYLLABUS

1. Newton's rings –Determination of radius of curvature of Plano Convex Lens.
2. Determination of wavelength of spectral lines -Diffraction Grating
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of wavelength of laser source using diffraction grating
5. Determination of Numerical Aperture and bending loss of a given Optical Fiber.
6. Determination of dispersive power of prism.
7. Determination of Rigidity modulus of a material- Torsional Pendulum.
8. Determination of Acceleration due to Gravity and Radius of Gyration-Compound Pendulum.
9. Determination of Young's modulus by method of single cantilever oscillations
10. Verification of laws of vibrations in stretched strings – Sonometer.

11. Estimation of Planck's Constant using Photo electric Effect
12. Study of I /V Characteristics of Semiconductor diode.
13. I/V characteristics of Zener diode.
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
15. Energy Band gap of a Semiconductor using p - n junction diode

Reference Books

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

B.TECH II SEMESTER	ESC	L	T	P	C
		0	0	3	1.5

20CS2L07 DATA STRUCTURES LAB

Course Objectives:

The objective of this lab is to

- Demonstrate the different data structures implementation.

Course Outcomes:

- Use basic data structures such as arrays and linked list.
- Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
- Use various searching and sorting algorithms.

List of Experiments:

Exercise -1 (Searching)

a) Write C program that use both recursive and non-recursive functions to perform Linear search for a Key value in a given list.

b) Write C program that use both recursive and non-recursive functions to perform Binary search for a Key value in a given list.

Exercise -2 (Sorting-I)

a) Write C program that implement Bubble sort, to sort a given list of integers in ascending order.

b) Write C program that implement Quick sort, to sort a given list of integers in ascending order.

c) Write C program that implement Insertion sort, to sort a given list of integers in ascending order.

Exercise -3 (Sorting-II)

a) Write C program that implement radix sort, to sort a given list of integers in ascending order

b) Write C program that implement merge sort, to sort a given list of integers in ascending order

Exercise -4 (Singly Linked List)

a) Write a C program that uses functions to create a singly linked list

b) Write a C program that uses functions to perform insertion operation on a singly linked list

c) Write a C program that uses functions to perform deletion operation on a singly linked list

d) Write a C program to reverse elements of a single linked List.

Exercise -5 (Queue)

a) Write C program that implement Queue (its operations) using arrays.

b) Write C program that implement Queue (its operations) using linked lists

Exercise -6 (Stack)

a) Write C program that implement stack (its operations) using arrays

b) Write C program that implement stack (its operations) using Linked list

c) Write C program for implementing infix to postfix conversion

d) Write a C program that uses Stack operations to evaluate postfix expression

Exercise -7 (Binary Tree)

Write a recursive C program for traversing a binary tree in preorder, in-order and post-order.

Exercise -8 (Binary Search Tree)

a) Write a C program to Create a BST

b) Write a C program to insert a node into a BST.

c) Write a C program to delete a node from a BST.

Exercise-9

Write a program for implementing Heap Sort.

B.TECH II SEMESTER	ESC	L	T	P	C
		0	0	3	1.5

20CS2L08 PYTHON PROGRAMMING LAB

Course Objectives:

The objective of this lab is to

- To elucidate problem solving through python programming language.
- To introduce function-oriented programming paradigm through python.
- To train in development of solutions using modular concepts.
- To teach practical Python solution patterns

Course Outcomes

CO1: Develop fundamental programs in python programming language.
CO2: Develop Python programs for numerical and text-based problems.
CO3: Develop Python programs on object-oriented programming and regular expressions.
CO4: Develop python programs on data structures.

LIST OF EXPERIMENTS

1. Write a program to perform various list of operations (eg: Arithmetic, logical, bitwise etc) in python.
2. Write a program to implement control flow statements.
3. Write a program implementing various predefined function of Lists, Sets, Tuples and Dictionaries.
4. Write a program covering various arguments for a function.
5. Write a program to implement various types of functions.
6. Write a program to implement recursion.
7. Write a program to implement command line arguments.
8. Write a program to create a class and its constructors.
9. Write a program to implement inheritance.
10. Write a program for exception handling.
11. Write a program to perform various linear algebra operations like finding eigen values and vectors, determinant and trace for a matrix.

12. Write a program to perform matrix operations like addition, subtraction, multiplication of matrices using Numpy Module.
13. Write a program to use System, math etc., packages.
14. Write a Python program to find the occurrence and position of the substrings within a string.
15. Write a Python program to replace all occurrences of space, comma, or dot with a colon.
16. Write a Python program to match a string that contains only upper and lowercase letters, numbers, and underscores.

B.TECH III SEMESTER	BSC	L	T	P	C
		3	0	0	3

20CS3T01 NUMERICAL METHODS AND VECTOR CALCULUS

Course objectives:

- Understand the basic numerical methods to solve simultaneous linear equations
- Knowledge of numerical methods to solve ordinary differential equations
- The types of integration over the lines, surfaces & volumes

Course Outcomes:

By the end of the course students will be able to

CO1: Determine the solution of transcendental equations by different numerical methods

CO2: Provide the interpolation techniques which analyze the data of an unknown function

CO3: Illustrate the numerical methods to determine solutions for a class of ordinary differential equations involving irregularly shaped boundaries

CO4: Evaluate areas and volumes using double & triple integrals.

CO5: Apply the concepts of calculus to scalar and vector fields and establish the relation between line, surface and volume integrals.

SYLLABUS

UNIT I: Numerical Solution of Equations:

Solution of Algebraic and transcendental equations: Bisection method, Method of false position and Newton-Raphson method. Iterative methods of solution of linear simultaneous equations: Jacobi's and Gauss-Seidel iteration methods.

UNIT II: Interpolation:

Forward and backward, relation between these operators, Differences of a polynomial, Interpolation with unequal intervals: Lagrange's interpolation formula, Newton's forward & backward interpolation formulae & problems.

UNIT III: Numerical Integration & Numerical Solutions of ordinary differential equations with initial conditions:

Numerical Integration: Trapezoidal rule, Simpson's 1/3rd and 3/8th rules.

Numerical Solution of ODE: Picard's method, Taylor's series method, Euler's method, Modified Euler's method, Runge-Kutta method of 4^{th} order.

UNIT IV: Multiple Integrals:

Double integrals in Cartesian & polar coordinates, Change of order of integration, Triple integrals, Change of variables (Cartesian to Polar, Rectangular coordinates to Cylindrical & Rectangular coordinates to Spherical polar coordinate systems). **Applications:** Area enclosed by plane curves, Volume of solids.

Unit-V: Vector Differentiation & Vector Integration:

Introduction, Scalar and Vector point functions, Del applied to scalar point functions-Gradient, directional derivatives, Del applied to vector point functions-Div& Curl, physical interpretation of div & curl, Del applied twice to point functions, Del applied to products of point functions (Identities without proofs).

Line integral, Green's theorem in the plane (without proof), Surface integrals, Stoke's theorem (without proof), Volume integral, Gauss Divergence theorem (without proof).

Text Books:

1. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rd Edition, 2014.
2. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

3. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.
4. **N. P. BALI & Dr. MANISH GOYAL,** A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.

B.TECH III SEMESTER	PCC	L	T	P	C
		3	0	0	3

20CS3T02 OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Objectives:

- To learn the fundamentals of object-oriented programming.
- To implement object-oriented concepts using Java.
- To understand how to design object-oriented applications using Java.

Course Outcomes:

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

CO1: Understand the concepts of Object-Oriented Programming and Java programming constructs.

CO2: Demonstrate the concepts – Strings, Inheritance and Interfaces.

CO3: Build efficient and error-free codes using exception handling and demonstrate multi-threading.

CO4: Design GUI applications using Event Handling and Abstract Window Toolkit.

CO5: Develop real-time applications using Applets and Swings.

SYLLABUS

UNIT-I:

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

Control Statements: Introduction, if statement, Nested if statement, if–else statements, Ternary Operator, Switch Statement, **Iteration Statements:** while statement, do–while Loop, for Loop, Nested for Loop, For–Each for Loop, Break Statement, Continue Statement.

Classes and objects: class declaration, creating objects, methods, method overloading, constructors and constructor overloading, garbage collector.

UNIT-II:

Basic Input-Output Operations. String, String Buffer and String Tokenizer classes.

Inheritance: types of inheritance, super keyword, final keyword, overriding and abstract class.

Interfaces: Introduction, Declaration of Interface, Implementation of Interface, Multiple Interfaces, Nested Interfaces, Inheritance of Interfaces, Default Methods in Interfaces, Static Methods in Interface, importance of static keyword, this keyword, arrays, command line arguments, nested classes.

UNIT-III:

Packages and Java Library: creating and using packages, importance of CLASSPATH and java. Lang package.

Exception handling: importance of try, catch, throw, throws and finally block, user-defined exceptions, Assertions.

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

UNIT-IV

Event Handling: Events, Event sources, Event classes, Event Listeners, Event Delegation model, handling mouse and key board events, Adapter classes, inner classes.

AWT: Class hierarchy, user- interface components- labels, button, canvas, scrollbars, text components, checkbox, checkbox groups, choices, list panes-scroll pane, dialogs, menu bar, graphics, layout manager- layout manager types-boarder, grid, flow, card and grid bag.

UNIT-V

Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Swings: Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing – J Applet, J Frame and J Component, Icons and Labels, text fields, buttons-The J Button class, Check boxes, Radio Buttons, Combo boxes, Tabbed panes, Scroll panes, Trees and Tables.

TEXT BOOKS:

1. Herbert Schildt —Java The Complete Reference, 11th Edition, McGraw-Hill Education.
2. E Balagurusamy —Programming with Java: A Primer, 4th Ed, Tata McGraw Hill Education Pvt Ltd.

REFERENCE BOOKS:

1. Java Programming, K.Rajkumar. Pearson
2. Core Java, Black Book, R Nageswara rao, Wiley, Dream Tech
3. Core Java for Beginners, Rashmi Kanta Das, vikas.
4. Object Oriented Programming Through java, P. Radha Krishna, Universities Press.
5. Introduction to java programming, 7th edition by Y Daniel Liang, Pearson.
6.

B.TECH III SEMESTER	PCC	L	T	P	C
		3	0	0	3

20CS3T03 DATABASE MANAGEMENT SYSTEMS

Course Objectives:

- Understand the basic database concepts, applications, schema and various models.
- Familiarize with entity relation model for a data base and write queries using SQL.
- Emphasize the importance of normalization, transaction management and concurrency control in databases.

COURSE OUTCOMES:

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

CO1: Understand the concept of database, database models and familiarize with Entity Relationship models.

CO2: Demonstrate the use of constraints, relational algebra operations.

CO3: Apply SQL queries to interact with database and understand the basics of NOSQL.

CO4: Apply normalization in database design to eliminate anomalies.

CO5: Understand the basic concepts of transaction processing and concurrency control.

SYLLABUS:

Unit – I:

Database System Applications: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS.

Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design with the ER Model.

Unit – II:

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views. Relational Algebra, Tuple relational Calculus, Domain relational calculus.

Unit – III: SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active data bases.

NOSQL: Definition of NOSQL, History of NOSQL and Different NOSQL products, Applications, features of NoSQL, Difference between SQL and NoSQL.

Unit-IV: **Schema Refinement (Normalization):** Introduction to Schema Refinement, Functional Dependencies Reasoning about FDs, Normal Forms, Properties of decomposition, Normalization, Schema refinement in database design, Other kinds of dependencies.

Unit-V: Transaction Management and Concurrency Control: Properties of transactions, Transactions and Schedules, Concurrent execution of transactions, Lock-based concurrency control, deadlocks, Performance of locking.

Concurrency control: 2PL, Serializability, recoverability, Introduction to lock management, dealing with deadlocks.

Text Books:

1. Raghu rama Krishnan, Johannes Gehrke, “Data base Management Systems”, 3rd Edition, TATA McGraw Hill.
2. "Professional NOSQL” by Shashan k Tiwari, 2011, WROX Press.

Reference Books:

1. Peter Rob & Carlos Coronel, “Data base Systems design, Implementation, and Management”, 7th Edition, Pearson Education, 2000.
2. Silberschatz, Korth, “Data base System Concepts”, 6th Edition, McGraw Hill, 2010.
3. ElmasriNavathe, “Fundamentals of Database Systems”, 5th Edition, Pearson Education, 2007.
4. C.J.Date, “Introduction to Database Systems”, 7th Edition, Pearson Education, 2002.

B.TECH III SEMESTER	PCC	L	T	P	C
		3	0	0	3

20CS3T04 SOFTWARE ENGINEERING

Course Objectives

- Gain knowledge about software process models.
- Familiarize the basic software engineering methods, practices and its applications.
- Facilitate students in software design.

Course Outcomes

CO1: Understand the software life cycle models.

CO2: Understand the scrum approach to agile project management.

CO3: Analyze the software requirements and generate SRS document.

CO4: Understand some of the different models that may be used to design.

CO5: Understand various software testing approaches and quality control to ensure good quality software.

SYLLABUS

UNIT – I

INTRODUCTION TO SOFTWARE ENGINEERING: Nature of software, Software engineering, The Software Processes, Software Myths.

PROCESS MODELS: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialised Process models, The Unified Process, Personal and Team Process Models.

UNIT – II

REQUIREMENTS ENGINEERING: Functional and Non-Functional Requirements, The Software Requirements Document, Requirements Specification, requirements Engineering, Requirements Elicitation and Analysis, Requirement Validation, Requirement Management.

REQUIREMENTS MODELLING: Requirement Analysis, Scenario-Based Modelling, Data Modelling Concepts, Class-Based Modelling.

UNIT – III

DESIGN CONCEPTS: The Design Process, Design Concepts, The Design Models, Architectural Design: Software Architecture, Architectural Genres, Architectural Styles. User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

UNIT – IV

Understanding of UML diagrams: Structural diagrams - class diagram, object diagram, component diagram, deployment diagram, Behavioural diagrams - Use-case diagram, activity diagram, sequence diagram, collaboration diagram, state chart diagram.

UNIT – V

IMPLEMENTATION: Structured coding Techniques, Coding Styles-Standards and Guidelines, Implementation Issues.

SOFTWARE TESTING STRATEGIES: A Strategic approach to Software Testing, Strategic Issues and Test Strategies for Conventional Software, Validation Testing, System Testing, The Art of Debugging, White-Box Testing, Black Box Testing, Software Quality concepts.

TEXT BOOKS:

1. Roger S. Pressman (2010), Software Engineering, A Practitioner's Approach, 7th Edition, McGraw-Hill International Edition, India.
2. Ian Sommerville (2011), Software Engineering, 9th Edition, Pearson education, India.
3. Grady Booch, Robert A. Maksimchuk, Michael W. Engle, Bobbi J. Young, Ph.D.Jim ConallenKelli A. Houston," Object-Oriented Analysis and Design with Applications", 3rd edition.

REFERENCES BOOKS:

1. Pankaj Jalote (2010), Software Engineering, A Precise Approach, Wiley India.
2. Waman S. Jawadekar (2008), Software Engineering: A Primer, McGraw-Hill, India.
3. Hans Van Vilet (2008), Software Engineering Principles and Practice, 3rd Edition, John Wiley & Sons Ltd.
4. Rajib Mall (2005), Fundamental of Software Engineering, PHI.
5. Deepak Jain, Software Engineering, Principles and Practices, Oxford, University Press, India.

B.TECH III SEMESTER	PCC	L	T	P	C
		3	0	0	3

20CS3T05 COMPUTER ORGANIZATION

PREREQUISITES: Digital logic design

Course Objectives:

- To understand the design of various functional units and components of computers.
- Emphasizes basic organization, design, and programming of a simple digital computer.
- To explain the function of each element of a memory hierarchy.
- To identify and compare different methods for computer IO.

Course Outcomes:

CO1: Understand the architecture of a modern computer with its various processing units.

CO2: Understand RTL, micro-operations, instruction cycle.

CO3: Understand the features of hardwired and micro programmed control units.

CO4: Analyze the memory hierarchy system and performance improvement by cache memory.

CO5: Analyze the communication methods of I/O devices and standard I/O interfaces.

SYLLABUS:

UNIT I:

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation, Other Binary codes (Gray Code), Other decimal codes (BCD, Weighted code, Excess-3), Error Detection codes.

UNIT II:

Register Transfer and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

UNIT III:

Micro programmed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: Stack Organization**,** Instruction formats, Addressing modes, Data Transfer and Manipulation Instructions, Program control Instructions, RISC

UNIT IV:

Computer Arithmetic: Addition and subtraction, Booth multiplication Algorithm.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, virtual Memory, Memory Management hardware.

UNIT V:

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

Input - Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct memory Access, IOP, Serial Communication.

TEXT BOOKS

1. Computer Systems Architecture — M. Morris Mano, Pearson Education Publishers, 3rdedition.

REFERENCE BOOKS:

1. William Stallings, — Computer Organization and Architecture, 6th Edition Pearson/ PHI publishers.
2. Andrew S. Tanenbaum, —Structured Computer Organization, Pearson / PHI publishers,
   4th edition.
3. John D Carpinelli, — Computer Systems Organization and Architecture ǁ, Pearson Education, 1st edition.
4. Carl Hamacher, ZvonkoVranesic, Safwat Zaky, — Computer Organization, TMH publications, 5th edition.

B.TECH III SEMESTER	PCC	L	T	P	C
		0	0	3	1.5

20CS3L06 OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Course Objectives:

- Understand fundamentals of Object-Oriented Programming in java including defining classes, invoking methods using class libraries etc.,
- Demonstrate an understanding of graphical user interfaces, multi-threaded programming and event driven programming.

Course Outcomes: By the end of the course student will be able to

CO1: Implement java applications using OOP principles and proper program structuring.

CO2: Develop java programs using packages, inheritance and interfaces.

CO3: Implement error and exception handling techniques.

CO4: Design event driven GUI and real-time web related applications.

LIST OF EXPERIMENTS

Exercise - 1 (Basics)

a) Write a JAVA 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.

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 String Buffer to delete, remove character.

Exercise - 3 (Class, Objects)

Implement java programs using the concept of

a) Class mechanism. Create a class, methods and invoke them inside main method.

b) Constructor.

c) Constructor overloading.

b) Method overloading.

Exercise -4 (Inheritance)

Implement java programs using the concept of

a) Single Inheritance

b) Multilevel Inheritance

c) Abstract class

Exercise - 5 (Inheritance - Continued)

Implement java programs using the concept of

a)"super" keyword. b) Interfaces

Exercise – 6 (Runtime Polymorphism)

a) Write a JAVA program that implements Runtime polymorphism

Exercise – 7 (Exception)

Implement the programs by using the concepts of

a. Exception handling mechanism

b. Multiple catch clauses

c. Finally

d. Creating user defined exceptions

Exercise – 8 (Threads)

a) Write a JAVA program that creates threads by extending Thread class. First thread displays "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 – 9 (**Packages)**

a) Create a user defined package and demonstrate different ways of importing packages

Exercise - 10 (Applet)

a) Write a JAVA program to paint like paint brush in applet.

b) Write a JAVA program to create different shapes and fill colors using Applet.

Exercise -11 (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.

B.TECH III SEMESTER	PCC	L	T	P	C
		0	0	3	1.5

20CS3L07 DATABASE MANAGEMENT SYSTEMS LAB

PREREQUISITES: -

Course Objectives:

- Populate and query a database using SQL - DDL/DML commands.
- Understand various advanced query executions such as relational constraints, joins, set operations, aggregate functions, trigger, views and embedded SQL.
- Develop solutions using PL/SQL for database applications using procedures, cursors and triggers

COURSE OUTCOMES:

1. Design database schema for a given application and apply normalization
2. Acquire skills in using SQL commands for data definition and data manipulation.
3. Develop solutions for database applications using procedures, cursors and triggers
4. Develop solutions using PL/SQL procedures.

LIST OF EXPERIMENTS

1. Introduction to SQL: DDL, DML, DCL, TCL.
2. Queries for Creating Tables with Constraints, Views.
3. Example SQL Queries using select.
4. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN).
5. Queries using Group By, Order By, and Having Clauses and Working with Index, Sequence, Synonym.
6. Queries to facilitate acquaintance of Built-In Functions, String Functions, Numeric Functions, Date Functions and Conversion Functions.
7. Queries on Joins and Correlated Sub-Queries.
8. Write a PL/SQL Code using Basic Variable, Anchored declarations, and Usage of Assignment Operation.
9. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL.
10. Write a PL/SQL block using SQL and Control Structures in PL/SQL.
11. Write a PL/SQL Code using Cursors, Exceptions and Triggers.
12. Write a PL/SQL Code using Procedures, Functions, and Packages.

Text Books:

1. ORACLE PL/SQL by example, Benjamin Rosen Zweig, Elena Silvestrova,

Pearson.

2. ORACLE database log PL/SQL programming SCOTT URMAN, TMH.
3. SQL and PL/SQL for ORACLE 10g, Black Book, Dr. P.S Deshpande.
4. Data Base Management System, Oracle SQL and PL/SQL, Pranab Kumar Das Gupta, P Radha Krishna, PHI.

B.TECH III SEMESTER	PCC	L	T	P	C
		0	0	3	1.5

20CS3L08 SOFTWARE ENGINEERING LAB

COURSE Objectives:

- To provide hands-on experience with different aspects of Software Engineering including requirements identification, implementation, testing, and so on.
- To draw DFD, behavioural and structural design using UML diagrams.

COURSE OUTCOMES:

- Prepare SRS document, design document, test cases and software configuration management and risk management related document.
- Develop function oriented and object-oriented software design using tools like rational rose.
- Design and develop Test Cases for a system
- Track the progress of a project using various tools.

LIST OF EXPERIMENTS

1. Create the problem statement for a specific system of relevance.
2. Perform requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3. To carry out the function-oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4. To draw UML diagrams.
5. To illustrate the test cases, test case preparation and perform Manual Tests.
6. Perform Estimation of effort using FP Estimation for chosen system.
7. To prepare time line chart/Gantt Chart/PERT Chart for selected software project

S. No	Case Study
1	Credit Card Processing
2	Stock Maintenance System
3	Online course reservation system
4	Recruitment system
5	Passport automation System
6	Online Exam Registration

Note: Students shall prepare a document related to all the above activities for at least three real time Case Studies listed below.

B.TECH III SEMESTER	SC	L	T	P	C
		0	0	4	2

20CS3S09 Python NumPy and Pandas (Skill Oriented Course)

Course Objectives:

- To acquire programming skills in Python package NumPy and perform mathematical and statistical operations.
- To understand the fundamentals of the Pandas library in Python and how it is used to handle data and also develop basic skills in data analysis and visualization

Course Outcomes: By the end of this lab the student is able to

CO1: Understand the workings of various numerical techniques, different descriptive measures of Statistics, correlation and regression to solve the engineering problems.

CO2: Understand how to apply some linear algebra operations to n-dimensional arrays.

CO3: Understand how NumPy perform common data wrangling and computational tasks in Python.

CO4: Use Pandas to create and manipulate data structures like Series and DataFrames.

CO5: Work with arrays, queries, and dataframes

NumPy Exercises:

1. NumPy Installation using different scientific python distributions(Anaconda, Python(x,y), WinPython, Pyzo)
2. NumPy Basics (np.array, np.arrange, np.linespace, np.zeros, np.ones, np.random.random, np.empty)
3. Arrays (array.shape, len(array), array.ndim, array.dtype, array.astype(type), type(array))
4. Array Manipulation (np.append, np.insert, np.resize, np.delete, np.concatenate, np.vstack, np.hstack)
5. Mathematical Operations(np.add, np.substract, np.divide, np.multiply, np.sqrt, np.sin, np.cos, np.log, np.dot, np.roots) , Statistical Operations(np.mean, np.median, np.std, array.corrcoef( ))
6. NumPy data types
7. NumPy ndarray
8. NumPy String Operations
9. NumPy Linear Algebra Operations(norm,eigen values and vectors, determinant of a matrix, sum of diagonal elements, inner product, matrix decomposition

etc..)

10. NumPy Functional Programming

Pandas Exercises:

11. Pandas DataSeries:

1. Write a Pandas program to create and display a one-dimensional array-like object
   containing an array of data using Pandas module.
2. Write a Pandas program to convert a Panda module Series to Python list and it's type.
3. Write a Pandas program to add, subtract, multiple and divide two Pandas Series.
4. Write a Pandas program to convert a NumPy array to a Pandas series.

Sample Series:

NumPy array: [10 20 30 40 50]

Converted Pandas series:
```
0 10
1 20
2 30
3 40
4 50
dtype: int64
```

12. Pandas DataFrames: Consider Sample Python dictionary data and list labels:

exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'], 'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19], 'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1], 'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}

labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']

1. Write a Pandas program to create and display a DataFrame from a specified dictionary data which has the index labels.
2. Write a Pandas program to change the name 'James' to 'Suresh' in name column of the DataFrame.
3. Write a Pandas program to insert a new column in existing DataFrame.
4. Write a Pandas program to get list from DataFrame column headers.
5. Write a Pandas program to get list from DataFrame column headers.

13. Pandas Index:

1. Write a Pandas program to display the default index and set a column as an Index in a given dataframe.
2. Write a Pandas program to create an index labels by using 64-bit integers, using floating-point numbers in a given dataframe.

14. Pandas String and Regular Expressions:
    1. Write a Pandas program to convert all the string values to upper, lower cases in a given pandas series. Also find the length of the string values.
    2. Write a Pandas program to remove whitespaces, left sided whitespaces and right sided whitespaces of the string values of a given pandas series.
    3. Write a Pandas program to count of occurrence of a specified substring in a DataFrame column.
    4. Write a Pandas program to swap the cases of a specified character column in a given DataFrame.
15. Pandas Joining and merging DataFrame:
    1. Write a Pandas program to join the two given dataframes along rows and assign all data.
    2. Write a Pandas program to append a list of dictionaries or series to a existing DataFrame and display the combined data.
    3. Write a Pandas program to join the two dataframes with matching records from both sides where available.
16. Pandas Time Series:
    1. Write a Pandas program to create
        a. Datetime object for Jan 15 2012.
        b. Specific date and time of 9:20 pm.
        c. Local date and time.
        d. A date without time.
        e. Current date.
        f. Time from a datetime.
        g. Current local time.
    2. Write a Pandas program to create a date from a given year, month, day and another date from a given string formats.
    3. Write a Pandas program to create a time-series with two index labels and random values. Also print the type of the index.
17. Pandas Grouping Aggregate:

Consider dataset:

School	class	name	date_Of_Birth	age	height	weight	address
S1 s001	V	Alberto Franco	15/05/2002	12	173	35	street1
S2 s002	V	Gino Mcneill	17/05/2002	12	192	32	street2
S3 s003	VI	Ryan Parkes	16/02/1999	13	186	33	street3
S4 s001	VI	Eesha Hinton	25/09/1998	13	167	30	street1

S5 s002	V	Gino Mcneill	11/05/2002	14	151	31	street2
S6 s004	VI	David Parkes	15/09/1997	12	159	32	street4
S1 s001	V	Alberto Franco	15/05/2002	12	173	35	street1

1. Write a Pandas program to split the following dataframe into groups based on school code. Also check the type of GroupBy object.
2. Write a Pandas program to split the following dataframe by school code and get mean, min, and max value of age for each school

18. Pandas Styling:
    1. Create a dataframe of ten rows, four columns with random values. Write a Pandas program to highlight the negative numbers red and positive numbers black.
    2. Create a dataframe of ten rows, four columns with random values. Write a Pandas program to highlight the maximum value in each column.
    3. Create a dataframe of ten rows, four columns with random values. Write a Pandas program to highlight dataframe's specific columns.
19. Excel:
    1. Write a Pandas program to import excel data into a Pandas dataframe.
    2. Write a Pandas program to find the sum, mean, max, min value of a column of file.
20. Plotting:
    1. Write a Pandas program to create a horizontal stacked bar plot of opening, closing stock prices of any stock dataset between two specific dates.
    2. Write a Pandas program to create a histograms plot of opening, closing, high, low stock prices of stock dataset between two specific dates.
    3. Write a Pandas program to create a stacked histograms plot of opening, closing, high, low stock prices of stock dataset between two specific dates with more bins.
21. Pandas SQL Query:
    1. Write a Pandas program to display all the records of a student file.
    2. Write a Pandas program to select distinct department id from employees file

References:

1. https://www.w3resource.com/python-exercises/pandas/index.php
2. https://www.w3resource.com/python-exercises/numpy/index.php

B.TECH III SEMESTER	MC	L	T	P	C
		2	-	-	-

20CS3M10 CONSTITUTION OF INDIA

Course Objectives:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and election commission of India.
- To understand the central and state relation financial and administrative

Course Outcomes:

At the end of the course, the student will be able to have a clear knowledge on the following:

CO1: Understand historical background of the constitution making, importance for building a democratic India, features and principles of Indian Constitution.

CO2: Understand the functioning of three wings of the government ie., executive, legislative and judiciary.

CO3: Understand the roles and powers of State Government and its Administration and value of the fundamental rights and duties for becoming good citizen of India.

CO4: Understand and analyze the decentralization of power between Union, State and Local self-Government and local administration.

CO5: Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission, UPSC, Welfare commissions for sustaining democracy.

SYLLABUS

UNIT I

Introduction to Indian Constitution: Constitution meaning of the term, Indian Constitution -Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT II

Union Government and its Administration Structure of the Indian Union: Federalism, CentreState relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, LokSabha, Rajya Sabha, The Supreme

Court and High Court: Powers and Functions;

UNIT III

State Government and its Administration Governor, Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

UNIT IV

A.Local Administration, District's Administration Head, Role and Importance, Municipalities, Mayor and role of Elected Representative, CEO of Municipal Corporation PachayatiRaj: Functions PRI: ZilaPanchayat, Elected officials and their roles, CEO ZilaPanchayat: Block level Organizational Hierarchy(Different departments),

Village level, Role of Elected and Appointed officials, Importance of grass root democracy

UNIT V

Election Commission: Election Commission, Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

References:

1) Durga Das Basu, Introduction to the Constitution of India, Prentice Hall of India Pvt. Ltd.

2) Subash Kashyap, Indian Constitution, National Book Trust

3) J.A. Siwach, Dynamics of Indian Government & Politics

4) D.C. Gupta, Indian Government and Politics

5) H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)

6) J.C. Johari, Indian Government and Politics Hans

7) J. Raj Indian Government and Politics

8) M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi

9) Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

E-sources:

1) nptel.ac.in/courses/109104074/8

2) nptel.ac.in/courses/109104045/

3) nptel.ac.in/courses/101104065/

4) www.hss.iitb.ac.in/en/lecture-details

5)www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

B.TECH IV SEMESTER	BSC	L	T	P	C
		3	0	0	3

20CS4T01 PROBABILITY AND STATISTICS

Course objectives:

- Computation of expectation and variance for probability distributions of a random variable
- Description of sampling, distribution of means, proportions & variances
- Knowledge of different distributions to test statistical hypothesis

Course Outcomes:

By the end of the course students will be able to

CO1: Understand random variables and discrete probability distributions

CO2: Determine probabilities based on practical situations using the normal distributions

CO3: Apply different distributions to compute confidence intervals

CO4: Test the hypothesis concerning means and proportions

CO5: Understand the concept of least square estimation linear regression

Syllabus:

UNIT I: Discrete Random variables and Distributions:

Introduction-Random variables- Discrete Random variable-Distribution function-Expectation-Moment Generating function-Moments and properties. Discrete distributions: Binomial and Poisson distributions.

UNIT II: Continuous Random variable and distributions:

Introduction-Continuous Random variable-Distribution function- Expectation-Moment Generating function-Moments and properties. Continuous distribution: Normal distributions, Normal approximation to Binomial distribution.

UNIT III: Sampling Theory:

Introduction - Population and samples- Sampling distribution of means (s known)-Central limit theorem- t-distribution- Sampling distribution of means (s unknown)-Sampling, distribution of variances, Point estimation- Maximum error of estimate - Interval estimation.

UNIT IV: Tests of Hypothesis:

Introduction –Hypothesis-Null and Alternative Hypothesis- Type I and Type II errors –Level of significance - One tail and two-tail tests- Tests concerning one mean and proportion, two means- Proportions and their differences- ANOVA for one-way and two-way classified data.

UNIT V: Regression Analysis:

The method of Least squares, Curvilinear Regression, Multiple Regression, Correlation.

Text Books:

1. **Richards A Johnson, Irvin Miller and Johnson E Freund**. Probability and Statistics for Engineering, 9th Edition, PHI.
2. **Jay l. Devore,** Probability and Statistics for Engineering and the Sciences, 8th edition, Cengage.

Reference Books:

3. **ShronL.Myers, Keying Ye, Ronald E Walpole,** Probability and StatisticsEngineers and the Scientists,8th Edition, Pearson 2007.
4. **William Menden Hall, Robert J. Bever and Barbara Bever**, Introduction toprobability and statistics, Cengage learning, 2009.

B.TECH IV SEMESTER	ESC	L	T	P	C
		3	0	0	3

20CS4T02 DISCRETE MATHEMATICAL STRUCTURES

Course objectives:

- The validity or the strength of any particular argument or reasoning
- Knowledge of the theory of relations and functions
- Knowledge of types of graphs to apply in real life problems

Course Outcomes:

By the end of this course the student will be able to

CO1: Apply mathematical logic to design new programming languages

CO2: Illustrate the properties of sets and functions to design a modeling software system

CO3: Explain a structure of an algebra which is useful to understand the theory of sequential machines, formal languages and coding theory.

CO4: Apply the techniques of recursion for representing the data in the analysis of algorithms

CO5: Provide the knowledge of graphs such as trees which is useful in maintaining files and directories by Operating Systems.

SYLLABUS

UNIT-I: Mathematical Logic:

Introduction, Statements and Notation, Connectives and Truth tables, Normal forms, Theory of inference for Statement Calculus, The Predicate Calculus, Inference theory of Predicate calculus.

UNIT-II: Set Theory & Functions:

Introduction, Basic concepts of set theory, Principle of Inclusion and Exclusion, Properties of Binary relations, Relation matrix and Digraph, operations on relations, Partition and covering, Transitive closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams, Bijective functions, Inverse functions, Composition of functions, Recursive functions, Pigeonhole principle and its applications.

UNIT-III: Algebraic Structures & Number Theory:

Algebraic systems and examples, general properties, semigroup, monoid, groups and subgroups. Properties of integers, Division algorithm, Greatest common divisor, Euclidean algorithm (without proof), Least common multiple, testing of prime numbers, The fundamental theorem of Arithmetic, Fermat's theorem and Euler's

theorem (without proofs) and its applications.

UNIT-IV

Recurrence Relations: Recurrence relations, solving recurrence relations by substitution, the method of characteristic roots, Solutions of Inhomogeneous recurrence relations.

UNIT -V:

Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula, Graph Coloring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems without Proofs).

TEXT BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T.P. Baker, 2nd Edition, Prentice Hall of India.
2. Mathematical Foundation for Computer science, S. Santha, E.V. Prasad, Cengage publications.

REFERENCE BOOKS:

1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H.Rosen, 7th Edition, Tata McGraw Hill.
2. Discrete Mathematical Structures, BernandKolman, Robert C. Busby, Sharon Cutler Ross, PHI.

B.TECH IV SEMESTER	PCC	L	T	P	C
		3	0	0	3

20CS4T03 OPERATING SYSTEMS

Course Objectives

- Understand the importance of Operating System and its services.
- To impart the concepts of process, memory and file management techniques.
- To familiarize with the deadlock handling techniques.

Course Outcomes

CO1: Understand the importance, functions and structures of operating systems.
CO2: Analyze and compare the performance of various CPU scheduling algorithms.
CO3: Develop software or hardware-based solutions for process synchronization.
CO4: Apply deadlock handling techniques to avoid deadlocks.
CO5: Compare various Memory Management Schemes and analyze various disk Scheduling Algorithms.

Syllabus

UNIT-I:

Introduction: Defining operating system, operating system structures, operating systems operations, User and Operating-System Interface, Operating-system services, System calls: Types of system calls, operating system debugging, System Boot.

Study of Linux System: Components of LINUX, Inter process Communication.

UNIT-II:

Process Management: Process Concept, Process state, Process control block (PCB), Process scheduling, Scheduling queues, Schedulers, Operations on Processes, Process creation, Process Termination, Process, Inter process communication.

Multithreaded Programming: Multithreading models, Scheduling: Basic Concepts, Scheduling algorithms

UNIT-III:

Synchronization: The critical section problem, Peterson's solution, Synchronization hardware, Semaphores, Classic problems of synchronization, Monitors.

File System Interface: File attributes, File operations, Access methods, Directory and Disk structures.

UNIT-IV:

Deadlocks: Deadlock characterization, Methods for handling deadlocks: deadlock-Prevention - Mutual Exclusion, Hold and wait, No preemption, Circular wait,

Avoidance-Safe state, Resource allocation, Bankers's Algorithm, Safety Algorithm, Detection-Single instance of each resource type, several instances of a resource type, Detection algorithm usage, recovery from Dead lock

UNIT-V:

Memory Management Strategies: Swapping, Contiguous memory allocation, Paging, Segmentation

Virtual-Memory Management: Demand paging, Page replacement Algorithms, Thrashing.

Mass-storage structure: Magnetic disk, Disk Scheduling.

Text Books

1. Abraham Silberschatz, Peter B, Galvin, Greg Gagne, Operating System, John Wiley, 9thedition.(Unit-1,2,3,4,5)
2. Stallings, Operating Systems - Internal and Design Principles, Pearson education, 6th edition–2005.(Unit-5)

Reference Books

1. D. M. Dhamdhere, Operating systems- A Concept based Approach, TMH, 2nd edition.
2. Andrew S Tanenbaum, Modern Operating Systems, PHI, 4th edition.
3. Charles Crowley ,Operating Systems: A Design-Oriented Approach, Tata Mc Graw Hill Education,1996

B.TECH IV SEMESTER	PCC	L	T	P	C
		3	0	0	3

20CS4T04 ADVANCED DATA STRUCTURES

Course Objectives:

- Describe variety of advanced data structures.
- Understand operations on various search trees.

Course Outcomes:

CO1: Illustrate several sorting algorithms.

CO2: Construct Priority queues such as min heap and max heap for the given data.

CO3: Apply various operations on AVL and Red Black trees

CO4: Build Multi-Way Search Trees and perform various operations.

CO5: Demonstrate various operations of Digital Search Structures and Multi-Way Trees.

SYLLABUS

UNIT - I:

Sorting: Medians and order statistics, External Sorting: Introduction, K-way Merging, Buffer Handling for parallel Operation, Run Generation, Optimal Merging of Runs.

Hashing: Introduction, Hash Table, Hash Function, Types of Hashing: Linear Probing, Quadratic Probing, Double Hashing.

UNIT - II:

Priority Queues: Introduction, types of priority queues, implementation methods of priority queues, Applications of Priority queues,

Heaps: Binary heap: min heap and max heap, Applications of heap.

UNIT – III: Advanced and Efficient Binary Search Trees

Optimal Binary Search Trees: Red Black Trees Definition- Representation of a Red- Black Tree- Searching a Red-Black Tree- Inserting into a Red Black Tree- Deletion from a Red-Black Tree- Joining Red-Black Trees, Splitting a Red-Black tree.

Splay and Scapegoat Trees:

Scapegoat Tree-Definition-Insertion and Deletion operations, Splay tree-Definition-Insertion and Deletion operations.

UNIT - IV: Multi-way Trees

M-Way Search Trees: Definition and Properties, Searching an M-Way SearchTree, B-Trees, Definition and Properties, Number of Elements in a B-tree, Insertion into B-Tree, Deletion from a B-Tree, B+-Tree Definition, Searching a B+-Tree, Insertion into B+-tree, Deletion from a B+-Tree.

UNIT - V: Digital Search Trees and Multi - way Trees

Digital Search Trees: Definition, Search, Insert and Delete. Binary Tries, Compressed Binary Tries.

Multi-way Trees: Definition, searching a Tree, sampling strategies, Insertion, Deletion, Height of a Tree. Prefix Search and applications. Suffix Trees.

Text Books:

1. Richard F Gilberg, Behrouz A Forouzan, "Data Structures, a Pseudo code Approach with C", Cengage Learning. (Unit 1,2,3,4 & 5)
2. Horowitz, Sahni, Anderson-Freed, "Fundamentals of Data Structures in C", 2nd edition, University Press.

Reference Books:

1. Reema Thareja, S.RamaSree, "Advanced Data Structures"Oxford Higher Education.
2. Mark Allen Weiss, "Data structures and Algorithm Analysis in C", Pearson, 2nd edition
3. Introduction to Algorithms", T. Cormen, R.Rivest, C. Stein, C. Leiserson, PHI publication, Second Edition, 2004, ISBN 81-203-2141-3.

B.TECH IV SEMESTER	HSMC	L	T	P	C
		3	0	0	3

20CS4T05 MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

- The Learning objectives of this course are to understand the concept and nature of Managerial Economics and its relationship with other disciplines and also to understand the Concept of Demand and Demand forecasting
- To familiarize about the Production function, Input Output relationship, Cost-Output relationship and Cost-Volume-Profit Analysis
- To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles
- To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation
- Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals

Course Outcomes:

CO1: The Learner is equipped with the knowledge of estimating the Demand and demand elasticity's for a product

CO2: The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs

CO3: The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units

CO4: The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis

CO5: The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making

SYLLABUS

UNIT I: Introduction to Managerial Economics and demand Analysis: Definition of Managerial Economics –Scope of Managerial Economics and its relationship with other subjects –Concept of Demand, Types of Demand, Determinants of Demand-Demand schedule, Demand curve, Law of Demand and its limitations- Elasticity of Demand, Types of Elasticity of Demand and Measurement Demand forecasting and Methods of forecasting, Concept of Supply and Law of Supply.

UNIT II: Theories of Production and Cost Analyses: Theories of Production function- Law of Variable Proportions - Isoquants and Isocosts and choice of least cost factor combination-Concepts of Returns to scale and Economies of scale-Different cost concepts: opportunity costs, explicit and implicit costs-Fixed costs, Variable Costs and Total costs –Cost –Volume-Profit analysis-Determination of Breakeven point(problems)-Managerial significance and limitations of Breakeven point.

UNIT III: Introduction to Markets, Theories of the Firm & Pricing Policies: Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly – Features – Price and Output Determination – Managerial Theories of firm: Marris and Williamson's models – other Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing, Internet Pricing: (Flat Rate Pricing, Usage sensitive pricing) and Priority Pricing, Business Cycles: Meaning and Features – Phases of a Business Cycle. Features and Evaluation of Sole Trader, Partnership, Joint Stock Company – State/Public Enterprises and their forms.

UNIT IV: Introduction to Accounting & Financing Analysis: Introduction to Double Entry System, Journal, Ledger, Trail Balance and Preparation of Final Accounts with adjustments – Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-Ratio Analysis – Preparation of Funds flow and cash flow analysis (Problems)

UNIT V: Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Time value of money- Methods of appraising Project profitability: Traditional Methods (payback period, accounting rate of return) and modern methods(Discounted cash flow method, Net Present Value method, Internal Rate of Return Method and Profitability Index)

Text Books:

1) A R Aryasri, Managerial Economics and Financial Analysis, The McGraw – Hill companies.

Reference Books:

1) Varshney R.L, K.L Maheswari, Managerial Economics, S. Chand & Company Ltd.

2) JL Pappas and EF Brigham, Managerial Economics, Holt, R & W; New edition edition

3) N.P Srinivasn and M. SakthivelMurugan, Accounting for Management, S. Chand & Company Ltd.

4) MaheswariS.N,AnIntroduction to Accountancy, Vikas Publishing House Pvt Ltd

5) I.M Pandey, Financial Management , Vikas Publishing House Pvt Ltd

6) V. Maheswari, Managerial Economics, S. Chand & Company Ltd.

B.TECH IV SEMESTER	ESC	L	T	P	C
		0	0	3	1.5

20CS4L06 R PROGRAMMING LAB

Course Outcomes:

CO1: Understand the use of operators in R

CO2: Use Data Structures to implement programs in R

CO3: Implement Mathematical functions in R

CO4: Understand reading and writing files

CO5: Analyze data from various sources

LIST OF EXPERIMENTS

Exercise 1: Implement programs in R to work with different types of operators

Exercise 2: Implement programs in R with data structures

Exercise 3: Implement programs in R using the concept of functions

Exercise 4: Working with simulation in R

Math functions

Calculus

Linear algebraic operations

Set operations

Exercise 5: Reading in your own data

Working with files

Accessing the keyboard and monitor

Exercise 6: Data visualization

Charts and plots

Exercise 7:

a) Program to implement simple and multiple linear regression.

b) Program to implement non- linear regression.

Exercise 8:

a) Program to implement logistic regression.

Exercise 9:

a) Program to perform ANOVA test (one-way, two way)

B.TECH IV SEMESTER	PCC	L	T	P	C
		0	0	3	1.5

20CS4L07 OPERATING SYSTEMS LAB

Course Objectives

- To develop the concepts of process and memory management techniques.
- To know the problems of deadlock and study the various handling mechanisms.
- To impart knowledge on developing shell scripts.

Course Outcomes

CO1: Implement CPU and disk scheduling algorithms.

CO2: Demonstrate memory management techniques.

CO3: Demonstrate algorithms for Deadlock Detection and prevention.

CO4: Develop shell scripts in order to perform shell programming.

List of Experiments

1. Simulate the following CPU scheduling algorithms
   a) FCFS b) SJF
2. Simulate the following CPU scheduling algorithms
   a) Priority b) Round Robin
3. Simulate MVT and MFT
4. Simulate the following page replacement algorithms
5. Simulate the following page replacement algorithms
6. Implement FIFO page replacement algorithm.
7. Implement LRU page replacement algorithm.
8. Illustrate Dead Lock Avoidance Algorithm
9. Illustrate Dead Lock Detection Algorithm
10. Simulate the following disk scheduling algorithms
    a) FCFS b) SSTF
11. Simulate the following disk scheduling algorithms
    a) SCAN b) CSCAN
12. Illustrate UNIX commands and Vi editor
13. Write a Shell program to check the given number is even or odd
14. Write a shell script to print the factorial of first n natural numbers.
15. Write shell scripts to find the length of a given string and to extract a substring from a given string.
16. Write a shell script that counts the number of lines and words present in a given file.

B.TECH IV SEMESTER	PCC	L	T	P	C
		0	0	3	1.5

20CS4L08 ADVANCED DATA STRUCTURES LAB

Objectives:

- To make the student learn a object oriented way of solving problems.
- To make the student learn different sorting algorithms.
- To make the student learn different algorithm design techniques.

Course Outcomes

CO1 - Develop programs for sorting.

CO2 - Develop programs for implementing trees and their traversal operations.

CO3 - Implement graph traversal algorithm. .

List of Experiments

1. Construct a Hash Table and illustrate
   a) Linear Probing b) Quadratic Probing c) Double Hashing
2. Write programs for the implementation of Priority Queue.
3. Write a program to implement operations on binary heap.
4. Write a program to perform the following operations
   a) Insertion into an AVL-tree b) Deletion from an AVL-tree
5. Write a program to perform the following operations
   a) Insertion into a B-tree b) Deletion from a B-tree
6. Write a program to perform the following operations
   a) Insertion into Scapegoat tree b) Deletion from an Scapegoat tree
7. Write a program to perform the following operations
   a) Insertion into Splay tree b) Deletion from an Splay tree
8. Write a program to implement Kruskal's algorithm to generate a minimum cost spanning tree.
9. Write a program to implement Prim's algorithm to generate a minimum cost spanning tree.
10. Write a program to implement operations on graph.
    a)vertex insertion b) Vertex deletion c) finding vertex d))Edge addition and deletion
11. Write programs for the implementation of BFS for a given graph.
12. Write programs for the implementation of DFS for a given graph
13. Write a program to implement operations on graph.
    a) Finding vertex b) Edge addition and deletion
14. Write a program to implement Dijkstra's algorithm to find shortest path in the graph.
15. Write a program to implement Bellman-Ford algorithm to find shortest path in the graph

B.TECH IV SEMESTER	SC	L	T	P	C
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20CS4S09 BASIC WEB PROGRAMMING
(Skill Oriented Course)

Course Objectives:

- To acquire skills in developing web pages
- To understand the use of HTML and CSS in designing web pages
- To gain knowledge on Java Script for performing validations

Course Outcomes: By the end of this lab the student is able to

CO1: Understand and use various HTML Tags and apply CSS

CO2: Develop websites that include static pages

CO3: Design Front end for Web Applications

LIST OF EXPERIMENTS

1) Exercises to demonstrate the use of Basic HTML tags.
2) Exercises to demonstrate Tables, Lists and Forms
3) Implement forms using HTML Frames and CSS
4) Write an HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, lines and words in the text entered using an alert message. Words are separated with white space and lines are separated with new line character.
5) Write an HTML page that contains a selection box with a list of 5 countries In the above page when the user selects a country, its capital should be printed next to the list, and add CSS to customize the properties of the font of the capital.
6) Create a website using the HTML and CSS to create your personal portfolio.
7) Create a website using HTML and CSS for a Book Store.
8) Write a JavaScript to design a simple calculator to perform the operations: sum, product, difference and quotient
9) Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in HTML table format.
10) Write a JavaScript code that displays text “TEXT-GROWING” with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays “TEXT-SHRINKING” in BLUE color. Then the font size decreases to 5pt.
11) Demonstrate the Login page with userid and password validations.
12) Develop and demonstrate a HTML5 file that includes JavaScript script that uses functions for the following problems:

a. Parameter: A string Output: The position in the string of the left-most vowel

b. Parameter: A number Output: The number with its digits in the reverse order

13) Write an HTML page with Javascript that takes a number from one text field in the range 0-999 and display it in other text field in words. If the number is out of range, it should show “out of range” and if it is not a number, it should show “not a number” message in the result box.