MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE

MADANAPALLE

(UGC-AUTONOMOUS)

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DEPARTMENT OF COMPUTER SCIENCE & TECHNOLOGY

Course structure

&

Detailed SYLLABI

For the students admitted to

B. Tech. Regular Four Year Degree Programme from the academic year 2018-19

and

B. Tech. Lateral Entry Scheme from the academic year 2019-20

B.TECH. COMPUTER SCIENCE & TECHNOLOGY

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

B. Tech Four Year Curriculum Structure

Branch: COMPUTER SCIENCE & TECHNOLOGY

Total Credits: 160 (4 Year Course)

I. Induction Program and Holistic Development Activities

Sl. No.	Title	Duration
1	Induction Program (Mandatory)	Three weeks duration at the start of First Year (Refer Annexure - I)
2	Holistic Development Activities (Every Student from Semester 2 – 8 should register for at least one activity)	Three hours per week (Activity list is enclosed in Annexure - I)
3	Virtual Laboratory (Students are encouraged to choose and register for any of the Virtual laboratories he /she is interested)	As specified by the Virtual Laboratory

I Year I Semester

Sl.No.	Category	Course Code	Course Title	Hours Per Week				Credits
				L	T	P	Total Contact Hrs	
1	Humanities, Social Sciences including Management	18ENG101	Professional English	2	0	2	4	3
2	Basic Science Course	18MAT101	Engineering Calculus	3	1	0	4	4
3	Basic Science Course	18CHE101	Engineering Chemistry	3	0	0	3	3
4	Engineering Science Course	18ME101	Engineering Graphics	2	0	3	5	3.5
5	Engineering Science Course	18CSE101	Programming for Problem Solving (Python)	2	0	2	4	3
6	Basic Science Course	18CHE201	Chemistry Laboratory	0	0	3	3	1.5
8	Engineering Science Course	18CSE202	Engineering and IT Workshop	0	0	3	3	1.5
						Total	**26**	**19.5**

I Year II Semester

Sl. No.	Category	Course Code	Course Title	Hours Per Week				Credits
				L	T	P	Total Contact Hrs	
2	Basic Science Course	18MAT110	Linear Algebra	3	1	0	4	4
3	Basic Science Course	18PHY102	Modern Physics	3	1	0	4	4
3	Engineering Science Course	18EEE101	Basic Electrical Engineering	3	0	0	3	3
5	Engineering Science Course	18CSE102	C Programming and Data Structures	3	0	0	3	3
6	Basic Science Course	18PHY201	Physics Laboratory	0	0	3	3	1.5
7	Engineering Science Course	18EEE201	Electrical Engineering Laboratory	0	0	3	3	1.5
8	Engineering Science Course	18CSE201	C Programming and Data Structures Laboratory	0	0	3	3	1.5
						Total	**23**	**18.5**

II Year I Semester- R18

Sl.No.	Category	Course Code	Course Title	Hours Per Week				Credits
				L	T	P	Total Contact Hrs	
1	Humanities, Social Sciences including Management	18HUM102	Principles of Management	3	0	0	3	3
2	Basic Science Course	18MAT111	Probability Models And Statistics	3	1	0	4	4
3	Professional Core Course	18CST101	Data Structures	3	0	0	3	3
4	Professional Core Course	18CST102	Object Oriented Programming using JAVA	3	0	0	3	3
5	Professional Core Course	18CST103	Database Management Systems	3	0	0	3	3
6	Professional Core Course	18CST201	Data Structures Laboratory	0	0	3	3	1.5
7	Professional Core Course	18CST202	Object Oriented Programming using JAVA Laboratory	0	0	3	3	1.5
8	Professional Core Course	18CST203	Database Management Systems Laboratory	0	0	3	3	1.5
9	Mandatory non-credit Course		Mandatory Course – I (Refer Annexure - V)	2	0	0	2	0
Total Credits							**27**	**20.5**

II Year II Semester

Sl.No.	Category	Course Code	Course Title	Hours Per Week				Credits
				L	T	P	Total Contact Hrs	
1	Humanities, Social Sciences including Management	18HUM101	Economics and Financial Accounting for Engineers	3	0	0	3	3
2	Basic Science Course	18MAT112	Discrete Mathematical Structures	3	0	0	3	3
3	Basic Science Course	18BIO101	Life Sciences for Engineers	3	0	0	3	3
4	Professional Core Course	18CST104	Digital Logic Design	3	0	0	3	3
5	Engineering Science Course	18CST105	Design and Analysis of Algorithms	3	0	0	3	3
6	Professional Core Course	18CST106	Operating Systems	3	0	0	3	3
7	Humanities, Social Sciences including Management	18ENG201	English Communication – Listening & Speaking Laboratory	0	0	3	3	1.5
8	Professional Core Course	18CST204	Design and Analysis of Algorithms Laboratory	0	0	3	3	1.5
9	Professional Core Course	18CST205	Operating Systems Laboratory	0	0	3	3	1.5
10	Mandatory non-credit Course		Mandatory Course – II (Refer Annexure - V)	2	0	0	2	0
						Total Credits	**29**	**22.5**
Summer Internship								

Tentative Curriculum Structure from III Year to IV Year

III Year I Semester

Sl.No.	Category	Course Code	Course Title	Hours Per Week				Credits
				L	T	P	Total Contact Hrs	
1	Professional Core Course	18CST107	Computer Organization and Architecture	3	0	0	3	3
2	Professional Core Course	18CST108	Computer Networks	3	0	0	3	3
3	Professional Core Course	18CST109	Formal Language Automata and Compiler Design	3	0	0	3	3
4	Professional Core Course	18CST110	AI Tools, Techniques and Applications	3	0	0	3	3
5	Professional Elective Course		Discipline Elective - I (Refer Annexure - III)	3	0	0	3	3
6	Open Elective Course		Open Elective – I (Refer Annexure - II)	3	0	0	3	3
7	Humanities, Social Sciences including Management	18ENG202	Corporate Communication Laboratory	0	0	2	2	1
8	Professional Core Course	18CST206	Computer Networks Laboratory	0	0	3	3	1.5
9	Professional Core Course	18CST207	AI Tools, Techniques and Applications Laboratory	0	0	3	3	1.5
10	Mandatory non-credit Course		Mandatory Course – III (Refer Annexure - V)	2	0	0	2	0
Total Credits							**28**	**22**

III Year II Semester

Sl.No.	Category	Course Code	Course Title	Hours Per Week				Credits
				L	T	P	Total Contact Hrs	
1	Humanities, Social Sciences including Management	18ENG102	English Communication - Reading and Writing	2	0	0	2	2
2	Engineering Science Course	18CST111	Internet of Things	3	0	0	3	3
3	Professional Core Course	18CST112	Software Engineering	3	0	0	3	3
4	Professional Elective Course		Discipline Elective – II (Refer Annexure - III)	3	0	0	3	3
5	Professional Elective Course		Discipline Elective– III (Refer Annexure - III)	3	0	0	3	3
6	Open Elective Course		Open Elective – II (Refer Annexure - II)	3	0	0	3	3
7	Engineering Science Course	18CST208	Internet of Things Laboratory	0	0	3	3	1.5
8	Professional Core Course	18CST209	Software Engineering Laboratory	0	0	3	3	1.5
9	Professional Core Course		Virtual Laboratory (Refer Annexure - IV)	0	0	2	2	0
10	Mandatory non-credit Course		Mandatory Course – IV (Refer Annexure - V)	2	0	0	2	0
Total Credits							**27**	**20**
Summer Internship								

IV Year I Semester

Sl.No.	Category	Course Code	Course Title	Hours Per Week				Credits
				L	T	P	Total Contact Hrs	
1	Professional Core Course	18CST113	Distributed and Cloud Computing	3	0	0	3	3
2	Professional Core Course	18CST114	Mobile Application Development	3	0	0	3	3
3	Professional Elective Course		Discipline Elective - IV (Refer Annexure - III)	3	0	0	3	3
4	Professional Elective Course		Discipline Elective - V (Refer Annexure - III)	3	0	0	3	3
5	Open Elective Course		Open Elective – III (Refer Annexure - II)	3	0	0	3	3
6	Professional Core Course	18CST210	Distributed and Cloud Computing Laboratory	0	0	2	2	1
7	Professional Core Course	18CST211	Mobile Application Development Laboratory	0	0	2	2	1
8	PROJ - CST	18CST701	Project Work – I	0	0	4	4	2
Total Credits							**23**	**19**

IV Year II Semester

Sl.No.	Category	Course Code	Course Title	Hours Per Week				Credits
				L	T	P	Total Contact Hrs	
1	Professional Elective Course		Discipline Elective – VI (Refer Annexure - III)	3	0	0	3	3
2	Open Elective Course		Open Elective – IV(Refer Annexure - II)	3	0	0	3	3
3	PROJ-CST	18CST702	Project Work - II	0	0	24	24	12
Total Credits							**30**	**18**

List of MANDATORY COURSES

Sl. No.	Course Code	Name of the Course
1.	18CHE901	Environmental Sciences
2.	18HUM902	Indian Constitution
3.	18HUM903	Essence of Indian Traditional Knowledge
4.	18CE904	Disaster Management

B. Tech I Year I Semester

B. Tech I Year I Semester

18ENG101 PROFESSIONAL ENGLISH
(Common to all branches)

L	T	P	C
2	0	2	3

Course Prerequisite: None

Course Description: Communication takes place in many forms, however the major impact and effectiveness is in its professionalism. This course defines, enlightens and enables learners to engage in Professional Communication by addressing all the areas of communication – Listening, Speaking, Reading and Writing. This course also deals with various types of communication – Verbal, Non-verbal, Storytelling, Crucial Conversations, Written Communication, Vocalics, Eye Contact, Posture, etc.

Course Objectives:
This course enables the student to:
1. Engage effectively in a professional environment
2. Understand the intricacies and implications of professional communication
3. Use linguistic skills in any given context
4. Conduct self in a learning environment
5. Be better prepared for employment

UNIT I GRAMMAR & VOCABULARY
Grammar - Tense, Reported Speech, Modals, Conditionals; Vocabulary development - prefixes, suffixes, compound words, synonyms & antonyms. **(6)**

Practical: Dumb Charade, Giving Direction, Talking about an experiment (Tenses), Running Commentary. **(6)**

UNIT II READING SKILLS & WRITTEN COMMUNICATION
Reading - short comprehension passages, practice in skimming, scanning and predicting; Writing- completing sentences, developing hints; Paragraph writing- topic sentence, main ideas, coherence. **(6)**

Practical: Short Passages – Reading Comprehension, Paragraph Writing, Skit Writing. **(6)**

UNIT III VERBAL & NON-VERBAL ASPECTS
Verbal - Introducing oneself, exchanging personal information, Using 'Wh'- Questions, asking and answering, yes or no questions- asking about routine actions and expressing opinions; **Non-Verbal** – Use of body language, combating nervousness. **(6)**

Practical: Daily Activities, Role Play, JAM **(6)**

UNIT IV CONVERSATIONS
Listening-short texts & conversing, formal and informal conversations, short group conversations, speaking about oneself, speaking about one's friend. **(6)**

Practical: Speaking: formal and informal conversations, short group conversations, speaking about oneself, speaking about one's friend, Character Portrayal.
Listening: Listening/watching interviews, conversations, documentaries, etc.; Listening to lectures, discussions from TV/Radio/Podcast. **(6)**

UNIT V BUSINESS ENVIRONMENT & ETIQUETTES
Sharing information of a personal kind - greeting & taking leave; Writing e-mails, memos, reports, etc. **(6)**

Practical: Mock Interview, Oral Presentation **(6)**

Course Outcomes:
At the end of the course, learners will be able to
1. Read articles and understand professional communication
2. Participate effectively in informal conversations
3. Introduce themselves and their friends and express opinions in English
4. Comprehend conversations and short talks delivered in English
5. Write short essays of a general kind and personal letters and emails in English.

Suggested Reading/Textbooks:
1. Guy Brook Hart & Norman Whitby; *Cambridge English-Business Benchmark: Pre-Intermediate to Intermediate*; Published by: Cambridge University Press.
2. Adrian Doff, Craig Thaine, Herbert Puchta, et al; *Empower: Intermediate (B1+)*; Published by: Cambridge University Press.

Reference:

1. AJ Thomson & AV Martinet; *A Practical English Grammar*; Oxford University Press, 2015.
2. Raymond Murphy; *English Grammar in Use with CD*; Cambridge University Press, 2013.
3. K.S. Yadurajan; *Modern English Grammar*; Oxford University Press, 2014.
4. William Strunk Jr; *The Elements of Style*; ITHACA, N.Y.; W.P. HUMPHREY, 2006.
5. Joseph Devlin; *How to Speak and Write Correctly*; ITHACA, N.Y.; W.P. HUMPHREY, 2006
6. Anjana Agarwal; *Powerful Vocabulary Builder*; New Age Publishers, 2011.
7. *Writing Tutor*; Advanced English Learners' Dictionary; Oxford University Press, 2012.
8. *www.cambridgeenglish.org/in/*
9. https://learnenglish.britishcouncil.org/en/english-grammar
10. https://www.rong-chang.com/

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examination.

B.Tech. I Year I Semester

18MAT101 ENGINEERING CALCULUS

L	T	P	C
3	1	0	4

Course Prerequisite: Intermediate

Course Description :
The course introduces the concepts of single variable and multivariable calculus with the view of its applications in various engineering fields. The course will well prepare the students to develop the solution methods and enrich their experience in critical analysis and problem solving.

Course Objectives:
The objective of this course is to familiarize the prospective engineers with techniques in calculus and multivariate analysis. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

UNIT I CALCULUS
Definite integrals; Applications of definite integrals to evaluate area and length of curves, surface areas and volumes of revolutions; Beta and Gamma functions and their properties **(12)**

Unit II CALCULUS
Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms, Maxima and minima. **(12)**

UNIT III SEQUENCES AND SERIES
Convergence of sequence and series, tests for convergence, power series, Taylor's series. Series for exponential, trigonometric and logarithmic functions; Fourier series: Half range sine and cosine series, Parseval's theorem. **(12)**

UNIT IV MULTIVARIABLE CALCULUS (DIFFERENTIATION)
Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers. **(12)**

UNIT V MULTIVARIABLE CALCULUS (INTEGRATION)
Multiple Integration: double integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes by (double integration), triple integrals, curl and divergence, Theorems of Green, Gauss and Stokes (without proofs). **(12)**

Course Outcomes:

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

1. Evaluate the definite integrals to curvatures and infer the Beta and Gamma functions.
2. Analyze the fundamental theorems of calculus to Engineering problems.
3. Use the power series and Fourier series for learning advanced Engineering Mathematics.
4. Apply the functions of several variables and geometrical ideas to engineering.
5. Calculate the area and volume of quantities and connecting them to single double and triple integrals.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42th Edition, 2012.
2. G. B. Thomas, Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas' Calculus Pearson education 11^{th} Edition, 2004.

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11^{th} Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examination.

B. Tech I Year I Semester

18CHE101 ENGINEERING CHEMISTRY

L	T	P	C
3	0	0	3

Course Pre-requisite: Basic Chemistry at Intermediate or equivalent level.

Course Description:
Deals with the basic principles of various branches of chemistry like physical, organic, analytical and nanomaterial chemistry.

Course Objectives:
1. Students will understand, analyse and determine the impurities present in the water.
2. Appreciate the synthetic organic reactions used in daily life
3. Learn the principles of spectroscopies to analyse them.
4. Value the basic concepts of thermodynamics and electrochemistry.
5. Be exposed to the importance of nano and engineering materials used in their daily life.

UNIT I IMPURITIES PRESENT IN WATER AND WATER TREATMENT
Impurities in water (BIS and WHO standards), Hardness of water, determination of hardness by EDTA Method (numerical problems), Disadvantages (industry level) of using hard water, Alkalinity of water and its importance, Chlorides, Softening of water by Reverse Osmosis method. Water treatment for civic applications: coagulation, sedimentation, filtration, sterilization - chlorination and ozonization. Concept of break point chlorination. **(9)**

UNIT II PERIODIC PROPERTIES AND ORGANIC REACTIONS
Electronic configurations, atomic and ionic sizes, ionization energies, oxidation states, molecular geometries, Introduction to substitution, addition, elimination, oxidation and reduction reactions. **(9)**

UNIT III SPECTROSCOPY
Basic principle and applications of Electronic, Fluorescence, Vibrational and Rotational spectroscopy. Magnetic resonance imaging. **(9)**

UNIT IV FREE ENERGY IN CHEMICAL EQUILIBRIA
Thermodynamics: Systems, State Functions, Thermodynamic functions: Work, Energy, Entropy and Free energy. Estimations of entropy in various processes and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Batteries (Pb-acid, Li-ion) and Fuel-Cells (H_2-O_2). Corrosion: Factors influencing Corrosion, Protective coatings. **(9)**

UNIT V ENGINEERING MATERIALS, NANOSCIENCE & NANOTECHNOLOGY
Cement Materials - Lime, Cement, Gypsum. Lubricants – definition, classification, Extreme pressure lubrication mechanism, important properties – viscosity, viscosity index, saponification number, flash point and pour point. Nanomaterials: Introduction, Classes/Types, Structure-Property relationship; Chemical synthesis of nanomaterials: sol-gel, Hydrothermal and Chemical Vapor Deposition method, Characterization by powder XRD (Scherrer's equation), SEM. Applications of nanomaterials – Catalysis, Electronics & Telecommunication, Medicines, Energy and Environmental Sciences. **(9)**

Course Outcomes:

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

1. Analyze and determine the impurities in water such as hardness, alkalinity for sustainable development.
2. Prepare organic compounds/polymers for environmental, safety and society need.
3. Comprehend the principles and applications of spectroscopies
4. Apply the concept of free energy in thermodynamics, electrochemistry for solving the problems evolve in the engineering processes.
5. Acquire spotlight to the nanomaterials and basic engineering materials used in academics, industry and daily life.

Text Books:

1. "Atkins' Physical Chemistry", P.W. Atkins & Julio de Paula, Ninth edition (Oxford University Press, Oxford 2010).
2. Fundamentals of Molecular Spectroscopy, by C. N. Banwell, Fourth Edition, (Tata McGraw Hill, 2008).
3. Engineering Chemistry, Dr. S. S. Dara and Dr. S. S. Umare, (S. Chand & Company Ltd., 2013).
4. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan.

Reference Books:

1. 'Physical Chemistry', D. W. Ball, First Edition, India Edition (Thomson, 2007).
2. Perry's Chemical Engineers' Handbook, Perry and Green, 9th Edition, Section 2, McGraw Hill
3. Engineering Chemistry, Dr. Suba Ramesh and others, 1st Edition, Wiley India, 2011.
4. Engineering chemistry, K. N Jayaveera, G. V. Subba Reddy and C. Rama Chandraiah, 1st Edition, McGraw Hill education 2013.

Mode of Evaluation: Assignment/Quiz, Internal Mid Examinations and External End Examination.

B. Tech. I Year I Semester

18ME101 ENGINEERING GRAPHICS

L	T	P	C
2	0	3	3.5

Course Prerequisite: None

Course Description:
Introduction to AutoCAD commands, simple drawings, orthographic projections, projection of points, lines, planes; auxiliary projections; projections and sections of solids; development and intersection of surfaces; isometric projections.

Course Objectives:
1. Engineering Graphics is the primary medium for development and communicating design concepts.
2. Through this course the students are trained in Engineering Graphics concepts with the use of AutoCAD.
3. The latest ISI code of practice is followed while preparing the drawings using AutoCAD.
4. Computerized drawing is an upcoming technology and provides accurate and easily modifiable graphics entities.
5. Storage and Retrieval of Drawings is also very easy and it takes very less time to prepare the drawings. Also enhances the creativity.

UNIT I: INTRODUCTION TO AUTO CAD
Introduction to AutoCAD commands, simple drawings, Orthographic Projections-Theory, techniques, first angle projections and third angle projections. **(10)**

UNIT II: PROJECTIONS OF POINTS & LINES
Projections of points: Positions, notation system and projections. Projections of lines: positions, terms used, different cases, traces of lines and finding true lengths, auxiliary projections. **(10)**

UNIT III: PROJECTIONS OF PLANES & SOLIDS
Projections of planes: positions, terms used, different cases and projections procedure. Projections of Solids: Projections of Regular Solids inclined to one planes. **(10)**

UNIT IV: SECTIONS AND DEVELOPMENTS OF SOLIDS
Section Planes and Sectional View of Right Regular Solids-Prism, cylinder. True shapes of the sections. Development of Surfaces of Right Regular Solids-Prism, Cylinder and their Sectional Parts. **(10)**

UNIT V: INTERSECTIONS & ISOMETRIC PROJECTIONS
Intersections of surfaces of solids: Intersection between: Line-plane, Plane-plane, line-solid, solid-solid. **Isometric Projections**: Theory of isometric drawing, construction of isometric projection from orthographic. **(10)**

Course Outcomes:

The students after completing the course will be able to:

1. Identify various commands in AutoCAD and their usage for engineering graphics
2. Draw the projections of points and straight lines with AutoCAD
3. Draw the projections of the planes and sections of solids.
4. Sketch the intersections of surfaces and developments of solids
5. Draw the conversion of the orthographic views to isometric views and vice versa.

Text Book:

1. D.M. Kulkarni, A.P. Rastogi and A.M. Sarkar., Engineering Graphics with AutoCAD, PHI Learning Private Limited, New Delhi 2009.

References:

1. Dhananjay A Jolhe, Engineering Drawing: with an introduction to AutoCAD, Tata McGraw Hill, 2008
2. Warren J. Luzadder& Jon M. Duff Fundamentals of Engineering Drawing, 11th edition, Prentice Hall of India, New Delhi.ss

Mode of Evaluation: Lab classes Evaluation, Mid and End Examination

B. Tech. I Year I Semester

18CSE101 Programming for Problem Solving (Python)

L	T	P	C
2	0	3	3.5

Course Prerequisite: None

Course Description:
Python is a language with a simple syntax, and a powerful set of libraries. It is an interpreted language, with a rich programming environment. While it is easy for beginners to learn, it is widely used in many scientific areas for data exploration. This course is an introduction to the Python programming language for students without prior programming experience. This course provides knowledge on how to implement programs in python language and to solve computational problems using the various programming constructs including data structures, functions, string handling mechanisms and file handling concepts.

Course Objectives:
1. Learn Python programming constructs.
2. Implement Python programs with conditional structures and loops.
3. Use functions for structuring Python programs.
4. Handle compound data using Python lists, tuples, and dictionaries.
5. Manipulate data using files handling in Python.

UNIT-I
Introduction: Algorithms, building blocks of algorithms (flow chart), History of Python, features of Python Programming, Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation. **Data Types** - Integers, Strings, Boolean.

a) Develop a flowchart for the various arithmetic operations on numbers.
b) Develop a flowchart to check whether the number is positive or negative.
c) Develop a flowchart for finding whether a given number is even or odd.
d) Develop a flowchart for finding biggest number among three numbers.
e) Develop a flowchart for displaying reversal of a number.
f) Develop a flowchart to print factorial of a number using function.
g) Develop a flowchart to generate prime numbers series up to N using function.
h) Develop a flowchart to check given number is palindrome or not using function.
i) Alexa travelled 150 kms by train. How much distance in miles she actually covered?

(10)

UNIT-II
Operators and Expressions: 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.

a) Swapping of two number with and without using temporary variable.
b) If the age of Ram, Sam, and Khan are input through the keyboard, write a python program to determine the eldest and youngest of the three.
c) Develop a program that performs arithmetic operations (Addition, Subtraction, Multiplication, and Division) on integers. Input the two integer values and operator for performing arithmetic operation through keyboard. The operator codes are as follows:
    - For code '+', perform addition.
    - For code '-', perform subtraction.
    - For code '*', perform multiplication.
    - For code '/', perform division.
d) Implement the python program to generate the multiplication table.
e) Implement Python program to find sum of natural numbers
f) If the first name of a student is input through the keyboard, write a program to display the vowels and consonants present in his/her name.
g) The marks obtained by a student in 5 different subjects are input through the keyboard. Find the average and print the student grade as per the MITS examination policy as shown below.

% OBTAINED	GRADE
90 – 100	O (Outstanding)
80 – 89	A+ (Excellent)
70 – 79	A (Very Good)
60 – 69	B+ (Good)
50 – 59	B (Above)
45 – 49	C (Average)
40 – 44	P (Pass)
< 40	F (Fail)

h) Implement Python Script to generate prime numbers series up to N.
i) Given a number x, determine whether it is Armstrong number or not. Hint: For example, 371 is an Armstrong number since 3**3 + 7**3 + 1**3 = 371. Write a program to find all Armstrong number in the range of 0 and 999.

(10)

UNIT-III

Data Structures Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions. **Functions** - Defining Functions, Calling Functions, Passing Arguments, variable in python-Global and Local Variables.

a) Write a Python script to
    - create a list
    - access elements from a list

- slice lists
- change or add elements to a list
- delete or remove elements from a list

b) Write a Python script to read the values from a list and to display largest and smallest numbers from list.
c) Write a Python script to compute the similarity between two lists.
d) Write a Python script to read set of values from a Tuple to perform various operations.
e) Write a Python script to perform basic dictionary operations like insert, delete and display.
f) Write a Python program to count the occurrence of each word in a given sentence.
g) Define a dictionary named population that contains the following data.

Keys	Values
Shanghai	17.8
Istanbul	13.3
Karachi	13.0
Mumbai	12.5

h) Write a Python script to create Telephone Directory using dictionary and list to perform basic functions such as Add entry, Search, Delete entry, Update entry, View and Exit.
i) Implement Python script to display power of given numbers using function.
j) Implement a Python program that takes a list of words and returns the length of the longest one using function.

(10)

UNIT-IV

String Handling - Modules: Creating modules, import statement, name spacing - **Files and Directories**

a) Implement Python program to perform various operations on string using string libraries.
b) Implement Python program to remove punctuations from a given string.
c) Write a Python program to change the case of the given string (convert the string from lower case to upper case). If the entered string is "computer", your program should output "COMPUTER" without using library functions.
d) Implement Python program to capitalize each word in a string. For example, the entered sentence "god helps only people who work hard" to be converted as "God Helps Only People Who Work Hard"
e) Write a Python script to display file contents.
f) Write a Python script to copy file contents from one file to another.

g) Write a Python script to combine two text files contents and print the number of lines, sentences, words, characters and file size.

h) Write a Python commands to perform the following directory operations.

- List Directories and Files
- Making a New Directory
- Renaming a Directory or a File
- Removing Directory or File

(10)

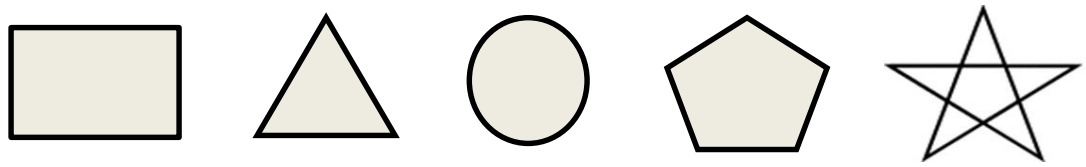
UNIT-V

Python packages, Introduction to PIP, Installing Packages via PIP (Numpy, Pandas etc.), Using Python Packages.

Brief Tour of the Standard Library - Dates and Times, Data Compression, Turtle Graphics.

a) Create a package named Cars and build three modules in it namely, BMW, Audi and Nissan. Illustrate the modules using class. Finally, we create the __init__.py file. This file will be placed inside Cars directory and can be left blank or we can put the initialization code into it.

b) Write a python script to display following shapes using turtle.



(10)

Course Outcomes:

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

1. Understand problem solving techniques and their applications.
2. Apply the basic elements and constructs of python to solve simple logical problems.
3. Demonstrate different data structures using functions.
4. Demonstrate different file operations and modules.
5. Apply object-oriented principles to build simple applications.

Text Book:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/think-python/)

2. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

References:

1. Charles Dierbach, “Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.
2. John V Guttag, “Introduction to Computation and Programming Using Python’’, Revised and expanded Edition, MIT Press , 2013.
3. Kenneth A. Lambert, “Fundamentals of Python: First Programs”, CENGAGE Learning, 2012.
4. Paul Gries, Jennifer Campbell and Jason Montojo, “Practical Programming: An Introduction to Computer Science using Python 3”, Second edition, Pragmatic Programmers,LLC,2013.
5. Robert Sedgewick, Kevin Wayne, Robert Dondero, “Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.

Mode of Evaluation: Model Lab Examinations, External Lab End Examination.

B. Tech I Year I Semester

18CHE201 CHEMISTRY LABORATORY

L	T	P	C
0	0	3	1.5

Course Prerequisites: Intermediate

Course Description:
It deals with basic principles of volumetric and instrumental analytical methods.

Course Objective:
This Engineering Chemistry Laboratory is common to all branches of I Year B Tech. At the end of the course the student is expected to Students will learn to estimate the chemical impurities present in water such as hardness, alkalinity, chlorine, etc.

1. Understand and experience the synthetic methods for the preparation of a polymer / inorganic (or) organic compounds.
2. Be trained to use the instruments for to practically understand concepts of electrochemistry.
3. Bridge theoretical concepts and their practical engineering applications, thus highlighting the role of chemistry in engineering
4. Learn and understand the practical implementation of fundamental concepts.

CHOICE OF 10 EXPERIMENTS FROM THE FOLLOWING

1. Estimation of total, permanent and temporary hardness of water by EDTA method.
2. Estimation of Chloride content in bleaching powder.
3. Estimation of alkalinity of water sample.
4. Determination of rate constant of a chemical reaction/process
5. Adsorption of acetic acid by charcoal.
6. Determination of rate of corrosion by colorimetry (Galvanized steel and $CuSO_4$).
7. Synthesis of a polymer and determination of molecular weight by measuring viscosity.
8. Saponification/acid value of an oil.
9. Synthesis of an inorganic complex.
10. Synthesis of a simple organic compound / Preparation of Thiokol Rubber.
11. Determination of strength of an acid Pb-Acid battery by conductometric titration (Neutralisation Titration).
12. Conductometric titration of BaCl2 Vs Na2SO4 (Precipitation Titration).
13. Dissociation constant of weak electrolyte by Conductometry.
14. Determination of percentage of Iron in Cement sample by colorimetry.
15. Estimation of ferrous ion by potentiometric titration (Redox Titration).

Course Outcomes:

After the completion of the Engineering Chemistry Laboratory experiments, students will be able to

1. Develop and perform analytical chemistry techniques to address the water related problems (for e.g., hardness, alkalinity, dissolved oxygen present in water) technically.
2. Synthesize and analyse the given chemical compound / material for engineering applications towards the needs of the society, environment, etc.
3. Procure practical skills to handle spectroscopic methods to understand the rate of corrosion, colour and much more topics applicable in industry.
4. Operate various instruments for the analysis of materials and produce accurate results in a given time frame.
5. Think innovatively and improve the creative skills that are essential for solving engineering problems.

Text Book:

1. Engineering Chemistry Lab Manual, Dept. of Chemistry, Madanapalle Institute of Technology and Science, Madanapalle – 517325, Chittoor Dist., Andhra Pradesh, India.
2. "Vogel's Textbook of Qualitative Chemical Analysis", Arthur Israel Vogel, Prentice Hall, 2000.
3.

Mode of evaluation: Continuous Evaluation of the lab Experiments, Record, Viva-voce and External Lab Examination.

B. Tech. I Year I Semester

18CSE202 ENGINEERING & IT WORKSHOP

L	T	P	C
0	0	3	1.5

Course Prerequisite: None

Course Description:
This course will provide students with a hands-on experience on various basic engineering practices CSE and presenting the final product design.

Course Objective

1. Introduction to the use of Tools and Machinery in foundry, forging, tinsmith, carpentry, welding, fitting, working, fabrication of plastic components, fabrication of polymer composite materials, simple machine turning and wood turning, basic electrical connections
2. Introduction of basic electrical engineering
3. Fabrication of final product design at end of the semester.

LIST OF EXPERIMENTS

1. Carpentry (Cross half lap Joint and Miter Joint)
2. Fitting (Square and 'V' fit)
3. Sheet Metal - Tin smithy (Square tray)
4. Foundry (Solid and Split pattern)
5. Welding (Arc and Gas welding) – SingleV Butt Joint, T-fillet Joint
6. Plastic fabrication (Pen Stand)
7. Metrology (Internal and External dimension)
8. Introduction of Power Tools and CNC (Demo Only)
9. Introduction to 3D Printing (Demo Only)

Course Outcomes: On successful completion of this course, the student will be able to

1. Fabricate carpentry components with suitable joint and pipe connections including plumbing works.
2. Practice the welding equipment to join the structures
3. Effective the basic machining operations
4. Create the models using sheet metal and plastic works.
5. Illustrate the operations of foundry, fitting and smithy
6. Fabrication product in composite material and product in plastic material
7. Conduct experiment basic electrical wire connection
8. Design and fabrication of final product design

Mode of Evaluation: Continuous Internal Evaluation, Practical Examination (Project show).

Suggested Text/Reference Books:

(i) Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

(ii) Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition, 2002.

(iii) Gowri P. Hariharan and A. Suresh Babu, "Manufacturing Technology – 1" Pearson Education, 2008.

(iv) Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998. (v) Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.

IT WORKSHOP

L	T	P	C
0	0	3	1.5

Course Prerequisite: None

Course Description:

This course helps the students to understand the basic components of a computer, installation of operating systems, working on productivity tools Word power, point excel. Also it gives a basic understanding of using Google tools and various emails setting in Gmail.

Course Objectives:

1. The course focuses on enhancing student knowledge in computer peripherals and assembling.
2. To install operating system on computers and create new email account.
3. To understand basic software like WinRAR, WinZip, PDF readers and web browser.
4. To provide technical training to the students on Google tools like forms, calendar, drive, translate and Photo.
5. To make the students to install software like JDK, Turbo C compiler and .net

LIST OF EXPERIMENT

1. Components of Computer & Assembling a Computer:

Learning about the different parts of the computer and its advancement

- Processor
- Memory – Types
- Motherboard
- Peripheral interfaces – I/O devices
- Learn about the proper connectivity among the devices inside the PC
- Assembling the different parts of the computer inside the cabinet

2. Install Operating System

- Partition the disk drive based on the capacity and the OS to be installed using utility tools
- Install Windows
- Install Linux or Ubuntu - use command line installation

3.Basic PC Troubleshooting

- Awareness on the possible issues in a computer
- Troubleshooting the problems using the available tools
- Removal and repair of existing software
- Identification of suitable Device driver for Hardware Devices.

4. Learning Basic Software:

- Installation of Productivity tools like WinRAR, WinZip, and PDF Reader.
- Installation of Image Editor and Web browsers.
- Basic Software installation in Linux based system.
- Connect the Printer and Scanner Devices perform printing and scanning operation.

5. Productivity Tools (Office 365):

- Generate, manipulate, search, aligning content using MS Word.
- Creation of Excel sheet with various column and rows applying various Excel formulas.
- Create Presentation and Visualization – graphs, charts, 2D, 3D.
- Create a database template using MS Access.
- Draw flowchart using the Drawing tools – Google Quick draw,sketchup,

6. Introduction to Google Tools

- Design a Google form and collect a response date among students using Google Form.
- Schedule One day of your activities using Google Calendar.
- Store and Retrieve Date from cloud storage using Google Drive.
- Translate the English language sentence to Telugu sentence using Google Translate
- Organizing photo and editing photo using Google Photos.

7. Exploring Email

- Creation, Composing and Sending the E-mail.
- Use High Priority setting to categories the mail.
- Create a Folder in different Categories and move the received mail to Folder.
- Unsubscribing unwanted emails
- Enable settings for automatic reply

Add_on content:

Networking Commands: ping, ssh, ifconfig, scp, ipconfig, traceroute, nslookup, getmac

Technical Stack : Windows 7 /UbantuOs – Winrar,Winzip,PDF reader, Office Package.

Course Outcomes:

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

1. Understand the working principles of computer hardware
2. Demonstrate Installation of Operating Systems and troubleshooting using utility software.
3. Demonstrate Installation of basic application software.
4. Experiment various applications of MS Office.
5. Practice Google Tools and Email handling for effective communications.

Mode of Evaluation: Continuous Internal Evaluation, End Semester Practical Examination.

B. Tech I Year II Semester

B.Tech. I Year II Semester

18MAT110 LINEAR ALGEBRA

L	T	P	C
3	1	0	4

Course Prerequisite: 18MAT101

Course Description:
Linear algebra is one of the most important subjects in the study of engineering because of its widespread applications in electrical, communications and computer science. The objective of this course is to give a presentation of basic concepts of linear algebra to illustrate its power and utility through applications to computer science and engineering.

Course Objectives:
1. Understanding basic concepts of linear algebra (systems of linear equations, matrix calculus, vectors and basic vector operations).
2. Learn about vector spaces and sub spaces.
3. To become proficiency in solving computational problems of linear algebra.
4. To understand the axiomatic structure of modern mathematics and learn to construct simple proof.
5. Learn to solve Engineering problem.

UNIT I LINEAR EQUATIONS AND MATRICES
System of linear equations – Gaussian elimination/Jordan – block matrices –finding inverse of matrices – elementary matrices – permutation matrix – LDU factorization – applications to cryptography and electrical network **(12)**
.

UNIT II VECTOR SPACE
The n-space R^n and vector space – subspaces – bases – linear combination– span linearly dependent – independent – dimensions – finite dimensional – Row and column spaces – Rank and nullity – Bases for subspace – invertibility – application in interpolation . **(12)**

UNIT III LINEAR TRANSFORMATIONS
Basic Properties of Linear transformations – invertible linear transformation – matrices of linear transformations. **(12)**

UNIT IV VECTOR SPACE OF LINEAR TRANSFORMATIONS
Vector space of linear transformations – change of bases – similarity – application to computer graphics . **(12)**

UNIT V INNER PRODUCT SPACES
Dot Products and Inner products – the lengths and angles of vectors – matrix representations of inner products – Gram-Schmidt orthogonalization – orthogonal projections – relations of fundamental subspaces – orthogonal matrices and isometrics– applications to least square solutions. **(12)**

Course Outcomes:

This course meets the following student outcomes:

1. Solve systems of linear equations using Gaussian elimination and matrix inversion.
2. Demonstrate understanding of the concepts of vector space and subspace, linear independence, span, and basis.
3. Apply principles of matrix algebra to linear transformations.
4. Apply principles of vector space to linear transformations.
5. Demonstrate understanding of inner products and associated norms.

Text Book:

1. Jin Ho Kwak and Sungpyo Hong, "Linear Algebra", Second edition, Birkhaüser, 2004

Reference Books:

1. Stephen Andrilli and David Hecher, Elementary Linear Algebra, 3rd Edition, Academic Press(2006)

2. Charles W. Curtis, Linear Algebra, Springer (2004)

3. Howard Anton and Robert C Busby, Contemporary linear algebra, John Wiley (2003).

4. Gilbert Strang, Introduction to Linear Algebra.

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examination.

B. Tech. I Year II Semester

18PHY102 MODERN PHYSICS

L	T	P	C
3	1	0	4

Course Prerequisite: Intermediate

Course Description:
Waves & optics is a basic physics course, which will cover Waves, Optics, Quantum Mechanics, Semiconductors and Lasers.

Course Objectives:
1. Expose students to recognize and use a mathematical wave equation using the principles of oscillations and waves understanding the basic laws of nature through physics.
2. Educate students to think and participate deeply, creatively, and analytically in applying various kinds of forces in day today life.
3. Demonstrate the ability to identify and apply the appropriate analytic, numerical, computational and other mathematical reasoning, to situations of the physical world.
4. Analyze and understand the subjects Mechanics, Oscillations, Waves and Optics in preparing the students for advanced level courses.
5. Expose students to theoretical and mathematical aspects of Interference, Diffraction techniques and Lasers for mechanical testing of materials.
6. Adaptability to new developments in science and technology by successfully completing or pursuing graduate education in engineering.

UNIT I: WAVES
Simple Harmonic Motion, damped harmonic oscillations, forced harmonic oscillations, resonance, and quality factor. Superposition of vibrations along same direction (equal frequency) and in perpendicular directions, Lissajous figures. Transverse waves, solution of wave equation, velocity of a transverse wave along a stretched string, modes of vibration of stretched string, standing waves, standing wave ratio. **(12)**

UNIT II: OPTICS
Light as an electromagnetic wave, Huygens' Principle, superposition of waves, interference of light by division of wavefront- Young's double slit experiment, expression for fringe width, intensity distribution graph, interference of light by division of amplitude- interference in thin film by reflection, Newton's rings experiment, Michelson interferometer, Mach Zehnder interferometer. Diffraction, Diffraction grating, Farunhofer diffraction due to single slit, double slit and N-slit, Rayleigh criterion for limit of resolution-resolving power. **(12)**

UNIT III: QUANTUM MECHANICS
Introduction to Quantum Mechanics, Wave nature of Particles, Time-dependent and time-independent Schrodinger equations for wave function, Free-particle wave function and wave-packets, Uncertainty principles. Solution of Wave Equation. Solution of stationary-state Schrodinger equation for one dimensional problems–particle in a box, square-well potential, linear harmonic oscillator. Scattering from a potential barrier and tunnelling-scanning tunnelling microscope. **(12)**

UNIT IV: SEMICONDUCTORS

Introduction to Solids and Semiconductors, Free electron theory of metals, Fermi level, density of states, Bloch's theorem for particles in a periodic potential, Kronig-Penney model and origin of energy bands, metals, semiconductors, and insulators. Direct and indirect bandgap semiconductors, Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination (radiative and non-radiative), Carrier transport: diffusion and drift, p -n junction. **(12)**

UNIT V: LASERS

Introduction to Lasers, characteristics of Laser, interaction of radiation with matter-spontaneous and stimulated emission, Einstein's coefficients; amplification of light by population inversion, excitation mechanisms, types of lasers: solid-state lasers – ruby laser, gas lasers - He-Ne Laser, semiconductor p-n junction diode laser, dye laser, applications of lasers **(12)**

Course Outcomes:

Upon successful completion of this course, the students should be able to:

1. Describe a mathematical wave equation using the principles of oscillations and waves and explain the behavior of the oscillations.
2. Define and evaluate the fundamentals of mechanical testing of materials using Interference and Diffraction techniques.
3. Understand the idea of wave function and to solve Schroedinger equation for simple potentials.
4. Explain the role of semiconductors in different realms of physics and their applications in both scientific and technological systems.
5. Identify the four elements of different lasers and estimate laser operation parameters for material processing.

Text Books:

1. H. J. Pain, "The physics of vibrations and waves", Wiley, 2006.
2. A. Ghatak, "Optics", McGraw Hill Education, 2012.
3. D. J. Griffiths, "Quantum mechanics", Pearson Education, 2014.
4. B.G. Streetman, "Solid State Electronic Devices", Prentice Hall of India, 1995.
5. O. Svelto, "Principles of Lasers", Springer Science & Business Media, 2010

Reference Books:

1. H. J. Pain, "The physics of vibrations and waves", Wiley, 2006.
2. Physics Vol I & II, Halliday/Resnick/Krane 5th Edition, John Wiley, 2003.
3. D. A. Neamen, "Semiconductor Physics and Devices", Times Mirror High Education Group, Chicago, 1997.
4. Berkeley Physics Course Volume I, Tata-McGraw Hill.

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examination.

B. Tech I Year II Semester

18EEE101 BASIC ELECTRICAL ENGINEERING

L	T	P	C
3	0	0	3

Course Prerequisite: None

Course Description:
This course equips the students with a basic understanding of Electrical circuits and machines for specific applications. In specific, the course covers basic of DC circuit & its analysis, introduction to single-phase and three-phase AC Systems, magnetic circuits, transformers, DC & AC electrical machines, basic converters and Components of LT Switchgear.

Course Objectives:
1. To learn the basics of the D.C. circuit analysis.
2. To have an idea about single-phase and three-phase A.C. electrical circuits.
3. To gain knowledge about basic magnetic circuits and transformers.
4. To learn the construction and operation of D.C. and A.C. machines.
5. To understand the operation of basic rectifiers and various components of LT Switchgear.

UNIT I DC CIRCUIT ANALYSIS
Electrical circuit elements (R, L and C), voltage and current sources, Series and parallel resistive circuits, Kirchhoff's current and voltage laws, Nodal and Mesh analysis of simple circuits with dc excitation. Source Transformation, Star-Delta Transformation, Superposition Theorem. **(9)**

UNIT II AC CIRCUIT ANALYSIS
Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations. Three phase balanced circuits, voltage and current relations in star and delta connections. **(9)**

UNIT III MAGNETIC MATERIALS AND TRANSFORMERS
Magnetic materials, B-H characteristics, ideal and practical transformer, principle of operation, emf equation, equivalent circuit, losses in transformers, regulation and efficiency. **(9)**

UNIT IV DC AND AC MACHINES
Construction, working, emf equation of DC generator, methods of excitation, speed control of dc motor. Generation of rotating magnetic fields, construction and working of a three-phase induction motor. Introduction of Single-phase induction motor. **(9)**

UNIT V RECTIFIERS AND ELECTRICAL INSTALLATIONS
PN junction diode, half wave, full wave and bridge rectifiers. Components of LT Switchgear: switch fuse unit (SFU), MCB, ELCB, MCCB, types of wires and cables, earthing. **(9)**

Course Outcomes:

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

1. To understand and analyze basic DC electric circuits.
2. To measure and analyze various electrical quantities of single phase and three AC electric circuits.
3. To develop magnetic circuits to experiment and analyze the transformers.
4. To study the working principles of electrical machines.
5. To create power converters for domestic applications with LT switchgear.

Text Books:

1. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
2. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
3. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
4. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
5. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

References:

1. Abhijit Chakrabarti, "Circuit Theory : Analysis and Synthesis", Dhanpat Rai & Co., 2014
2. J.B. Gupta, "Theory & Performance of Electrical Machines", S. K. Kataria & Sons, 2013.
3. John Bird, "Electrical Circuit Theory and Technology", Fourth edition, Elsevier Ltd., 2010.

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examination.

B. Tech. I Year II Semester

18CSE102 C PROGRAMMING AND DATA STRUCTURES

L	T	P	C
3	0	0	3

Course Prerequisite: 18CSE101

Course Description:
This course includes C program basics, control structures, arrays, files, pointers and data structures.

Course Objectives:
1. To make the student understand problem solving techniques and their applications
2. Students will be able to understand the syntax and semantics of C programming language
3. Develop algorithms for manipulating stacks, queues, searching and sorting.

UNIT I C PROGRAMMING
Structure of C Program, C Tokens: Variables, Data types, Constants, Identifiers, key words and Operators, Expressions. **Control Structures**: Conditional Statements (Simple if, if-else, Nested - if-else, Switch). Iterative Statements (for, While, Do-While), Jump Statements (break, Continue). **(9)**

UNIT II FUNCTIONS & ARRAY
Functions Introduction, User defined function, accessing a function, Function prototypes, Recursion, storage classes **Arrays**: Defining an array, processing an array, one dimensional arrays, two dimensional arrays. **Searching:** Linear and Binary search **Sorting:** Bubble Sort and Insertion Sort. **(9)**

UNIT III POINTERS AND STRUCTURE
Pointers: Fundamentals of pointer, Pointer Declarations, Parameter passing: Pass by value, Pass by reference – Example Program: Swapping of two numbers and changing the value of a variable using pass by reference. Dynamic memory allocation. **Structures:** Defining a structure, processing a structure. **(9)**

UNIT IV DATA STRUCTURES
Classification of Data Structure, **Stack and Queues:** stack, stack operations, stack implementations using arrays.Queue, queue operations, queue implementations using array, types of queues, applications of stack and queue. **(9)**

UNIT V STRINGS & FILES
Declaring and Defining a string, Initialization of strings, Strings Library functions **Files:** File Definition, Opening and closing a data file, Reading and Writing a data file, Files I/O Functions. **(9)**

Course Outcomes:

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

1. Illustrate the use of control structures, decision making and looping statement.
2. Build programs using arrays and functions.
3. Implement the concepts of pointer, structure and list.
4. Implement storage and retrieval of ordered data using stacks and queues.
5. Illustrate the concepts of Strings and File processing.

Text Books:

1 The C Programming Language, Kernighan and Ritchie, 2 nd Edition, Prentice Hall, India 1988.

2 Alfred V. Aho, John E. Hopcroft and Jeffry D. Ullman, Data Structures and Algorithms, Pearson Education, New Delhi, 2006.

References:

Programming in ANSI C, E. Balagurusamy, Sixth Edition, Tata Mc-Graw Hill Publishing Co.Ltd.-New Delhi

Problem Solving & Program Design in C, Hanly, Jeri R and Elliot. B Koffman, Pearson Education,5th edition, 20007.

K. N. King ,"C Programming ": A Modern Approach, 2nd Edition 2nd Edition

Byron Gottfried , Jitender Chhabra , Programming with C (Schaum's Outlines Series)

Mode of Evaluation: Assignment/Quiz, Internal Mid Examinations and External End Examination.

B. Tech I Year II Semester

18PHY201 PHYSICS LABORATORY

Course Prerequisite: None

L	T	P	C
0	0	3	1.5

Course Description:
Physics Practical course is meant for making the students to gain practical knowledge to co relate with the theoretical studies. It covers experiments on Principles of Mechanics and Optics, Measurement of Magnetic field and studying Resonance using LCR Circuit.

Course Objectives:
1. Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.
2. Illustrate the basics of mechanics, waves and opticsto analyze the behavior and characteristics of various materials for its optimum utilization.
3. Develop an ability to apply the knowledge of physics experiments in the later studies.

LIST OF EXPERIMENTS: (Any 10 Out of 12)

1. Spring constant - Coupled Pendulums
2. Study of resonance effect in series and parallel LCRcircuit
3. Determination of radius of curvature of a curved surface - Newton's Rings
4. Wavelength of a laser - Diffraction Grating
5. Wavelength of the spectral lines - Diffraction Grating
6. Magnetic field along the axis of a current carrying coil - Stewart Gees' Apparatus
7. Ferroelectric hysteresis
8. Thickness of a given wire - Wedge Method
9. Dispersive power of prism – Spectrometer
10. Frequency of the tuning fork - Melde's apparatus
11. Energy gap of a material of p-n junction.
12. Width of single slit - Diffraction due to Single Slit

Course Outcomes:
Upon successful completion of this course, the students should be able to:
1. Apply the scientific process in the conduct and reporting of experimental investigations.
2. Understand measurement technology, usage of new instruments and real time applications in engineering studies.
3. Verify the theoretical ideas and concepts covered in lecture by doing hands on in the experiments.
4. Know about the characteristics of various materials in a practical manner and gain knowledge about various optical technique methods.
5. Acquire and interpret experimental data to examine the physical laws.

Mode of Evaluation: Continuous Evaluation of the lab Experiments, Record, Viva-voce and External Lab Examination.

B. Tech. I Year II Semester

18EEE201 ELECTRICAL ENGINEERING LABORATORY

L	T	P	C
0	0	3	1.5

Course Prerequisite: None

Course Description:
The laboratory facilitates the students to deal with electrical instruments which further strengthen the concepts & operation of various AC & DC circuits, and machines, and their characteristics. The lab also reinforce the concepts discussed in class with a hands-on approach which enable the students to gain significant experience with electrical instruments such as ammeter, voltmeter, digital multimeters, oscilloscopes, tachometer, switches, fuses and power supplies.

Course Objectives:
1. To provide hands on experience in setting up simple electrical circuits (DC and AC).
2. To get exposure to handle different electrical equipment's.
3. To measure various electrical parameters with different measuring instruments.
4. To get hands on experience in operating DC and AC machines.
5. To understand the operation of basic converters and various components of LT Switchgear.

LIST OF LABORATORY EXPERIMENTS/DEMONSTRATIONS

DEMONSTRATIONS:
1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
2. Demonstration of voltage and current relationships (line-line voltage, phase-to-neutral voltage, line and phase currents). In star and delta connections.
3. Demonstration of cutout sections of transformer and DC & AC machines.
4. Demonstration of induction machine. Motor operation and generator operation of an induction machine driven at super-synchronous speed.
5. Familiarization of (i) different types of cables/wires and switches and their uses, (ii) different types of fuses & fuse carriers; MCB, ELCB, MCCB their ratings and uses (components of LT switchgear).

EXPERIMENTS:
1. Wiring of a simple circuit for controlling a lamp/fan point.
2. Wiring of a power circuit for controlling an electrical appliance (16A Socket).
3. Verification of Kirchhoff's current and voltage laws (KCL & KVL).
4. Verification of superposition theorem
5. Sinusoidal steady state response of R-L, and R-C circuits (impedance calculation and verification).
6. Measurement of voltage, current and power in a single phase circuit using voltmeter, ammeter and wattmeter. Also, calculate the power factor of the circuit.

7. Measurement of active power for star and delta connected balanced loads (single wattmeter method).
8. Open-circuit and short-circuit test on a single phase transformer.
9. Speed control of separately excited DC motor.
10. Wiring of a power distribution arrangement using single phase MCB distribution board with ELCB, main switch and energy meter (or residential house wiring).

Course Outcomes:

Upon successful completion of the course, the students are expected to

1. Get an exposure to common electrical components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical measuring instruments.
4. Understand the basic characteristics of transformers and electrical machines.
5. Get an exposure to the working of various power electronic converters.

Mode of evaluation: Continuous Evaluation of the lab Experiments, Record, Viva-voce and External Lab Examination.

B. Tech. I Year II Semester

18CSE201 C PROGRAMMING AND DATA STRUCTURES LABORATORY

L	T	P	C
0	0	3	1.5

Course Prerequisite: 18CSE101

Course Description:
This course includes C program basics, control structures, arrays, files, pointers and data structures.

Course Objectives:
1. To make the student understand problem solving techniques and their applications
2. Students will be able to understand the syntax and semantics of C programming language
3. Develop algorithms for manipulating linked lists, stacks, queues, searching and sorting.

LIST OF EXPERIMENTS

1. a) Write a C program to swap the two numbers.
   b) Write a C Program to find the eligibility of admission for a Professional course based on the following criteria:
   Marks in Maths >=65
   Marks in Physics >=55
   Marks in Chemistry>=50
   OR
   Total in all three subject >=180

2 a) Write a C program to list all the factorial numbers less than or equal to an input number n.
   A number N is called a factorial number if it is the factorial of a
   Positive integer. For example, the first few factorial numbers are
   1, 2, 6, 24, 120, ...
   Note - We do not list the factorial of 0.
   b) Write a program that reads numbers which are in the range 0 to 100, till it encounters -1. Print the sum of all the integers that you have read before you encountered -1

3 a) Given three points (x1, y1), (x2, y2) and (x3, y3), write a program to check if all the three points fall on one straight line.
   b) The digital root (also called repeated digital sum) of a number is a single digit value obtained by an iterative process of summing digits. Digital sum of 65536 is 7, because 6+5+5+3+6=25 and 2+5 = 7. Write a program that takes an integer as input and prints its digital root.

4. a) Write a C program to find the series of prime numbers in the given range.
   b) Write a C Program to Check Whether a Number is Palindrome or Not.

5. a) Write a c program to check whether a given number is a perfect number or not. (Perfect number is a positive number which sum of all positive divisors excluding that number is

equal to that number. For example 6 is perfect number since divisor of 6 are 1, 2 and 3. Sum of its divisor is 1 + 2+ 3 = 6)

b) Write a C function to find the kth occurrence of an integer n in a sequence of non-negative integers, and then call your function from main.

Your function should be according to the following declaration:

int find(int n, int k);

sample example: input 3 2

1 1 3 2 3 -1

Output: 4

6) Write a C program to find Factorial, GCD, Fibonacci, (Using recursion)

7. Your program should take as input: dimension of a square matrix N, two matrices of size N x N with integer values, and one operator symbol (+, - ,*). It must perform the Corresponding operation given below

a) Matrix Addition b) Matrix Subtraction c) Matrix Multiplication

8. One needs to first input a set of N number of ALPHABETIC Strings each representing a name of a student in an array studname [N] . Assume each string can be Max. 40 Characters long. subsequently, one needs to input Marks obtained by those students in another array marks [N] Assume that studname [I] i.e. ith student in the list of student names has obtained Marks [I] in the Marks List. You need to find out and print the Max Marks obtained by a student and also print the name of the student who has obtained this marks.

9. Implement the following searching techniques

a) Linear Search b) Binary Search

10.a) Bubble sort is a sorting algorithm that works by repeatedly stepping through lists that need to be sorted, comparing each pair of adjacent items and swapping them if they are in the wrong order. This passing procedure is repeated until no swaps are required, indicating that the list is sorted. Bubble sort gets its name because smaller elements bubble toward the top of the list. Consider an array of size 10. It will be filled it by reading 10 integers. The final output will be sorted output in Ascending Order.

b) Insertion sort is a sorting algorithm in which the elements are transferred one at a time to the right position. Here the first element in the array is considered as sorted, even if it is an unsorted array. Then each element in the array is checked with the previous elements, resulting in a growing sorted output list. With each iteration, the sorting algorithm removes one element at a time and finds the appropriate location within the sorted array and inserts it there. The iteration continues until the whole list is sorted. First an array of size 10 will be taken. We will fill it by reading 10 integers. The final output will be sorted output in Ascending Order.

11 a) Write a C program to swap two integers using pointers. You have to write a swap function that will accept the address of two integers and swap their values

b) Write a program in C to add two numbers using pointers. You have to write the fsum() function which accepts the address of two variables and returns the sum of their values to the main function.

12. Write a C program to compute internal marks of students for five different subjects using Structures.

13. Implement the following Data Structures
    a) Stack ADT b) queue ADT c) Circular queue ADT

14. a)Write a C program to implement all string operations (string length, string copy, string compare, string concatenation and string reverse) without using standard string library functions.
    b) Write a C program for reading a string and assigning its base address to the character pointer to count characters are vowels or consonants.

15.a) Write a C program to copy the file contents from one file to another file (pass file names as Command line arguments).
    b) Write a C program to count no of lines, words and characters in a file.

Course Outcomes:

After completing this course the students should be able to

1. Apply the concepts of control structures using C.
2. Implement the concepts of arrays and functions through C programming.
3. Develop the source code to implement the concepts of Strings, Pointers and File processing.
4. Implement sorting and searching algorithms using arrays.
5. Implement stack and queue data structures using arrays.

Mode of Evaluation: Continuous Internal Evaluation, Practical Examination.

B. Tech II Year I Semester

B. Tech. II Year I Semester

18HUM102 PRINCIPLES OF MANAGEMENT

L	T	P	C
3	0	0	3

Course Prerequisite: None

Course Description: The course provides students with a practical and concrete explanation of management concepts and techniques they will need to manage today's and tomorrow's organizations. The course will follow the "planning, organizing, leading, controlling" format of managerial functions while putting together many small pictures presented by individual modules into one bigger meaningful picture in which managerial knowledge would apply. At the end of the course students are expected to understand role of components of bigger picture and interactions between and among components.

Course Objectives:

The course is intended to:

1. Describe the concepts of Management theories, approaches and their application with organizations around us;
2. Know the concepts of planning and management;
3. Explain the basic concepts of organization, types and structure of organization;
4. Make the students know leading, good communication, theories of motivation; and
5. Explain about controlling, managing operations and functional areas of marketing and financial management.

UNIT I: INTRODUCTION:

Introduction to Management and Organizations- Management definition, skills, roles, goals and functions of a manager, organization, value of studying management - Managing in a Global Environment- Global Perspective, Understanding global environment, - Social Responsibility and Managerial Ethics. **(9)**

UNIT II: PLANNING

Decision-making process, Types of decisions and decision making conditions, styles, biases and errors, Planning: Meaning of planning, establishing goals and developing plans, contemporary issues in planning - Strategic Management-Importance of strategic management, strategic management process, types of organizational strategies, current issues in strategic management.

(9)

UNIT III: ORGANIZING:

Organizational structures - HRM process, Contemporary issues in HRM – Departmentation – decentralization – delegation of Authority - Managing Change and Innovations. **(9)**

UNIT IV: COMMUNICATION, MOTIVATION AND LEADING

Functions of communication, Inter-personal communication, Barriers of Communication – Understanding Information Technology- Motivation**:** Theories of motivation and current issues in motivation. Leading: Leaders and Leadership, Leadership theories - Leadership issues in twenty first century **(9)**

UNIT V: CONTROLLING

Process of control – Types of Control - feed-forward, concurrent and feedback controls, contemporary issues in control – Strategic role of Operations Management - Value Chain Management **(9)**

Course Outcomes:

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

1. Understand the various concepts, approaches and theories of management in the real situation,
2. Analyze the concept of planning and apply on the decisions in strategic management,
3. Compare organization structure designs and chart diligently with theoretical learning concepts,
4. Apply communication and theories of motivation in an organization, and
5. Understand various tools for controlling organizational performance and apply to achieve the corporate objectives.

Text Book:

1. Stephen P. Robbins, Mary Coulter "Management", Pearson Education, 2010, 10th edition.

References:

1. Gary Dessler, "Management", Prentice Hall, Inc., 1998, 1st edition.
2. Daft Richard L. 'Management' Thomson South Western, 5th edition.
3. Koontz H. and Weihrich H., "Essentials of Management", McGraw Hill Int. ed., 2004, 6th edition.

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examinations.

B. Tech. II Year I Semester

18MAT111 PROBABILITY MODELS AND STATISTICS

L	T	P	C
3	1	0	4

Course prerequisite: 18MAT101

Course description:
Probability, conditional probability, Bayes theorem, random variables, mathematical expectation, discrete and continuous distributions, joint distributions, Markov chains, Poisson process; queuing models, data analysis and testing of hypothesis.

Course objectives:

1. Introduce the probability concepts through sets, random variables and univariate probability distributions.
2. Study the joint probability distributions and introduce stochastic processes.
3. Understand the idea of Markov chains and Poisson process.
4. Analyze the queuing systems and data methods.
5. Apply statistical inference involving confidence intervals and hypothesis testing in engineering problems.

Unit I: Probability and random variables
Introduction to probability theory, discrete random variables, continuous random variables and expectation of a random variable. **(12)**

Unit 2: Joint distributions and Stochastic processes
Jointly distributed random variables, moment generating functions, conditional probability and conditional expectation. Introduction to stochastic processes. **(12)**

Unit 3: Markov Chains and Poisson process
Introduction to Markov chains, Chapman–Kolmogorov equations, classification of states, limiting probabilities, the Gambler ruin problem. Definition of the Poisson process, inter-arrival and waiting time distributions, properties of Poisson process. **(12)**

Unit 4 Queuing theory and data analysis
Queueing theory: Introduction, preliminaries- cost equations - steady-state probabilities, exponential models - A single-server exponential queueing system–single server exponential queueing system having finite capacity -birth and death queueing models -A shoe shine shop -A queueing system with bulk service. Moments, skewness, kurtosis, correlation and linear regression. **(12)**

Unit 5: **Tests of hypothesis**
Sampling distribution, tests of significance: Null and alternative hypothesis, errors in sampling, critical region and level of significance. Test of significance for large samples-single and difference of proportions, single and difference of means. Small sample tests: *t*- test for single mean, paired and difference of means, chi-square test for goodness of fit and test for ratio of variances. **(12)**

Text Books

1. S.M. Ross, Introduction to Probability Models, 10th edition, Academic press.
2. B.S. Grewal, Higher Engineering Mathematics, 43rd edition (2014), Khanna publishers.

Reference Books

1. A M Yagolam, I.M. Yagolam Probability and Information, Hindustan Pub. Corp (1983)
2. J. Jacob, P. Protter, Probability Essentials, Springer Verlag, 2nd edition (2013)
3. Blake, An Introduction to Applied Probability, John Wiley (2011)

Course outcomes:

After taking this course, the students should be able to

1. Understand the concepts of probability, univariate distributions and their importance.
2. Solve the joint distributions and stochastic processes evolving in time or space processes.
3. Avail the knowledge of Markov chains and Poisson process for analysis of random graphs.
4. Analyze the queuing systems and data.
5. Apply hypothesis testing to make decision in practical engineering problems.

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examination.

B. Tech. II Year I Semester

18CST101 DATA STRUCTURES

Course Prerequisite: 18CSE102

L	T	P	C
3	0	0	3

Course Description:
This course is aimed to provide basic understanding of different data structures and algorithms. This Course covers introduction to algorithms, basic data structures like linked lists, stacks, queues, various types of trees, graphs and their implementation.

Course Objectives:
1. To develop skills to design and analyze linear and nonlinear data structures.
2. Develop algorithms for manipulating linked lists, stacks, queues, trees and graphs.
3. Develop recursive algorithms as they apply to trees and graphs.

UNIT I: LIST AND STACK
Introduction: Algorithm specification, growth of functions, Asymptotic notations.
List: Singly Linked List and Its Operations, Doubly Linked List and its operations, Circular Lists.
Stack: Array representations, operations on stack. Applications of Stack. **(9)**

UNIT II: QUEUE
Queue: array and linked list representations, operations on queue, applications of queue, Circular queue, insertion and deletion, Dequeue. Priority queue: Definition and Applications, implementation using Heaps, Max Heap, Min Heap, Insertion into a Max Heap, Deletion from a Max Heap, Heap Sort. **(9)**

UNIT III:SORTING & HASHING
Sorting: Selection Sort, Merge Sort, Quick Sort, Radix Sort
Hashing: Dictionaries, HashTable Representation, Static and Dynamic Hashing, Collision Resolution methods-Open Addressing, Separate Chaining, Double hashing. **(9)**

UNIT IV: TREE
Tree: Introduction, Terminology, Binary Tree, representation, Binary Tree Traversals. **Binary Search Tree:** Properties, Insertion, Deletion, and Searching operations. **(9)**

UNIT V: BALANCE SEARCH TREES AND GRAPHS
Balanced Search Trees: AVL Trees, Red Black Trees, and Splay Trees. **Graphs:** Terminology, Representation, operations, Graph Traversal techniques. **(9)**

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

1. Design algorithms to implement various linked lists.
2. Implement queues using arrays and linked lists.
3. Compare the complexity of various sorting techniques.

4. Create binary tree and implement different traversal techniques.
5. Develop solutions for problems based on graphs.

Text Books:

1. Data Structures and Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffery D.Ulman.Pearson; 1st edition.
2. Data Structures and Algorithms Made Easy, Narasimha Karumanchi, CareerMonk Publications; 5th edition.

References:

1. Robert L. Kruse, Alexander J. Ryba, Data Structures and Program Design in C++, Prentice Hall, 2ed.
2. Fundamentals of Data Structures using C++, Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Silicon Press, Second Edition. 2007.
3. Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
4. Data Structures, Algorithms and Applications in C++ by Sartaj Sahni, McGraw Hill, NY, Second Edition.
5. URL: http://nptel.ac.in/courses/106102064/
6. URL: https://swayam.gov.in/nd2_cec19_cs04
7. URL: https://swayam.gov.in/nd1_noc19_cs40

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examinations

B. Tech. II Year I Semester

18CST102 OBJECT ORIENTED PROGRAMMING USING JAVA

	L	T	P	C
Course Prerequisite: 18CSE101, 18CSE102	**3**	**0**	**0**	**3**

Course Description:

Basics of Object Oriented Programming - objects, classes, polymorphism, inheritance, static and dynamic binding. Object Oriented Programming using Java-classes, interfaces, inheritance, polymorphism, method dispatch, features for encapsulation and modularity.

Course Objectives:

1. Understand object oriented programming concepts, and apply them in solving problems.
2. Learn the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
3. To Introduce the implementation of packages and interfaces
4. Learn the concepts of exception handling and multithreading.
5. Learn the design of Graphical User Interface using applets and swing controls.

Unit – I : INTRODUCTION TO OOPS CONCEPTS AND CLASSES

Introduction to Object Oriented Programming, Java buzzwords, Java Programming Basics, Sample programs, Data types and operators, Control statements. **Classes:** Classes, Objects, Methods, Constructors, this and static keywords, Method and Constructor Overloading, Access modifiers, Polymorphism **Arrays:** One Dimensional and multi dimensional arrays. **(9)**

Unit – II : STRINGS, INHERITANCE, INTERFACES, AND PACKAGES

Strings: Strings, String Handling **Inheritance**: Basics, Usage of Super, Multi level hierarchy, Method overriding, Abstract class, Final keyword. **Packages:** Defining, Finding and Importing packages, Member Access. **Interfaces:** Creating, Implementing, Using, Extending, and Nesting of interfaces. **(9)**

UNIT III: EXCEPTION HANDLING &MULTI-THREADING

Exception Handling: Fundamentals, Types, Multiple catch clauses, Nested try blocks, Thrown Class, Using Finally and Throws, Built-in exceptions, User-defined exceptions. **Multi-threading:** Thread Class, Runnable interface, creating multiple threads, life cycle of thread, thread properties, synchronization, thread communication, suspending, resuming and stopping threads. **(9)**

Unit – IV : I/O STREAMS AND COLLECTION FRAME WORK CLASSES

I/O Streams: Byte Stream Classes and Character Stream Classes. **Collection Frame work :** Hierarchy of collection framework, ArrayList, LinkedList, Vector, Stack, Queue, Priority Queue, HashSet, LinkedHashSet, TreeSet. **(9)**

UNIT V: SWINGS

Swing – Introduction, limitations of AWT, MVC architecture, components, containers, Event Handling- Handling mouse and keyboard events, Exploring Swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables. **(9)**

Course Outcomes:

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

1. Understand object-oriented programming concepts for problem solving.
2. Build class hierarchy and packages for real world problems.
3. Develop thread safe Java programs with appropriate Exception handling.
4. Develop Java program with file storage and collections for memory storage.
5. Design GUI based applications.

Text Books:

1. Java The Complete Reference, Herbert Schildt, MC GRAW HILL Education, 9th Edition, 2016.

References:

1. "Programming with Java" T.V.Suresh Kumar, B.Eswara Reddy, P.Raghavan Pearson Edition.
2. "Java Fundamentals - A Comprehensive Introduction", Herbert Schildt and Dale Skrien, Special Indian Edition, McGrawHill, 2013.
3. "Java – How to Program", Paul Deitel, Harvey Deitel, PHI.
4. "Core Java", NageswarRao, Wiley Publishers.
5. "Thinking in Java", Bruce Eckel, Pearson Education.
6. Java and Object Orientation, an introduction, John Hunt, second edition, Springer.
7. "A Programmers Guide to Java SCJP", Third Edition, Mughal, Rasmussen, Pearson.

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examination.

B. Tech. II Year I Semester

18CST103 DATABASE MANAGEMENT SYSTEMS

Course Prerequisite: None

L	T	P	C
3	0	0	3

Course Description:

This course is designed to provide basic understanding on database systems and its design. The course material further used for developing any web based applications in which database is back end. Course covers from all basic and advanced queries of SQL, PL/SQL programs, Relational algebra and calculus, normal forms, low level details such as representing data elements of database and indexed structures, transaction management and data recovery.

Course Objectives:

1. To understand the components of DBMS and to study the database design.
2. To study the retrieval of data using relational algebra and calculus and the concept of normal forms in the design of database.
3. To comprehend the structure of SQL Queries to query, update, and manage a database.
4. To understand all constraints to develop a business application using cursors, triggers and stored procedures.
5. To provide knowledge on distributed databases, concurrency techniques.

UNIT I: DATABASE SYSTEM ARCHITECTURE AND RELATIONAL MODEL

Overview of Database Systems: Managing data, File Systems versus a DBMS,
Introduction to Database Design: Database design and ER Diagrams, Entities, Attributes and Entity sets, Relationships and relationship types, Additional features of ER model, conceptual design with the ER Model. **Introduction to Relational Model**: Introduction, Integrity Constraints, Logical database design, Introduction to views. **(9)**
Relational Algebra: Preliminaries, Relational algebra- Selection and Projection, Set Operations, Renaming, Joins, Division

UNIT II: RELATIONAL CALCULUS AND SQL

. Relational Calculus – Expressive power of Algebra and Calculus. **(9)**
The Database Language SQL – Simple Queries in SQL – Queries Involving More than One Relation, Sub Queries, aggregate operators, null values, complex integrity constraints, triggers and active databases Embedded SQL, Dynamic SQL, Cursors, Introduction to JDBC, Stored Procedures.

UNIT III: DATABASE DESIGN

Functional Dependencies– Rules about Functional Dependencies, Keys, Design of Relational Database Schemas, Multivalued Dependencies. **(9)**

UNIT IV: STORAGE STRATEGIES AND TRANSACTION PROCESSING

Storage strategies: Indices, B-trees, hashing. **Transaction Processing:**Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes,. **(9)**

UNIT V: DATABASE SECURITY

Databaserecovery Authentication, Authorization and access control, DAC, MAC and RBAC models, SQL injection. **(9)**

Course Outcomes:

At the end of the course, students will able to

1. Design database structure and represent ER model.
2. Construct relational algebra expressions for the query.
3. Design database and access data from the database using SQL queries.
4. Implement transaction processing techniques in database.
5. Design database security plan for database.

Text Books:

1. Database Management Systems, Raghu RamaKrishnan, Johannes Gehrke, 3rd Edition, 2003, McGraw Hill.
2. Database Systems, The Complete Book, Hector Garcia-Molina, Jeffrey D. Ullman and Jennifer Widom, 3rd impression, 2009, Pearson.

References:

1. "Data base System Concepts", Silberschatz, Korth, McGraw Hill, V edition
2. "Fundamentals of Database Systems", Elmasri Navathe, 6th edition, 2013, Pearson.
3. "Introduction to Database Systems", C. J. Date, Pearson Education.

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examination.

B. Tech. II Year I Semester

18CST201 DATA STRUCTURES LABORATORY

Course Prerequisite: 18CSE102, 18CSE201

L	T	P	C
0	0	3	1.5

Course Description:
This course is aimed to provide hands on experience to implement basic linear and nonlinear data structures. This course covers implementation of stack, queue, list, sorting techniques, binary search trees, and balanced search trees.

Course Objectives:
1. To develop skills to analyze and program linear and nonlinear data structures.
2. Develop different data structures with effective usage of arrays and linked lists.
3. Develop recursive algorithms as they apply to trees and graphs.

List of Experiments

1**.** Write a Program to Implement Singly Linked List and its operations.
2. a) Write a Program to Implement Stack Operations by using Array.
   b) Write a Program to Implement Stack Operations by using Linked List.
3. a) Write a program that uses stack operations to convert a given infix expression into its postfix.
b) Write a program that uses stack operations to evaluate given postfix expression.
4. a) Write a Program to implement the operations of Queue using array.
   b) Write a Program to implement the operations of Queue using linked list.
5. Write a Program to Implement Circular Queue Operations by using Array.
6. Write a Program to Sort the set of elements by using
   i) Quick Sort. iii) Merge Sort.
7. Write a Program to Implement All functions of a Dictionary by using Hashing.
8. Write a Program to Implement the Binary Search Tree Operations.
9. Write a Program to Perform the Tree Traversal Techniques by using Iterative Method
10. Write a Program to Perform the Tree Traversal Techniques by using recursion.
11. Write a program to Implement Insertion and Deletion Operations on AVL Trees
12. Write a program for implementing the following graph traversal algorithms:
    a) Depth First Search b) Breadth First Search.

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

1. Develop source code for operations on arrays and linked lists.
2. Implement stack and queue using array and linked lists.
3. Implement quick sort and merge sort algorithms using arrays.
4. Develop source code for insertion, deletion and traversal operations on binary and AVL trees.
5. Implement DFS and BFS techniques on graphs.

References:

1. Data Structures and Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffery D.Ulman.Pearson; 1st edition.
2. Data Structures and Algorithms Made Easy, Narasimha Karumanchi, CareerMonk Publications; 5th edition.
3. Robert L. Kruse, Alexander J. Ryba, Data Structures and Program Design in C++, Prentice Hall, 2ed.
4. Fundamentals of Data Structures using C++, Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Silicon Press, Second Edition. 2007.
5. Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
6. Data Structures, Algorithms and Applications in C++ by Sartaj Sahni, McGraw Hill, NY, Second Edition.

Mode of Evaluation: Continuous Evaluation of the Lab Experiments, Record, Viva-voce and External Lab Examination.

B. Tech. II Year I Semester

18CST202 OBJECT ORIENTED PROGRAMMING USING JAVA LABORATORY

Course Prerequisite: 18CSE102

L	T	P	C
0	0	3	1.5

Course Description:
Basics of Object Oriented Programming - objects, classes, polymorphism, inheritance, static and dynamic binding. Object Oriented Programming using Java-classes, interfaces, inheritance, polymorphism, method dispatch, features for encapsulation and modularity.

Course Objectives:

1. Understand object oriented programming concepts, and apply them in solving problems.
2. Learn the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
3. To Introduce the implementation of packages and interfaces
4. Learn the concepts of exception handling and multithreading.
5. Learn the design of Graphical User Interface using applets and swing controls.

LIST OF EXPERIMENTS:

1. a) Write a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant b2-4ac is negative, display a message stating that there are no real solutions.
   b) Write a Java program that find prime numbers between 1 to n.
   c) Write a Java Program that find the factorial of a number

2. a) The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that print the nth value in the Fibonacci sequence.
   b) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a Palindrome.
   c) Write a Java program for sorting a given list of names in ascending order.

3. a) Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by part<n> where n is the sequence number of the part file
   b) Write a java program to convert an ArrayList to an Array.
   c) Write a Java program to make frequency count of vowels, consonants, special symbols, digits, words in a given text.

4. a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
   b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
   c) Implement Stack using queues.

5. a) Write a java program to make rolling a pair of dice 10,000 times and counts the number of times doubles of are rolled for each different pair of doubles. Hint: Math.random()
   b) Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it is not a duplicate of any number already read display the complete set of unique values input after the user enters each new value.
   c) Write a java program to read the time intervals (HH:MM) and to compare system time if the system time between your time intervals print correct time and exit else try again to repute the same thing. By using StringToknizer class.

6. a) Write java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and second is Triangle. Each of the sub class overridden area() so that it returns the area of a rectangle and a triangle respectively.
   b) Write a Java program that creates three threads. First thread displays ―Good Morning‖ every one second, the second thread displays ―Hello‖ every two seconds and the third thread displays ―Welcome‖ every three seconds

7. a) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.
   b) Use inheritance to create an exception super class called EexceptionA and exception sub class ExceptionB and ExceptionC, where ExceptionB inherits from ExceptionA and ExceptionC inherits from ExceptionB. Write a java program to demonstrate that the catch block for type ExceptionA catches exception of type ExceptionB and ExceptionC

8. Write a Java Program to design login window using AWT components.

9. Develop an application for simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result

10. Design & Develop an application that creates a user interface to perform integer divisions. The user enters two numbers in the JtextFields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException Display the exception in a message dialog box.

11. Design a GUI application that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.

12. Design a GUI application for Cafeteria bill generation.

Project Based Learning:
Design and development a Mini project using OOPs concepts.

Course Outcomes

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

1. Apply the concepts of control structures using Java.
2. Perform operations on strings and files using java libraries.
3. Implement hierarchy concept using java classes.
4. Design and Develop thread based program with synchronization.
5. Design and implement GUI applications using Swings.

Mode of Evaluation: Continuous Evaluation of the Lab Experiments, Record, Viva-voce and External Lab Examination.

B. Tech. II Year I Semester

18CST203 DATABASE MANAGEMENT SYSTEMS LABORATORY

Course Prerequisite: None

L	T	P	C
0	0	3	1.5

Course Description:

This course is designed to provide basic understanding on database systems and its design. The course material further used for developing any web based applications in which database is back end. Course covers from all basic and advanced queries of SQL, PL/SQL programs, Relational algebra and calculus, normal forms, low level details such as representing data elements of database and indexed structures, transaction management and data recovery.

Course Objectives:

1. To understand the components of DBMS and to study the database design.
2. To study the retrieval of data using relational algebra and calculus and the concept of normal forms in the design of database.
3. To comprehend the structure of SQL Queries to query, update, and manage a database.
4. To understand all constraints to develop a business application using cursors, triggers and stored procedures.
5. To provide knowledge on distributed databases, concurrency techniques.

LIST OF EXPERIMENTS

1. To study DDL-create and DML-insert commands.

a) Create tables according to the following definition.
b) Insert the data as shown below.
c) From the above given tables perform the following queries:

(1) Describe deposit, branch.
(2) Describe borrow, customers.
(3) List all data from table DEPOSIT.
(4) List all data from table BORROW.
(5) List all data from table CUSTOMERS.
(6) List all data from table BRANCH.
(7) Give account no and amount of depositors.
(8) Give name of depositors having amount greater than 4000.
(9) Give name of customers who opened account after date '1-12-96'.

2. Create the below given table and insert the data accordingly.

Perform following queries

(1) Retrieve all data from employee, jobs and deposit.
(2) Give details of account no. and deposited rupees of customers having account opened between dates 01-01-06 and 25-07-06.

(3) Display all jobs with minimum salary is greater than 4000.
(4) Display name and salary of employee whose department no is 20. Give alias name to name of employee.
(5) Display employee no, name and department details of those employee whose department lies in(10,20)

To study various options of LIKE predicate

(1) Display all employee whose name start with 'A' and third character is ' 'a'.
(2) Display name, number and salary of those employees whose name is 5 characters long and first three characters are 'Ani'.
(3) Display the non-null values of employees and also employee name second character should be 'n' and string should be 5 character long.
(4) Display the null values of employee and also employee name's third character should be 'a'.
(5) What will be output if you are giving LIKE predicate as '%_%' ESCAPE '\'

3. To Perform various data manipulation commands, aggregate functions and sorting concept on all created tables.

(1) List total deposit from deposit.
(2) List total loan from karolbagh branch
(3) Give maximum loan from branch vrce.
(4) Count total number of customers
(5) Count total number of customer's cities.
(6) Create table supplier from employee with all the columns.
(7) Create table sup1 from employee with first two columns.
(8) Create table sup2 from employee with no data
(9) Insert the data into sup2 from employee whose second character should be 'n' and string should be 5 characters long in employee name field.
(10) Delete all the rows from sup1.
(11) Delete the detail of supplier whose sup_no is 103.
(12) Rename the table sup2.
(13) Destroy table sup1 with all the data.
(14) Update the value dept_no to 10 where second character of emp. name is 'm'.
(15) Update the value of employee name whose employee number is 103.

4. To study Single-row functions.

(1) Write a query to display the current date.
(2) For each employee, display the employee number, job, salary, and salary increased by 15% and expressed as a whole number. Label the column New Salary
(3) Modify your query no 4.(2) to add a column that subtracts the old salary from the new

salary. Label the column Increase
(4) Write a query that displays the employee's names with the first letter capitalized and all other letters lowercase, and the length of the names, for all employees whose name starts with J, A, or M. Give each column an appropriate label. Sort the results by the employees' last names.
(5) Write a query that produces the following for each employee: <employee last name> earns <salary> monthly
(6) Display the name, hire date, number of months employed and day of the week starting with Monday.
(7) Display the hiredate of emp in a format that appears as Seventh of June 1994 12:00:00 AM.
(8) Write a query to calculate the annual compensation of all employees (sal+comm)

5. Displaying data from Multiple Tables (join)

(1) Give details of customers ANIL.
(2) Give name of customer who are borrowers and depositors and having living city Nagpur
(3) Give city as their city name of customers having same living branch.
(4) Write a query to display the last name, department number, and department name for all employees.
(5) Create a unique listing of all jobs that are in department 30. Include the location of the department in the output
(6) Write a query to display the employee name, department number, and department name for all employees who work in NEW YORK.
(7) Display the employee last name and employee number along with their manager's last name and manager number. Label the columns Employee, Emp#, Manager, and Mgr#, respectively.
(8) Create a query to display the name and hire date of any employee hired after employee SCOTT.

6. To apply the concept of Aggregating Data using Group functions.

(1) List total deposit of customer having account date after 1-jan-96.
(2) List total deposit of customers living in city Nagpur.
(3) List maximum deposit of customers living in bombay.
(4) Display the highest, lowest, sum, and average salary of all employees. Label the columns Maximum, Minimum, Sum, and Average, respectively. Round your results to the nearest whole number.

(5) Write a query that displays the difference between the highest and lowest salaries. Label the column DIFFERENCE.
(6) Create a query that will display the total number of employees and, of that total, the number of employees hired in 1995, 1996, 1997, and 1998
(7) Find the average salaries for each department without displaying the respective department numbers.
(8) Write a query to display the total salary being paid to each job title, within each department.
(9) Find the average salaries > 2000 for each department without displaying the respective department numbers.
(10) Display the job and total salary for each job with a total salary amount exceeding 3000, in which excludes president and sorts the list by the total salary.
(11) List the branches having sum of deposit more than 5000 and located in city bombay.

7. To solve queries using the concept of sub query.

(1) Write a query to display the last name and hire date of any employee in the same department as SCOTT. Exclude SCOTT
(2) Give name of customers who are depositors having same branch city of mr. sunil.
(3) Give deposit details and loan details of customer in same city where pramod is living.
(4) Create a query to display the employee numbers and last names of all employees who earn more than the average salary. Sort the results in ascending order of salary.
(5) Give names of depositors having same living city as mr. anil and having deposit amount greater than 2000
(6) Display the last name and salary of every employee who reports to ford.
(7) Display the department number, name, and job for every employee in the Accounting department.
(8) List the name of branch having highest number of depositors.
(9) Give the name of cities where in which the maximum numbers of branches are located.
(10) Give name of customers living in same city where maximum depositors are located.

8. Manipulating Data
(1) Give 10% interest to all depositors.
(2) Give 10% interest to all depositors having branch vrce
(3) Give 10% interest to all depositors living in nagpur and having branch city bombay.
(4) Write a query which changes the department number of all employees with empno 7788's job to employee 7844'current department number.
(5) Transfer 10 Rs from account of anil to sunil if both are having same branch.
(6) Give 100 Rs more to all depositors if they are maximum depositors in their respective branch.

(7) Delete depositors of branches having number of customers between 1 to 3.
(8) Delete deposit of vijay.
(9) Delete borrower of branches having average loan less than 1000.

9. **a)** Create a cursor to update the salary of employees in EMP table .

b) Write a PL/SQL program to raise an Exception when the bonus exceeds salary

10. a) Create a trigger which checks whether employee with Emp_no is present in the Employee table before inserting into EMP.
b) Write a procedure to insert a record into ORDER table by validating qty limit of the item and also check whether that item exists

Project Based Learning:

Design and implementation of Student Information System

Course Outcomes:

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

1. Perform DDL and DML operations on database tables.
2. Design and implement complex queries to access the data using SQL join.
3. Implement stored procedures in PL/SQL.
4. Implement exceptions and triggers to solve the real time problems.
5. Design and develop a real world application to access and render data.

Mode of Evaluation: Continuous Evaluation of the Lab Experiments, Record, Viva-voce and External Lab Examination.

B. Tech II Year II Semester

B.Tech. II Year II Semester

18HUM101 ECONOMICS AND FINANCIAL ACCOUNTING FOR ENGINEERS

Course Prerequisite: None

L	T	P	C
3	0	0	3

Course Description: The Engineering Economics and Financial Accounting aims to provide an insight into production, cost analysis, market structure, Accounting Basic concepts and financial Statement Analysis. The course is designed to give emphasis on the application of real life examples on various fundamental issues of economics and accounts. This course introduces the accounting system, principles, types of accounts, and financial statements etc. The ratio analysis and financial analysis are useful to know the position of financial statements. Funds flows statements and cash flow statements are explained to know the analysis of financial matters.

Course Objectives: The course is intended to:

1. Describe the nature of engineering economics in dealing with the issues of scarcity;
2. Know the supply, demand, production and cost analysis to analyze the impact of economic events on markets;
3. Explain the performance of firms under different market structures and Price determination in various market conditions.
4. Explain the accounting principles, types of accounting and preparation of final accounts; and
5. Describe the financial analysis through ratios, funds flow and cash flow statements.

UNIT I: DEMAND ANALYSIS:

Scope and Significance of Economics- Understanding the problem of scarcity and choice - Elements of market Economy: Demand, Supply and Market Equilibrium- Theory of Demand, Elasticity of Demand, Supply and Law of Supply. **(9)**

UNIT II: PRODUCTION AND COST ANALYSIS

Production Function – Short-run and long- run production – Cost Analysis: Cost concepts - Cost Structure of Firms and output decision- Break-Even Analysis (BEA) – Managerial significance and limitations of BEA - Determination of Break Even Point (Simple Problems). **(9)**

UNIT III: MARKET STRUCTURE:

Classification of Markets - General Equilibrium and efficiency of Perfect competition, Monopoly, Monopolistic, Oligopoly, Duopoly – Price determination and various market conditions. **(9)**

UNIT IV: BASICS OF ACCOUNTING:

Uses of Accounting - Book Keeping Vs Accounting - Double Entry System - Accounting Principles - Classification of Accounts - Rules Of Debit & Credit. Accounting Cycle: Journal, Ledger, Trial Balance. Final Accounts: Trading Account - Profit & Loss Account - Balance Sheet with Adjustments, (Simple Problems). **(9)**

UNIT V: BASICS OF FINANCIAL ANALYSIS

Ratio Analysis - Liquidity, Leverage, Solvency and Profitability Ratios - Interpretation of Financial Statements - FundS Flow Statement - Capital Budgeting **(9)**

Course Outcomes:

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

1. Understand Engineering economics basic concepts,
2. Analyze the concepts of demand, elasticity, supply, Production, Cost Analysis and its essence in floating of an organization,
3. Compare different market structures and identify suitable market,
4. Demonstrate an understanding and analyzing the accounting statements, and
5. Demonstrate the ability to apply knowledge of accounting concepts through Financial Statements Analysis.

Text Book:

1. Case E. Karl & Ray C. Fair, "Principles of Economics", Pearson Education, 8th Edition, 2007
2. Financial Accounting, S.N.Maheshwari, Sultan Chand, 2009
3. Financial Statement Analysis, Khan and Jain, PHI, 2009
4. Financial Management, Prasanna Chandra, T.M.H, 2009

References:

1. Lipsey, R. G. & K. A. Chrystal , "Economics", Oxford University Press, 11th Edition, 2007
2. Samuelson P. A. &Nordhaus W. D. "Economics", Tata McGraw-Hill 18th Edition, 2007
3. Financial Management and Policy, Van Horne, James,C., Pearson ,2009.
4. Financial Management, I.M.Pandey, Vikas Publications

Mode of Evaluation: Assignments, Internal Mid Examination, External End Examination.

B. Tech. II Year II Semester

18MAT112 DISCRETE MATHEMATICAL STRUCTURES

L	T	P	C
3	0	0	3

Course Prerequisite: 18MAT101

Course Description:
This course introduces the concepts of discrete mathematics and their applications in computer science. It covers algebraic structures, combinatorics and finite state machines. It also provides insight into the concepts of graph theory and their applications.

Course Objectives

1. To introduce the concepts of logic, rules of inference and predicates.
2. To discuss the concepts on combinatorics.
3. To explain the concepts of algebraic structures.
4. To familiarize the principles of Lattices and Boolean algebra.
5. To illustrate the problems in graph theory.

Unit I: Mathematical Logic and Statement Calculus
Introduction -Statements and Notation - Connectives – Tautologies – Two State Devices and Statement logic - Equivalence - Implications - The Theory of Inference for the Statement Calculus –-The Predicate Calculus - Inference Theory of the Predicate Calculus. **(9)**

Unit II: Combinatorics
The Basics of Counting- The Pigeonhole Principle -Permutations and Combinations - Binomial Coefficients -Generalized Permutations and Combinations –Generating Permutations and Combinations. **(9)**

Unit III: Algebraic Structures
Semigroups and Monoids - Grammars and Languages –Types of Grammars and Languages – Groups – Subgroups – Lagranges Theorem –Homomorphism: Introduction –Properties - Group Codes. **(9)**

Unit IV: Lattices and Boolean algebra
Partially Ordered Relations-Posets-Hasse Digram - Lattices - Boolean algebra - Boolean Functions - Representation and Minimization of Boolean Functions. **(9)**

Unit V: Graph Theory
Basic Concepts of Graph Theory - Matrix Representation of Graphs – Trees - Storage Representation and Manipulation of Graphs-Dijkstra’s and Kruskal’s algorithms -Introduction to Finite State Machines **(9)**

Text Book

1. Discrete Mathematics and its Applications, seventh edition, Kenneth Rosen, Tata McGrawHill Education Private Limited.
2. Discrete Mathematical Structures with Applications to Computer Science J.P Tremblay, R.Manohar, TMH.

References

1. "Discrete mathematics for computer scientists and mathematicians", Mott, Kandel, Baker, PHI
2. Johnson Baugh R, and Carman R, Discrete mathematics, 6th edition, Person Education, 2003.
3. Kolman B, Busoy R.C, and Ross S.C, Discrete Mathematical Structures, Prentice Hall, 2004.

Course Outcomes

At the completion of the course the students will be able to:

1. Evaluate elementary mathematical arguments and identify fallacious reasoning (not just fallacious conclusions).
2. Understand the concepts of combinatorics.
3. Apply graph theory models of data structures and state machines to solve problems of connectivity under constraints such as scheduling.
4. Synthesize concepts of algebraic structures to represent the real system.
5. Learn elementary proofs and properties of modular arithmetical results; and explain their applications such as in cryptography and hashing algorithms.

Mode of Evaluation: Assignments, Internal Mid Examination, External End Examination.

B. Tech. II Year II Semester

18BIO101 LIFE SCIENCES FOR ENGINEERS

L	T	P	C
3	0	0	3

Course Prerequisites: Basic knowledge about sciences up to intermediate or equivalent level.

Course Description: The course deals with basic concepts of life sciences, its impact on human & universe, biological systems and functions, human physiology and metabolism.

Course Objectives

- Introduce the molecular basis of life.
- Provide the basis for classification of living organisms.
- Describe the transfer of genetic information**.**
- Introduce the techniques used for modification of living organisms**.**
- Describe the applications of biomaterials

Unit I: Introduction to Life Sciences & Living Organisms

Why we need to study Life Sciences? Comparison and differences of biological organisms with manmade systems (Eye & Camera, Bird flying & Aircraft), Biological observations of 18th Century that led to major discoveries. Classification of living organisms, Cellular basis of life, differences between prokaryotes and eukaryotes, classification on the basis of carbon and energy sources. **(8)**

Unit II: Biomolecules & Macromolecules

Molecules of life: Water, Sugars, Starch, Cellulose, Amino acids, Structure and functions of proteins (primary, secondary, tertiary and quaternary structure), Structure and functions of nucleotides, nucleic acids, DNA (single and double strand) & RNA, hemoglobin, antibodies and enzymes, Industrial applications of enzymes and Fermentation process. **(10)**

Unit III: Human Physiology

Bioenergetics, Respiration: Glycolysis and TCA cycle, Electron transport chain and oxidative phosphorylation, Human physiology, Neurons, Synaptic and Neuromuscular junctions. **(7)**

Unit IV: Genes, DNA & RNA

Mendel's laws, gene mapping, Mitosis and Meiosis, single gene disorders in humans, Genetic code, DNA replication, Transcription, Translation. Discuss the concept of complementation using human genetics. Recombinant DNA Technology: recombinant vaccines, transgenic microbes, plants and animals, animal cloning, biosensors, biochips. **(10)**

Unit V: Metabolism

Thermodynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergoinc reactions. Concept of Keq and its relation to standard free energy. ATP as an energy

currency. This should include the breakdown of glucose to CO_2 + H_2O (Glycolysis and Krebs cycle) and synthesis of glucose from CO_2 and H_2O (Mechanism of Photosynthesis). **(10)**

Course Outcomes

After studying the course, the student will be able to:

1. Explain the differences between biological organisms and manmade systems and classify organisms
2. Interpret the relationship between the structure and function of proteins, nucleic acid and summarize the industrial applications of biomolecules
3. Explain the mechanism of respiration
4. Demonstrate the mapping of genes and explain the medical importance of gene disorders.
5. Apply thermodynamic and kinetic principles to biological systems.

Text books:

1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, "Biology: A global approach", Pearson Education Ltd, 2018.
2. Arthur T Johnson, Biology for Engineers, CRC press, 2011.
3. Cell and Molecular Biology by De Robetis and De Robertis.

Reference Books:

1. Alberts Et. Al. The molecular biology of the cell, 6/e, Garland Science, 2014.
2. E. E. Conn, P. K. Stumpf, G. Bruening and R. H. Doi, "Outlines of Biochemistry", John Wiley and Sons, 2009.
3. John Enderle and Joseph Bronzino Introduction to Biomedical Engineering, 3/e, 2012.

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examination.

B. Tech. II Year II Semester

18CST104 DIGITAL LOGIC DESIGN

Course Prerequisite: None

L	T	P	C
3	0	0	3

Course Description: This course provides a modern introduction to logic design and the basic building blocks used in digital systems, in particular digital computers. It starts with a discussion of combinational logic, and also the course deals with sequential circuits, State machines, Different representations including truth table; logic gate, timing diagram, switch representation, and state diagram will be discussed.

Course Objectives:

1. The Objective of this course is to familiarize the student with fundamental principles of digital design.
2. Acquire the skills to manipulate and examine Boolean algebraic expressions, logical operations, Boolean functions and their simplifications.
3. Acquaint with classical hardware design for both combinational and sequential logic circuits.

UNIT I: BINARY SYSTEMS, BOOLEAN ALGEBRA AND LOGIC GATES

Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, RTL. Boolean Algebra and Logic Gates: Basic Definitions, Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits. **(9)**

UNIT II: GATE – LEVEL MINIMIZATION

The Map Method, Four Variable Map, Five-Variable Map, Product of Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Other Two Level Implementations, EX-OR Function, Other Minimization Methods. **(9)**

UNIT III: COMBINATIONAL LOGIC

Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Analysis of arithmetic units - Multiplication and Division algorithms, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexers, HDL description. **(9)**

UNIT IV: SYNCHRONOUS SEQUENTIAL LOGIC

Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Design Procedure, Registers, Shift Registers, Ripple Counters, Synchronous Counters. **(9)**

UNIT V: MEMORY AND PROGRAMMABLE LOGIC

Memory Hierarchy & different types of memories, Random access memory, memory decoding, Error Detection and Correction, Read-only Memory, Programmable Logic Array, Programmable

Array Logic, Design of Digital Systems- Algorithmic State Machines, Digital Integrated Circuits-TTL, MOS Logic families and their characteristics. **(9)**

Course Outcomes:

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

1. Compare different number systems and logic gates
2. Understand the logical elements to design various logical units.
3. Design combinational circuits
4. Design synchronous sequential circuits.
5. Illustrate the memory hierarchy and programmable logic.

Text Books:

1. Digital Design, M. Morris Mano, Micheal D. Ciletti, 5th Edition, 2013, Pearson.
2. G Raghurama, TSB Sudharshan "Introduction to Computer Organization". EDD notes 2007

References:

1. Donald D. Givonne, "Digital Principles and Design" TMH, 2003. Digital Logic & State Machine Design, David J. Comer, Oxford University Press, 3rd Reprinted Indian Edition, 2012.
2. Digital Logic Design, R.D. Sudhakar Samuel, Elsevier.
3. Computer System Architecture, M. Morris Mano, 3th Edition, pearson
4. Digital Logic Design, Leach, Malvino, Saha,TMH.

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examination.

B. Tech. II Year II Semester

18CST105 DESIGN AND ANALYSIS OF ALGORITHMS

L	T	P	C
3	0	0	3

Course Prerequisite: 18CSE102**,** 18CST102

Course Description:
This course emphasis on analysis of various types of algorithms. It provides idea to design the algorithm to solve the problems using complexity analysis.

Course Objectives:

1. To introduce the concepts of Algorithm Analysis, Time Complexity, Space Complexity.
2. To discuss various Algorithm Design Strategies with proper illustrative examples.
3. To introduce Complexity Theory with NP and Linear programming.

UNIT I: INTRODUCTION & DIVIDE AND CONQUER
Introduction: Algorithm specification, growth of functions, Asymptotic notations. **Divide and Conquer:** Master Method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Median finding Algorithm, Strassen's matrix multiplication.
(9)

UNIT II: GREEDY METHOD & DYNAMIC PROGRAMMING
Greedy Method: General method, Knapsack problem, Huffman Code, Job Scheduling with Deadlines, Minimum cost Spanning Trees. **Dynamic Programming:** Fibonacci, LCS, Matrix Chain Multiplication, Stamp Problem, Knapsack problems, The traveling sales person problem
(9)

UNIT III: GRAPH ALGORITHMS & ADVANCED GRAPH ALGORITHMS
Graph Algorithms: BFT, DFT, topological sort, Connected components, Minimum cost Spanning Trees, Kruskal's algorithm, Prim's algorithm.
Advanced Graph Algorithms: Shortest Path Algorithm: Single Source Shortest path Algorithm Dijkstra's, All Pairs Shortest Path Algorithm – Floyd Warshall's. **(9)**

UNIT IV: BACK TRACKING, BRANCH AND BOUND
Backtracking: Introduction, n-Queens Problem, sum of subsetproblem
Branch and Bound: The method, Travelling salesperson, 0/1 Knapsack problem. **(9)**

Unit V: NP–HARD AND NP– COMPLETE PROBLEMS
NP–Hard and NP–Complete Problems: Complexity Class - P, NP, NP Complete, NP Hard. Is P=NP?, Reducibility.
Network flow problem-Ford Fulkerson Algorithm for Maximum Flow Problem **(9)**

Course Outcomes:

1. Analyze the complexity of the algorithms and use divide and conquer technique to solve the problems.
2. Identify feasible solutions for different problems through greedy method and dynamic programming.

3. Solve the problems using graph algorithms.
4. Solve problems using Backtracking & Branch and Bound techniques.
5. Apply NP Hard & NP Complete techniques to solve complex problems.

Text Books:

1. Micheal T. Goodrich and Roberto Tamassia: Algorithm Design: Foundations, Analysis and Internet examples (Algorithms, MIT Press, Second Edition)
2. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran. Fundamentals of Computer Algorithms, MIT Press, Second Edition (Prentice Hall)

References:

1. Cormen T.H., Leiserson, C.E., Rivest, R.L., and C. Stein. Introduction to Algorithms, MIT Press, Second Edition.
2. Jon Kleinberg and Eva Tardos. Algorithm Design. Pearson Education. (2007)
3. Sanjoy Das Gupta, Christos Papadimitriou, Umesh Vazirani, Algorithms Tata McGraw-Hill Publishers
4. Alfred V. Aho, John E. Hopcroft, Jeffery D.Ulman. Data Structures and Algorithms

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examination.

B. Tech. II Year II Semester

18CST106 OPERATING SYSTEMS

L	T	P	C
3	0	0	3

Course Prerequisite: None

Course Description:
This course will cover the tradeoffs that can be made between performance and functionality during the design and implementation of an operating system. Particular emphasis will be given to three major OS subsystems: process management (processes, threads, CPU scheduling, synchronization, and deadlock), memory management (segmentation, paging, swapping), and file systems.

Course Objectives:
1. To learn the mechanisms of OS to handle processes and threads and their communication
2. To give introduction to shell programming.
3. To learn the mechanisms involved in memory management in contemporary OS
4. To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
5. To know the components and management aspects of concurrency management

UNIT I: INTRODUCTION
Concept of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic, Microkernel Operating Systems, Case study on UNIX and WINDOWS Operating System.
KORN SHELL PROGRAMMING: Basic Script Concepts, Expressions, Decisions: Making Selections, Repetition, Special Parameters and Variables, Changing Positional Parameters, Argument Validation, Debugging Scripts. **(9)**

UNIT II: PROCESS CONCEPTS
Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads, Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: **(9)**

UNIT III: PROCESS SYNCHRONIZATION AND DEADLOCKS
Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer\ Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc. Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery. **(9)**

UNIT IV: MEMORY MANAGEMENT STRATEGIES

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition– Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging. Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU). **(9)**

UNIT V: FILE SYSTEM

File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance. Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks. **(9)**

Course Outcomes:

At the completion of the course the students will be able to

1. Understand the structure and functionality of OS.
2. Compare process & threads and evaluate different process scheduling techniques.
3. Analyse the concurrent processing and deadlock situations.
4. Understand and analyze different memory management techniques.
5. Understand the file and disk management techniques.

Text Books:

1. Operating System Concepts Essentials, 9th Edition by Avi Silberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.

2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.

References:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing

2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley

3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India

4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

Mode of Evaluation: Assignments, Internal Mid Examinations, External End Examination.

B. Tech. II Year II Semester

18ENG201 ENGLISH COMMUNICATION – LISTENING & SPEAKING LABORATORY
(Common to all branches)

L	T	P	C
0	0	2	1

Course Prerequisite: 18ENG101

Course Description: As the **s**tudents are being exposed to the global language 'English; it has become a widespread need. This course builds on what was offered in the first semester and facilitates deeper understanding into the mechanics of the English language, especially in regard to two particular skills, i.e. Listening and Speaking. This course is offered in order to help students cultivate and nurture a mind that "thinks in English." Intricate issues of pronunciation, modulation, timbre are dealt with in regard to Speaking and also the sub-skills of Listening, thus the whole course is entirely lab oriented.

Course Objectives: This course enables students to
1. Hone in on their listening skills
2. Grasp the differences between native level and mother-tongue influenced pronunciation
3. Develop crucial speaking skills
4. Enhance vocabulary for greater communicative impact
5. Overall development of thinking in the English language

UNIT 1: Listening; Understanding key vocabulary; Listening for main ideas; Listening in detail; Syllable stress; Sentence stress; Presentation. **(12)**

UNIT 2: Vocabulary for important places (bank, library, restaurant, etc.); Prepositions for places; Stress determiners (this & that); Intonation. **(12)**

UNIT 3: Using background knowledge; Collocations; Pronouncing clusters of consonants (e.g. – gh, -ing, ph, ck); Mapping ideas; Pronunciation of phrases; Listening for opinion; Vocabulary and collocations for jobs **(12)**

UNIT 4: Listening for lecture organization; Text organization features; Phrases with make; Evaluating and proposing ideas; Expressing attitudes **(12)**

UNIT 5: Identifying opposing viewpoints; Silent letters; Idioms; Fixed expressions; Phrasal verbs **(12)**

Course Outcomes:

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

1. Listening with intent
2. Pronounce more fluently
3. Develop crucial thinking skills
4. Enhance vocabulary
5. Overall development in the English language

Suggested Reading/Textbook:

1. Sabina Ostrowska; *Unlock 3 series(B1): Listening & Speaking*; Published by: Cambridge University Press.

Reference:

1. Gary Buck; *Assessing Listening;* Cambridge University Press, 2010.
2. Adrian Doff, Craig Thaine, Herbert Puchta, et al; *Empower: Upper Intermediate (B2+)*; Published by: Cambridge University Press.
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5. Joseph Devlin; *How to Speak and Write Correctly*; ITHACA, N.Y.; W.P. HUMPHREY, 2006.
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Mode of Evaluation: Continuous Evaluation of the Lab Experiments, Record, Viva-voce and External Lab Examination.

B. Tech. II Year II Semester

18CST204 DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY

L	T	P	C
0	0	3	1.5

Course Prerequisite: 18CSE201, 18CST201

Course Description:
This course is aimed to provide hands on experience to analyze the time complexity of sorting, graph, tree, branch and bound algorithms.

Course Objectives:
1. To learn how to analyze a problem & design the solution for the problem.
2. To Strengthen the ability to identify and apply the suitable algorithm for the given real world problem.
3. To develop the optimal solution, i.e., time complexity & space complexity must be very low.

List of Experiments:
1. Sort a given set of elements using the Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted. The elements can be read from a file or can be generated using the random number generator.
2. Using OpenMP, implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted. The elements can be read from a file or can be generated using the random number generator.
3. a. Obtain the Topological ordering of vertices in a digraph.
   b. Compute the transitive closure of a given directed graph using Warshall's algorithm.
4. Implement 0/1 Knapsack problem using Dynamic Programming.
5. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijikstra‟s algorithm.
6. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.
7. a. Print all the nodes reachable from a given starting node in a digraph using BFS method.
   b. Check whether a given graph is connected or not using DFS method.
8. Find a subset of a given set $S = \{s_1, s_2,.....,s_n\}$ of n positive integers whose sum is equal to a given positive integer d. For example, if S= {2, 3, 5, 7, 8} and d = 10 there are three solutions {2,3,5}, {3,7}. And {2,8}. A suitable message is to be displayed if the given problem instance doesn't have a solution.
9. Implement any scheme to find the optimal solution for the Traveling Salesperson problem and then solve the same problem instance using any approximation algorithm and determine the error in the approximation.
10. Find Minimum Cost Spanning Tree of a given undirected graph using Prim‟s algorithm.
11. Implement All-Pairs Shortest Paths Problem using Floyd's algorithm. Parallelize this algorithm, implement it using OpenMP and determine the speed-up achieved.
12. Implement N Queen's problem using Back Tracking.

Course Outcomes:

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

1. Implement quick sort and merge sort techniques.
2. Develop source code for finding the shortest path using Dijikstra's algorithm.
3. Implement Warshall's, Kruskal' and Prim's algorithms on graphs.
4. Develop solution for travelling sales man problem.
5. Implement N Queen's problem using Back Tracking.

Reference Books:

1. Levitin A, "Introduction to the Design and Analysis of Algorithms", Pearson Education, 2008.
2. Goodrich M.T.,R Tomassia, "Algorithm Design foundations Analysis and Internet Examples", John Wileyn and Sons, 2006.
3. Base Sara, Allen Van Gelder, "Computer Algorithms Introduction to Design and Analysis", Pearson, 3rd Edition, 1999.

Web References:

1. http://www.personal.kent.edu/~rmuhamma/Algorithms/algorithm.html
2. http://openclassroom.stanford.edu/MainFolder/CoursePage.php?course=IntroToAlgorithms
3. http://www.facweb.iitkgp.ernet.in/~sourav/daa.html

Mode of Evaluation: Continuous Evaluation of the Lab Experiments, Record, Viva-voce and External Lab Examination.

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B. Tech. II Year II Semester

18CST205 OPERATING SYSTEMS LABORATORY

L	T	P	C
0	0	3	1.5

Course Prerequisite: 18CSE201

Course Description:
This course will cover the tradeoffs that can be made between performance and functionality during the design and implementation of an operating system. Particular emphasis will be given to three major OS subsystems: process management (processes, threads, CPU scheduling, synchronization, and deadlock), memory management (segmentation, paging, swapping), and file systems.

Course Objectives:
1. To learn the mechanisms of OS to handle processes and threads and their communication
2. To learn the mechanisms involved in memory management in contemporary OS
3. To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
4. To know the components and management aspects of concurrency management.

LIST OF EXPERIMENTS

1. To Study basic concepts in OS with the help of Linux commands.

2. a) Write a shell script that accepts two integers as its arguments and computers the value of first number raised to the power of the second number.
   b) Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.

3. a) Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.
   b) Write a shell script that computes the gross salary of a employee according to the following rules:
      i)If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic.
      ii)If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic
      The basic salary is entered interactively through the key board.

4. a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
   b) Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.

5. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority

6. Program on process creation and Execution
   a) To display Environment variables.

b) To implement Different types of exec functions.

7. a) Write a program to create a chain of Processes.
   b) Demonstration of Zombie and Orphan process.

8. Write a program for Producer Consumer Problem.
9. Write a program to create pipes.
10. Write a Program to find whether a file is having read, write, execute permissions and also check whether a given name is file or directory.
11. Simulate MVT and MFT.
12. Simulate all page replacement algorithms
13. Simulate all file allocation strategie
    a) Sequential b) Indexed c) Linked

Course Outcomes:

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

1. Understand and use commands in Linux shell environment.
2. Develop shell script for simple logical problems.
3. Simulate CPU Scheduling algorithms.
4. Develop solutions for inter process communication.
5. Implement different page replacement algorithms.

Text Books:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.

2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India

References:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing

2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley

3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India

4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

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