GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
Cheeryal (V), Keesara (M), R. R. Dist., - 501 301

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech. Program in Computer Science and Engineering

VISION

To produce globally competent and socially responsible computer science engineers contributing to the advancement of engineering and technology which involves creativity and innovation by providing excellent learning environment with world class facilities.

MISSION

1. To be a center of excellence in instruction, innovation in research and scholarship and service to the stake holders, the profession, and the public.
2. To prepare graduates to enter rapidly changing field as a competent computer science engineer.
3. To prepare graduates capable in all phases of software development, possess a firm understanding of hardware technologies, have the strong mathematical background necessary for scientific computing, be sufficiently well versed in general theory and practice to allow growth within the discipline as it advances.
4. To prepare graduates to assume leadership roles by possessing good communication skills, ability to work effectively as team members, appreciation for their social and ethical responsibility in a global setting.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

Program Educational Objectives (PEOs) are broad statements that describe what graduates are expected to attain within a few years of graduation. The PEOs for Computer Science and Engineering graduates are:

PEO-I: To provide graduates with a good foundation in mathematics, sciences and engineering fundamentals required to solve engineering problems that will facilitate them to find employment in industry and/or to pursue postgraduate studies with an appreciation for lifelong learning.

PEO-II: To provide graduates with analytical and problem solving skills to design algorithms, other hardware/ software systems, and inculcate professional ethics, inter-personal skills to work in a multi-cultural team.

PEO-III: To facilitate graduates get familiarized with state of the art software/hardware tools, imbibing creativity and innovation that would enable them to develop cutting-edge technologies of multi-disciplinary nature for societal development.

PROGRAM OUTCOMES (POs):

Program Outcomes (POs) describe what students are expected to know and be able to do by the time of graduation to accomplish Program Educational Objectives (PEOs). The Program Outcomes for Computer Science and Engineering graduates are:

Engineering Graduates would be able to:

PO 1:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO 1: To identify and define the computing requirements appropriate for its solution under given constraints.

PSO 2: To follow the best practices, namely, SEI-CMM levels and 6-sigma which varies from time to time for software development projects using open-ended programming environments to produce software deliverables as per customer needs.

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION
B.Tech. COMPUTER SCIENCE AND ENGINEERING
Acamdemic Regulations:AR-16 **Academic Year 2016-17**

PROGRAM STRUCTURE

FIRST YEAR SEMESTER-I

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	
1	16EN1101	English-I	HS	2	-	-	30	70	100	2
2	16PH1101	Engineering Physics	BS	3	1	-	30	70	100	3
3	16MA1101	Mathematics – I	BS	4	1	-	30	70	100	4
4	16CH1101	Engineering Chemistry	BS	3	-	-	30	70	100	3
5	16CS1101	Computer Programming-I	ES	3	-	-	30	70	100	3
6	16ME1101	Engineering Drawing	ES	2	-	3	30	70	100	4
7	16EN11L1	English - I Lab	HS	-	-	2	25	50	75	1
8	16CH11L1	Engineering Chemistry Lab	BS	-	-	3	25	50	75	2
9	16CS11L1	Computer Programming - I Lab	ES	-	-	3	25	50	75	2
Total				**17**	**2**	**11**	**255**	**570**	**825**	**24**
Total Periods Per Week				**30**						

Abbreviation	Description
HS	Humanities and Social Sciences
BS	Basic Sciences
ES	Engineering Sciences
PC	Professional Core
SC	Soft Core
CC	Core Course
PE	Professional Elective
OE	Open Elective

Abbreviation	Description
L	Lecture
T	Tutorial
P	Practical
D	Drawing
CIE	Continuous Internal Evaluation
SEE	Semester End Examination
Tot	Total

FIRST YEAR SEMESTER-II

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	
1	16EN1201	English-II	HS	2	-	-	30	70	100	2
2	16PH1202	Semiconductor Physics	BS	4	1	-	30	70	100	4
3	16MA1201	Mathematics-II	BS	3	1	-	30	70	100	3
4	16MA1202	Mathematics-III	BS	3	-	-	30	70	100	3
5	16CS1201	Computer Programming -II	ES	3	-	-	30	70	100	3
6	16EN12L1	English – II Lab	HS	-	-	2	25	50	75	1
7	16PH12L2	Semiconductor Physics Lab	BS	-	-	3	25	50	75	2
8	16MA12L1	Computational Mathematics Lab	BS	-	-	3	25	50	75	2
9	16CS12L1	Computer Programming - II Lab	ES	-	-	3	25	50	75	2
10	16WS12L1*	Information Technology Workshop (ITWS)/ Engineering Workshop (EWS)	ES	-	-	3	25	50	75	2
Total				**15**	**2**	**14**	**275**	**600**	**875**	**24**
Total Periods Per Week				**31**						

***CSE BoS specified the syllabus for ITWS while ME BoS specified the syllabus for EWS.**

SECOND YEAR SEMESTER-I

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	
1	16CS2101	Mathematical Foundations of Computer Science	PC	4	1	-	30	70	100	4
2	16CS2102	Data Structures	PC	4	-	-	30	70	100	4
3	16CS2103	Object Oriented Programming through Java	PC	3	-	-	30	70	100	3
4	16EC2103	Switching Theory and Logic Design	ES	3	1	-	30	70	100	3
5	16EE2104	Basic Electrical Engineering	ES	3	1	-	30	70	100	3
6	16CS21L1	Object Oriented Programming through Java Lab	PC	-	-	3	25	50	75	2
7	16CS21L2	Data Structures Lab	PC	-	-	3	25	50	75	2
8	16EE21L4	Basic Electrical Engineering Lab	ES	-	-	3	25	50	75	2
9	16MA2104	Logical Reasoning	BS	-	-	2	25	25	50	1
Total				**17**	**3**	**11**	**250**	**525**	**775**	**24**
Total Periods Per Week				**31**						

SECOND YEAR SEMESTER-II

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	
1	16CS2201	Design and Analysis of Algorithms	PC	3	-	-	30	70	100	3
2	16CS2202	Computer Organization and Assembly Language Programming	PC	3	1	-	30	70	100	3
3	16CS2203	Database Management Systems	PC	3	-	-	30	70	100	3
4	16MA2201	Probability and Statistics	BS	4	1	-	30	70	100	4
5	16CH2201	Environmental Studies	HS	3	-	-	30	70	100	3
6	16CS22L1	Computer Organization and Assembly Language Programming Lab	PC		-	3	25	50	75	2
7	16CS22L2	Database Management Systems Lab	PC	-	-	3	25	50	75	2
8	16CS22L3	Algorithms Lab	PC	-	-	3	25	50	75	2
9	16HS22L1	Gender Sensitization	HS	-	-	3	25	50	75	2
Total				**16**	**2**	**12**	**250**	**550**	**800**	**24**
Total Periods Per Week				**30**						

THIRD YEAR SEMESTER-I

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	
1	16CS3101	Web Technologies	PC	3	-	-	30	70	100	3
2	16CS3102	Computer Networks and Operating Systems	PC	4	-	-	30	70	100	4
3	16CS3103	Formal Languages and Automata	PC	4	1	-	30	70	100	4
4	**Soft Core-I**		SC	3	1	-	30	70	100	3
	16CS3104	Data Ware Housing and Data Mining								
	16CS3105	Information Security								
5	**Open Elective – I**		OE	3	-	-	30	70	100	3
	16EN3102	Human Values and Professional Ethics								
	16MB3102	Intellectual Property Rights								
	16EE3105	Industrial Safety and Hazards								
6	**Soft Core-I Lab**		SC	-	-	3	25	50	75	2
	16CS31L1	Data Ware Housing and Data Mining Lab								
	16CS31L2	Information Security Lab								
7	16CS31L3	Web Technologies Lab	PC	-	-	3	25	50	75	2
8	16CS31L4	Computer Networks and Operating Systems Lab	PC	-	-	3	25	50	75	2
9	16EN3101	Soft Skills	HS	-	-	2	25	25	50	1
Total				**17**	**2**	**11**	**250**	**525**	**775**	**24**
Total Periods Per Week				**30**						

THIRD YEAR SEMESTER-II

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	
1	16MB3201	Management Science	HS	3	-	-	30	70	100	3
2	**Soft Core-II**		SC	3	1	-	30	70	100	3
	16CS3201	Data Analytics								
	16CS3202	Information Security Assessments and Audits								
3	**Professional Elective- I**		PE	4	-	-	30	70	100	4
	16CS3203	Artificial Intelligence								
	16CS3204	Soft Computing								
	16CS3205	Adhoc Sensor Networks								
	16CS3206	Computer Graphics								
4	**Professional Elective – II**		PE	4	-	-	30	70	100	4
	16CS3207	Advanced Computer Architecture								
	16CS3208	Simulation and Modelling								
	16CS3209	Design Patterns								
	16CS3210	Image Processing								
5	**Open Elective –II**		OE	3	-	-	30	70	100	3
	16MB3203	Supply Chain Management								
	16CS3211	Knowledge Management								
	16EE3211	Energy Conservation and Management								
6	**Open Elective –III**		OE	3	-	-	30	70	100	3
	16EN3202	Foreign Language-French								
	16EN3203	Foreign Language-German								
	16EN3204	Foreign Language-Spanish								
	16MB3204	Banking and Insurance								
	16CE3207	Disaster Mitigation and Management								
7	**Soft Core-II Lab**		SC	-	-	3	25	50	75	2
	16CS32L1	Data Analytics Lab								
	16CS32L2	Information Security Assessments and Audits Lab								
8	16EN32L1	Advanced English Communication Skills Lab	HS	-	-	3	25	50	75	2
Total				**20**	**1**	**6**	**230**	**520**	**750**	**24**
Total Periods Per Week				**27**						

FOURTH YEAR SEMESTER-I

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	
1	16CS4101	Big Data Analytics	PC	3	1	-	30	70	100	3
2	16CS4102	Multi Media and Rich Internet Applications	PC	3	-	-	30	70	100	3
3	16CS4103	Cloud Computing	PC	3	-	-	30	70	100	3
4	16CS4104	Mobile Application Development	PC	3	1	-	30	70	100	3
5	16CS4105	Software Engineering	PC	3	1	-	30	70	100	3
6	**Professional Elective-III**		PE	3	-	-	30	70	100	3
	16CS4106	Neural Networks								
	16CS4107	Distributed Systems								
	16CS4108	Internet of Things								
	16CS4109	Web Services								
7	16CS41L1	Big Data and Mobile Application Development Lab	PC	-	-	3	25	50	75	2
8	16CS41L2	Software Engineering Lab	PC	-	-	3	25	50	75	2
9	16CS4111	Industry Oriented Mini Project	CC	-	-	-	-	50	50	1
10	16CS4112	Major Project Seminar	CC	-	-	2	50	-	50	1
Total				**18**	**3**	**8**	**280**	**570**	**850**	**24**
Total Periods Per Week				**29**						

FOURTH YEAR SEMESTER-II

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	
1	16MB4201	Project and Financial Management	HS	3	-	-	30	70	100	3
2	**Professional Elective- IV**		PE	4	-	-	30	70	100	4
	16CS4201	Machine Learning								
	16CS4202	Human Computer Interaction								
	16CS4203	Software Practice and Testing								
	16CS4204	Parallel Algorithms								
3	**Open Elective – IV**		OE	3	-	-	30	70	100	3
	16MB4202	Entrepreneurship								
	16MA4201	Actuarial Science								
	16EN4201	Anthropology								
4	16CS4205	Technical Seminar	CC	-	-	2	50	-	50	1
5	16CS4206	Major Project	CC	-	-	15	50	150	200	10
6	16CS4207	Comprehensive Viva Voce	CC	-	-	-	-	100	100	3
Total				**10**	**0**	**17**	**190**	**460**	**650**	**24**
Total Periods Per Week				**27**						

Comparison of AICTE Guidelines for Curriculum Structure of B.Tech Degree Program in Computer Science and Engineering Vis-à-vis GCET Program

S. No.	Broad Course Classification	Course Group/ Category	Course Description	No. of Credits & Percentages (%)	Range of Percentage Credits given by AICTE
1.	**Foundation Courses (FnC)**	**BS – Basic Sciences**	Includes - Mathematics, Physics and Chemistry Subjects	**31 (16.15%)**	**15% - 20%**
2.		**ES - Engineering Sciences**	Includes fundamental engineering subjects	**24 (12.5%)**	**15% - 20%**
3.		**HS – Humanities and Social Sciences**	Includes subjects related to Humanities, Social Sciences and Management	**20 (10.42%)**	**5%-10%**
4.	**Core Courses (CoC)**	**PC – Professional Core**	Includes core subjects related to the Parent Discipline/ Department/ Branch of Engg.	**64 (33.33%)**	**30% - 40%**
5.	**Elective Courses (ElC)**	**SC- Soft Core**	Includes core elective courses with the associated lab	**10 (5.2%)**	**10% -15%**
		PE – Professional Electives	Includes Elective subjects related to the Parent Discipline/ Department/ Branch of Engg.	**15 (7.8%)**	
6.		**OE – Open Electives**	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the Parent Discipline/ Department/ Branch of Engg.	**12 (6.25%)**	**5% - 10%**
7.	**Core Courses (CC)**	**Project Work**	B.Tech. Project or UG Project or UG Major Project	**16 (8.3%)**	**10% - 15%**
8.		**Industrial Training/ Mini-Project**	Industrial Training/ Internship/ UG Mini-Project/ Mini-Project		
9.		**Seminar**	Seminar/ Colloquium based on core contents related to Parent Discipline/ Department/ Branch of Engg.		
10.		**Minor Courses**	1 or 2 Credit Courses (subset of HS)	**Included**	
Total Credits for B. Tech. Programme				**192 (100%)**	

SYLLABUS

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY
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Cheeryal (V), Keesara (M), R. R. Dist. - 501 301, Telangana State

16EN1101 – ENGLISH – I

I Year. B.Tech. (CSE) – I Sem

L	T	P/D	C
2	-	-/-	2

Prerequisite(s): None

Course Objectives

Develop ability to

1. Read well and speak grammatically correct English.
2. Become a good communicator, both written and oral.
3. Analyze, interpret the given data/ text and infer appropriately.
4. Design an outline for a paragraph, essay, letters etc.
5. Listen actively and respond accordingly.
6. Apply classroom learning to conduct oneself in a multicultural environment

Course Outcomes (COs)

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

CO1. Speak fluent, intelligible and grammatically correct English
CO2. Use language appropriately in various functional contexts
CO3. Analyze a given situation/ text and interpret accordingly.
CO4. Write effectively in formal and informal situations
CO5. Acquire active listening skills and demonstrate the same.
CO6. Acquire the nuances of behavioural etiquette in a multicultural environment.

Unit-1

Reading	*Tea Party* by Ruth PrawerJhabvala
Vocabulary	Homonyms, Homophones Homographs
Grammar	Nouns and Articles Types of Verbs
Speaking	Greeting people and taking leave Introducing oneself and others
Writing	Writing sentences Punctuation

Unit-2

Reading	1)*Risk Management* by Joe Crompton 2)*Sivakasi* by Amrutha Gayatri
Vocabulary	1)Synonyms 2)Antonyms and Synonyms, Commonly misspelt words
Grammar	1)Subject-verb agreement 2)The present tense
Speaking	Giving Directions
Writing	Paragraph Writing Note making, Note taking

Unit-3

Reading	1*)Polymer Banknotes* 2*)The one thing every business executive must understand about social media by Kerpen*
Vocabulary	1)Collocations 2)Technical Vocabulary
Grammar	1)Past Tense & Future Tense 2)Adjectives – Comparison, Prepositions
Speaking	1)Group Discussions 2)Speaking on the telephone (Telephone Etiquette)
Writing	Information Transfer

Unit-4

Reading	1*)IF* by Rudyard Kipling 2) *Courage and integrity are at the core of the successful leadership*
Vocabulary	1)Positive descriptive vocabulary, Common errors in English 2)Idioms and Phrases
Grammar	1)Reported Speech 2)Active voice & passive voice
Speaking	1)Talking about hypothetical situations 2)Narrating experiences/events and expressing opinions
Writing	1)Letter Writing 2)Phrasal Verbs 3)Guided Composition

Unit-5

Reading	Study Skills
Vocabulary	Functional vocabulary related to writing and reading
Grammar	Picture Reading/ Interpretation
Writing	Job Application Narrative Reviews-articles/newspaper/books/movies Essay/articles

TEXT BOOK(S)

1. Skills Annexe: Functional English for Success published by Orient Longman

REFERENCE BOOK(S)

1. Contemporary English Grammar Structures and Composition by David Green, Macmillan Publishers 2010, New Delhi.
2. Innovate with English: A course in English for Engineering students by T Samson, Foundation Books.
3. English Grammar Practice by Raj N Bakshi, Orient Longman.

4. Spoken English by R.K.Bansal and Harrison, Orient Longman.
5. Technical Communication by Meenakshi Raman, Oxford University Press.
6. Grammar Games by Renuvolcuri Mario, Cambridge University Press.
7. Enrich Your English by Thakur K.B.P. Sinha, Vijay Nicole Imprints Pvt. Ltd.

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16PH1101 – ENGINEERING PHYSICS

I Year. B.Tech. CSE – I Sem

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): None

Course objectives

Develop ability to

1. Understand fundamental aspects of crystal structures, various types of crystal defects and methods of determining the crystal structures by using X- ray diffraction.
2. Distinguish different types of dielectric polarization mechanisms; understand the properties of different dielectric materials and their applications.
3. Demonstrate classification of magnetic materials; understand the phenomenon of superconductivity and the applications of magnetic materials and superconductors.
4. Understand the concepts of interference, diffraction, light amplification, working of various types of LASERs and their applications.
5. Outline the behavior of materials at nanoscale, three methods of preparation of nanomaterials and their characterization techniques with applications.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Explain the fundamentals of crystal structures; summarize various crystal defects and methods of determining the crystal structures using X-Rays.
CO2. Explain different types of dielectric polarization mechanisms, and the properties of different dielectric materials and their applications.
CO3. Explain different types of magnetic materials, phenomenon of superconductivity and applications of magnetic materials and superconductors.
CO4. Explain phenomena of interference, diffraction, and light amplification process, construction and working of Ruby, He-Ne, Semiconductor LASERs and their applications in different fields.
CO5. Illustrate awareness of sol-gel method, physical vapour deposition method, and ball milling method for preparation of nanomaterials and their applications.

UNIT I: C**rystallography and X-Ray diffraction**

Space lattice, unit cell, lattice parameters, crystal systems, Bravais lattices, atomic radius, coordination number and atomic packing factors of simple cubic, body centered cubic, face centered cubic, and diamond structure. Crystal directions & planes, Miller indices, inter planar spacing of orthogonal crystal systems.

Defects in crystal: Point defects, line defects (Qualitative Treatment). Estimation of Schottky and Frenkel defects, Burger's vector, Bragg's law, X-Ray diffraction - Laue method and powder method. Applications of X-Rays in different fields.

UNIT II: Dielectric properties

Electric dipole, dipole moment, dielectric constant, polarizability, electric susceptibility, displacement vector, electronic and ionic polarizations (Quantitative), orientation and space charge polarizations (Qualitative). Internal fields in solids, Clausius-Mosotti equation, Piezo, Pyro & Ferro electricity and their applications.

UNIT III: Magnetic Properties

Permeability, field intensity, magnetic field induction, magnetization, magnetic susceptibility, origin of magnetic moment, Bohr magneton, classification of Dia, Para, Ferro, Antiferro and Ferri magnetic materials; domain theory of Ferro magnetism- Hysteresis curve, soft and hard magnetic materials, applications of magnetic materials. Basic concepts of superconductivity and properties of superconductors: Type – I, Type – II superconductors, BCS theory (Qualitative), applications of superconductors in science and engineering.

UNIT IV: Optics and Lasers

Introduction to interference, theory of interference in thin films, Newton's rings, anti reflection coatings; introduction to diffraction, diffraction due to single slit, double slit and diffraction grating. LASERs and their characteristics, stimulated absorption, spontaneous emission and stimulated emission, Einstein's coefficients and relation between them, pumping schemes, optical resonator, various types of Lasers: Ruby Laser, He-Ne Laser, Semiconductor Laser and applications of Lasers.

UNIT V: Nanoscience

Origin of Nanoscience, Nanoscale, classification of nanomaterials- surface to volume ratio, Quantum confinement, synthesis of nanomaterials – sol gel method, physical vapour deposition method, ball milling method; properties of nanomaterials, characterization of nanomaterials using Scanning Electron Microscope(SEM), Transmission Electron Microscope(TEM), Applications of nanoscience in various fields.

TEXT BOOK(S)

1. Engineering Physics, K. Malik, A. K. Singh, Tata Mc Graw Hill Book Publishers.
2. Engineering Physics, M N Avadhanulu, S Chand Publications.

REFERENCE BOOK(S)

1. Introduction to Solid state physics by Kittel, 8th Edition, John Weily Publishers.
2. Fundamentals of Physics, David Halliday, John Weily Publishers.
3. University Physics, Sear's and Zemansky (10th Edition), Wesly Publishers.
4. Applied Physics, PK Mittal, IK International Publishing House.
5. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers.

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16MA1101 – MATHEMATICS-I

I Year. B.Tech. CSE – I Sem

L	T	P/D	C
4	1	-/-	4

Prerequisite(s): None

Course Objectives
Develop ability to

1. Understand various types of Matrices, properties and rank of the matrix to find the solution for system of equations, if it exists.
2. Apply the knowledge of eigenvalues and eigenvectors of a matrix from quadratic form into a canonical form through linear and orthogonal transformations.
3. Identify the methods of solving the differential equations of first order and applications in engineering problems namely, Newton's law of cooling, Natural growth and decay.
4. Solve second and higher order differential equations and apply the same to electrical circuits and simple harmonic motion.
5. Analyse properties of Laplace Transform, Inverse Laplace Transform, convolution theorem and apply the same to ordinary differential equations.

Course Outcomes (COs)
At the end of the course, the student would be able to:

CO1. Write the matrix representation of a set of linear equations and analyse solutions of a system of equations.
CO2. Deduce eigenvalues and eigenvectors of a matrix and apply the same to reduce quadratic form into a canonical form through linear and orthogonal transformations.
CO3. Identify the type of differential equation and use the appropriate method to solve the differential equation.
CO4. Apply differential equations to solve engineering problems particularly, electrical circuits and simple harmonic motion.
CO5. Solve ordinary differential equations of second and higher order using Laplace Transform techniques.

UNIT-I: Theory of Matrices-I
Real matrices-symmetric, Skew-symmetric, Orthogonal, Complex matrices**:** Hermitian, Skew Hermitian, Unitary Matrices and Idempotent Matrix, Finding rank of a matrix by reducing to Echelon and Normal forms, Inverse of a non-singular matrix using row/column transformations (Gauss-Jordan method). Consistency of system of linear equations (homogeneous and non-homogeneous) using the rank of a matrix, Solving mxn and nxn linear system of equations by Guass elimination.

UNIT- II: Theory of Matrices-II
Cayley-Hamilton Theorem(without proof)-Verification, Calculating inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem, Linear dependence and Independence of Vectors, Linear Transformation-Orthogonal Transformation, Eigenvalues and eigenvectors of a

matrix, Properties of eigenvalues and eigenvectors of real and complex matrices, Linearly independent eigenvectors of a matrix when the eigenvalues of the matrix are repeated, Quadratic forms up to three variable, Rank-positive definite, negative definite, semi-definite, Index, signature of a quadratic form.

UNIT – III: First Order Ordinary Differential Equations

Differential equations- exact, linear and Bernoulli, Applications of first order differential equations-Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories. Electrical Circuits.

UNIT-IV: Higher Order Ordinary Differential Equations

Linear, homogeneous and non-homogeneous differential equations of second and higher order with constant coefficients, Non homogeneous of the type e^{ax}, sin ax, cos ax and x^n, $e^{ax}V(x)$, $x^nV(x)$ and Method of variation of parameters, Applications of second order differential equations to Electrical circuits and simple harmonic motion.

UNIT-V: Laplace Transforms

Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms. Existence of Laplace transforms. Laplace transform of standard functions, first shifting theorem, Laplace transform of functions when they are multiplied or divided by "t". Laplace transforms of derivatives and integrals of functions-Unit step function-second shifting theorem-Dirac's delta function, Periodic function-Inverse Laplace transform by Partial fractions (Heaviside method), Inverse Laplace transforms of functions when they are multiplied or divided by "s". Inverse Laplace transforms of derivatives and integrals of functions, Convolution theorem-Applications to ordinary differential equations.

TEXT BOOK(S)

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
2. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.

REFERENCE BOOK(S)

1. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.
2. Engineering Mathematics by Srimanta pal, subhodh C.Bhunia, Oxford higher Education.
3. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
4. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC
5. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.
6. Ordinary & Partial Differential Equations, M D Raisinghania, S. Chand.

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16CH1101 - ENGINEERING CHEMISTRY

I Year. B.Tech. CSE – I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives
Develop ability to
1. Define and understand various conductances in electrochemistry, functional working of electrodes, different types of batteries and cells along with their applications.
2. Understand the concept of corrosion; distinguish various types of corrosion and prevention.
3. Identify the causes of hardness in water and its treatment using various techniques.
4. Classify polymers and their applications, understand different mechanisms of polymerization and understand different fibers along with their applications.
5. Understand the engineering materials namely, cement, lubricants, ceramics and glass.
6. Understand various adsorption techniques and its applications.

Course Outcomes (COs)
After completion of the course, student would be able to
- CO1. Explain
  a. various conductances in electrochemistry
  b. functional working of electrodes
  c. construction and working of different types of batteries and cells along with their functional differences and applications.
- CO2. Explain corrosion and causes of corrosion, distinguish various types of corrosion and explain various methods to prevent corrosion.
- CO3. Explain hardness in water and various techniques used to treat the same.
- CO4. Distinguish clearly various polymers and various synthetic and natural fibers; explain various polymerisation processes.
- CO5. Explain the properties of various materials namely, cement, lubricants, ceramics and glass and their applications.
- CO6. Explain various adsorption techniques and its applications.

UNIT I: Electrochemistry and Batteries
Electro Chemistry: Conductance -Specific, Equivalent and Molar, their Units;
EMF: Galvanic Cell; types of Electrodes: Calomel, Quinhydrone and Glass; Nernst equation and its applications; Concentration cells, determination of pH using glass electrode-Numerical problems.
Batteries: Introduction, types of batteries: Primary cells and secondary cells, differences between them with examples.
Fuel cells: Hydrogen–Oxygen fuel cell; applications of fuel cells.

UNIT II: Corrosion and its Control Methods
Corrosion: Introduction, definition, Types of Corrosion and disadvantages of corrosion.

Mechanism of corrosion- chemical and electrochemical corrosion. Factors affecting rate of corrosion– Nature of metal and Nature of Environment –Electrochemical series and its applications, Corrosion control methods–Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings –hot dipping (galvanization & tinning), Electro plating (Copper plating) and Electroless plating (Ni plating) – Organic coatings–Paints-constituents and their functions.

UNIT III: Water and its treatment

Hardness of Water: Types of hardness-temporary and permanent, units and interrelation between them, Boiler troubles–Scale & sludge, Priming and foaming, Caustic embrittlement-Treatment of boiler feed water–Internal treatment (Colloidal and Calgon conditioning)–External treatment–Zeolite process, ion exchange process. Potable water- Steps involved in treatment of potable water–Disinfecting water by chlorination and ozonization –Reverse Osmosis & its significance.

UNIT IV: Polymers

Introduction: Classification of polymers, Types of Polymerization–addition and condensation, differences between addition and condensation polymers, Mechanism of free radical addition polymerization.

Plastics: Thermoplastic & Thermosetting resins, differences between thermoplastic and thermosetting polymers. Preparation, properties and engineering applications of PVC, Teflon and Bakelite.

Fibers: Introduction, types- natural and synthetic. Preparation, properties and uses of Nylon–6,6, Nylon 6,10. Fiber reinforced plastic (FRP) –Carbon Fiber Reinforced Plastic and applications.

UNIT V: Materials and Surface Chemistry

A) Materials Chemistry

Cement –Introduction, Types of Cement, setting and hardening of Portland cement, Reinforced Concrete, **Lubricants**–Characteristics of good lubricant, properties– flash and fire, cloud and pour point and their significance, Nano Fabricated Lubricants, **Ceramics**-Advanced Ceramics, **Glass**– Reinforced glass material.

B) Surface Chemistry

Adsorption:– Introduction, Types of adsorption, **Isotherms**– Freundlich and Langmuir adsorption isotherm, applications of adsorption, application of adsorption in heterogeneous catalysis (automotive catalysts).**Colloids**– Definition, optical properties of colloids and their applications in industry.

TEXT BOOK(S)

1. Engineering Chemistry by R.P. Mani, K.N. Mishra, B. Rama Devi /CENGAGE learning.
2. Engineering Chemistry by P.C Jain and Monica Jain, Dhanpatrai Publishing Company (2008).

REFERENCE BOOK(S)

1. Engineering Chemistry by B. Siva Shankar McGraw Hill Publishing Company Limited, New Delhi (2006)
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).

3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi (2006)
4. Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.
5. An Introduction to Electro Chemistry by Samuel Glassstone, East-West Pvt.ltd.
6. Corrosion Engineering by Mars G,Fontana,McGraw Hill

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16CS1101 – COMPUTER PROGRAMMING - I

I Year. B.Tech. CSE – I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives
Develop ability to

1. Understand the intricacies of program development and problem solving techniques using Raptor tool.
2. Understand the structure of a C-language Program, list, describe, classify the C data types, input and output concepts as they apply to programs in C.
3. Describe the expression types; understand the rules of precedence and associativity in evaluating the expressions.
4. Understand how a C program evaluates logical and repetitive (loop) statements.
5. Describe the importance of modularity and design multi-function programs.
6. Understand the basic concepts and uses of arrays using C-Language Program.
7. Understand the concept and use of pointers for memory management techniques.

Course Outcomes (COs)
After completion of the course, student would be able to

CO1. Demonstrate problem solving skills by developing algorithms to solve problems using Raptor tool.
CO2. Incorporate the concept of variables, constants and basic data types in a C language program.
CO3. Use simple input and output statements in a C Language Program.
CO4. Incorporate the use of sequential, selection and repetition control statements into the algorithms implemented as computer programs using C language.
CO5. Demonstrate an understanding of structured design by implementing programs with functions and passing of parameters to solve more complex problems.
CO6. Implement C programs using arrays.
CO7. Write and execute programs that access and manage data through pointers.

UNIT – I
Basics of Computers
Logic Building: Flow chart, Algorithm, Pseudo code. Introduction to Raptor Programming Tool

Introduction to Programming – Computer Languages, Creating and running programs, Program Development.

Introduction to the C Language – Background, C Programs, Identifiers, Data Types, Variables, Constants, Input/output functions.

Operators - Arithmetic, relational, logical, bitwise, conditional, increment/decrement, assignment etc.., C program examples. Expressions, Precedence and Associativity, Expression Evaluation, Type conversions.

UNIT - II

Statements- Selection Statements (decision making) – if and switch statements with Raptor Tool, and C program examples.

Repetition statements (loops) - while, for, do-while statements with Raptor Tool, and C Program examples

Statements related to looping – break, continue, goto, Simple C Program examples.

UNIT - III

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, C program examples.

Recursion- recursive functions, Limitations of recursion, example C programs

UNIT -IV

Arrays – Concepts, using arrays in C, arrays and functions, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - V

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, void pointer, null pointer.

Pointer Applications - Arrays and Pointers, Pointer Arithmetic and arrays, passing an array to a function.

Memory allocation functions – malloc(), calloc(), realloc(), free().
Array of pointers, pointers to functions, C program examples.

TEXT BOOK(S)

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Thompson Learning, 2007 Reprint.

REFERENCE BOOK(S)

1. Raptor-A flow charting Tool http://raptor.martincarlisle.com
2. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
3. Programming in C. P. Dey and M Ghosh , Oxford University Press.
4. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
5. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.

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16ME1101 – ENGINEERING DRAWING

I Year. B Tech. CSE, Semester I

L	T	P/D	C
2	-	-/3	4

Prerequisite(s): None

Course Objectives
Develop ability to
1. Visualize and communicate all engineering elements and understand various concepts such as dimensions, conventions and standards related to working drawings.
2. Understand the fundamentals of geometrical curves and their applications in engineering.
3. Visualize different positions of planes and solids.
4. Visualize various isometric views and their applications in engineering.
5. Understand multi-view representations and their conversion into pictorial views and vice versa.

Course Outcomes (COs)
After the completion of the course, student would be able to
CO1. Visualize and communicate all engineering elements and represent the same using standard dimensions and conventions related to working drawings used in engineering practice.
CO2. Comprehend concepts of all 2D elements such as Conic Sections and 3D Objects namely, Prisms, Cylinders, Pyramids and Cones.
CO3. Draw orthographic projections of straight lines, planes and solids of given engineering components.
CO4. Construct isometric scale, isometric projections and views of given engineering components.
CO5. Visualizemulti-view representations and its conversion into pictorial views and vice versa.

Unit-I
Introduction to engineering drawing & Importance of engineering drawing:
Principles of Engineering Drawing, Various Drawing Instruments., Lettering &dimensioning, BIS standards, Title block, Geometrical constructions, Bisecting a line, arc and angle, Dividing straight line in to equal number of parts, Tangents to circles and arcs, Construction of pentagon, hexagon, inscribing circles inside regular polygons and vice versa etc.,

Curves:
Constructions of curves used in engineering practice: Conic sections including rectangular hyperbola - **General method only**, Cycloid, Epi-cycloid, Hypocycloid and Involutes.
Scales: Construction of different types of scales - Plain scale, Diagonal scale, vernier scale

Unit-II

Introduction to Orthographic projections: conventions-first and third angle projections.
Projections of points: in all four quadrants.
Projections of straight lines: lines in simple position, inclined to one plane and parallel to other plane.
Projections of straight lines: Line inclined to both the planes.

Unit-III

Projections of planes: planes in simple position, plane inclined to one plane and perpendicular to other plane, plane inclined to both the planes.
Projections of solids: (Cube, tetrahedron, Cone, Cylinder, Regular Prisms and Pyramids): solids in simple position (Axis perpendicular to one plane)

UNIT-IV

Isometric projections: Principle of isometric projection - isometric scale - isometric views - conventions - plane figures. Simple and compound solids - isometric projection of objects having non-isometric lines.

Unit-V

Transformation of projections: conversion of Isometric views to orthographic views. Conversion of orthographic views to Isometric views - simple objects.

TEXT BOOK(S)

1. Engineering Drawing – N.D. Bhatt, charotar publications.
2. Engineering Drawing- Basant Agrawal, TMH.

REFERENCE BOOK(S)

1. Engineering Graphics- P I Varghese Tata McGraw Hill Education Pvt. Ltd.
2. Engineering Drawing – P.J. Shah .S.Chand Publishers.
3. Engineering Drawing- Johle/Tata Mcgraw Hill Book Publishers.
4. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson.
5 .Engineering Drawing - K.Venu Gopal & V.Prabu Raja New Age Publications.
6. Engineering Drawing - John. PHI Learning Publisher.

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16EN11L1 – ENGLISH - I LAB

I Year. B.Tech. (CSE) – I Sem

L	T	P/D	C
-	-	2/-	1

Prerequisite(s): None

Course Objectives
Develop Ability to
1. Use Computer-aided Multimedia learning tool for individual language learning.
2. Sensitize student to the nuances of English speech sounds, accent, intonation and rhythm.
3. Listen actively and speak with intelligibility.
4. Apply language skills in real life situations.

Course Outcomes (COs)
At the end of the course, student would be able to
CO1. Demonstrate the nuances of language through audio-visual tools during presentation.
CO2. Demonstrate good writing skills.
CO3. Speak intelligibly.
CO4. Practice usage of International Phonetic Alphabet.

Module: 1 Ice Breaking Activities, JAM

Module: 2 Speech sounds, Neutralization of Mother Tongue Influence and Conversation Practice

Module: 3 Syllables, Stress, Intonation

Module: 4 Listening Activities (only for demonstrative purposes)

Module: 5 Situational Dialogues and Role Play

Module: 6 Information Transfer

Additional Topics
Stress Management
Negotiation Skills

REFERENCE BOOK(S)
1. Speaking English Effectively 2nd Edition by Krishna Mohan and N.P.Singh, MacMillan Publishers, 2011.
2. How to prepare for interviews by Shashi Kumar.V and Dhamija P.V
3. English Pronunciation in Use by Hancock, M. 2009, Cambridge University Press
4. Spoken English, a Manual of Speech and Phonetics, by R.K.Bansal and J.B.Harrison, Orient Black Swan 2013.
5. Spoken English CDs by Shashi Kumar and Dhamija.

6. A Manual entitled English Language Communication Skills Lab Manual cum Workbook by Cengage Learning India 2013
7. GCET ELCS Lab Workbook.

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16CH11L1 - ENGINEERING CHEMISTRY LAB

L	T	P/D	C
-	-	3/-	2

I Year. B.Tech. CSE – I Sem

Prerequisite(s): None

Course Objectives
Develop ability to

1. Understand the preparation of compounds namely, Aspirin and Biodiesel.
2. Use instrumental methods namely, Potentiometry, Conductometry and Colorimetry to find the concentration of a given solution.
3. Experimentally determine the physical constants namely, viscosity and surface tension of a given liquid using Ostwald's Viscometer and Stalagmometer respectively.
4. Use EDTA method to find the hardness of water, estimate chlorides in hard water by Precipitation Titration, ferrous iron in water by Dichrometry and iodine in different salts using Iodometry.
5. Understand the preparation of Oil of Winter green.
6. Experimentally determine ferrous iron in cement by Colorimetric method.

Course Outcomes (COs)
Students would be able to

CO1. Employ the techniques which are fundamental in the preparation of Aspirin, Biodiesel and Oil of Winter Green.
CO2. Use various instrumental methods in volumetric analysis namely, Potentiometry, and Conductometry to determine the concentration of a given solution.
CO3. Use various titration methods namely, EDTA, Precipitation, Iodometry and Dichrometry for estimating different chemical compounds/ions present in various samples.
CO4. Estimate the concentration of a coloured compound using the technique of Colorimetry.
CO5. Experimentally determine the physical properties of liquids such as viscosity and surface tension.

Any TEN of the following TWELVE experiments must be conducted.

List of Experiments

I. Preparation

1. Preparation of Aspirin
2. Preparation of Biodiesel

II. Instrumental Methods

A. Potentiometry

3. Titration of Strong acid vs Strong base by Potentiometry.
4. Titration of Weak acid vs Strong base by Potentiometry.

B. Conductometry:

5. Titration of Strong acid vs Strong base by Conductometry.

C. Colorimetry:

6. Estimation of Copper by Colorimetric method.

III. Physical Constants

7. Determination of Viscosity of given liquid by Ostwald's Viscometer.
8. Determination of Surface tension of given liquid by Stalagmometer.

IV. Titrimetry

9. Estimation of Hardness of water by EDTA method.
10. Estimation of Chlorides in hard water Precipitation method.
11. Estimation of Ferrous Iron by Dichrometry.
12. Estimation of Iodine in different salts using Iodometry.

V. Additional Experiments(Mandatory)

1. Preparation of Oil of Winter green.
2. Determination of Ferrous iron in cement by Colorimetric method.

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16CS11L1 – COMPUTER PROGRAMMING – I LAB

I Year. B.Tech. CSE – I Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): None

Course Objectives
Develop ability to

1. Have understanding intricacies of program development and problem solving techniques using Raptor tool.
2. Understand the structure of a C-language Program, list, describe, classify the C data types, input and output concepts as they apply to programs in C.
3. Describe the expression types; understand the rules of precedence and associativity in evaluating the expressions.
4. Understand how a C program evaluates logical and repetitive (loop) statements.
5. Describe the importance of modularity and design multi-function programs.
6. Understand the basic concepts and uses of arrays using C-Language Program.
7. Understand the concept and use of pointers for memory management techniques.

Course Outcomes (COs)
After completion of the course, student would be able to

CO1. Demonstrate problem solving skills by developing algorithms to solve problems using Raptor tool.
CO2. Incorporate the concept of variables, constants and basic data types in a C language program.
CO3. Use simple input and output statements in a C Language Program.
CO4. Incorporate the use of sequential, selection and repetition control statements into the algorithms implemented as computer programs using C language.
CO5. Demonstrate an understanding of structured design by implementing programs with functions and passing of parameters to solve more complex problems.
CO6. Implement C programs using arrays.
CO7. Write and execute programs that access and manage data through pointers.

LIST OF EXPERIMENTS	
1.	Introduction to RAPTOR Tool Draw Flow chart using RAPTOR for, a. Read a number and Display the same number b. Read and Display the student details c. Read two numbers from user and calculate addition and subtraction of those numbers d. Read two numbers from user at the time of execution and calculate

	multiplication and division of those numbers e. Find the square of a given number (take the number from the user) f. Calculate the value of Y from the equation y = x2 + 2x + 3 (read the value of X from user)
2.	Draw Flow chart using RAPTOR for, a. Calculate the area of a Circle b. Calculate the area of a Square c. Calculate the area of a Rectangle d. Interchange two numbers e. Find the sum of square of two numbers f. Convert Centigrade to Fahrenheit g. Convert Radius to Degrees h. Display the roots of Quadratic Equation
3	Draw Flow chart using RAPTOR for, a. Check the given number is Positive or Negative b. Check the given number is even or odd c. Display whether a person is eligible for vote or not d. Calculate the Largest of two numbers e. Check the given year is leap year or not f. Check whether two numbers are equal or not g. Find the largest value among three given numbers
4	Draw Flow chart using RAPTOR for, a. Calculate and display the grade of a student i. < 30 % - Fail ii. Between 31 and 50 – C grade iii. Between 51 to 60 – B grade iv. Between 61 to 75 – A grade v. Greater than 75 - distinction b. Find the quadratic roots of an equation (real or imaginary) c. Check the given number is multiple of 2,4and 8
5	Draw Flow chart using RAPTOR for, a. Display n numbers using looping b. Calculate the sum of n natural numbers c. Display the even numbers below n d. Calculate sum of even numbers and odd numbers from 1 to n (n value supplied by the user)
6	a. Write a C program to display student details b. Write a C program to perform arithmetic operations c. Write a C program to implement increment and decrement operators d. Write a C program to implement conditional operator e. Write a C program to implement bit wise operator
7	a. Write a C program to calculate the biggest of given two numbers

	b. Write a C Program to print the result depending on the following i. < 30 % - Fail ii. Between 31 and 50 – C grade iii. Between 51 to 60 – B grade iv. Between 61 to 75 – A grade c. Write a C Program to implement arithmetic calculator using switch case
8	a. Write a C program to find sum of n natural numbers b. Write a C program to find individual digits of the given number c. Write a C program to find factorial of a given number
9	a. Write a C program to display the prime numbers below n (where n value is given by user) b. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. c. Write a C program to generate the first n terms of the sequence. d. Write a C program to find the quadratic roots of an equations e. Write a c program to calculate sum of the following geometric equation $Sum=1+x+x^2+x^3+\ldots.+x^n$
10	a. Write a C program to find the given number is palindrome or not b. Write a C program to find GCD and LCM of two given numbers using functions c. Write a C program to find the factorial of a given number using recursive function d. Write a C program to generate the fibonacci series using recursive function
11	e. Write a c program to find largest and smallest numbers in a list of array elements using functions f. Write a C program to sort the given list of elements in ascending order using functions. g. Write a c program to search for a given element in the list of array and display the “location” if the number is found else print “the number is not found”. i. Using fixed length array ii. Using variable length array.
12	a. Find the duplicate elements in the list of sorted array b. Write a C program that uses functions to perform the Addition of Two Matrices c. Write a C program that uses functions to perform the Multiplication of Two Matrices
13	a. Write a C program to swap two integers using following methods i. call by value ii. call by reference b. Write a C program to find sum of even and odd numbers using functions and pointers c.

14	a. Write a C program to find Largest Number Using Dynamic Memory Allocation. b. Write a C program to return multiples values from a function using pointers

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16EN1201 – ENGLISH - II

I Year. B.Tech. (CSE) – II Sem

L	T	P/D	C
2	-	-/-	2

Prerequisite(s): 16EN1101 – ENGLISH – I

Course Objectives
Develop ability to
1. Function in multidisciplinary teams.
2. Understand of professional and ethical responsibility.
3. Apply strategies and inculcate life skills.

Course Outcomes (COs)
After completion of the course, student would be able to
CO1. Acquire interpersonal and life skills
CO2. Demonstrate professional ethics and etiquette.
CO3. Demonstrate application of various strategies to real life situations.

Unit-1

Writing	Steps in Writing Process Cover letter and Job Application, Letter CurriculumVitae Résumé Abstract Writing and Responding to a blog

Unit-2

Reading	1*)Mokshagundam Visvesvaraya* *2) The Palm Islands*
Vocabulary	Prefixes and Suffixes
Grammar	Joining ideas using conjunctions, Adverbs
Speaking	Opinion-based questions
Writing	Summarizing

Unit-3

Reading	*1)Leela's Friend* by R.K.Narayan *2)Forensic Science*
Vocabulary	Guessing the words, Using the Appropriate word, Phrasal verbs
Grammar	Knowing with questions
Speaking	Presentation
Writing	Report Writing

Unit-4

Reading	*1)The Last Leaf* by O.Henry *2)Chose how to start your day*
Vocabulary	Idioms
Grammar	Relating objects by using prepositions, Ergative verbs
Speaking	Creative Speaking Activity
Writing	Technical Report Writing

Unit-5

Reading	*1)Indian Crowds* by Nirad C.Chaudhuri *2)Snippets that focus on cultural differences among the people*
Vocabulary	One-Word Substitutes (related to the lesson)
Grammar	Synthesis of Sentences
Speaking	Activity on Indo-American Cultural Differences
Writing	Day to day-experiences of students while travelling

TEXT BOOK(S)

1. Epitome of Wisdom published by Orient Longman
2. A Passage to England by Nirad C. Chaudhuri

REFERENCE BOOK(S)

1. Contemporary English Grammar Structures and Composition by David Green, Macmillan Publishers 2010, New Delhi
2. Innovate with English: A Course in English for Engineering Students by T Samson, Foundation Books
3. English Grammar Practice by Raj N Bakshi, Orient Longman
4. English Pronunciation in Use by Hancock, M. 2009, Cambridge University Press
5. Technical Communication by Meenakshi Raman, Oxford University Press
6. Grammar Games by Renuvolcuri Mario, Cambridge University Press
7. Enrich Your English by Thakur K.B.P. Sinha, Vijay Nicole Imprints Pvt.Ltd

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16PH1202 – SEMICONDUCTOR PHYSICS

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
4	1	-/-	4

Prerequisite(s): 16PH1101 ENGINEERING PHYSICS

Course Objectives

Develop ability to

1. Discuss the formation of energy bands in solids, classification of solids, and find the carrier concentration in intrinsic and extrinsic semiconductors, understand the concept of Fermi level and Hall effect.
2. Analyse p-n junction diode and its load line characteristics; understand breakdown mechanisms in semiconductor diodes.
3. Understand functioning of rectifiers and filters; functioning of zener diode as a voltage regulating device.
4. Understand the working of BJT, its various configurations and applications.
5. Discuss various methods of transistor biasing, understand fundamentals of RC coupled amplifier, basic concepts of FET and JFET.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Distinguish between conductors, semiconductors and insulators, evaluate carrier concentration in intrinsic and extrinsic semiconductors; identify the type of extrinsic semiconductor through Hall effect.
CO2. Analyze V-I characteristics of p-n junction diode and its cut-in voltage.
CO3. Explain working of half wave and full wave rectifiers, filters and their applications.
CO4. Explain the functioning of BJT, distinguish various configurations of BJT and their applications.
CO5. Analyse various transistor biasing methods and explain fundamentals of RC coupled amplifier, functioning of FET, summarize the differences between BJT and FET.

UNIT I: Band theory of solids and semiconductors

Electron in a periodic Potential, Bloch theorem, Kronig-Penny Model (Qualitative Treatment), Brillouin Zones(E-K curve), origin of energy band formation in solids, concept of effective mass of an electron, classification of materials into conductors, semiconductors & insulators.

Classification of semiconductors: n-type, p-type, Fermi level in Intrinsic and Extrinsic Semiconductors, variation of Fermi level with temperature and concentration of dopants in extrinsic semiconductors, calculation of carrier concentration in Intrinsic & Extrinsic Semiconductors, equation of continuity, direct and indirect band gap semiconductors, Hall effect.

UNIT II: p-n junction diode

Qualitative theory of p-n junction, Energy level diagram of p-n junction in forward & reverse bias condition, p-n junction as a diode, volt-ampere characteristics, temperature dependance of V-I characteristic, ideal versus practical – Resistance levels (Static and Dynamic), Transition and Diffusion capacitances, diode equivalent circuits, load line analysis, breakdown mechanisms in semiconductor diodes, Zener diode characteristics.

UNIT III: Rectifiers and filters

p-n junction as a rectifier, half wave rectifier, full wave rectifier, bridge rectifier, harmonic components in a rectifier circuit, inductor filters, capacitor filters, L- section filters, π- Section Filters, Comparison of Filters, voltage regulation using Zener Diode.

UNIT IV: Bipolar Junction Transistor

Junction transistor, BJT symbol, transistor construction, BJT operation, common base, common emitter and common collector configurations. Transistor current components, limits of operation, transistor as an amplifier, BJT specifications, comparison of CB, CE, CC amplifier configurations.

UNIT V: Transistor Biasing-stabilization and Field Effect Transistor

The DC and AC load lines, Operating point, need for biasing, fixed bias, collector feedback bias, Emitter feedback bias, Collector-Emitter feedback bias, Voltage divider bias - bias stability and stabilization factors, stabilization against variations in V_{BE} and β, RC coupled amplifier (qualitative treatment)

Field Effect Transistor: The Junction field effect Transistor (Construction, Principle of operation, symbol)- Pinch – off voltage – volt ampere characteristics, The JFET small signal model, comparison of BJT and FET (Qualitative treatment analysis).

TEXT BOOK(S)

1. Millman's Electronic devices & Circuits, Jacob Millman, Christos C Halkias, Satyabrata JIT, 3rd edition, Mc Graw Hill Book Publishers.
2. Engineering Physics, K. Malik, A. K. Singh, Tata Mc Graw Hill Book Publishers.

REFERENCE BOOK(S)

1. Electronic devices & Circuits, S Salivahanan, N Srushkumar, A Vallava Raj, Second Edition, Tata Mc Graw Hill Book Publishers.
2. Fundamentals of Physics, David Halliday, John Weily Publishers.
3. University Physics, Sear's and Zemansky (10th Edition), Wesly Publishers.
4. Modern Physics, R. Murugesan, S Chand & Co Publishers (For Statistical Mechanics)
5. Fiber optic communication, Gerd Keiser, Tata Mc Graw Hill Book Publishers, 5th Edition.
6. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers.

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16MA1201 – MATHEMATICS – II

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): 16MA1101 MATHEMATICS I

Course Objectives
Develop ability to
1. Identify the methods of differential calculus to optimize single and multivariable functions.
2. Evaluate Improper integrals using Beta and Gamma functions.
3. Evaluate multiple integrals and apply the same to solve engineering problems.
4. Understand convergence of the series using Fourier series technique and to find solution of integral equations using Fourier Transforms.
5. Explain properties of vector operators. Use vector calculus to determine the length of a curve, area between surfaces and volume of solids.

Course Outcomes (COs)
After completion of the course, the student would be able to:
CO1. Apply the methods of differential calculus to optimize single and multivariable functions.
CO2. Evaluate improper integrals using Beta and Gamma functions.
CO3. Evaluate multiple integrals and apply the concepts of the same to find the areas, volumes and moment of inertia of regions on a plane or in space.
CO4. Apply Fourier series to find convergence of series and Fourier Transforms to solve integral equations.
CO5. Apply vector operators on scalar and vector point functions to compute length of a curve, area between surfaces and volume of solids, using vector calculus.

UNIT-I: Functions of Several Variables
Limit, Continuity, Partial Differentiation, Total Derivatives, Functions of several variables- Functional dependence- Jacobian- Maxima and Minima of functions of two variables without constraints and with constraints-Method of Lagrange multipliers

UNIT-II: Improper Integration
Gamma and Beta Functions – Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.

UNIT-III: Multiple Integration and its Applications
Multiple integrals – double and triple integrals – change of order of integration- change of variables (polar, cylindrical and spherical), Finding the area of a region using double integration and volume of a region in space using triple integration.

UNIT – IV: Fourier series and Transforms

Definition of periodic function, Fourier expansion of periodic functions in a given interval of length 2π. Determination of Fourier coefficients–Fourier series of even and odd functions–Fourier series in an arbitrary interval –even and odd periodic continuation – Half-range Fourier sine and cosine expansions, Fourier integral theorem –Fourier sine and cosine integrals, Fourier Integral transforms–Fourier sine and cosine transforms and their properties–inverse transforms–Finite Fourier transforms

UNIT –V: Vector Calculus

Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties, - Laplacian operator- Solenoidal and irrotational vectors, Scalar Potential function, directional derivatives. Line integral – work done – Surface integrals -Volume integral. Green's theorem, Stoke's theorem and Gauss's Divergence theorems (Statement & their Verification).

TEXT BOOK(S)

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa publishing House, Delhi.

REFERENCE BOOK(S)

1. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
2. Engineering Mathematics by Srimanta pal, subhodh C.Bhunia, Oxford higher Education.
3. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC.
4. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.
5. Ordinary & Partial Differential Equations, M D Raisinghania, S. Chand.

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16MA1202 – MATHEMATICS – III

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): 16MA1101 MATHEMATICS I

Course Objectives
Develop ability to
1. Understand approximation of a polynomial/curve to satisfy the given set of data.
2. Determine approximate zeros of an algebraic/transcendental/system of equations using suitable numerical methods.
3. Evaluate differentiation/integration methods for a given set of data using numerical methods.
4. Apply various numerical methods to compute approximate solution of a given ordinary differential equation with initial conditions.
5. Apply Partial Differential Equations to solve problems in one dimensional heat and wave equations.

Course Outcomes (COs)
After completion of the course, student would be able to
CO1. Approximate a polynomial/curve to satisfy the given set of data.
CO2. Apply suitable numerical methods to find the approximate root/solution of algebraic/transcendental/system of equations.
CO3. Apply various numerical methods to evaluate differentiation/integration for a given set of data.
CO4. Solve a given ordinary differential equation with initial conditions using suitable numerical methods.
CO5. Apply partial differential equations to solve problems namely, one dimensional wave equation and heat equation.

UNIT – I: Interpolation and Curve fitting
Interpolation: Introduction-Errors in polynomial Interpolation - Finite Differences - Forward Differences - Backward Differences - Central Differences - Symbolic relations and separation of symbols - Difference Equations - Differences of a polynomial - Newton's formulae for interpolation-interpolation with unevenly spaced points-Lagrange's interpolation formula.

Curve fitting: Fitting of a straight line - Second degree curve –exponential curve -power curve by method of least squares.

UNIT – II: Root finding Methods
Solution of Algebraic and Transcendental Equations and Linear system of equations, Introduction – Graphical interpretation of solution of equations, the bisection method – The

Method of False Position – The Iteration Method – Newton-Raphson Method, Solving system of non-homogeneous equations by L-U Decomposition method (Crout's Method)Jacobi's and Gauss Seidel Iteration method.

UNIT – III: **Numerical Differentiation, Integration**
Numerical differentiation: Newton's forward and backward difference derivatives, Stirling's Central difference derivatives, Numerical integration – General quadrature formula, Trapezoidal rule, Simpson's $1/3^{rd}$ and $3/8^{th}$ Rule.

UNIT – IV: **Numerical solutions of First order differential equations**
Numerical solution of Ordinary Differential equations: Solution by Taylor's series method – Picard's Method of successive Approximation- single step methods-Euler's Method-Euler's modified method, Runge - Kutta Methods.

UNIT – V: Partial Differential Equations
Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation, Method of separation of variables for second order equations –Applications of Partial differential equations- one dimensional wave equation, one dimensional Heat equation.

TEXT BOOK(S)

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.

REFERENCE BOOK(S)

1. Computer Oriented Numerical Methods by V. Rajaraman, PHI Learning.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Engineering Mathematics by Srimanta pal, subhodh C.Bhunia, Oxford higher Education.
4. A text book of Higher Engineering Mathematics, Bali N P and Saxena, Lakshmi Publications.
5. Introductory methods of Numerical Analysis by S.S. Sastry, PHI learning.

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16CS1201 – COMPUTER PROGRAMMING - II

I Year. B.Tech. CSE –II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): 16CS1101 COMPUTER PROGRAMMING - I

Course Objectives
Develop ability to
1. Understand the concepts of String Manipulation Functions using C language in programming.
2. Introduce the structure, union, and enumerated types
3. Understand the classical approaches to sorting arrays: selection, bubble, insertion, merge sorting; sequential and binary searching algorithms.
4. Introduce the basic concepts of lists, stacks and queues and their applications.
5. Understand the basic characteristics of text, binary files and C implementation of file I/O using streams.

Course Outcomes (COs)
After completion of the course, student would be able to
- CO1. Write and execute programs that read, write and manipulate strings using C language program.
- CO2. Use the type definition, enumerated types, define and use structures, unions in programs using C language.
- CO3. Write programs that sort data using selection, bubble, insertion techniques and perform search mechanisms either by sequential or binary search techniques using C language program.
- CO4. Demonstrate the basic operations of stacks and queues using C program.
- CO5. Write programs that read and write text, binary files using the formatting and character I/O functions.

UNIT – I
Strings – Concepts, C Strings, String Input / Output functions, string manipulation functions, arrays of strings, string / data conversion, C program examples.

Enumerated – The Type Definition (typedef), Enumerated types

Preprocessor commands: C program examples.

UNIT – II
Structure and Union Types
Structures – Declaration, initialization, accessing structures, operations on structures, Complex structures, C program examples.

Structures in C
Structures and functions, passing structures through pointers, self referential structures, unions, bit fields, C programming examples

UNIT – III
Sorting - Selection sort, bubble sort, insertion sort and merge sort techniques (Using Arrays)
Searching - Linear search, binary search, binary recursive search techniques (Using Arrays)

UNIT - IV
Linear list - Singly linked list implementation, insertion, deletion and searching operations on linear list

Stacks - Push and Pop Operations, Introduction to In-fix and Post-Fix Notation. (Arrays and List implementation.)

Queues - Enqueue and Dequeue operations. (Arrays and List implementation.)

UNIT – V
File Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions, C program examples.

Command line arguments, C program examples.

Program Development – Simple file, Multi-function, Multi-source files, Separate Compilation of functions

TEXT BOOK(S)
1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Thompson Learning, 2007 Reprint.

REFERENCE BOOK(S)
1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.
3. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
4. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
5. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.

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16EN12L1 – ENGLISH – II LAB

I Year. B.Tech. (CSE) – II Sem

L	T	P/D	C
-	-	2/-	1

Prerequisite(s): **16EN1101 ENGLISH - I**
16EN11L1 ENGLISH - I LAB

Course Objectives

Develop ability to

1. Usage of Computer Aided Multimedia learning tools for advanced language learning.
2. Sensitize the student to the nuances of combination of speech sounds, accent, intonation and rhythm of English language.
3. Listen actively and speak fluently at various fora.
4. Apply language skills with ease in real life situations.
5. Enhance writing skills.

Course Outcomes (COs)

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

CO1. Demonstrate with ease the nuances of English language through audio-visual tools.
CO2. Listen actively and speak fluently at various fora.
CO3. Demonstrate language skills aptly in various situations.
CO4. Demonstrate writing skills with appropriate usage of words.

Module: 1 Consonant Clusters, Past Tense and Plural Markers, Minimal Pairs

Module: 2 Describing people, places, situations – Narrating- Giving Directions

Module: 3 Discussions and Public Speaking

Module: 4 Debate

Module: 5 Oral Presentations

Module: 6 Creative Writing

Additional Topics

a. Assertive Communication
b. Time Management

REFERENCE BOOK(S)

1. Speaking English Effectively 2nd Edition by Krishna Mohan and N.P.Singh, MacMillan Publishers, 2011.
2. How to prepare for interviews by Shashi Kumar.V and Dhamija P.V
3. English Pronunciation in Use by Hancock, M. 2009, Cambridge University Press
4. Spoken English, a Manual of Speech and Phonetics, by R.K.Bansal and J.B.Harrison, Orient Black Swan 2013.
5. Spoken English by Shashi Kumar and Dhamija.

6. A Manual entitled English Language Communication Skills Lab Manual cum Workbook by Cengage Learning India 2013
7. Creative Writing Skills by Ashraf Rizvi, Tata Mc. Graw Hill
8. CD's on listening.

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16PH12L2 – SEMICONDUCTOR PHYSICS LAB

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): 16PH1101 ENGINEERING PHYSICS

(Any ten of the following twelve experiments compulsory)

Course Objectives

Develop ability to

1. Determine modulii of elasticity.
2. Determine wavelength of spectral lines in Mercury spectrum, wavelength of LASER, radius of curvature of a plano-convex lens.
3. Determine time constant of a capacitor, energy gap of a given semiconductor, study V-I characteristics of p-n junction and Zener diode; calculate ripple factor of a given rectifier.
4. Plot input and output characteristics of a given transistor in different configurations, understand methods of transistor biasing, plot V-I characteristics of a Field Effect Transistor (FET).
5. Determine the magnetic induction at several points on the axis of coil carrying current using Stewart and Gee's method; plot the V-I characteristics of solar cell.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Infer modulii of elasticity of a given material, computer shearing stress and strain: identify their limitations.

CO2. Demonstrate the optical phenomenon like interference and diffraction by computing wavelength of spectral lines of a given source.

CO3. Explain the signal delay in electronic circuits by calculating time constant of a capacitor, plot V-I characteristics of p-n junction diode and zener diode, Compute ripple factor of a given rectifier.

CO4. Evaluate current gain of a given transistor; computer drain resistance and transconductance of a FET.

CO5. Compute the magnetic induction using Stewart and Gee's method; Obtain the V-I characteristics of solar cells and specify their applications.

List of Experiments

1. Determination of Rigidity Modulus of a given wire using Torsional Pendulum.
2. Determination of radius of curvature of a given Plano Convex lens by forming Newton's Rings.
3. Determination of wavelength of spectral lines of mercury spectrum - Diffraction grating.
4. Determination of Wavelength of a given source of LASER-Diffraction Grating.
5. Determination of Time constant of a given RC combination.
6. Determination of Energy gap of a given semiconductor.

7. V-I Characteristics of p-n junction diode and zener diode.
8. Input and Output Characteristics of n-p-n Transistor - CE configuration.
9. Input and Output Characteristics of n-p-n Transistor - CB configuration.
10. Conversion of ac to dc by using Half wave rectifier without filters.
11. Conversion of ac to dc by using Full wave rectifiers without filters.
12. FET Characteristics.

Additional Experiments

1. Determination of magnetic field of induction at several points on the axis of coil carrying current using Stewart and Gee's method.
2. V-I characteristics of Solar cell.

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16MA12L1 – COMPUTATIONAL MATHEMATICS LAB

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): 16CS1101 COMPUTER PROGRAMMING I

Course Objectives

Develop ability to write and execute programs using C-programming/ Octave/ Scilab to

1. Find the solution of system of non-homogeneous equations by L-U decomposition method.
2. Construction of a polynomial of suitable degree by using the discrete data.
3. Find the numerical solutions of ordinary differential equations using different numerical methods like Taylor's series method, Picard's method, Euler's method, Euler's modified method and Runge-Kutta method, when usual methods fail to find the general solution of differential equation.
4. Apply numerical integration methods to find integration of unintegrable functions.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Determine the solution of system of non-homogeneous equations by L-U decomposition method

CO2. Construct a polynomial of suitable degree by using the discrete data.

CO3. Apply Numerical differentiation techniques to find first, second and higher order derivatives, when the function under consideration is not differentiable

CO4. Determine the numerical solutions of ordinary differential equations using different numerical methods like Taylor's series method, Picard's method, Euler's method, Euler's modified method and Runge-Kutta methods, when usual methods failed to apply to find the general solution of differential equation.

Programming Tasks

1. Determine y for a given x, if two arrays of x and y of same size are given (using Newton's interpolation both forward and backward).
2. Determine y for a given x, if two arrays of x and y of same size are given(using Lagrange's and Gauss's interpolation)
3. Find the solution of given system of linear equations using L-U decomposition method.
4. Find the solution of given system of linear equations using Jacobi's method.
5. Find the solution of given system of equations using Gauss-seidel iteration method.
6. Find the solution of given system of equations using Gauss Jordan elimination method.
7. Evaluate definite integral using trapezoidal rule, Simpson's $1/3^{rd}$ rule and $3/8^{th}$ rule.
8. Solve a given differential equation using Taylor's series.
9. Solve a given differential equation using Euler's and modified Euler's method.
10. Solve a given differential equation using Runge-Kutta method.

Advance Lab techniques

1. Solve system of equations using QR-algorithm.
2. Solve system of equations using Predictor-Corrector algorithm.

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16CS12L1 – COMPUTER PROGRAMMING – II LAB

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): 16CS1101 COMPUTER PROGRAMMING - I
16CS11L1 COMPUTER PROGRAMMING - I LAB

Course Objectives

Develop ability to

1. Understand the concepts of String Manipulation Functions using C language in programming.
2. Introduce the structure, union, and enumerated types
3. Understand the classical approaches to sorting arrays: selection, bubble, insertion, merge sorting; sequential and binary searching algorithms.
4. Introduce the basic concepts of lists, stacks and queues and their applications.
5. Understand the basic characteristics of text, binary files and C implementation of file I/O using streams.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Write and execute programs that read, write and manipulate strings using C language program.
CO2. Use the type definition, enumerated types, define and use structures, unions in programs using C language.
CO3. Write programs that sort data using selection, bubble, insertion techniques and perform search mechanisms either by sequential or binary search techniques using C language program.
CO4. Demonstrate the basic operations of stacks and queues using C program.
CO5. Write programs that read and write text, binary files using the formatting and character I/O functions.

Week No	Name of the program
1	a. Write a C program to find weather a given string is palindrome or not. b. Write a C program to insert characters at a given location in a given string. c. Write a C program to delete characters from a given string and position d. Write a C program to print the number of vowels and consonants using Strings.
2	a. Write a C program to convert Roman number to Decimal Number. b. Write a C program to find the 2's Compliment of a given string c. Write a C program to Reverse a String by Passing it to function d. C Program to Input a String with at least one Number, Print the Square of all the Numbers in a String
3	a. Write a c program to implement complex structures for the following

	operations. i. Addition of 2 Complex numbers ii. Multiplication of 2 Complex Numbers
4	a. Write a c program to implement arrays of structures? b. Write a c program to implement bit fields in C?
5	a. Write a C Program to store the information (name, roll no, and branch) of a student using unions. b. Write a c program to implement inter function communication by passing pointers to a structure.
6	a. Write a c program to sort the elements using selection sort b. Write a c program to sort the elements using Bubble sort. c. Write a c program to sort the elements using Insertion sort d. Write a c program to sort the elements using Merge sort
7	a. Write a c program to search an element in a list of elements using linear search. If the element found display the position, otherwise print "element not present". b. Write a c program to search an element in a list of elements using Binary search. If the element found display the position, otherwise print "element not present". c. Write a c program to search an element in a list of elements using recursive Binary search. If the element found display the position, otherwise print "element not present".
8	Write a c program to implement singly linked list for the following operations. a) Insertion b)Deletion c)Search
9	a. Write a c program implement Stack using arrays. b. Write a c program implement Stack using linked list. c. Write a c program convert infix to postfix notation.
10	a. Write a c program implement Queue using arrays for the following operations. i) Enqueue ii) Dequeue b. Write a c program implement Queue using Linked list for the following operations. i) Enqueue ii) Dequeue
11	a. Write a c program open a new file and implement the following I/O functions. i. fprintf(), fscanf() ii. getw(), putw() iii. getc(), putc() b. Write a c program to copy data from one file to another. c. Write a c program to merge two files, using command line arguments.

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16WS12L1 – INFORMATION TECHNOLOGY WORKSHOP (ITWS) / ENGINEERING WORKSHOP (EWS)

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): None

Course Objectives

Develop ability to

1. Identify different components of Personal Computer (PC) and their configurations.
2. Identify various steps for disassembly and assembly of PC components.
3. Install Windows and Linux operating systems on Personal Computers.
4. Troubleshoot simple hardware and software related problems.
5. Make Text Documents using various features of document preparation tools such as MS-Word, Libre Office Write, LaTex.
6. Make Spread Sheet using various features of worksheet preparation tools namely, MS-Excel, Libre Office Calc.
7. Make Presentations using various features of presentation tools namely, MS-Powerpoint, Libre Office Express.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Identify the components of Personal Computer (PC) System.
CO2. Disassemble and assemble the components of Personal Computer.
CO3. Troubleshoot trivial hardware and software related problems.
CO4. Use productivity software such as MS Office Tools: Word, Excel, Power Point, Libre Office Tools: Write, Calc, Express and LaTex.
CO5. Install Operating Systems such as Windows and Linux on personal computers

Week 1	**Task 1**: Different generations of computers, computing environments, Identify the peripherals of a computer, components in CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral. **Task 2**: The students need to go through the video which shows the process of assembling a PC. The student should disassemble and assemble the PC back to its working condition.
Week 2	**Task 1:** Every student should learn installing Windows-7 in the personal computer. **Task 2:** Hardware & software Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals and Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.
Week 3	**Task**: Every student should learn the process of installing Linux in the computer

	along with configuring as dual boot with both windows and Linux.
Week 4	**Task 1**: Features of Word Processor Tool: Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track changes. **Task 2**: Creating a Newsletter: Features: Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge.
Week 5	**Task 1**: Features of Spreadsheet Tool: Creating a Scheduler - Features:- Gridlines, Format Cells, Summation, auto fill, Formatting Text **Task 2**: Calculating GPA : Cell Referencing, Formulae in spreadsheet – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, lookup, Sorting, Conditional formatting.
Week 6	**Task**: Features of Presentation tool: Students will work on basic power point utilities and tools which help them to create power point presentation. Presentation Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Hyperlinks, Inserting – Images, Clip Art, Audio, Video, Objects, Tables and Charts Lines and Arrows.
Week 7	**Task:** Document preparation using LaTex
Week 8	**Task:** Document, Spreadsheet and Presentation using Libre Office

TEXT BOOK(S)

1. Comdex Information Technology Course Tool Kit, Vikas Gupta, WILEY Dreamtech, 2009-10 Edition.
2. Introduction to Information Technology, ITL Education Solutions Limited, Pearson Education, 2012.

REFERENCE BOOK(S)

1. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
2. LaTex Companion, Leslie Lamport, PHI/ Pearson.
3. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education.
4. IT Essentials PC Hardware and Software Companion Guide, Third Edition, David Anfinson and Ken Quamme, CISCO Press, Pearson Education.

ENGINEERING WORKSHOP

Prerequisite(s): None

Course Objectives

Develop ability to

1. Inculcate general machining skills.
2. Understand the dignity of labour, precision, safety at work place, team working and development of positive attitude.
3. Gain hands on experience on different trades of engineering such as fitting, carpentry, tin smithy, welding, foundry, black smithy, house wiring and sheet metal.
4. Acquire knowledge of thread cutting and pipe joining in plumbing.
5. Understand the concept of Machining with lathes and automats.
6. Be aware of power tools used in various Engineering applications.

Course Outcomes (COs)

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

CO1. Use various modern engineering tools for engineering practice
CO2. Recognize dignity of labour and workshop safety regulations.
CO3. Design and model different prototypes in carpentry such as T-Lap Joint and L-Lap Joint.
CO4. Make basic prototypes in Tin Smithy such as Open Scoop and Rectangular Tray.
CO5. Perform basic House Wiring techniques such as Series wiring, Staircase (one lamp with two switches) Connection, Connecting one lamp with one switch, connecting two lamps with one switch.
CO6. Design and model basic prototypes in fitting such as L-Fitting, V-Fitting and Dove tail Fitting.
CO7. Make basic prototypes in Black Smithy such as S-Hook, C –Hook and Flat Chisel.
CO8. Perform basic Foundry such as Dumbbell Pattern, Stepped Pulley Pattern and Gear Pattern
CO9. Demonstrate knowledge of welding process, Plumbing and power Tools.

List of Experiments

I. TRADES FOR EXERCISES:

At least TWO exercises from each trade:

1. **Carpentry:** T-Lap Joint, L-Lap Joint, Cross Lap joint, Dove Tail Joint
2. **Fitting:** L-Fitting, V-Fitting,Dove tail Fitting.
3. **Tin-smithy and development of jobs carried out and soldering.:**Open Scoop, Rectangular Tray, Funnel.
4. **House-wiring:** Series Wiring, Staircase Wiring, Connecting one lamp with one switch, connecting two lamps with one switch.
5. **Black smithy:** S-Hook, C –Hook, Flat Chisel.
6. **Foundry:** Doumble Pattern, Stepped Pulley Pattern, Gear pattern

II. TRADES FOR DEMONSTRATION & EXPOSURE:

1. **Welding:** V-Butt Joint, Corner Butt Joint, Lap Joints.
2. Power tools used in construction, wood working, electrical engineering and mechanical engineering.
3. **Plumbing:** Thread Cutting, Pipe Joining –1, Pipe Joining -2.

TEXT BOOK(S)

1. Work shop manual - P.Kannaiah/K.L Narayana/scitech publishers.
2. Workshop manual by Venkat Reddy, 2nd Edn, Scitech publishers.

REFERENCE BOOK(S)

1. Raghuwanshi B.S., Workshop Technology Vol. I & II, Dhanpath Rai & Sons.
2. John K.C., Mechanical Workshop Practice. 2nd Edn. PHI 2010.
3. Jeyapoovan T.and Pranitha S., Engineering Practices Lab Manual, 3rd Edn. Vikas Pub.2008.

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16CS2101 – MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
4	1	-/-	4

Prerequisite(s): None

Course Objectives
Enable student to
1. Understand concepts of Mathematical Logic and its applications.
2. Understand mechanisms of inference rules for propositional and predicate logic and their applications.
3. Understand principles of Mathematical Induction and Contradiction.
4. Understand the concepts of relations, functions, sets, algebraic structures and counting and their applications.
5. Understand the fundamental notions of statistics, such as sample space, mean and distributions.
6. Understand basic definitions and properties of graphs and their applications in computer science and engineering.

Course Outcomes (COs)
After completion of the course, student would be able to
- CO1. Distinguish between Propositional Logic and Predicate Logic and check the proposition satisfiability.
- CO2. Illustrate by examples the basic terminology of functions, relations, sets and algebraic structures along with their associated operations.
- CO3. Demonstrate basics of counting, principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
- CO4. Apply induction proof techniques towards solving recurrences and other problems in elementary algebra.
- CO5. Compute the probability of an event in a well-defined distribution.
- CO6. Represent a problem as a graph in solving computer science and engineering problems.

UNIT-I
Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers.

Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

UNIT-II

Relations: Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram.

Functions: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties.

UNIT-III

Algebraic structures: Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

Elementary Combinatorics: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principles and its application.

UNIT-IV

Recurrence Relation: Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating functions. Characteristic roots solution of In-homogeneous Recurrence Relations.

UNIT-V

Graph Theory: Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs. Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

TEXT BOOK(S)

1. Discrete Mathematical Structures with Applications to Computer Science, J.P.Tremblay, R.Manohar, 1st Edition, Tata McGraw Hill, 2001.
2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, 2nd Edition, PHI, 2009.

REFERENCE BOOK(S)

1. Elements of Discrete Mathematics- A computer Oriented Approach-C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.
2. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition.TMH.
3. Discrete Mathematical structures Theory and application-Malik & Sen, Cengage.
4. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
5. Logic and Discrete Mathematics, Grass Man & Trembley, Pearson Education.

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16CS2102 – DATA STRUCTURES

L	T	P/D	C
4	-	-/-	4

II Year. B.Tech. CSE – I Sem

Prerequisite(s): 16CS1101 COMPUTER PROGRAMMING - I
16CS1201 COMPUTER PROGRAMMING - II

Course Objectives

Develop ability to

1. Understand the basic concepts of Abstract Data Types, Linear and Non Linear Data structures.
2. Identify the notations used to represent the Performance of algorithms.
3. Understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
4. Familiarize with various data structures for various applications.
5. Understand various searching and sorting algorithms.
6. Write programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Explain the basic concepts of Abstract Data Types, Linear and Non Linear Data structures.
CO2. Calculate the performance of the different algorithms in terms of time and space.
CO3. Write programs in C for different data structures like stacks, queues, linked lists (singly and doubly).
CO4. Select appropriate data structure for a given problem.
CO5. Write C programs for different searching and sorting algorithms.
CO6. Write C programs on non-linear data structures such as trees and graphs.

UNIT- I

Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations,

Introduction to Linear and Non Linear data structures: Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion. Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

UNIT- II

Stack ADT, definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation.

Queue ADT, definition and operations, array and linked implementations in C, Circular queues-Insertion and deletion operations, Deque (Double ended queue)ADT, array and linked implementations in C.

UNIT- III

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees.

Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap. , Sorting-Insertion Sort, Selection Sort, Merge sort, Quick sort, Heapsort Radix Sort, Comparison of Sorting methods.

UNIT- IV

Search Trees - Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees- Definition and Examples, Insertion into an AVL Tree, B-Trees, Definition, B-Tree of order m, operations-Insertion and Searching, Introduction to Red-Black and Splay Trees, Comparison of Search Trees.

UNIT-V

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations-Adjacency matrix, Adjacency lists, Adjacency multi lists, Graph traversals- DFS and BFS.
Static Hashing-Introduction, hash tables, hash functions, Overflow Handling.
Pattern matching algorithm- The Knuth-Morris-Pratt algorithm, Tries (examples only).

TEXT BOOK(S)

1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and SusanAnderson-Freed, Universities Press.

REFERENCE BOOK(S)

1. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
2. Data Structures using C, R.Thareja, Oxford University Press.
3. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
4. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
5. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson.
6. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI
7. Data Structures, S.Lipscutz, Schaum's Outlines, TMH.
8. Data structures using C, A.K.Sharma, 2nd edition, Pearson..
9. Data Structures using C &C++, R.Shukla, Wiley India.
10. Classic Data Structures, D.Samanta, 2nd edition, PHI.

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16CS2103 – OBJECT ORIENTED PROGRAMMING THROUGH JAVA

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): 16CS1101 COMPUTER PROGRAMMING - I
16CS1201 COMPUTER PROGRAMMING - II

Course Objectives
Develop ability to
1. Understand basic concepts of object oriented programming.
2. Understand the primitive data types built into the Java language and features of strongly typed language.
3. Learn scope, lifetime, and the initialization mechanism of variables and parameter passing mechanisms.
4. Write simple graphics programs involving drawing of basic shapes.
5. Create Graphical User Interfaces by means of Java Programming Language.

Course Outcomes (COs)
After completion of the course, student would be able to
CO1. Apply the concepts of OOPs in problem solving.
CO2. Use data abstraction, inheritance, polymorphism, encapsulation and method overloading principles in structuring computer applications.
CO3. Identify classes, objects, members of a class and relationships among them needed for a specific problem.
CO4. Use Java Collection of Application Programming Interface (API) as well as the Java standard class library with necessary exception handling mechanisms in constructing computer applications.
CO5. Develop java programs using multi-threading, files and database concepts and their connectivity.
CO6. Design and develop Graphical User Interface applications using Abstract Window Toolkit (AWT), Swings and Applets.

UNIT-I
OOP concepts - Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, procedural and Object oriented programming paradigms

Java Programming - History of Java, comments, datatypes, variables, constants, scope and life time of variables,operators,operator hierarchy, expressions,type conversion and casting, enumerated types,control flow block scope, conditional statements, loops break and continue statements. simple java program,arrays,console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this keyword, overloading methods and constructors recursion,garbage collection,building strings, exploring string class

UNIT-II

Inheritance - Definition,hierarchies, super and subclasses,Member access rules, super keyword,preventing inheritance: final classes and methods, the Object class and its methods.

Polymorphism - Dynamic binding, method overriding, abstract classes and methods.

Interfaces - Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

Inner classes - Uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

Packages - Definition, Creating and Accessing a package, understanding CLASSPATH, importing packages.

UNIT-III

Exception handling – Dealing with errors, benefits of exception handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, exception specification, built in exceptions, creating own exception sub classes.

Multi-Threading - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter thread communication, producer consumer pattern.

UNIT –IV

GUI Programming with java - The AWT class hierarchy, Introduction to Swing, Swing Vs AWT, Hierarchy for Swing components, containers- JFrame, JApplet, JDialog, JPanel, Overview of some swing components - JButton, Jlabel, JtextField, JTextArea, simple Swing Applications, Layout Management- Layout Manager types- border , grid and flow

Event handling - Events, event sources, event classes, event Listeners, Relationship between event sources and Listeners Delegation event model, Examples: handling a button click, handling mouse events, Adapter classes.

Applets – Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters, applet security issues.

UNIT –V

Connecting to Database - JDBC type 1 to 4 drivers, connecting to a data base, querying a data base and processing the results, updating data with JDBC.

Files: streams – byte streams, character streams, text input/ Output binary input/ output
Random access file operations, file management using File class

Collection Frame work in java - Introduction to java Collections, overview of java collection frame work, Generics, commonly used collection classes- ArrayList, Vector, Hash table, Stack, Enumeration, Iterator, String tokenizer, Random, Scanner, Calendar and Properties

TEXT BOOK(S)

1. Java fundamentals- A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH, 1st Edition, 2013.

REFERENCE BOOK(S)

1. Core Java 2–Volume1, Cay S. Horstmann and Gary Cornell
2. Java for Programmers, PJ. Dietel and H.M Deitel Pearson education.
3. Object Oriented Programming through Java. P.Radha Krishna. Universities Press.
4. Thinking in Java, Bruce Eckel, Pearson Education.

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16EC2103– SWITCHING THEORY AND LOGIC DESIGN

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): None

Course Objectives
Develop ability to
1. Understand basic concepts of various number systems used in digital systems.
2. Understand boolean algebra and various boolean simplification theorems
3. Understand simplification of boolean functions using k-map and tabular method.
4. Understand design and analysis of combinational and sequential logic circuits.
5. Understand the concepts of various memories and PLDs.
6. Understand symmetric functions and design the same using relay contacts
7. Understand Threshold logic and design switching functions using threshold elements.

Course Outcomes (COs)
After completion of the course, student would be able to
CO 1. Perform conversions from one number system to another
CO 2. Simplify Switching functions using Boolean minimization theorems, map method and tabulation method.
CO 3. Analyze and Design the combinational and sequential logic circuits that are hazard free.
CO 4. Distinguish between RAM, ROM and PLDs and synthesize logic circuits using PLDs.
CO 5. Synthesize symmetric functions using relay contact networks
CO 6. Design switching circuits using threshold elements

UNIT I
Number Systems: Number Systems, Base Conversion Methods, Binary arithmetic, Complements of Numbers, Codes-Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Alpha Numeric Codes, Error Detecting and Correcting Codes.

Boolean Algebra and Switching Functions: Switching algebra, Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification of Digital Logic Gates Properties of XOR Gates, Universal Gates, Multilevel NAND/NOR realizations.

UNIT II
Minimization of switching functions: Introduction, The Minimization with theorem, The Karnaugh Map Method, Five and six Variable maps, Prime and essentials implications, Don't

care map entries, using the maps for simplifying, Tabular method, partially specified expressions.

UNIT III

Design of Combinational Circuits: Design using Conventional Logic gates, Data Selectors, Encoders, Priority Encoder, Decoders, comparators, Adders, multiplexers, De-multiplexers, MUX realization of switching functions, Parity generators and code converters. Multi-output minimizations, Hazards and Hazard Free Realizations.

Memory Elements and Programmable Logic Devices: Types of Memory Elements (RAM and ROM). Basic PLD's- ROM, PROM, PLA and PAL. Realization of Switching functions using PLD's.

UNIT IV

Synthesis of Symmetric Networks: Relay Contacts, Analysis and Synthesis of Contact Networks, Symmetric Networks, Identification of Symmetric Functions.

Threshold Logic: Threshold Elements, Capabilities and Limitations of Threshold logic, Elementary Properties, Synthesis of threshold networks (Unate function, Linear seperability, Identification and realization of threshold function, Map based synthesis of two-level networks).

UNIT V

Sequential Machines Fundamentals: Introduction, State table, State Assignment, Finite State Model-Basic Definitions. Memory Elements and their Excitation Functions-SR flip-flop, T flip-flop, JK flip-flop, D flip-flop, Clock timing and Master Slave flip-flop. Synthesis of Synchronous Sequential circuits-Sequence Detector, Binary counter, Parity bit generator.

Counters and Shift Registers: Ripple Counter, Ring Counters, Twisted Ring Counter, Shift Registers and their types, Ring Counter using Shift Register

TEXT BOOK(S)

1. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge.
2. Digital Design- Morris Mano, PHl, 3rd Edition.

REFERENCE BOOK(S)

1. Introduction to Switching Theory and Logic Design - Fredriac J. Hill, Gerald R. Peterson, 3rd Ed, John Wiley & Sons lnc.
2. Digital Fundamentals - A Systems Approach - Thomas L. Floyd, Pearson, 2013.
3. Digital Logic Design - Ye Brian and Holds Worth, Elsevier.
4. Fundamentals of Logic Design- Charles H. Roth, Cengage Learning, Sth, Edition, 2004.
5. Digital Logic Applications and Design, John M. yarbrough, Thomson Publications, 2006.
6. Digital Logic and State Machine Design - Comer, 3 ed, Oxford, 2013.

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16EE2104 – BASIC ELECTRICAL ENGINEERING

II Year B.Tech. CSE I Semester

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): None

Course Objectives
Develop ability to
1. Understand Network theorems, fundamentals of Alternating Current (AC).
2. Understand basic operating principles, construction and functions of single phase transformers.
3. Understand basic operating principles of Direct Current (DC) machines and AC motors.
4. Understand basic operating principles, construction and working of Permanent Magnet Moving Coil (PMMC) and Moving Iron (MI) ammeters and voltmeters.

Course Outcomes (COs)
At the end of the course, student would be able to
CO1. Analyze electrical circuits and solve simple network problems by applying suitable laws and network theorems.
CO2. Analyze basic AC circuits and calculate AC network parameters.
CO3. Determine efficiency, power loss (iron loss and copper loss) and percentage regulation of a single phase transformer.
CO4. Determine parameters of DC machines and AC motors, namely, power loss, torque, efficiency etc.
CO5. Distinguish between PMMC and MI ammeters and voltmeters.

UNIT – I
Introduction to Electrical Engineering: Ohm's law, basic circuit components, Kirchhoff's laws. Simple problems. **Network Analysis:** Basic definitions, types of elements, types of sources, resistive networks, inductive networks, capacitive networks, and series parallel circuits, star delta and delta star transformation. **Network theorems**: Superposition, Thevenins's, Maximum power transfer theorems and simple problems.

UNIT-II
Alternating Quantities: Principle of AC voltages, waveforms and basic definitions, root mean square and average values of alternating currents and voltage, form factor and peak factor, phasor representation of alternating quantities, the J operator and phasor algebra, analysis of AC circuits with single basic network element, single phase series circuits.

UNIT-III

Transformers : Principles of operation, constructional details, ideal transformer and practical transformer, losses, transformer test, efficiency and regulation calculations (All the above topics are only elementary treatment and simple problems).

UNIT-IV

DC and AC Machines: DC generators: Principle of operation of dc machines, types of DC generators, EMF equation in DC generator. **DC motors:** Principle of operation of DC motors, types of DC motors, losses and torque equation, losses and efficiency calculation in DC generator. **AC Machines:** Three phase induction motor, principle of operation, slip and rotor frequency, torque (simple problems).

UNIT V

Basic Instruments: Introduction, classification of instruments, operating principles, essential features of measuring instruments, PMMC and MI instruments of Ammeters and Voltmeters (elementary treatment only).

TEXT BOOK(S)

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
2. Basic Electrical Engineering, S.N. Singh, PHI.

REFERENCE BOOK(S)

1. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudipta nath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
3. Basic Electrical Engineering, T. K. Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI.
5. Basic Electrical Engineering by D.P.Kothari , I.J. Nagrath, McGraw-Hill.

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16CS21L1 – OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): **16CS11L1 COMPUTER PROGRAMMING - I LAB**
16CS12L1 COMPUTER PROGRAMMING - II LAB

Course Objectives

Develop ability to

1. Understand basic concepts of object oriented programming.
2. Understand the primitive data types built into the Java language and features of strongly typed language.
3. Learn scope, lifetime, and the initialization mechanism of variables and parameter passing mechanisms.
4. Write simple graphics programs involving drawing of basic shapes.
5. Create Graphical User Interfaces by means of Java Programming Language.

Course Outcomes

After completion of the course, student would be able to

CO1. Apply the concepts of OOPs in problem solving.
CO2. Use data abstraction, inheritance, polymorphism, encapsulation and method overloading principles in structuring computer applications.
CO3. Identify classes, objects, members of a class and relationships among them needed for a specific problem.
CO4. Use Java Collection of Application Programming Interface (API) as well as the Java standard class library with necessary exception handling mechanisms in constructing computer applications.
CO5. Develop java programs using multi-threading, files and database concepts and their connectivity.
CO6. Design and develop Graphical User Interface applications using Abstract Window Toolkit (AWT), Swings and Applets.

Week 1 :(Basic programs to get used to java syntax) Write a Java program to

a. print the Fibonacci series upto the given number.
b. write a Java program to print the reverse of the given number
c. write a Java program to find factorial of the given number at command line.
d. write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer

Week 2:Write a Java program to

a. check whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
b. sort a given list of names in ascending order.

c. find frequency count of words in a given text.

Week 3:Write a java program to
a. illustrate creation of classes and objects
b. illustrate constructor and method overloading
c. create a stack ADT

Week 4
a. implement diiferent types of inheritance
b. illustrate method overriding and Dynamic method dispatch
c. illustrate static keyword with variables and methods

Week 5
a. Create an interface for stack of integers with abstract methods push, pop and display. Write an implementation of the above mentioned abstract methods for a fixed size stack and a dynamic size stack.
b. illustrate inner classes
c. illustrate creation and importing the packages

Week 6 Write a java program to
a. illustrate usage of try, catch, finally with multiple exceptions
b. create user defined exceptions.

Week 7
a. Write a java program that implements a multi-thread applications that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the thread will print the value of the number.
b. create a thread by implementing Runnable interface.
c. implement producer consumer problem using the concept of inter thread communication.

Week 8
a. Develop an applet that displays a simple message.
b. Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
c. c)Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the+, -,*, % operations. Add a text field to display the result.

Week 9
a. Write a java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired .
b. Applet handle a keyboard event for a name textbox to accept only alphabets (skip off any other characters)

Week 10
a. Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is

displayed in the Result field when the 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.

b. Applet that depicts a login page.

Week 11

a. Write a java program 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.
b. Write a Java program that allows the user to draw lines, rectangles and ovals.
c. Applet which displays current date and time every second using Thread and Calendar class

Week 12

a. Write a java program to create an abstract class named Shape that contains an empty method named numberOfSides ( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides ( ) that shows the number of sides in the given geometrical figures.
b. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Jtable component.

Week 13

a. Write a java Program that loads names and phone numbers from a text file where the data is organized as one line per record and each filed in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
b. Implement the above program with database instead of a text file.

Week 14

a. Write a java Program that takes tab separated data (one record per line) from a text file and inserts them into a database.
b. Write a java program that prints the meta-data of a given table.

Week 15

a. Write a java program that connects to a database using JDBC and does add,delete, modify and retrieve operations.
b. An applet to check for a valid user id and password using the data in table users(user_id, password)

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16CS21L2 – DATA STRUCTURES LAB

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): 16CS11L1 COMPUTER PROGRAMMING - I LAB
16CS12L1 COMPUTER PROGRAMMING - II LAB

Course Objectives
Develop ability to

1. Understand the basic concepts of Abstract Data Types, Linear and Non Linear Data structures.
2. Identify the notations used to represent the Performance of algorithms.
3. Understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
4. Familiarize with various data structures for various applications.
5. Understand various searching and sorting algorithms.
6. Write programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.

Course Outcomes
After completion of the course, student would be able to

CO1. Explain the basic concepts of Abstract Data Types, Linear and Non Linear Data structures.
CO2. Calculate the performance of the different algorithms in terms of time and space.
CO3. Write programs in C for different data structures like stacks, queues, linked lists (singly and doubly).
CO4. Select appropriate data structure for a given problem.
CO5. Write C programs for different searching and sorting algorithms.
CO6. Write C programs on non-linear data structures such as trees and graphs.

List of Programs

Week 1: Write a C program that uses functions to perform the following:

a. Create a singly linked list of integers.
b. Delete a given integer from the above linked list.
c. Display the contents of the above list after deletion.

Week 2: Write a C program that uses functions to perform the concatenation of a singly linked list

Week3: Write a C program that uses functions to perform the following:

a. Create circularly linked lists
b. Delete a given integer from the above linked list.

c. Display the contents of the above list after deletion.

Week4: Write a C program that uses functions to perform the following:

a. Create a doubly linked list of integers.
b. Delete a given integer from the above doubly linked list.
c. Display the contents of the above list after deletion

Week 5: Write a C program for polynomial addition using linked lists.

Week6: Write C programs to implement a Stack and Queue ADT using
i) Array and ii) singly linked list respectively.

Week7. Write a C program that uses stack operations to convert a given infix expression into its postfix Equivalent. Implement the stack using an array.

Week8: Write C programs to implement a double ended queue ADT using
i) Array and ii) doubly linked list respectively.

Week9:

a. Write a C program that uses functions to perform the following:
    i. Create a binary search tree of characters.
    ii. Traverse the above Binary search tree recursively in Post order.
b. Create a binary search tree of integers.
c. Traverse the above Binary search tree non recursively in in order, pre order, post-order.

Week 10: Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order:
a) Insertion sort b) Selection sort c) Merge sort

Week 11: Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order:
a) Quick sort b) Radix Sort c) Heap Sort

Week 12: Write a C program to perform the following operation:
a) Insertion into a B-tree. b) Searching a B-Tree.

Week 13: Write C programs for implementing the following graph traversal algorithms:
a) Depth first traversal b)Breadth first traversal

Week 14: Write a C program to implement all the functions of a dictionary (ADT) using hashing.

Week15: Write a C program for pattern matching algorithm (KMP).

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16EE21L4 – BASIC ELECTRICAL ENGINEERING LAB

II Year B.Tech. CSE I Semester

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): None

Course Objectives
Develop ability to
1. Understand Network theorems.
2. Understand magnetization characteristics of DC shunt generator.
3. Understand Swinburne's Test on a DC shunt motor.
4. Understand characteristics of DC shunt motor by Brake test.
5. Understand Open Circuit (OC) and Short Circuit (SC) Tests on a single phase transformer.
6. Understand characteristics of three phase induction motor by Brake test

Course Outcomes
At the end of the course, student would be able to
- CO1. Experimentally verify Network theorems.
- CO2. Determine critical resistance and critical speed from magnetization characteristics of DC shunt generator.
- CO3. Experimentally validate efficiency of DC machine.
- CO4. Determine efficiency of DC shunt motor.
- CO5. Calculate efficiency, percentage regulation and determine the equivalent circuit parameters of single phase transformer.
- CO6. Determine efficiency of three phase induction motor.

List of Experiments
1. Verification of Superposition and Reciprocity theorems.
2. Verification of Maximum Power Transfer theorem.
3. Experimental verification of Thevenin's and Norton's theorems.
4. Magnetization characteristics of DC Shunt Generator.
5. Swinburne's Test on a DC Shunt Motor.
6. Brake test on a DC Shunt Motor.
7. OC and SC test on a single phase transformer.
8. Brake test on three phase Induction Motor.

Additional Experiment
1. Verification of KVL(Kirchhoff's Voltage Law) and KCL(Kirchhoff's Current Law)

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16MA2104 – LOGICAL REASONING

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
-	-	2/-	1

Prerequisite(s): None

Course Objectives
Develop ability to
1. Understand and compute LCM, HCF, Square Roots & Cube Roots.
2. Calculate averages; solve problems on time, distance and work done.
3. Understand relation between capital investment, period of investments and shares.
4. Think analytically and logically to solve a given problem.
5. Understand concepts of clocks and calendars.

Course Outcomes:
At the end of the course, student would be able to
CO1. Apply cogent methods to evaluate LCM, HCF, Square Roots & Cube Roots.
CO2. Apply various principles to solve mathematical problems on time, distance and workdone involving lesser computations.
CO3. Apply relation between Capital investments, period of investments and shares to solve numerical problems which involves shorter computational time.
CO4. Demonstrate analytical and logical thinking by solving various problems which include relations and puzzle solving abilities.
CO5. Solve problems related to time.

UNIT-I
Numbers- Classification of numbers, Divisibility rules, Finding the units digit, Finding remainders in divisions involving higher powers, LCM and HCF Models**,** Decimal fractions, Simplifications, Square Roots & Cube Roots, Surds and Indices.

UNIT- II
Averages- Definition of Average, Rules of Average, Problems on Average, Problems on Weighted Average, Finding average using assumed mean method**.**

Time and Distance- Relation between speed, distance and time, Converting kmph into m/s and vice versa, Problems on average speed, Problems on relative speed, Problems on trains.

Time and Work- Problems on Unitary method, Relation between Men, Days, Hours and Work, Problems on Man-Day-Hours method, Problems on alternate days, Problems on Pipes and Cisterns.

UNIT-III

Partnership - Introduction, Relation between capitals, Period of investments and Shares.

Simple Interest - Definitions, Problems on interest and amount, Problems when rate of interest and time period are numerically equal.

Compound Interest-Definition and formula for amount in compound interest, Difference between simple interest and compound interest for 2 years on the same principle and time period.

UNIT – IV

Analytical Reasoning puzzles- Problems on Linear arrangement, Problems on Circular arrangement, Problems on Double line-up, Problems on Selections, Problems on Comparisons.

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Blood relations- Defining the various relations among the members of a family, Solving Blood Relation puzzles, Solving the problems on Blood Relations using symbols and notations.

UNIT – V

Clocks - Finding the angle when the time is given, Finding the time when the angle is known, Relation between Angle, Minutes and Hours, Exceptional cases in clocks.

Calendars - Definition of a Leap Year, Finding the number of Odd days, Framing the year code for centuries, Finding the day of any random calendar date.

Odd man out- Problems on number Odd man out, Problems on letter Odd man out, Problems on verbal Odd man out.

TEXT BOOK(S)

1. Quantitative Aptitude for Competitive Examinations by R.S. Aggarwal, S Chand Publication.
2. Quantitative Aptitude for Competitive Examination by Abhijit Guha, McGraw Hill Education.

REFERENCE BOOK(S)

1. Quantitative Aptitude for the CAT by Nishit K. Sinha, Pearson Education.
2. Wiley's Quantitative Aptitude by P.A. Anand, Wiley; First Edition.

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16CS2201 – DESIGN AND ANALYSIS OF ALGORITHMS

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s):
16CS2101 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
16CS2102 DATA STRUCTURES

Course Objectives
Develop ability to
1. Realize the asymptotic performance of algorithms.
2. Understand the behavior of Greedy strategy, Divide and Conquer approach, Dynamic Programming and branch and bound theory for several problem solving techniques.
3. Understand how the choice of data structures and algorithm design methods impact the performance of programs.
4. Distinguish deterministic and non-deterministic algorithms and their computational complexities.

Course Outcomes
After completion of the course, student would be able to
CO1. Analyze algorithms and estimate their best-case, worst-case and average-case behavior in terms of time and space and execute the same through programming.
CO2. Identify suitable problem solving technique for a given problem and design algorithms using greedy strategy, divide and conquer approach, dynamic programming, and branch and bound theory accordingly and execute the same through programming.
CO3. Implement algorithm design method into appropriate data structures using programming.
CO4. Design deterministic and non-deterministic algorithms for tractable and intractable problems and categorize them as P Class/ NP Class/ NP-Hard/ NP-complete problems accordingly.

UNIT-I
INTRODUCTION: Algorithm, Pseudo code for expressing algorithms, Performance analysis - Time complexity and space complexity, Asymptotic Notations: O notation, Omega notation, Theta notation, and little oh notation, probabilistic analysis and amortized complexity.

DIVIDE AND CONQUER: General method, applications – binary search, merge sort, quick sort, Strassen's matrix multiplication.

UNIT-II

SEARCHING AND TRAVERSAL TECHNIQUES : Efficient non-recursive binary tree traversal algorithms, spanning trees, graph traversals- BFS and DFS, Connected components, bi-Connected components, AND/OR graphs, game tree.

Disjoint sets: operations, union and find algorithms.

UNIT-III

GREEDY-METHOD: General method, Applications-Job sequencing with deadlines, 0/1 knapsack problem, minimum cost spanning tree, single source shortest path problem.

DYNAMIC PROGRAMMING: General method**,** applications-multistage graphs, matrix chain multiplication, optimal binary search trees, 0 /1 knapsack problem, travelling sales person problem, reliability design problem.

UNIT-IV

BACK TRACKING: General method, applications: n-queens problem, sum of sub set problem, graph colouring problem, Hamiltonian cycles.

BRANCH and BOUND: General method, applications: Job Sequencing with deadlines, travelling sales person problem, 0 /1 knapsack problem, LC branch and bound, FIFO branch and bound solution

UNIT-V

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP-hard and NP- complete classes, NP- Hard problems, Cook's theorem.

TEXT BOOK(S)

1. Fundamentals of Computer Algorithms Ellis Horowitz, Satraj Sahni and Sanguthevar Rajasekharan, 2nd Edition, Universities Press, 2009 Reprint.
2. Design and Analysis of Algorithms, Aho, Ullman and Hopcroft, Pearson education, Reprint 2004.

REFERENCE BOOK(S)

1. Introduction to Algorithms, secondediton, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt.Ltd/Person Education
2. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc.Graw Hill
3. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Perason education
4. Algorithms-Richard Johnson baugh and Marcus Schaefer, Pearson Education
5. Design and Analysis Algorithms-Parag Himanshu Dave, Himanshu Bhalachndra Dave Publisher: Person
6. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, John wiley and sons

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16CS2202 – COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): 16EC2103 SWITCHING THEORY AND LOGIC DESIGN

Course Objectives
Develop ability to

1. Understand computer components in general and in particular Von Neumann Architecture and their functionalities.
2. Understand the data representation (2's complement, floating point) inside the processor, and perform arithmetic operations on them.
3. Understand the rationale behind memory organization, storage, I/O, and know how cache operates.
4. Understand 8086 processor architecture and its organization: pin diagram, different types of registers, addressing modes and data transfer.
5. Illustrate computer organization concepts by Assembly Language programming, structure of assembly language program and function call mechanisms.

Course Outcomes
After completion of the course, student would be able to

CO1. Explain various computer abstract levels and functions of computer hardware components and concept of stored program organization.
CO2. Identify different hardware components associated with the memory organization of a computer.
CO3. Recommend instruction formats, addressing modes, interrupts, I/O and Memory buses, Isolated and Memory mapped I/O.
CO4. Recommend mode of asynchronous serial data transfer using an interface (UART).
CO5. Design and implement simple systems using 8086 processor with the knowledge of pin diagram, registers and instruction formats of 8086 processor by writing assembly language programs.

UNIT-I
Basic Computer Organization – Functions of CPU, I/O Units, Memory, Instruction Formats- one address, two addresses, zero addresses and three addresses and comparison; addressing modes with numeric examples; Program Control- Status bit conditions, conditional branch instructions, Program Interrupts: Types of Interrupts.

UNIT-II
Input-Output Organizations- I/O Interface, I/O Bus and Interface Modules: I/O Vs Memory Bus, Isolated Vs Memory-Mapped I/O, Asynchronous Data Transfer- Strobe Control, Hand Shaking; Asynchronous Serial Transfer- Asynchronous Communication Interface, Modes of Transfer-

Programmed I/O, Interrupt Initiated I/O, DMA; DMA Controller, DMA Transfer, IOP- CPU-IOP Communication, Intel 8089 IOP.

UNIT-III

Memory Organizations: Memory Hierarchy, Main Memory, RAM, ROM Chips, Memory Address Map, Memory Connection to CPU, Associate Memory.

Cache Memory, Data Cache, Instruction Cache, Miss and Hit Ratio, Access Time, Associative Mapping, Set-Associative Mapping, Writing into Cache, Introduction to Virtual Memory.

UNIT-IV

8086 CPU Pin Diagram- Special Functions of General Purpose Registers, Segment Register, Concept of Pipelining, 8086 Flag Register, Addressing Modes of 8086.

UNIT-V

8086 Instruction Formats: Assembly Language Programs involving Branch & Call Instructions, Sorting, Evaluation of Arithmetic Expressions.

TEXT BOOK(S)

1. Computer System Architecture, M. Morris Mano, 3/e, Pearson Education. (UNIT-1,2,3).
2. Advanced Micro Processor and Peripherals, Hall/A K Ray, McGraw Hill Education, 2006. (UNIT-4,5).

REFERENCE BOOK(S)

1. Computer Organization and Architecture, William Stallings, Sixth Edition, Pearson/PHI.
2. Structured Computer Organization-Andrew S Tanenbaum, 4th Edition, PHI/Pearson.
3. Fundamentals of Computer Organization and Design, Sivaraama Dandamudi, Springer Int. Edition.
4. Computer Architecture a Quantitative Approach, John L. Hennessy and David A. Patterson, 4th Edition, Elsevier.
5. Computer Architecture: Fundamentals and Principles of Computer Design, SJoseph D. Dumas II, BS Publication.

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16CS2203 – DATABASE MANAGEMENT SYSTEMS

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s):
16CS1101 COMPUTER PROGRAMMING - I
16CS1201 COMPUTER PROGRAMMING - II
16CS2101 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
16CS2102 DATA STRUCTURES

Course Objectives
Develop ability to

1. Learn and practice data modeling using entity-relationship and develop database design.
2. Understand the features of database management systems and Relational database.
3. Understand Structured Query Language (SQL) and learn SQL syntax.
4. Understand normalization process of a logical data model and correct any anomalies.
5. Understand needs of database processing and learn techniques for controlling the consequences of concurrent data access.

Course Outcomes
After completion of the course, student would be able to

CO1. Design and describe data models and schemas in DBMS.
CO2. Use SQL- the standard language of relational databases, for database processing.
CO3. Resolve redundant and functional dependencies, design a normalized database.
CO4. Implement Transaction and Query processing techniques for data storage and retrieval.

UNIT I
Introduction- Data base System Applications, Purpose of Database Systems, View of Data – Data Abstraction , Instances and Schemas , Data Models ,Introduction to Data base design , ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets , Relationships and Relationship sets , Additional features of ER Model , Conceptual Design with the ER Model , Conceptual Design for Large enterprises, database Access for applications Programs ,Data Storage and Querying,– data base Users and Administrator ,data base System Structure ,History of Data base Systems. Database Languages–DDL, DML,DCL.

Relational Model: Introduction to the Relational Model - Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data, Logical data base Design, Introduction to Views – Destroying /altering Tables and Views.

UNIT II
Relational Algebra and Calculus : Relational Algebra – Selection and projection ,set operations , renaming , Joins , Division , Examples of Algebra overviews , Relational calculus

– Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

Form of Basic SQL Query – Examples of Basic SQL Queries , Introduction to Nested Queries, Correlated Nested Queries Set – Comparison Operators – Aggregative Operators , NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs ,Outer Joins ,Disallowing NULL values , Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT III

Introduction to Schema refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Function dependencies- reasoning about FDS,

Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF – properties of Decompositions Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form, Join Dependencies, FIFTH Normal Form, Inclusive Dependencies.

UNIT IV

Transaction Management- Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability.

Concurrency Control - Lock –Based Protocols – Timestamp Based Protocols- Validation-Based Protocols – Multiple Granularity.

Recovery system – Failure Classification- Storage Structure- Recovery – Atomicity – Log – Based Recovery- Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage - Advance Recovery systems- Remote Backup systems.

UNIT V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing,Tree base Indexing, Comparison of File Organizations.

Tree Structured Indexing - Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based indexing: Static Hashing, Extendable Hashing, Linear Hashing, Extendible vs. Linear Hashing.

TEXT BOOK(S)

1. Fundamentals of Database Systems, Elmasri, Navathe, 7th Edition, Pearson Education, 2016.

REFERENCE BOOK(S)

1. Data base System Concepts, Silberschatz, Korth, McGraw hill, VI edition.

2. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
3. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
4. Introduction to Database Systems, C.J.Date Pearson Education

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16MA2201 – PROBABILITY AND STATISTICS

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
4	1	-/-	4

Prerequisite(s): None

Course Objectives
Develop ability to
1. Understand different types of random variables and their distributions.
2. Estimate population parameters statistically from a sample of population.
3. Estimate correlation coefficient and coefficient of regression of the given data.
4. Examine statistical hypothesis for large and small samples.

Course Outcomes
At the end of the course, student would be able to
CO1. Distinguish between random variables pertaining to discrete and continuous distribution systems.
CO2. Compute moments and moment generating functions of Binomial, Poisson and Normal distribution.
CO3. Calculate sample statistics from given population and estimate population parameters.
CO4. Identify similarity between two variables using correlation coefficient and coefficient of regression.
CO5. Apply hypothesis procedure to test means and proportions using z-test for large samples and t-test, F-test, chi-square test for small samples.

UNIT-I: Single Random variables and probability distributions
Probability Theory, Baye's Theorem, Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution, Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution, Binomial, Poisson & normal distributions and their properties, Moment generating functions of the above three distributions, and hence finding the mean and variance.

UNIT-II: Sampling Distributions & Estimations
Definitions of population, sampling, statistic, parameter, Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance. Parameter estimations – likelihood estimate, interval estimations.

UNIT-III: Correlation & Regression

Correlation, coefficient of correlation, rank correlation (Karl Pearson's coefficient of correlation, Spearman's coefficient of correlation), regression, regression coefficient, lines of regression.

UNIT-IV: Testing of hypothesis (Large Samples)

Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, two sided test, Large sample tests: (i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances) (ii) Tests of significance of difference between sample S.D and population S.D. (iii) Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

UNIT-V: Testing of hypothesis (Small Samples)

Small sample tests: Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples Snedecor's F- distribution and it's properties. Test of equality of two population variances Chi-square distribution, it's properties, Chi-square test of goodness of fit.

TEXT BOOK(S)

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Academic Press.
3. Operations Research by S.D. Sharma.

REFERENCE BOOK(S)

1. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers
2. Probability and Statistics by John J. Schiller, Murray R Spiegel, A. V. Srinivasan, Tata McGraw - Hill Education.
3. Engineering Mathematics by Srimanta pal, subhodh C.Bhunia, Oxford higher Education.
4. Probability and Statistics by T. K. V. Iyengar & B. Krishna Gandhi Et, S Chand.
5. Fundamentals of Mathematical Statistics by S C Gupta and V. K. Kapoor.
6. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
7. Operations Research by S. Kalavathy, Vikas Publishing House Pvt LTD.

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16CH2201 – ENVIRONMENTAL STUDIES

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives
Develop ability to
1. Identify the importance of ecosystem and its functions.
2. Understand the natural resources and their usage in day to day life.
3. Understand the concept of bio-diversity, its values and conservation.
4. Be aware of the causes of different types of pollution and its control.
5. Understand various environmental impacts, requirement of various policies and legislations towards environmental sustainability.

Course Outcomes
After the completion of the course, student would be able to
- CO1. Explain ecosystem and its functions namely, food chain, ecological pyramids etc.
- CO2. Acquire knowledge about different types of natural resources such as land, water, minerals, non-renewable energy and their excessive usage leading to detrimental effects on environment.
- CO3. Comprehend ecosystem diversity, its values and importance of hot spots to preserve the same.
- CO4. Explain different types of pollution, its control and impact on global environment.
- CO5. Recognize various environmental impacts and the importance of various acts and policies towards environmental sustainability.

UNIT- I: Ecosystem
Scope and importance of ecosystem, Classification of ecosystem, Introduction to biotic and abiotic components, Forest and desert ecosystem, Functions of eco system food chains, food webs and ecological pyramids, Flow of energy in an ecosystem, Biogeochemical cycles, Nitrogen cycle and Carbon cycle, Phosphorous cycle and Hydrological cycle.

UNIT- II: Natural Resources
Classification of resources, Water resources-Use and over utilization of surface and ground water, Mineral resources-Environmental effects of extracting and using mineral resources –Case study, Land resources – Land degradation, man induced landslides, Energy resources – renewable, solar energy, wind energy, applications, Non renewable resources- fossil fuels, nuclear energy, Chernobyl and Fukushima Daiichi nuclear disasters.

UNIT- III: Biodiversity and Biotic Resources

Introduction, definition, genetic, species and ecosystem diversity, Types of diversity, Alpha, Beta and Gamma, Value of biodiversity- Consumptive use, productive use , ethical, aesthetic and intrinsic values , Hotspots of biodiversity in India, Threats to biodiversity, Conservation of biodiversity – In-situ and Ex-situ methods, bioaccumulation and biomagnifications.

UNIT- IV: Environmental Pollution and Control Technologies

Classification of Pollution, Air pollution causes, effects and remedial measures , Water pollution, causes, effects and remedial measures, Noise Pollution, Emission standard limits, Acid rains. Waste water treatment technologies- Common and Combined Effluent Treatment Plants (CETP), Thermal Pollution causes, effects and remedial measures, Solid Waste Management , Green house effect and Global warming, Ozone layer depletion and its effects.

UNIT- V: Environmental Policy, Legislation & EIA

Definition of Impact and Types of Impact, Steps involved in Environmental Impact Assessment (EIA) methodology, methods of base-line data acquisition, Impacts of development on different environmental components, Prediction of Impacts , Methods of rain-water harvesting traditional and modern methods , National Environmental Policy. Air conservation act , Water conservation act, Forest conservation act.

Towards Sustainable Future: Concept of Sustainable development, Threats of sustainable development, Environmental Education, Conservation of resources, Concept of Green building.

TEXT BOOK(S)

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha- University Grants Commission.
2. Environmental Studies by Anubha Kaushik & C.P. Kaushik

REFERENCE BOOK(S)

1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, B S Publication
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Introduction to Environmental Management by Mary.k. Theodare, Louis Theodare, CRC Press, Taylor &Francis group.
4. Fundamentals of Ecology by Eugene P.Odum, Gary W.Barrett, Thomson International.

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16CS22L1 – COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING LAB

L	T	P/D	C
-	-	3/-	2

II Year. B.Tech. CSE – II Sem

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand computer components in general and in particular Von Neumann Architecture and their functionalities.
2. Understand the data representation (2's complement, floating point) inside the processor, and perform arithmetic operations on them.
3. Understand the rationale behind memory organization, storage, I/O, and know how cache operates.
4. Understand 8086 processor architecture and its organization: pin diagram, different types of registers, addressing modes and data transfer.
5. Illustrate computer organization concepts by Assembly Language programming, structure of assembly language program and function call mechanisms.

Course Outcomes

After completion of the course, student would be able to

CO1. Explain various computer abstract levels and functions of computer hardware components and concept of stored program organization.
CO2. Identify different hardware components associated with the memory organization of a computer.
CO3. Recommend instruction formats, addressing modes, interrupts, I/O and Memory buses, Isolated and Memory mapped I/O.
CO4. Recommend mode of asynchronous serial data transfer using an interface (UART).
CO5. Design and implement simple systems using 8086 processor with the knowledge of pin diagram, registers and instruction formats of 8086 processor by writing assembly language programs.

List of Experiments

1. Write a program to display string "Computer Science and Engineering" for 8086.
2. Write an ALP to find the maximum of three numbers for 8086.
3. Write an ALP to find the minimum of three numbers for 8086.
4. Write an ALP to find the average of four numbers for 8086.
5. Write an ALP to find the factorial of a number for 8086.
6. Write an ALP to take n values from user and calculate their sum for 8086.

7. Write an ALP to take n values from user and calculate maximum & minimum values for 8086.
8. Write 8086 ALP to transfer a block of data from one location to another.
9. Write an ALP to reverse the given string for 8086.
10. Write an ALP to take n values from user and sort them in ascending order for 8086.

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16CS22L2 – DATABASE MANAGEMENT SYSTEMS LAB

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): None

Course Objectives

Develop ability to

1. Learn and practice data modeling using entity-relationship and develop database design.
2. Understand the features of database management systems and Relational database.
3. Understand Structured Query Language (SQL) and learn SQL syntax.
4. Understand normalization process of a logical data model and correct any anomalies.
5. Understand needs of database processing and learn techniques for controlling the consequences of concurrent data access.

Course Outcomes

After completion of the course, student would be able to

CO1. Design and describe data models and schemas in DBMS.
CO2. Use SQL- the standard language of relational databases, for database processing.
CO3. Resolve redundant and functional dependencies, design a normalized database.
CO4. Implement Transaction and Query processing techniques for data storage and retrieval.

List of Experiments

1. E-R Model: Analyze the problem with the entities which identify data persisted in the database which contains entities, attributes.

2. Concept design with E-R Model: Apply cardinalities for each relationship, identify strong entities and weak entities for relationships like generalization, aggregation, specialization.

3. Relation Model: Represent attributes as columns in tables and different types of attributes like Composite, Multi-valued, and Derived. Apply Normalization.

4. Installation of Mysql and Queries using DATA DEFINITION LANGUAGE (DDL) COMMANDS - Create, Alter, Drop, Truncate

5. Data Manipulation Language (DML) COMMANDS:- SELECT, INSERT, UPDATE, DELETE

6. Data Control Language (DCL):- GRANT, REVOKE
   Transaction Control Language (TCL) COMMANDS :- COMMIT , ROLL BACK SAVE POINT

7. In Built Functions: - DATE FUNCTION, NUMERICAL FUNCTIONS , CHARACTER FUNCTIONS, CONVERSION FUNCTION

8. Querying: Queries using ANY, ALL, IN, INTERSECT, UNION

9. Querying: Using aggregate functions COUNT, SUM using GROUPBY and HAVING
    a. Using aggregate functions AVERAGE using GROUPBY and HAVING

10. Querying: NESTED QUERIES AND JOIN QUERIES: Nested Queries , Correlated sub queries , Simple Join, a) Equi-join b) Non Equi-join , Self join , Outer Join

11. Set Operators: Union , Union all , Intersect , Minus

12. Views: Creating and dropping view

13. Triggers: Creation of INSERT TRIGGER, DELETE TRIGGER, UPDATE TRIGGER

14. Procedures: Creation, Execution and Modification of stored Procedure

15. Database Design and Implementation: MINI DATABASE PROJECT

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16CS22L3 – ALGORITHMS LAB

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s):

16CS11L1 COMPUTER PROGRAMMING - I LAB
16CS12L1 COMPUTER PROGRAMMING - II LAB
16CS21L2 DATA STRUCTURES LAB

Course Objectives

Develop ability to

1. Realize the asymptotic performance of algorithms.
2. Understand the behavior of Greedy strategy, Divide and Conquer approach, Dynamic Programming and branch and bound theory for several problem solving techniques.
3. Understand how the choice of data structures and algorithm design methods impact the performance of programs.
4. Distinguish deterministic and non-deterministic algorithms and their computational complexities.

Course Outcomes

After completion of the course, student would be able to

CO1. Analyze algorithms and estimate their best-case, worst-case and average-case behavior in terms of time and space and execute the same through programming.
CO2. Identify suitable problem solving technique for a given problem and design algorithms using greedy strategy, divide and conquer approach, dynamic programming, and branch and bound theory accordingly and execute the same through programming.
CO3. Implement algorithm design method into appropriate data structures using programming.
CO4. Design deterministic and non-deterministic algorithms for tractable and intractable problems and categorize them as P Class/ NP Class/ NP-Hard/ NP-complete problems accordingly.

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 and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.

2. Using Open MPI, 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 and plot a graph of the

time taken versus n. The elements can be read from a file or can be generated using the random number generator.

3. Implement Binary tree traversal techniques using recursion and without recursion. Identify the best method, Justify your answer.

4. 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.

5. Write and implement an algorithm determining articulation points and the biconnected components in the given graph.

6. Implement an algorithm to find the minimum cost spanning tree using
   i) Prims algorithm ii) Kruskals Algorithm

7. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijikstra‟s algorithm.

8. Implement Job Sequencing with Deadlines algorithm and Fast Job Sequencing with Deadlines.

9. Implement Marix Chain multiplication algorithm. Parallelize this algorithm, implement it using Open and determine the speed-up achieved.

10. Implement 0/1 Knapsack problem using Dynamic Programming.

11. Implement an algorithm to find the optimal binary search tree for the given list of identifiers.

12. Find a subset of a given set S = {sl,s2,.....,sn} of n positive integers whose sum is equal to a given positive integer d. For example, if S= {1, 2, 5, 6, 8} and d = 9 there are two solutions{1,2,6}and{1,8}.A suitable message is to be displayed if the given problem instance doesn't have a solution.

13. Implement N Queen's problem using Back Tracking.

14. Write a program for Hamiltonian Cycle Problem

15. Implement the solution for TSP problem using Branch & Bound technique

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16HS22L1 – GENDER SENSITIZATION
(Activity Based Course)

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): None

Course Objectives
Facilitate students to
1. Sensitize with regard to gender issues.
2. Provide a critical perspective on the requirements of healthy socialization of both genders.
3. Create awareness and understanding on some of the key biological changes of both genders.
4. Apprise on the importance of sharing domestic work and the economic contribution of women.
5. Create awareness on the impact of gender violence on society.
6. Create consciousness on the contribution of women of Telangana in its development.

Course Outcomes
At the end of the course, student would be able to
CO1. Demonstrate sensitivity with regard to gender issues.
CO2. Show healthy socialization among both the genders that can be observable.
CO3. Show empathy on some of the key biological changes of both genders.
CO4. Realize the importance of sharing domestic work and economic contribution of women.
CO5. Realize the impact of gender violence on society.
CO6. Show awareness on the contribution of women of Telangana in its development.

UNIT-I
UNDERSTANDING GENDER:
Gender: Why Should We Study It?(*Towards a World of Equals Unit-1*)

Socialization: Making Women, Making Men(*Towards a World of Equals Unit-2*)
Introduction, Preparing for Womanhood, Growing up Male, First lessons in Caste, Different Masculinities.

Just Relationships: Being Together as Equals (*Towards a World of Equals Unit-12*)
Mary Kom and Onler, Love and Acid just do not Mix, Love Letters, Mothers and Fathers, Further Reading: Rosa Parks-The Brave Heart.

UNIT-II
GENDER AND BIOLOGY:
Missing Women: Sex Selection and its Consequences(*Towards a World of Equals Unit-4*)
Declining Sex Ratio, Demographic Consequences

Gender Spectrum: Beyond the Binary(*Towards a World of Equals Unit-10*)
Two or Many? Struggles with Discrimination

Additional Reading: Our Bodies, Our Health (*Towards a World of Equals Unit-13*)

UNIT-III
GENDER AND LABOUR:
House work: The Invisible Labour(*Towards a World of Equals Unit-3*)
"My Mother doesn't Work". "Share The Load".

Women's Work: Its Politics and Economics (*Towards a World of Equals Unit-7*)
Fact and Fiction, Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

UNIT-IV
ISSUES OF VIOLENCE:
Sexual Harassment: Say No! (*Towards a World of Equals Unit-6*)
Sexual Harassment, not Eve-teasing, Coping with Everyday Harassment Further Reading: "Chupulu".

Domestic Violence: Speaking Out (*Towards a World of Equals Unit-8*)
Is Home a Safe Place? When Women Unite [Film]. Rebuilding Lives, Further Reading: New Forums for Justice.

Thinking about Sexual Violence (*Towards a World of Equals Unit-11*)
Blaming the Victim- "I Fought for my Life …." Further Reading: The Caste Face of Violence.

UNIT-V
GENDER STUDIES:
Knowledge: Through the Lens Gender (*Towards a World of Equals Unit-5*)
Point of View, Gender and the Structure of Knowledge. Further Reading: Unacknowledged Women Artists of Telangana.

Whose History? Questions for Historians and Others(*Towards a World of Equals Unit-9*)
Reclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

TEXT BOOK(S)

1. "Towards a World of Equals: A Bilingual Textbook on Gender" written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Thaaru.

REFERENCE BOOK(S)

1. Sen Amartya. "More the One Million Women are Missing", New York Review of Books 37,20(20 December 1990), Print. "We Were Making History…" Life Stories of Women in the Telangana People's Struggle, New Delhi: Kali for Women, 1989.
2. Tripti Lahiri. "By the Numbers: Where Indian Women Work", Women's Studies Journal (14 November 2012). Available online at: http://blogs.wsj.com/Indiarealtime/2012/11/14/by-the-numbers-where-Indian-women-work/
3. K.Satyanarayana and Susie Thar (Ed.). Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu and Kannada http://harpercollins.co.in/BookDetail.asp?Book_Code=3732
4. Vimala. "Vantillu (The Kitchen)", Women Writing in India:600 BC to the Present, Volume II, The 20th Century, Ed. Susie Tharu and K.Lalita, Delhi: Oxford University Press, 1995 599-601.
5. Shatrughna, Veena et al. Women's Work and its Impact on Child Health and Nutrition, National Institute of Nutrition, Indian Council of Medical Research, 1993.
6. Stree Shakti Sanghatana. "We Were Making History . . . " Life Stories of Women in the Telangana People's Struggle, New Delhi: Kali for Women, 1989.
7. Menon, Nivedita. "Seeing like a Feminist", New Delhi: Zubaan-Penguin Books, 2012.
8. Jayaprada A. "Chupulu (Stares)", Women Writing in India: 600 BC to the Present Volume II: The 20th Century Ed. Susie Tharu and K.Lalita, Delhi: Oxford University Press, 1995, 596-597.
9. Javeed, Shayan and Anupam Manuhaar. "Womne and Wage Discrimination in India: A Critical Analysis", International Journal of Humanities and Social Science Invention 2.4 (2013).
10. Gautam, Liela and Gita Ramaswamy. " A 'conversation' between a Daughter and a Mother", Broadsheet on Contemporary Politics, Special Issue on Sexuality and Harassment: Gender Politics on Campus Today. Ed. Madhumeeta Sinha and Asma Rasheed Hyderabad: Anveshi Research Center for Women's Studies, 2014.
11. Abdulali Sohaila. "I Fought For My Life and Won", Available online at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/
12. Jeganathan Pradeep, Partha Chatterjee (ed). "Community, Gender and Violence Subaltern Studies XI", Permanent Black and Ravi Dayal Publishers, New Delhi, 2000.
13. K.Kapadia. "The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India", London, Zed Books, 2002.
14. S. Benhabib. "Situating the Self: Gender, Community and Postmodernism in Contemporary Ethics", London, Routledge, 1992.
15. Virginia Woolf. "A Room of One's Own", Oxford: Black Swan, 1992.
16. T.Banuri and M.Mahmood. "Just Development: Beyond Adjustment with a Human Face, Karachi: Oxford university Press, 1997.

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NOTE: Since it is interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field.