CURRICULUM

(Scheme & Syllabi for First and Second semesters)

for

UNDERGRADUATE DEGREE COURSE (B. Tech.)

IN

ENGINEERING

(Common for All Branches)

[w.e.f. 2018-19]

DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE AND TECHONOLOGY
(Established Under Haryana Legislature Act NO. 29 of 2006)
Murthal-131039, Sonipat (Haryana)
www.dcrust.ac.in

Recommended by corresponding Board of Undergraduate studies and Faculty of Engineering and Technology
Approved in 13th meeting of The Academic Council held on 18th June 2018

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)

B.Tech. 1ST YEAR (SEMESTER – I) (Common for all branches)

Choice Based Credit System (Scheme Of Studies & Examinations w.e.f. 2018-19)

S. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total Marks	Credits	Duration of Exam (Hrs.)
			L	T	P		Theory	Practical			
1	HUM101C	ENGLISH LANGUAGE SKILLS **(Gr.-A)**	2	0	0	25	75	0	100	2	3
2		MATHEMATICS-I	3	1		25	75	0	100	4	3
3	CH101C	PHYSICS **(Gr.-A)** **OR** CHEMISTRY **(Gr.-B)**	3	1		25	75	0	100	4	3
4	EE101C	BASIC ELECTRICAL ENGINEERING **(Gr.-A)(Except CHE)** **OR**	3	1		25	75	0	100	4	3
	EE103C	ELECTRICAL AND ELECTRONICS ENGG (For CHE only)									
	CSE101C	**OR** PROGRAMMING FOR PROBLEM SOLVING **(Gr.-B)**	3	0		25	75	0	100	3	
5	ME101C	ENGINEERING GRAPHICS & DESIGN **(Gr.-A)**	1	0	4	25	0	75	100	3	3
	ME103C	OR WORKSHOP/ MANUFACTURING PRACTICES **(Gr.-B)**									
6	HUM103C	ENGLISH LANGUAGE LAB **(Gr.-A)**	0	0	2	25	0	75	100	1	3
7	CH103C	PHYSICS LAB **(Gr.-A)** **OR** CHEMISTRY LAB **(Gr.-B)**	0	0	2	25		75	100	1	3
8	EE105C	BASIC ELECTRICAL ENGINEERING LAB**(Gr.-A)**/	0	0	2	25		75	100	1	3
	EE107C	ELECTRICAL AND ELECTRONICS ENGG .LAB (For CHE only)									
		OR	0	0	4	25		75	100	2	
	CSE103C	PROGRAMMING FOR PROBLEM SOLVING LAB **(Gr.-B)**									
Total		**Gr.-A**	**12**	**3**	**10**	**200**	**300**	**300**	**800**	**20**	
		Gr.-B	**10**	**2**	**10**	**150**	**225**	**225**	**600**	**17**	

MATHEMATICS AND PHYSICS COURSES FOR DIFFERENT BRANCHES

COURSE CODE	COURSE TITLE
MATH101C	MATHEMATICS –I (For computer Science & Engg)
MATH103C	MATHEMATICS –I (For Bio-technology)
MATH105C	MATHEMATICS –I (common for all branches except CSE & BT)
PHYSICS AND PHYSICS LAB. (ANY ONE COMBINATION)	
PHY101C PHY111C	INTRODUCTION TO ELECTROMAGNETIC THEORY IEMT LAB (For ME, AE, Aero & ECE)
PHY103C PHY113C	MECHANICS MECHANICS LAB (For CE)
PHY105C PHY115C	OPTICS, FIBRE OPTICS, MAGNETISM AND QUANTUM MECHANICS OFMQ LAB (For CHE, BT &BME)
PHY107C PHY117C	WAVES, OPTICS AND QUANTUM MECHANICS WAVES, OPTICS AND QUANTUM MECHANICS LAB (For EE and EEE)
PHY1O9C PHY119C	SEMICONDUCTOR PHYSICS SEMICONDUCTOR PHYSICS LAB (For CSE)

Note:

1 Every student has to participate in the MANDATORY INDUCTION PROGRAM OF THREE WEEK DURATION at the start of regular teaching of first semester. It comprises physical activity, creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept/ Branch & Innovations.

2 All the branches are to be divided into groups 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.

For DCRUST Murthal: GROUP A: BME, BT, CSE, ECE. GROUP B: CE, CHE, EE, ME.

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Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)
B.Tech. 1ST YEAR (SEMESTER – II) (Common for all branches)
Choice Based Credit System (Scheme Of Studies & Examinations w.e.f. 2018-19)

S. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total Marks	Credits	Duration of Exam (Hrs.)
			L	T	P		Theory	Practical			
1	HUM101C	ENGLISH LANGUAGE SKILLS **(Gr.-B)**	2	0	0	25	75	0	100	2	3
2		MATHEMATICS-II	3	1		25	75	0	100	4	3
3	CH101C	PHYSICS **(Gr.-B)** **OR** CHEMISTRY **(Gr.-A)**	3	1		25	75	0	100	4	3
4	EE101C	BASIC ELECTRICAL ENGINEERING **(Gr.-B)(Except CHE)**	3	1		25	75	0	100	4	3
	EE103C	**OR** ELECTRICAL AND ELECTRONICS ENGG (For CHE only)									
	CSE101C	**OR** PROGRAMMING FOR PROBLEM SOLVING **(Gr.-A)**	3	0		25	75	0	100	3	
5	ME101C	ENGINEERING GRAPHICS & DESIGN **(Gr.-B)**	1	0	4	25	0	75	100	3	3
	ME103C	OR WORKSHOP/ MANUFACTURING PRACTICES **(Gr.-A)**									
6	HUM103C	ENGLISH LANGUAGE LAB **(Gr.-B)**	0	0	2	25	0	75	100	1	3
7	CH103C	PHYSICS LAB **(Gr.-B)** **OR** CHEMISTRY LAB **(Gr.-A)**	0	0	2	25		75	100	1	3
8	EE105C/ EE107C	BASIC ELECTRICAL ENGINEERING LAB/ ELECTRICAL AND ELECTRONICS ENGG. LAB (For CHE only)**(Gr.-B)**	0	0	2	25		75	100	1	3
	CSE103C	**OR** PROGRAMMING FOR PROBLEM SOLVING LAB **(Gr.-A)**	0	0	4	25		75	100	2	
Total		**Gr.-B**	**12**	**3**	**10**	**200**	**300**	**300**	**800**	**20**	
		Gr.-A	**10**	**2**	**10**	**150**	**225**	**225**	**600**	**17**	

MATHEMATICS AND PHYSICS COURSES FOR DIFFERENT BRANCHES

COURSE CODE	COURSE TITLE
MATH102C	MATHEMATICS –II (For computer Science & Engg)
MATH104C	MATHEMATICS –II (For Bio-technology)
MATH106C	MATHEMATICS –II (common for all branches except CSE & BT)
PHYSICS AND PHYSICS LAB. (ANY ONE COMBINATION)	
PHY101C PHY111C	INTRODUCTION TO ELECTROMAGNETIC THEORY IEMT LAB (For ME, AE, Aero & ECE)
PHY103C PHY113C	MECHANICS MECHANICS LAB (For CE)
PHY105C PHY115C	OPTICS, FIBRE OPTICS, MAGNETISM AND QUANTUM MECHANICS OFMQ LAB (For CHE, BT &BME)
PHY107C PHY117C	WAVES, OPTICS AND QUANTUM MECHANICS WAVES ,OPTICS AND QUANTUM MECHANICS LAB (For EE and EEE)
PHY1O9C PHY119C	SEMICONDUCTOR PHYSICS SEMICONDUCTOR PHYSICS LAB (For CSE)

Note:

1. All the branches are to be divided into groups 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.
2. For DCRUST Murthal: GROUP A: BME, BT, CSE, ECE. GROUP B: CE, CHE, EE, ME.

B.Tech. Semester I/II (Common for All Branches)

HUM 101 C ENGLISH LANGUAGE SKILLS

CATEGORY : HUMANITIES

L	T	P	Credits			
2	0	0	2	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course objectives:

1. To equip students with English Language skills needed in academic and professional world
2. To make students technically proficient in handling language skills required for competitive exams.
3. To inculcate human/ethical values in the students to ensure their holistic development
4. To develop ability to critically read the literary texts

Course outcomes:

The students will be able to

1. Acquire basic proficiency in English
2. Develop their verbal ability
3. Enhance their writing, reading and analytical skills
4. Develop proficiency in reading along with sensitivity to the impact literary texts can have on their minds/lives

Course Contents:

Unit I: Basic Writing skills

(a) Subject Verb Agreement
(b) Noun Pronoun Agreement
(c) Governance of Nouns Through Prepositions
(d) Basic Verb Patterns (V, SV, SVO, SVOO,SVC,SVOC,SVOA)

Unit II: Vocabulary Building

(a) One word substitution**(List attached)*
(b) Phrasal Verbs* *(List attached)*
(b) Commonly used Idioms * *(List attached)*
(d) Words/Phrases/Idioms from the texts prescribed in Unit IV-- their meaning and use in sentences

Approved by Board of UG Studies, Department of Humanities on 19 March 2018

Unit III: Creating Grammatical Cohesion

(a) Referring Time in Language(Tenses)
(b) Use of Conditional Sentences
(c) Use of Active and Passive Voice
(d) Synthesis of Sentences using Coordinating and Subordinating Conjunctions

Unit IV: Reading and Writing Practices

(a) Literary Texts:

i. "The Secret of Work" by Swami Vivekananda**
ii. " Public Transport in London and Delhi" by Nirad C. Chaudhuri #
iii. "An Outline of Intellectual Rubbish" by Bertrand Russell #
iv. "Mother Teresa" by Khushwant Singh #

(b) Writing official Letters- Issues Concerning Students' academic and social life
(c) Essay Writing
(d) Paragraph Writing

Note: Eight hour time on an average to each unit is recommended for class room teaching purposes.

Scheme of End Semester Examination (Major Test):

1. The duration of examination will be three hours.
2. Nine questions of 15 marks each will be set, out of which the examinees will have to attempt five questions.
3. First question of 15 marks will be compulsory. It will cover all the four units of the syllabus. The question will have sub- parts with marks assigned against each.
4. Question No 02 to 09 will be set from the four units of the syllabus --- two from each unit of 15 marks each. The nature of the questions in each unit will depend upon the nature of content therein. Examinees will have to attempt four more questions, selecting one from each unit. The questions may have parts.

Instruction for paper setter: Recommended pattern of questions in each unit will be as follows:

Unit I

Two questions of 15 marks each will be set from this unit. Examinees will attempt either of the two questions. Questions will be in the form of correcting the errors in the sentences, picking up the right alternative, filling in the blanks or completing the sentences. Examinees can also be asked to frame sentences on the patterns given or vice versa.

Unit II

Two questions of 15 marks each will be set from this unit out of which one is to be attempted. Questions will be in the form of giving the meaning of phrasal verbs, idioms and proverbs and using them in sentences/contexts of one's own or in the form of matching exercises, or choosing the correct alternative. The phrases/idioms/proverbs may be given from the texts prescribed in Unit IV. Examinees may also be asked to pick up the odd ones from the given series.

Unit III

Two questions of 15 marks each will be set from this unit also out of which one is to be attempted. Questions will be set on testing examinees' knowledge of the components prescribed preferably in the style deemed fit for the component by the examiner.

Unit IV

Two questions of 15 marks each will be set from this unit out of which one needs to be attempted. The questions may have parts if required. One question will be set on the literary texts prescribed. This question may be in the form of comprehension passage, long/short answer question, explanation of lines/passage from the text with reference to the context. The second Question will be in the form of writing formal letter / essay / paragraph.

Recommended Readings:

1. *Bhatnagar, Nitin and Mamta Bhatnagar. *Communicative English for Engineers and Professionals*. Pearson Education, 2013.(The soft copy of the book is available in the university library)
2. # Bhatnagar, k. Manmohan.Ed. *The Spectrum of Life: An Anthology of Modern Prose*. Delhi: Macmillan India Ltd., 2006.
3. Sinha, R.P.*Current English Grammar and Usage*. OUP, 2017.
4. Rizvi, M. Ashraf. *Effective Technical Communication*. McGraw Hill Education (India) Pvt. Ltd., 2014.
5. Eastwood, John. *Oxford Guide to English Grammar*. OUP, 2010.
6. Kumar, Sanjay and Pushp Lata. *Communication Skills*. OUP, 2011.
7. Raman, Meenakshi and Sangeeta Sharma.*Communication Skills*.New Delhi:OUP,2011.

8. Hill, L. A. *A Guide to Correct English*. London:OUP,1965.
9. *Oxford Dictionary of English Idioms*. New Delhi: OUP, 2009
10. **Vivekananda, Swami. *Karma Yoga.* New Delhi: Sahityashila Prakashan, 2015.
11. **
http://yousigma.com/religionandphilosophy/swamivivekananda/thescecretofwork.pdf

Approved by Board of UG Studies, Department of Humanities on 19 March 2018

Study Material (List) for Unit-II

One Word Substitution

1. People who work together - Colleagues
2. A person belonging to one's own country - Compatriot
3. One who is completely self-satisfied - Complacent
4. One who sells sweets and pastries - Confectioner
5. Belonging to an individual from birth - Congenital
6. One who believes in keeping things and customs as they are - Conservative
7. A number of stars grouped together - Constellation
8. One who lives at the same time - Contemporary
9. A person who lives in a foreign country - Alien
10. One who takes part in sports and other activities for enjoyment only - Amateur
11. A statement that is open to more than one interpretation - Ambiguous
12. Which cannot be compared- Unique
13. A partner in crime - Accomplice
14. Written declaration made on an oath - Affidavit
15. A list of things to be discussed at a meeting - Agenda
16. One who doubts the existence of God - Agnostic/Atheist
17. One who is a habitual drunkard - Alcoholic
18. A medicine which produces insensitivity - Anaesthetic
19. A book written by an unknown author - Anonymous
20. The study of man - Anthropology
21. A medicine used to counteract poison - Antidote
22. One who studies things of the past - Antiquarian
23. A substance which kills germs - Antiseptic
24. An artificial pond or a tank used for keeping live fish, water plants, etc. - Aquarium
25. One who criticizes-Critic
26. One who knows history– Historian
27. One who is out to destroy the government - Anarchist
28. Absence of government - Anarchy
29. The science of the structure of human body - Anatomy
30. An instrument used for measuring force of the wind - Anemometer
31. A building that can touch sky-Skyscraper
32. Which is not been heard before- Unprecedented
33. One who live in Orphanage- Orphan
34. A study of ancient things - Archaeology
35. One who designs buildings - Architect
36. A place where government and public records are kept - Archive
37. A government by the nobility - Aristocracy
38. A study of stars and planets and their influence on human affairs - Astrology
39. One who is unable to pay off one's debt - Bankrupt
40. A building used for lodging soldiers - Barrack
41. Hastily erected barrier across a street - Barricade
42. One who is engaged to be married - Betrothed

43. A great lover of books - Bibliophile
44. One who can speak two languages - Bilingual
45. An instrument used by both the eyes to see a distant object in an increased shape - Binocular
46. A record of one's life written by somebody else - Biography
47. A study of plants - Botany
48. A bunch of flowers - Bouquet
49. A collection of flags - Bunting
50. A government by the officials - Bureaucracy
51. A list which contains dates and days - Calendar
52. Thing which is very necessary- Mandatory
53. One who cannot die- Immortal
54. The place where books are kept for reading- Library
55. The art of beautiful writing - Calligraphy
56. One who flies a space vehicle - Astronaut
57. One who is unmarried - Celibate
58. One who is more than hundred years old - Centenarian
59. Situation in which everything happens in a confused way - Chaotic
60. One who mends shoes - Cobbler
61. The study of stars - Astronomy
62. Animals that live in water - Aquatic
63. Space or room which is immediately below the roof of a house - Attic
64. Something that can be heard - Audible
65. A record of one's life written by oneself - Autobiography
66. A government by one - Autocracy
67. The right of self-government - Autonomy
68. A place for keeping birds - Aviary
69. An unmarried man - Bachelor
70. One who eats human flesh - Cannibal

71. The dead body of an animal - Carcass
72. One who lives on flesh - Carnivorous
73. A place with gambling tables - Casino
74. Soldiers on horses - Cavalry
75. The world in miniature - Microcosm
76. One who imitates voice and gestures of another person - Mimic
77. A place where money is coined - Mint
78. One who hates mankind - Misanthrope
79. A person who loves money and hates spending it - Miser
80. A hater of women - Misogynist
81. A rule by the mob - Mobocracy
82. One for whom the world is home - Cosmopolitan
83. One who easily believes what others say - Credulous
84. A number of sailors working on a ship - Crew
85. A war of religion - Crusade
86. One who questions everything in a negative manner - Cynic
87. A person who has been appointed or selected to attend or speak at a conference - Delegate

88. A government by the people - Democracy
89. A language of a region with its own way - Dialect
90. Shy, timid unwilling to face a situation - Diffident
91. A book which contains telephone addresses - Directory
92. A game in which no one wins - Draw
93. Extremely dry weather without rainfall - Drought
94. A person who is slow in learning - Dunce
95. One who has strange habits - Eccentric
96. Something that can be eaten - Edible
97. something that cannot be repaired: Irreparable
98. A statement open to more than one interpretations - Equivocal
99. The act of spying - Espionage
100. A study of the origin of words - Etymology
101. The science of insects: Entomology
102. The doctor who treats children: pediatrician
103. To shift people from a place of danger to a safer place - Evacuate
104. A speech made without preparation - Extempore
105. Short stories with an element of moral - Fable
106. One who is not easily pleased - Fastidious
107. One who is curious- Inquisitive
108. One who is born in a good family- Noble
109. who is omnipresent- Omnipresent
110. One who knows everything- Omniscient
111. One who is all powerful-Omnipotent
112. A disease which ends in death - Fatal
113. One who believes in fate - Fatalist
114. Animals of a certain region - Fauna
115. One who champions the rights of women - Feminist
116. One who is engaged to marry - Fiancé/Fiancée
117. A person with showy character - Flamboyant
118. A number of battle ships - Fleet

119. A number of sheep - Flock
120. Plants and vegetation of a certain region - Flora
121. Murder of a brother - Fratricide
122. Large band of stars encircling the heavens - Galaxy
123. The study of rocks and soil - Geology
124. One who thinks and talks too much about himself/herself - Egoist
125. A poem written to mourn the death of someone - Elegy
126. The most capable part of group, class of society or a country - Elite
127. The art of effective speaking - Elocution
128. A book containing information on all branches of knowledge - Encyclopaedia
129. One who is given to the pleasures of flesh - Epicurean
130. A speech made by the dramatist at the end of the play - Epilogue
131. Words inscribed on a tomb about the person buried therein - Epitaph
132. One who eats too much - Glutton

133. Storehouse of grains - Granary
134. One who is easily deceived - Gullible
135. Language that has been very much used - Hackneyed
136. A cluster of houses in a village - Hamlet
137. One who travel at night- Noctivagant
138. Whose boundary cannot be found, boundless- Boundless
139. A place for shelter of ships - Harbour
140. A place for the collection of dried plants - Herbarium
141. Descending from father to son - Hereditary
142. One who acts against religion - Heretic
143. Murder of a human being - Homicide
144. Something that cannot be described - Indescribable
145. Something that cannot be eaten - Inedible
146. Something that cannot be avoided - Inevitable
147. One who does not make mistakes - Infallible
148. Murder of an infant - Infanticide
149. The soldiers on foot - Infantry
150. Liable to catch fire - Inflammable
151. Something which cannot be imitated - Inimitable
152. Something which cannot be satisfied - Insatiable
153. To examine one's thoughts and feelings - Introspect
154. Having no force, null and void - Invalid
155. Something which cannot be conquered - Invincible
156. A decision that cannot be taken back - Irrevocable
157. A plan for the route to be followed - Itinerary
158. A professional rider in horse races - Jockey
159. One who has an irresistible tendency to steal - Kleptomaniac
160. A place where food is kept - Larder
161. A book of account showing debit and credit - Ledger
162. Something which is lawful - Legal
163. Something which can be read - Legible
164. Number of books housed in one building - Library
165. A document allowing persons to travel abroad - Passport
166. Murder of a father - Patricide
167. One who loves one's own country - Patriot
168. One who shows too much concern for small details of learning or teaching - Pedant
169. One who walks on foot - Pedestrian
170. A doctor who specializes in the treatment of children - Paediatrician
171. One who looks at the dark side of things - Pessimist
172. One who loves mankind - Philanthropist
173. One who collects postage stamps - Philatelist
174. The study of languages - Philology
175. A study of human body - Physiology
176. One who doesn't want to work- Doodle
177. One who is cruel- Ruthless, Merciless
178. Pertaining/related to moon - Lunatic

179. The house of an Eskimo - Igloo
180. Something which is unlawful - Illegal
181. Something which cannot be read - Illegible
182. One who cannot read or write - Illiterate
183. One who settles in another country - Immigrant
184. Free from infection - Immune
185. Not planned ahead of time - Impromptu
186. Something which cannot be heard - Inaudible
187. Not of good omen - Inauspicious
188. Something that cannot be corrected - Incorrigible
189. A place where mad men are kept - Lunatic asylum
190. Name shared by all the members of a family - Surname
191. A person's last utterance - Swan Song
192. One who always keeps to himself - Taciturn
193. One who does not drink wine - Teetotaler
194. An instrument used to send messages to long distances - Telegraph
195. An instrument which transmits spoken words to long distances - Telephone
196. One who believes in God - Theist
197. Something through which light can partly pass - Translucent
198. Something through which light can pass - Transparent
199. One who changes sides - Turncoat
200. A decision on which all agree - Unanimous
201. A place where everything is perfect - Utopia
202. A person who lives a wandering life - Vagabond
203. A speech made for the first time - Maiden
204. Animals that suckle their young ones - Mammals
205. A book or a paper written by hand - Manuscript
206. Killing on a large scale - Massacre
207. Murder of a mother - Matricide
208. Negotiating between the opposite parties to settle their dispute - Mediate
209. Personal reminiscences in a narration form - Memoir
210. A government by a king or a queen - Monarchy
211. A treatise on a subject - Monograph
212. A speech delivered by one person - Monologue
213. A government by the few - Oligarchy
214. Flesh- and vegetable-eating animals - Omnivorous

215. Something through which light cannot pass - Opaque
216. One who is able to make an eloquent speech - Orator
217. Curved path of a planet, satellite - Orbit
218. An authoritative decree or law of the government - Ordinance
219. A place where clothes are kept - Wardrobe
220. A woman whose husband is dead - Widow
221. A man whose wife is dead - Widower
222. An unexpected piece of good fortune - Windfall
223. Highest point in the sky directly above the observer - Zenith

224. Deeply religious - Pious
225. A writer who steals ideas from another writer - Plagiarist
226. A government by the rich - Plutocracy
227. The science of government - Political science
228. Mental derangement confined to one idea - Monomania
229. Exclusive possession or control of any one thing - Monopoly
230. A place where dead bodies are kept before they are cremated or buried - Mortuary
231. A place where ancient works are kept - Museum
232. Favouring one's friends and relatives - Nepotism
233. Taking neither side in the dispute, remaining impartial - Neutral
234. A hollow space in a wall for a statue - Niche
235. One who is new to a profession - Novice
236. A word no longer in use - Obsolete
237. One who is 80-years old - Octogenarian
238. Something which can be carried or moved easily - Portable
239. Occurring after death - Posthumous
240. Examination of a dead body - Post-mortem
241. A child of unusual or remarkable talent - Prodigy
242. A speech made by the dramatist in the beginning of the play - Prologue
243. A person who preaches religion and is considered to be a messenger of God - Prophet
244. To write under a different name - Pseudonym
245. A doctor who specializes in mental illness - Psychiatrist
246. The study of human mind - Psychology
247. One who retires from society to live a solitary life - Recluse
248. Too much official formality - Red- tapism
249. Bitter or ironic remark, specially one ironically worded - Sarcasm
250. Person who is made to bear blame due to others - Scapegoat
251. Someone who knows a lot about the subject - Scholar
252. One who carves in stones - Sculptor
253. A state in which all the religions have equal freedom - Secular
254. A case in which sword is kept - Sheath
255. A speech made to one self - Soliloquy
256. One who walks in one's sleep - Somnambulist
257. One who talks in one's sleep -Somniloquist
258. An older woman who is unmarried and is not likely to get married - Spinster
259. A sudden rush of a large number of frightened people or animals - Stampede
260. Social position or rank - Status
261. One who loads and unloads ships - Stevedore
262. One who is indifferent to pain and pleasure - Stoic

263. Murder of self - Suicide
264. To spend life without purpose and initiative - Vegetate
265. One who is gifted with several talents - Versatile
266. One who offers one's services - Volunteer
267. One who is given to the sensual pleasures of body -Voluptuary
268. An institution meant for reforming young offenders - Reformatory

269. Murder of the king - Regicide
270. A place for improving one's health - Resort
271. One who speaks less - Reticent
272. A person who lives in a countryside far from the humdrum of society - Rustic
273. One who gets pleasure in others' trouble or pain - Sadist
274. A room where idols of God are kept - Sanctorum
275. A very private room - Sanctum
276. A study of animals - Zoology
277. Words different in meaning but similar in sound - Homophones
278. Serving without pay - Honorary
279. One who is sympathetic to mankind - Humanitarian
280. Payment for a specific work done- Remuneration
281. One who pretends to be what he/she is not - Hypocrite
282. A study of birds - Ornithology
283. The study of mountains - Orology
284. A place where orphans are housed - Orphanage
285. One who looks at the bright side of things in life - Optimist
286. A cure for all diseases - Panacea
287. Belief of God in nature - Pantheism
288. One that lives on others - Parasite

Phrasal Verbs (with examples)

1. Account for--To explain the reason for(Increased pollution may *account for* climate change)
2. Adhere to—Obey (You must *adhere to* the terms of the contract.)
3. Allude to--Mention in an indirect way (She kept *alluding to* our agreement, but she didn't want to reveal it.)
4. Bring on--To cause something bad to happen, especially illness (His heart condition was *brought on* by his diet.)
5. Bring up-- To start discussing a subject (She *brought* the matter *up* very late so they didn't have time to discuss it properly.)
6. Come about-- To happen, especially by chance (Increased unemployment has *come about* through automated production.) 7. Cut back-- To reduce (They are *cutting back* expenses.)
8. Do without-- To succeed in living or working without (We can *do without* help from you.)
9. Embark on-- To start a new project or activity, usually one that will be difficult or take time (After graduating from university, she *embarked on* a career in banking.)
10. Follow through-- To continue doing something until it has been completed (You will need to *follow through* with some reading if you want to master the subject.)
11. Frown upon--To not approve of something (Failure to attend classes is *frowned upon*.)

12. Get across-- To make people understand something
(The teacher managed to *get across* how important it was to attend lectures.)

13. Get around-- To be heard by a lot of people
(News of his promotion *got around* very fast.)

14. Get at-- To try to suggest something without saying it directly (What are you *getting at?* Was my presentation too long?)

15. Get back-- To start doing something again after not doing it for a period of time(Let's *get back* to discussing how this happened.)

16. Look forward to-- To feel happy about something that is going to happen (I'm *looking forward to* meeting you later.)

17. Look into-- To try to discover facts about something
(After several customers complained about late deliveries, they decided to *look into* the matter.)

18. Make of--To understand someone or something in a certain way (What do you *make of* the teacher's decision to shorten this course?')

19. Map out-- To plan in detail how something will happen
(Her career was *mapped out* for her when she decided to take that job.)

20. Meet up--To come together with someone
(Let's *meet up* and discuss how we are going to go about this project.) 21. Narrow down--To reduce the number of possibilities
(The detectives *narrowed down* the list of suspects to just two.)

22. Put forward-- To suggest an idea, opinion so that it can be discussed
(The proposals were *put forward* last week, but the committee didn't have time to discuss them.)

23. Put off-- To delay doing something especially when you don't want to do it
(Are you *putting off* writing that essay because you can't concentrate right now?)

24. Resort to--To do something unpleasant in order to solve a problem (We must resort to *legal action* of they don't offer compensation.)

25. Rule out-- To stop considering something as a possibility
(The CEO said that yearly bonuses can be *ruled out* in light of the financial crisis.)

26. Run by-- To tell someone your ideas so they can give you their opinion (I have a few ideas for tomorrow's meeting. Can I *run* them *by* you?)

27. Talk out of-- To persuade someone not to do something
(Her parents *talked* her *out of* living in a rented flat.)

28. Think over-- To consider a problem carefully
(You should *think* it *over* before handing in your resignation.)

29. Turn out--To develop in a particular way
(The presentation *turned out* well, considering how little you prepared for it.)

30. Verge on-- To almost be in a particular state
(His speech was so good, it was *verging on* genius.)

Some More Phrasal Verbs (with meaning only)

1. Abide by- Respect or obey the law, a decision, a rule
2. Account for- Explain, give a reason
3. Add up- Make sense, seem reasonable
4. Agree with- Have the same opinion as somebody else.
5. Allow for- Take advantage of something (an opportunity)
6. Answer back- Reply rudely
7. Apply for- Make a formal request for something (job, permit, loan, etc.)
8. Avail (oneself) of- Take into consideration, include in a calculation
9. Back away- Move backwards, in fear or dislike
10. Back down-Withdraw, concede, defeat
11. Blow up-Explode; be destroyed by anexplosion
12. Back up-Give support or encouragement; make a copy of (file, program, etc.)
13. Black out-Faint, loseconsciousness
14. Block off-Separate using a barrier
15. Boil down to-Be summarized as
16. Break down- Go out of order, cease to function; lose control of one's emotions
17. Break out- Start suddenly
18. Break into- Enter by force
19. Bump into- Meet by accident or unexpectedly
20. Burn out- Stop (something) working; become exhausted from overworking
21. Butt in (on something)- Interrupt impolitely
22. Call back- Return a phone call
23. Call off- Cancel
24. Call on/upon something- Formally invite or request
25. Calm down- Become more relaxed, less angry or upset
26. Carry on- Continue
27. Carry out- Do something as specified (a plan, an order, a threat); perform or conduct(test, experiment)
38. Cut down on- Reduce in number or size
39. Cut out- Remove using scissors; stop doing something
40. Deal with- Handle, take care of (problem, situation)
41. Die down- Calm down, become less strong
42. Dress up- Wear elegant clothes; disguise oneself
43. Do without- Manage without
44. Drag on- Last longer than expected
45. Draw up- Write (contract, agreement, document)
46. Drop in- Visit, usually on the way somewhere
47. Drop out- Leave school without finishing
48. Drop off- Deliver someone or something; fall asleep
49. Ease off- Reduce, become less severe or slow down (pain, traffic, work)
50. Even out- Eliminate differences of opinion; become level or regular
51. Fall through- Fail; doesn't happen
52. Figure out- Understand, find the answer

53. Fill out- Complete (a form/an application)
54. Find out- Discover or obtain information
55. Focus on- Understand; find a solution
56. Figure out- Concentrate on something
57. Get at- Imply
58. Check in- Register at a hotel or airport
29. Check out- Pay one's bill and leave (a hotel); investigate
30. Clam up- Refuse to speak
31. Close down- Stop operating (company, restaurant, cinema)
32. Come across- Find by chance; appear
33. Come forward- Present oneself
34. Conk out- Stop working; stop or fall asleep from exhaustion
35. Come up against- Be faced with or opposed by
36. Count on- rely or depend on (for help)
37. Cross out- Remove by drawing a line through
66. Get on (well) with (somebody)- Have a good relationship with
67. Get out of- Avoid doing something
68. Get over- Recover from (illness, disappointment)
69. Give up- Stop doing something
70. Get rid of- Eliminate
71. Get together- Meet each other
72. Get up- Rise, leave bed
73. Go through- Experience
74. Grow up- Spend one's childhood; develop; become an adult
75. Hand in- Distribute
76. Hand out- Submit (report, homework)
77. Hang out- Spend time in a particular place, or with a group of friends
78. Hang up- End a phone conversation
79. Hit at- Aim a blow at
80. Hit back- Retaliate; reply to an attack
81. Hit on/upon- Find unexpectedly or by inspiration
82. Hold on- Wait; grip tightly
83. Hurry up- Be quick, act speedily
84. Iron out- Resolve by discussion, eliminate differences
85. Join in- Participate
86. Get away- Escape
59. Get back at- To get revenge on somebody
60. Get in- Enter
61. Get into (+noun)- Manage to cope or to survive
62. Get off- Leave (bus, train, plane); remove
63. Get on- Board (bus, train, plane)
64. Get on with (something)- Continue to do; make progress
65. Get out- Leave
66. Join up- Engage in, become a member of, meet and unite with
87. Keep on- Continue doing something

88. Keep up with- Stay at the same level as someone or something
89. Kick off- Begin, start
90. Leave out- Omit, not mention
91. Let down- Disappoint
93. Look after- Take care of
94. Look ahead- Think of the future
95. Look down on- Consider as inferior
96. Look on- Be a spectator at an event
97. Look for- Try to find something
98. Look forward to- Await or anticipate with pleasure
99. Look up to- Admire
100. Make fun of- Laugh at/ make jokes about
101. Make up- Invent (excuse, story)
102. Mix up- Mistake one thing or person for another
103. Move in- Arrive in a new home or office
104. Move out- Leave your home/office for another one.
105. Nod off- Fall asleep
106. Note down- Write something
107. Opt out- Leave a system or decide not to participate
108. Own up- Admit or confess something
109. Pass away- Die
119. Rule out- Eliminate
120. Run away- Escape from a place or suddenly leave
121. Run into- Meet by accident or unexpectedly (also- bump into)
122. Run out of- Have no more of something.
123. Set off- Start a journey
124. Set up- Start a business
125. Shop around- Compare prices
126. Show off- Brag or want to be admired
127. Show up- Appear/arrive
128. Stick up for- Defend
129. Take after- Resemble, in appearance or character
130. Take care of- Look after
131. Take off- Leave the ground
132. Take on- Hire or engage staff
133. Tell off- Reprimand/criticize severely
134. Think over- Consider.
135. Pass out- Faint
111. Pay back- Reimburse
112. Put off- Postpone, arrange at a later date
113. Put on- Turn on, switch on
114. Put out- Extinguish
115. Put up- Accommodate, give somebody a bed
116. Pick up- Collect somebody

Point out- Indicate/direct attention to something

. Rely on- Count on, depend on, trust
135. Try on- Wear something to see if it suits or fits
136. Turn down- Refuse
137. Use up- Finish a product (so that there's none left)
138. Vouch for- Express confidence in, or guarantee something
139. Watch out- Be careful
140. Wear out- Become unusable, Become very tired
141. Work out-Do physical exercise, Find a solution or calculate something
142. Wipe off- Clean (board, table)

Commonly Used Idioms

1. As easy as pie - very easy (same as "a piece of cake")
2. Be sick and tired of -- to detest, to abhore (also "can't stand")
3. Bend over backwards-- try very hard (maybe too much!)
4. Bite off more than one can chew- "take responsibility for more than one can manage"
5. Broke- to have no money
6. A bed of roses- A comfortable position
7. A bed of thorns- An uncomfortable position.
8. A bird in the hand is worth two in the bush- Having something that is certain is much better than taking a risk for more.
9. A bird's eye view- A brief general view
10. A blessing in disguise- Something good that isn't recognized at first
11. A bolt from the blue- Any calamity that overtakes somebody suddenly.
12. A chicken-hearted fellow- A timid person.
13. 13. Achilles heel- A point of vulnerability
14. A red letter day- An important day
15. A slap on the wrist- A very mild punishment
16. A snake in grass- A deceitful person
17. A taste of your own medicine- When you are ill-treated the same way you ill-treat others.
18. At loggerheads- Engaged in a head-on dispute.
19. Actions speak louder than words- It's better to do something in reality than just talk about it.
20. Add fuel to the fire- To do something to make a bad situation even worse than it is.
21. Against the clock- To do something fast to finish it before a particular time.
22. All bark and no bite- Someone is threatening or aggressive but not willing to engage in a fight.
23. All Greek to me- Meaningless and incomprehensible like someone who cannot read, speak, or understand any of the Greek languages.
24. All in the same boat- When everyone is facing the same challenges.
25. An axe to grind- To have a dispute with someone.
26. An apple of someone's eye- Someone who is cherished above all others.
27. As high as a kite- Anything that is high up in the sky.
28. At the drop of a hat- Willing to do something immediately.
29. Back-seat driver- People who criticize from the sidelines, much like someone giving

unwanted advice from the back seat of a vehicle to the driver.

30. Back to square one- Having to start all over again.
31. Beat a dead horse- To force an issue that has already ended.
32. Beating about the bush- Avoiding the main topic, not speaking directly about the issue.
33. Between a rock and a hard place- Stuck between two very bad options.
34. Burn the midnight oil- To stay awake late at night to work or to study.
35. By hook or by crook- By whatever means possible, fair or unfair.
36. A doubting Thomas- A skeptic who needs physical or personal evidence to believe something.
37. A drop in the bucket- A very small part of something.
38. A fair weather friend-One who betrays in difficulty
39. A fish out of water- A person in uncomfortable surroundings.
40. A fool and his money are easily parted- It is easy for a foolish person to lose his/her money.
41. A hen-pecked husband- A person servile to his wife.
42. A leopard can't change his spots- You cannot change what you are.
43. A penny saved is a penny earned- Saving money little by little.
44. A picture paints a thousand words- A visual presentation is far more descriptive than words.
45. A piece of cake-A task that can be accomplished very easily.
46. Chew someone out- To scold someone verbally.
47. Cock and bull story- An unbelievable tale.
48. Crocodile tears- Pretending to be sad, in an attempt to manipulate the situation.
49. Cross your fingers- To hope that something happens the way you want it to.
50. Cry over spilt milk- When you complain about a loss from the past.
51. Cry wolf- Intentionally raise a false alarm.
52. Curiosity killed the cat- Being inquisitive can lead you into a dangerous situation.
53. Dark horse- One who was previously unknown and is now prominent.
54. Devil's advocate- Someone who takes a position for the sake of argument without believing in that particular side of the argument.
55. Don't count your chickens before they hatch- Don't rely on something until you are sure of it.
56. Don't put all your eggs in one basket- Do not put all your resources in one possibility.
57. Drastic times call for drastic measures- When you are extremely desperate you need to take extremely desperate actions.
58. Draw the line- To set a limit, as of accepted behaviour.
59. Drink like a fish- To drink very heavily.
60. Bite off more than you can chew- To take on a task that is way to big.
61. Bite your tongue- To avoid talking.
62. Black sheep- A person who is considered a disgrace to a family.
63. Blood is thicker than water- The family bond is closer than anything else.
64. Blow one's own horn- To praise your own abilities and achievements.
65. Blue moon- A rare event or occurrence.
66. Break the ice- To remove the tension, hesitation at the first meeting or at the opening of a party, etc.
67. Drive someone up the wall- To irritate and/or annoy very much.
68. Dropping like flies- A large number of people either falling ill or dying.
69. Every cloud has a silver lining- Be optimistic, even difficult times will lead to better days.

70. Everything but the kitchen sinks- Almost everything and anything has been included.
71. Eye for eye- Revenge.
72. Feather in one's hat- An accomplishment a person can be proud of.
73. Field day- An enjoyable day or circumstance.
74. Finding your feet- To become more comfortable in whatever you are doing.
75. Fixed in your ways- Not willing to change from your normal way of doing something.
76. Flash in the pan- Something that looks promising in the beginning but fails to deliver anything in the end.
77. Flesh and blood- Material of which people are made of, or it can refer to someone's family.
78. Fools' gold- A worthless rock that resembles real gold.
79. From pillar to post- From one place or thing to another.
80. From rags to riches- To go from being very poor to being very wealthy.
81. Fuddy-duddy- An old-fashioned and foolish type of person.
82. Chip on his shoulder- Angry today about something that occurred in the past.
83. Chip off the old block- People who closely resemble their parents in some way or the other.
84. Change one's mind - decide to do something different from what had been decided earlier
85. Cut it out! - stop doing something bad
86. Drop someone a line- send a letter or email to someone
87. Figure something out means- come to understand a problem
88. Fill in for someone-- do their work while they are away
89. Clean slate- To make a new start by clearing records
90. Get over it- To move beyond something that is bothering you
91. Get up on the wrong side of the bed- Someone who has a horrible day
92. Give him the slip- To get away from, to escape.
93. Go down like a lead balloon- To be received badly by an audience.
94. Go out on a limb- Put yourself in a tough position to support someone/something.
95. Go the extra mile- Making extra efforts for the task at hand.
96. Great minds think alike- Intelligent people think like each other.
97. Green room- The waiting room, especially for those who are about to go on stage, a TV or radio.
98. Gut feeling- A personal intuition that something may not be right.
99. Hit the books- To study, especially for a test or exam
100. Hit the nail on the head- Do something exactly right or say something exactly right
101. Hold your horses- Be patient
102. Icing on the cake- Something extra that is added to an already good situation
103. Idle hands are the devil's tools- You are more likely to get into trouble if you have nothing to do
104. Smell a rat- To detect someone in the group who is betraying others
105. Coming events cast their shadows before- Significant *events* are often preceded by signs that they are about to happen
106. Smell something fishy- Detecting something isn't right
107. Southpaw- Someone who is left handed
108. Spitting image- The exact likeness or kind
109. Start from scratch- To do it all over again from the beginning

110. Strike while the iron is hot- Act quickly when the opportunity is still available
111. The ball is in your court- It is your decision this time
112. The best of both worlds- There are two choices and you have them both
113. The bigger they are the harder they fall- While the bigger and stronger opponent might be a lot more difficult to beat
114. If it's not one thing, it's another- When one thing goes wrong, then another, and another.
115. In the heat of the moment- Overwhelmed by what is happening in the moment.
116. Haste makes waste- Quickly doing things results in a poor ending
117. Hat trick- Three scores made continuously without break in a sport, such as three wickets in cricket or three soccer goals.
118. Have a finger in every pie- To be involved in a lot of different activities and have influence over them
119. He lost his head- Angry and overcome by emotions
120. Head over heels- Very excited and/or joyful, especially when in love
121. Hell in a hand basket- Deteriorating and headed for complete disaster
122. Hit below the belt- An unfair or cruel remark
123. It takes two to tango- A two-person conflict where both people are at fault.
124. It's a small world- You frequently see the same people in different places.
125. It's anyone's call- A competition where the outcome is difficult to judge or predict.
126. Jack of all trades master of none- Someone good at many things but excellent at nothing.
127. Keep an eye on somebody- You should watch a person carefully.
128. In ages - for a very long time
129. Give someone a hand - to help
130. Hit the hay - go to bed (also hit the sack)
131. In the black - the business is making money, it is profitable
132. In the red - the business is losing money, it is unprofitable
133. Keep body and soul together- To earn a sufficient amount of money to keep yourself alive.
134. Keep your chin up- To remain joyful in a tough situation
135. Kitty-corner- Diagonally across, sometimes called Catty-Corner as well
136. Knee jerk reaction- A quick and automatic response
137. Knock on wood- Knuckle tapping on wood to avoid some bad luck
138. Know the ropes- To understand the details
139. Last but not the least- An introduction phrase to let the audience know that the last person mentioned is no less important than those introduced before him/her.
140. Off the hook- No longer have to deal with a tough situation
141. Off the record- Something said in confidence that the one speaking doesn't want attributed to him/her
142. Practice makes perfect- By constantly practicing, you will become better.
143. Pull the plug- To stop something, to bring something to an end
144. Pulling your leg- Tricking someone as a joke
145. Put a sock in it- To tell noisy person or a group to be quiet
146. Queer the pitch- Destroy or ruin a plan
147. Raining cats and dogs- A very loud and noisy rain storm
148. Read between the lines- To pay attention to what is implied in writing or speech
149. Ring fencing- To protect a particular sum of money by putting restrictions on its use
150. Rise and shine- Time to get out of bed and get ready for work/school

151. Rome was not built in one day- If you want something to be completed properly, then it is going to take time.
152. On pins and needles- Anxious or nervous, especially in anticipation of something
153. On the fence- Undecided
154. On the same page- When multiple people all agree on the same thing
155. Let the cat out of the bag- To share a secret that wasn't supposed to be shared
156. Level-playing field- A fair competition where no side has an advantage
157. Like a chicken with its head cut off- To act in a frenzied manner
158. Liquor someone up- To get someone drunk
159. Loose cannon- Someone who is unpredictable and can cause damage if not kept in check
160. Maiden speech- The first speech made by a person
161. Lend me your ear- To politely ask for someone's full attention
162. Let bygones be bygones- To forget about a disagreement or argument

Let sleeping dogs lie- To avoid restarting a conflict

Nest egg- Savings set aside for future use

165. Never bite the hand that feeds you- Don't hurt anyone who helps you.
166. New kid on the block- Someone new to the group or area
167. No dice- Not to accept a proposition
168. No room to swing a cat- An unusually small or confined space
169. Not playing with a full deck- Someone who lacks intelligence
170. Off on the wrong foot- Getting a bad start on a relationship or task.
171. Make no bones about- To state a fact so there are no doubts or objections
172. Mumbo jumbo- Nonsense or meaningless speech
173. Out of the blue- Something that suddenly and unexpectedly occurs.
174. Out on a limb- When people put themselves in a risky situation.
175. Out on the town- To enjoy yourself by going out
176. Rule of thumb- A rough estimate
177. Run out of steam- To be completely out of energy
178. Saved by the bell- Saved at the last possible moment
179. Scapegoat- Someone else who takes the blame
180. Show your true colours- To reveal your true intentions, personality or behaviour
181. Sick as a dog- To be very sick (with the flu or a cold)
182. Sitting shotgun- Riding in the front passenger seat of a car
183. Sixth sense- Intuition; a special ability to know something without using any of the five senses
184. The last straw- When one small burden after another creates an unbearable situation, the last straw is the last small burden that one can take.
185. The whole nine yards- Everything
186. Third times a charm- After no success the first two times, the third try is a lucky one.
187. Tie the knot- To get married
188. Turn a blind eye- Refuse to acknowledge something you know is real or legitimate
189. Under the weather- Feeling ill or sick
190. Up a blind alley- Going down a course of action that leads to a bad outcome
191. Use your loaf- Use your head / Think smart
192. Over the top- Highly excessive

193. Pass the buck- Avoid responsibility by giving it to someone else
194. Pedal to the metal- To go full speed, especially while driving a vehicle
195. Peeping Tom- Someone who observes people in the nude or sexually active people, mainly for his own gratification.
196. Pick up your ears- To listen very carefully
197. Pig out- To eat a lot and eat it quickly
198. Pipe down- To shut up or be quiet
199. Pour oil on troubled waters- To calm a disturbance
200. Variety is the spice of life- The more experiences you try the more exciting life can be
201. Wag the dog- A diversion away from something of greater importance
202. Water under the bridge-Anything from the past that isn't significant or important anymore
203. Wear your heart on your sleeve- To openly and freely express your emotions
204. When pigs fly- Something that will never ever happen
205. Wild and woolly- Uncultured and without laws
206. Wine and dine- When somebody is treated to an expensive meal
207. Without a doubt- For certain
208. X marks the spot- A phrase that is said when someone finds something he/she has been looking for
209. You are what you eat-To stay healthy you must eat healthy food
210. You can't judge a book by its cover- Decisions shouldn't be made primarily on appearance.
211. Your guess is as good as mine- I have no idea.
212. Young Turk- An insurgent person trying to take control of a situation
213. Zero tolerance- The policy of applying laws very strictly so that people are punished even for mild offences
214. To be in one's good books- To be favoured
215. To build castles in the air- Imaginary projects
216. To nip in the bud- To put a stop to a thing in the beginning
217. To call a spade a spade- To be plain and outspoken
218. To carry the day- To be victorious
219. To eat humble pie- To have to apologize
220. To pay lip service- To pretend to be faithful
221. To steal someone's thunder- To take the credit for something someone else did
222. To the backbone- Thoroughly
223. Tongue and cheek- Humour, not to be taken seriously

B.Tech. Semester-I (Computer Science & Engg.)

MATH 101C MATHEMATICS-I

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits		
3	1	0	4	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Course Objectives:

1. To give adequate exposure of basics of Engineering Mathematics so as to enable them to visualize engineering problems by using Mathematical tools and to support their subsequent engineering studies.
2. To familiarize the students with techniques in basic calculus and linear algebra.
3. To equip the students with standard concepts and tools at an intermediate to advanced level.
4. To know the advanced level of mathematics and applications that they would find useful in their disciplines.
5. Students will demonstrate the ability to apply the techniques of multivariable Calculus to problems in mathematics, the physical sciences, and engineering.

Unit-I (12 Lectures)

Matrices addition and scalar multiplication, matrix multiplication; Linear systems of equations, linear Independence, rank of a matrix, determinants, Cramer's Rule, inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.

Unit-II (12 Lectures)

Eigen values, Eigen vectors, Cayley Hamiltan Theorem symmetric, skew-symmetric, and orthogonal Matrices, Eigen space. Diagonalization; Inner product spaces, Gram-Schmidt orthogonalization.

Unit-III (12 Lectures)

Taylor's and Maclaurin theorems with remainders; Maxima and minma of function of single independent variable.

Curvature & Asymptotes (Cartesian and polar form), Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit-IV (12 Lectures)

Vector space, linear dependence and independence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank-nullity theorem, composition of linear Maps, Matrix associated with a linear map.

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9th Edition, Pearson Education.
2. D. Poole, Linear Algebra: A Modern Intaiduction, 2nd Edition, Brooks/Cole, 2005.
3. Veerarajan T., Engineering Mathematics for firstyear, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East-West press, Reprint 2005.

Course Outcomes:

1. The students will learn to apply differential and integral calculus to notions of curvature and to improper integrals.
2. They will have a basic understanding of Beta and Gamma functions.
3. They will understand essential tools of matrices and determinant to solve system of algebraic equation.
4. To know the basic concepts of linear algebra i.e., linear transformations, eigen values, diagonalization and orthogonalization to solve engineering problems.
5. Apply Taylor series to approximate functions and estimate the error of approximation

Note:

1. The paper setter will set two questions (with/without parts) from each units, & a ninth compulsory question comprising of 6 to 10 sub-parts, covering the entire syllabus. The examinee will attempt 5 questions in all, along with the compulsory question (with all it sub-parts), selecting one question from each unit.
2. The use of programmable devices such as programmable calculators, etc. is not allowed during the exam.

B.Tech. Semester-I (Bio-Technology)

MATH103C MATHEMATIC-I

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits		
3	1	0	4	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Course Objectives:

1. To give adequate exposure of basics of Engineering Mathematics so as to enable them to visualize engineering problems by using Mathematical tools and to support their subsequent engineering studies
2. To familiarize the students with basic concepts of Trigonometric Functions.
3. To know the complex numbers system with their property.
4. To equip Two & Three Dimensional Geometry.
5. To introduce to student rank of matrix, solution of simultaneous equations, Eigen values and Eigen vectors.

Unit-I (12 Lectures)

Review of trigonometric functions, sum and product formulae for trigonometric functions, Trigonometric Equations.

Unit-II (12 Lectures)

Complex Numbers and Quadratic Equations, Permutations and combinations, Binomial Theorem, sequences and series .

Unit-III (12 Lectures)

Matrices, Operations on Matrices, Determinants, singular and non-singular matrices, Adjoint and inverse of a matrix , Solution of system of linear equations using Cramer rule and Matrix inversion method.

Unit-IV (12 Lectures)

Co-ordinate Geometry: Rectangular Coordinate system, Straight lines, Circles and family of circles, Parabola, Ellipse and Hyperbola-their equations in standard form.

Text Books:

1. Mathematics, A Text book for Class XI, NCERT, New Delhi.
2. Mathematics, A Text book for Class XII, NCERT, New Delhi.

Reference Books:

1. Mathematics for class XI of Vol. I & II by R.D. Sharma., Dhanpat Rai Publication
2. Mathematics Text Book for class XI by R.S. Aggarwal, S Chand Publication
3. Comprehensive Mathematics for class XI volume I & II by Luxmi Publication

4. Elements of Mathematics for class XI by M.L. Bhargava, Janardan Dinodia, Jeevansons Publication

Course outcomes:

1. The students will understand the basic concepts of trigonometric functions.
2. The students will be familiar with the concepts of Complex Numbers, Permutations and combinations, Binomial Theorem, sequences and series .
3. The students will learn the basic concepts and applications of matrices and linear Algebra.
4. The students will be aware of the concepts of Co-ordinate Geometry and apply it in various branches of engineering.

Note:

1. The paper setter will set two questions (with/without parts) from each units, & a ninth compulsory question comprising of 6 to 10 sub-parts, covering the entire syllabus. The examinee will attempt 5 questions in all, along with the compulsory question (with all it sub-parts), selecting one question from each unit.
2. The use of programmable devices such as programmable calculators, etc. is not allowed during the exam.

B.Tech. Semester-I (Common for all Branch accept Bio-Tech. and CSE)

MATH105C MATHEMATICS-I

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits		
3	1	0	4	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Course objectives:

1. To familiarize the students with tools and Techniques in calculus and analysis.
2. To equip the students with standard concepts towards tackling various applications that are useful in several disciplines.
3. To understand liner algebra concepts and their application in different fields of engineering.
4. To have the idea of vector calculus and its applications
5. To give adequate exposure of basics of Engineering Mathematics so as to enable them to visualize engineering problems by using Mathematical tools and to support their subsequent engineering studies.
6. To introduce to students the concept of convergence of sequences and series.

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Unit-I (12 Lectures)

Determinants; Inverse and rank of a matrix, System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Eigenvalues and eigen vectors; Diagonalization of matrices; Cayley-Hamilton Theorem, Matrix representation, Rank-nullity theorem of a Linear Transformation, Orthogonal transformation.

Unit –II (12 Lectures)

Convergence of sequence and series, tests for convergence of sequence and series ; Power series, Taylor's and Maclaurin series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit-III (12 Lectures)

Taylor's and Maclaurin theorems with remainders; (one variable).Asymptotes, Curvature ,Evolutes and involutes, Curve Tracing; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit-IV (12 Lectures)

Function of several variables: Limit, continuity and partial derivatives, Total derivative; Maxima, minima and saddle points; Method of Lagrange multipliers; Differentiation under Integral Sign., Vector Calculus: Gradient, Directional derivative, curl and divergence.

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9th Edition, Pearson Education.
2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
4. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

Course outcomes:

1. The students will understand the basic properties of Determinants and matrices & apply these concepts in solving linear simultaneous equations.

2. They will learn the basic concepts regarding convergence of series.
3. The students will learn concepts of vector calculus and apply it in most of the branches of engineering.
4. They will be able to solve Eigen value problems and apply Cayley-Hamilton theorem.

Note:

1. The paper setter will set two questions (with/without parts) from each units, & a ninth compulsory question comprising of 6 to 10 sub-parts, covering the entire syllabus. The examinee will attempt 5 questions in all, along with the compulsory question (with all it sub-parts), selecting one question from each unit.
2. The use of programmable devices such as programmable calculators, etc. is not allowed during the exam.

B.Tech. Semester-I/II (Common for ECE, ME, AE and AERO)

PHY101C INTRODUCTION TO ELECTROMAGNETIC THEORY

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits		
3	1	0	4	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Course Objectives:

1. To Provides knowledge on Electromagnetism in different mediums
2. To develop and design various engineering applications involving Electromagnetic fields.
3. To provides good knowledge on magnetic materials.
4. To get aware the students with Maxwell's equations and their significance.
5. To study propagation of EM waves in different mediums.

Course Outcomes:

1. Success to analyze the different forms of Maxwell equations in different mediums
2. Students should be able to apply Maxwell equations as per their course or practical application requirements.
3. Can differentiate between the materials based on its magnetic properties.
4. Understood the basic difference between different mediums and how the medium can effect the electric and magnetic field.

Syllabus:

UNIT – I

Electrostatics in vacuum and linear dielectric medium

Calculation of electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace's and Poisson's equations for electrostatic potential Boundary conditions of electric field and electrostatic potential; energy of a charge distribution and its expression in terms of electric field.

Electrostatic field and potential of a dipole. Bound charges due to electric polarization; Electric displacement; boundary conditions on displacement.

UNIT - II

Magnetostatics

Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation for the vector potential and its solution for given current densities.

Magnetostatics in a linear magnetic medium: Magnetization and associated bound currents; auxiliary magnetic field; Boundary conditions on **B** and **H**. Solving for magnetic field due to simple magnets like a bar magnet; magnetic susceptibility and feromagnetic, paramagnetic and diamagnetic materials.

UNIT - III

Faraday's law and Maxwell's equations

Faraday's law in terms of EMF produced by changing magnetic flux; equivalence of Faraday's law and motional EMF; Lenz's law; Electromagnetic breaking and its applications; Differential form of Faraday's law; energy stored in a magnetic field.

Continuity equation for current densities; Modified equation for the curl of magnetic field to satisfy continuity equation; displacement current and magnetic field arising from time-dependent electric field; Maxwell's equation in vacuum and non-conducting medium; Energy in an electromagnetic field; Flow of energy and Poynting vector.

UNIT - IV

Electromagnetic waves and Transmission lines

The wave equation; Plane electromagnetic waves in vacuum, their transverse nature and polarization; relation between electric and magnetic fields of an electromagnetic wave; energy carried by electromagnetic waves and examples. Momentum carried by electromagnetic waves and resultant pressure.

Introduction, Basic Principles of Transmission Lines, Equivalent Circuit Representation, General Transmission Line Equation, Wave Characteristics on Finite Transmission Lines, Transients on Transmission lines, Primary Constant.

Suggested Reference Books

1. David Griffiths, Introduction to Electrodynamics, Pearson Publisher

2. Resnick and Halliday, Physics, Wiley Publisher

3. W. Saslow, Electricity, magnetism and light, Elsevier Publisher

B.Tech. Semester-I/II (Civil Engineering)

PHY103C MECHANICS

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits		
3	1	0	4	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Pre-requisites: (i) High-school education

Course Objectives:

1. To have basic understanding vector mechanics,
2. To study various frame of references.
3. To get aware about Harmonic motion,
4. To gain knowledge on rigid body mechanics.
5. To study solid body motion and different frictional forces.

Course outcomes

Students will be familiar with

1. Newton's Law
2. Frame of references
3. Harmonic motion
4. Rigid body and its mechanics
5. solid body motion and different frictional forces

Syllabus:

UNIT I

Vector Mechanics of Particles

Transformation of scalars and vectors under Rotation transformation; Forces in Nature; Newton's laws and its completeness in describing particle motion; Form invariance of Newton's Second Law; Solving Newton's equations of motion in polar coordinates; Problems including constraints and friction; Extension to cylindrical and spherical coordinates.

UNIT II

Mechanics of Particles in Motion and Harmonic Motion

Potential energy function; F = - Grad V, equipotential surfaces and meaning of gradient; Conservative and non-conservative forces, curl of a force field; Central forces; Conservation of Angular Momentum; Energy equation and energy diagrams; Elliptical, parabolic and hyperbolic orbits; Kepler problem; Application: Satellite manoeuvres;

Non-inertial frames of reference; Rotating coordinate system: Five-term acceleration formula. Centripetal and Coriolis accelerations; Applications: Weather systems, Foucault pendulum;

Harmonic oscillator; Damped harmonic motion – over-damped, critically damped and lightly-damped oscillators; Forced oscillations and resonance.

UNIT III

Rigid Body Mechanics

Definition and motion of a rigid body in the plane; Rotation in the plane; Kinematics in a coordinate system rotating and translating in the plane; Angular momentum about a point of a rigid body in planar motion; Euler's laws of motion, their independence from Newton's laws, and their necessity in describing rigid body motion; Examples.

Introduction to three-dimensional rigid body motion — only need to highlight the distinction from two-dimensional motion in terms of (a) Angular velocity vector, and its rate of change and (b) Moment of inertia tensor; Three-dimensional motion of a rigid body wherein all points move in a coplanar manner: e.g. Rod executing conical motion with center of mass fixed — only need to show that this motion looks two-dimensional but is three-dimensional, and two dimensional formulation fails.

UNIT IV

Statics of Solids

Free body diagrams with examples on modelling of typical supports and joints; Condition for equilibrium in three- and two- dimensions; Friction: limiting and non-limiting cases; Force displacement relationship; Geometric compatibility for small deformations; Illustrations through simple problems on axially loaded members like trusses.

Suggested Reference Books

(i) Engineering Mechanics, 2nd ed. — MK Harbola, Cengage Learning India publisher

(ii) Introduction to Mechanics — MK Verma, CRC Press

(iii) An Introduction to Mechanics — D Kleppner & R Kolenkow, University Printing House, Cambridge

(iv) Principles of Mechanics — JL Synge & BA Griffiths, McGraw-Hill

(v) Mechanics — JP Den Hartog, Dover Publication

(vi) Engineering Mechanics - Dynamics, 7th ed. - JL Meriam, Wiley Publisher

(vii) Mechanical Vibrations — JP Den Hartog, Dover Publication

(viii) Theory of Vibrations with Applications — WT Thomson, Pearson Publisher

B.Tech. Semester-I/II (CHE, BT and BME)

PHY105C OPTICS, FIBRE OPTICS, MAGNETISM AND QUANTUM MECHANICS

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits		
3	1	0	4	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Course Objectives:

1. To have basic understanding of optics and its applications,
2. To study light propagation through optical fibres.
3. To get aware about different laws of electricity and magnetism,
4. To gain knowledge on magnetic materials.
5. To have basic knowledge about Quantum Mechanical phenomena's.

Course outcomes

Students will be familiar with

1. Bragg's Law
2. principles, types of lasers and applications of lasers
3. Various terms related to properties of materials viz. permeability, polarization, etc.
4. Some basic laws related to quantum mechanics
5. about magnetic and dielectric properties of materials
6. Simple quantum mechanics calculations

Syllabus:

UNIT – I

Optics

Diffraction: Introduction to interference and example; concept of diffraction, Fraunhofer and Fresnel diffraction, Fraunhofer diffraction at single slit, double slit, and multiple slits; diffraction grating, characteristics of diffraction grating and its applications.

Polarisation: Introduction, polarisation by reflection, polarisation by double refraction, scattering of light, circular and elliptical polarisation, optical activity.

UNIT – II

Fibre Optics and Lasers

Fibre Optics: Introduction, optical fibre as a dielectric wave guide: total internal reflection, numerical aperture and various fibre parameters, losses associated with optical fibres, step and graded index fibres, application of optical fibres.

Lasers: Introduction to interaction of radiation with matter, principles and working of laser: population inversion, pumping, various modes, threshold population inversion, types of laser: solid state, semiconductor, gas; application of lasers.

UNIT – III

Electromagnetism and Magnetic Properties of Materials

Laws of electrostatics, electric current and the continuity equation, laws of magnetism. Ampere's Faraday's laws. Maxwell's equations. Polarisation, permeability and dielectric constant, polar and non-polar dielectrics, applications of dielectrics.

Magnetisation, permeability and susceptibility, classification of magnetic materials, ferromagnetism, magnetic domains and hysteresis, applications.

UNIT – IV

Quantum Mechanics

Introduction to quantum physics, black body radiation, explanation using the photon concept, photoelectric effect, Compton effect, de Broglie hypothesis, wave-particle duality, Born's interpretation of the wave function, verification of matter waves, uncertainty principle, Schrodinger wave equation, particle in box, quantum harmonic oscillator, hydrogen atom.

References:

1. I. G. Main, "Vibrations and waves in physics", Cambridge University Press, 1993.

2. H. J. Pain, "The physics of vibrations and waves", Wiley, 2006.

3. E. Hecht, "Optics", Pearson Education, 2008.

4. A. Ghatak, "Optics", McGraw Hill Education, 2012.

5. O. Svelto, "Principles of Lasers", Springer Science & Business Media, 2010.

6. D. J. Griffiths, "Quantum mechanics", Pearson Education, 2014.

7. R. Robinett, "Quantum Mechanics", OUP Oxford, 2006.

8. D. McQuarrie, "Quantum Chemistry", University Science Books, 2007.

9. D. A. Neamen, "Semiconductor Physics and Devices", Times Mirror High Education Group, Chicago, 1997.

10. E.S. Yang, "Microelectronic Devices", McGraw Hill, Singapore, 1988.

11. B.G. Streetman, "Solid State Electronic Devices", Prentice Hall of India, 1995..

B.Tech. Semester-I/II (For EE and EEE)

PHY107C WAVES OPTICS AND QUANTUM MECHANICS

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits		
3	1	0	4	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Course Objectives:

1. To have basic understanding of optics and its applications,
2. To study light propagation.
3. To get aware about wave optics and lasers,
4. To have basic knowledge about Quantum Mechanical phenomena's.
5. To gain knowledge on solids and semiconducting materials.

Course outcomes

Students will be familiar with

1. Wave motion
2. principles, types and applications of lasers
3. basic laws related to quantum mechanics
4. Simple quantum mechanics calculations
5. Various terms related to semiconducting properties of materials

Syllabus:

UNIT – I

Wave and Light Motion

Waves: Mechanical and electrical simple harmonic oscillators, damped harmonic oscillator, forced mechanical and electrical oscillators, impedance, steady state motion of forced damped harmonic oscillator

Non-dispersive transverse and longitudinal waves: Transverse wave on a string, the wave equation on a string, Harmonic waves, reflection and transmission of waves at a boundary, impedance matching, standing waves and their Eigen frequencies, longitudinal waves and the wave equation for them, acoustics waves.

Light and Optics: Light as an electromagnetic wave and Fresnel equations, reflectance and transmittance, Brewster's angle, total internal reflection, and evanescent wave.

UNIT – II

Wave Optics and Lasers

Wave Optics: Huygens' principle, superposition of waves and interference of light by wave-front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer. Farunhofer diffraction from a single slit and a circular aperture, the Rayleigh

criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power.

Lasers: Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne, CO), solid-state lasers (ruby, Neodymium), dye lasers; Properties of laser beams: mono-chromaticity.

UNIT – III

Introduction to Quantum Mechanics

Wave nature of Particles, Time-dependent and time-independent Schrodinger equation for wave function, Born interpretation, probability current, Expectation values, Free-particle wave function and wave-packets, Uncertainty principle.

Solution of stationary-state Schrodinger equation for one dimensional problems–particle in a box, particle in attractive delta-function potential, square-well potential, linear harmonic oscillator. Scattering from a potential barrier and tunneling; related examples like alpha- decay, field-ionization and scanning tunneling microscope, tunneling in semiconductor structures.

UNIT – IV

Introduction to Solids and Semiconductors

Free electron theory of metals, Fermi level, density of states in 1, 2 and 3 dimensions, Bloch's theorem for particles in a periodic potential, Kronig-Penney model and origin of energy bands.

Types of electronic materials: metals, semiconductors, and insulators. Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p -n junction.

References:

1. I. G. Main, "Vibrations and waves in physics", Cambridge University Press, 1993.
2. H. J. Pain, "The physics of vibrations and waves", Wiley, 2006.
3. E. Hecht, "Optics", Pearson Education, 2008.
4. A. Ghatak, "Optics", McGraw Hill Education, 2012.
5. O. Svelto, "Principles of Lasers", Springer Science & Business Media, 2010.
6. D. J. Griffiths, "Quantum mechanics", Pearson Education, 2014.
7. R. Robinett, "Quantum Mechanics", OUP Oxford, 2006.
8. D. McQuarrie, "Quantum Chemistry", University Science Books, 2007.
9. D. A. Neamen, "Semiconductor Physics and Devices", Times Mirror High Education Group, Chicago, 1997.
10. E.S. Yang, "Microelectronic Devices", McGraw Hill, Singapore, 1988.
11. B.G. Streetman, "Solid State Electronic Devices", Prentice Hall of India, 1995.

B.Tech. Semester-I/II (Computer Science & Engineering)

PHY109C SEMI CONDUCTOR PHYSICS

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits		
3	1	0	4	Class Work	: 25
				Examination	: 75
				Total	: 100
				Duration of Exam	: 3 Hours

Pre-requisite: "Introduction to Quantum Mechanics" Desirable

Course Objectives:

1. To give the detailed idea how the electronic bands are formed
2. To characterize materials based on band gap.
3. To provide the sound knowledge on semiconductor physics
4. To study light semiconductor interactions.
5. To know how the band gap and defects concentration can be find out.

Course Outcomes:

1. Able to differentiate how the band originated
2. Successfully differentiate the materials types based on their band gap values and use this knowledge as per their requirements.
3. Know about how the junctions are formed in PN diode and its theory.
4. Students have the idea of solar cell and it's working with advantages.
5. Successfully find the band gap, reflection and transmission percentage of a grown film over substrate with contents of defects.

Syllabus

UNIT - I

Electronic Materials

Free electron theory, Density of states and energy band diagrams, Kronig-Penny model (to introduce origin of band gap), Energy bands in solids, E-k diagram, Direct and indirect bandgaps, Types of electronic materials: metals, semiconductors, and insulators, Density of states, Occupation probability, Fermi level, Effective mass, Phonons.

UNIT - II

Semiconductors

Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal-semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for optoelectronic devices.

UNIT - III

Light-Semiconductor Interaction

Optical transitions in bulk semiconductors: absorption, spontaneous emission, and stimulated emission; Joint density of states, Density of states for photons, Transition rates (Fermi's golden rule), Optical loss and gain; Photovoltaic effect, Exciton, Drude model.

UNIT - IV

Measurements & Engineered Semiconductor Materials

Four-point probe and van der Pauw measurements for carrier density, resistivity, and hall mobility; Hot-point probe measurement, capacitance-voltage measurements, parameter extraction from diode I-V characteristics, DLTS, band gap by UV-Vis spectroscopy, absorption/transmission.

Density of states in 2D, 1d and 0D (qualitatively). Practical examples of low-dimensional systems such as quantum wells, wires, and dots: design, fabrication, and characterization techniques. Heterojunctions and associated band-diagrams

References:

1. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).

2. B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., (2007).

3. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).

4. A. Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).

5. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).

6. Online course: “Semiconductor Optoelectronics” by M R Shenoy on NPTEL

7. Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Gupta on NPTEL

B. Tech. Semester – I/II (Common for all Branches)

CH101C CHEMISTRY

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits			
3	1	0	4	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To give students in-depth knowledge of Atomic and molecular structures.
2. To make students understand and analyse periodic properties and related concepts.
3. To give knowledge of Stereochemistry, Organic reactions and synthesis of a drug molecule.
4. To apprise students of Intermolecular forces and potential energy surfaces and use of free energy in chemical equilibria**.**

UNIT-I

Atomic and molecular structure: Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles. Forms of the hydrogen atom wave functions and the plots of these functions to explore their spatial variations(derivation excluded). Molecular orbitals of diatomic molecules and plots of the multicenter orbitals. Molecular orbital energy level diagrams of diatomic. Pi-molecular orbitals of butadiene and benzene . Crystal field theory and the energy level diagrams for transition metal ions . Band structure of solids and the role of doping on band structures.

Periodic properties: Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states.

UNIT-II

Stereochemistry: Representations of 3 dimensional structures, structural isomers and stereoisomers Configurations, symmetry chirality, enantiomers, diastereomers. Optical activity, absolute configurations and conformational analysis.

Organic reactions and synthesis of a drug molecule: Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule (Asprin/Paracetamol).

UNIT-III

Intermolecular forces and potential energy surfaces: Ionic, dipolar and van der Waals interactions. Equations of state of real gases and critical phenomena. Potential energy surfaces (with example).

Use of free energy in chemical equilibria: Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base equilibria, oxidation reduction and solubility equilibria. Water chemistry. Corrosion. Use of free energy considerations in metallurgy through Ellingham diagrams.

UNIT-IV

Spectroscopic techniques and applications : Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules and its applications. Nuclear magnetic resonance and magnetic resonance imaging,surface characterisation techniques. Diffraction and scattering.

Suggested Text Books:

(i) University Chemistry by Bruce M. Mahan, 4th Edition, Pearson Education.

(ii) Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane

(iii)Fundamentals of Molecular Spectroscopy, by C. N. Banwell

(iv) Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan

(v) Physical Chemistry, by P. W. Atkins

(vi) Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition.

(vii) Organic chemistry, by R.T Morrison, R.N Boyd, 7th Edition, Pearson Education.

Course Outcomes

1. The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Students will be able to understand these concepts upto advanced level
2. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, students will be able to understand the description of all chemical processes at molecular levels.

3. The course will enable the student to: Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. Rationalise bulk properties and processes using thermodynamic considerations.
4. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and lectronegativity.

Notes:

1.The paper setter will set two question (with /without parts)from each of the four units, a ninth compulsory question comprising of 6 to 10 sub parts, covering the entire syllabus. The examinee will attempt 5 questions in all, along with the compulsory question (with all it subparts), selecting one question from each unit.

2. The use of programmable devices such as programmable calculators, etc is not allowed during the exam.

3.. A specific note shall be inserted in relevant question paper where ever the use of graph papers, semi-log papers, steam tables,etc.shall be allowed during the examination.

B. Tech. Semester – I/II (Common for all Branches except Chemical Engineering)

EE101C BASIC ELECTRICAL ENGINEERING

CATEGORY : ENGINEERING SCIENCE COURSE

L	T	P	Credits			
3	1	0	4	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To analyze dc and ac circuits.

2 To design and analyze RLC networks.

3. To appreciate basic knowledge of electric machines.

4. To assimilate elementary knowledge of electric installations.

UNIT-1

D.C. Circuits & Theorems: Basics of electric circuit elements, Kirchhoff's laws & its applications including those based on dependent sources, Nodal and Loop methods of Analysis, Star-Delta and delta-star transformations. Network Theorems: Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum Power transfer theorem. **(11 Hours)**

UNIT-2

Single A.C. Circuits: Sinusoidal signal, instantaneous & peak values, average and RMS values, form factor, peak factor. Concept of Phasors: Rectangular & Polar, Trigonometric & Exponential forms. Behaviour of R, L, C components in ac circuits. Time domain analysis of first-order RL and RC circuits. Series and parallel circuits: Active and reactive power, power factor, Resonance in series and parallel circuits. Q-factor, cut off frequencies and bandwidth. Three Phase Circuits: Phase and line voltages and currents, balanced star and delta circuits. **(11 Hours)**

UNIT-3

Electrical Machines: Construction, working principle, type, & equation of Single phase Transformer, Ideal Transformer, Phasor diagrams of Single-phase Transformer at no load and on load, Equivalent circuit, losses, efficiency. Three phase Transformer connections.single phase Autotransformer. Rotating Machines: Construction, operating principle of d.c. motors and its torque speed characteristics. Construction and working principle & type of single phase Induction motor & Three-phase Induction motor, concept of slip & torque-speed characteristics, construction and working of synchronous generators.**(11Hours)**

UNIT-4

Electrical and electronics components: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB(Miniature Circuit Breaker), ELCB(Earth Leakage Circuit Breaker), MCCB(Moulded Case Circuit Breaker), Types of Wires and Cables, Earthing. Types of Batteries,

Important Characteristics of Batteries. Elementary calculations for energy consumption. Introduction to power factor improvement and battery backup. **(11 Hours)**

Course Outcomes:

1. Students will be able to analyze dc and ac circuits.
2. Students will be able to solve, design and synthesize electrical networks mathematically.
3. Obtain basic knowledge of electric installations.
4. Imbibe elementary knowledge of electric machines.

TEXT BOOKS:

1. Del Toro, "Principles of Electrical Engineering", 2nd Edition,Pearson Education.
2. D.P.Kothari & I. J. Nagarath, "Basic Electrical Engg", TMH, New Delhi, 3rd edition.
3. B.L. Theraja & A. K. Theraja, "Electrical Technology", (Vol-I, Vol-II), S.Chand.
4. Edward Hughes, "Electrical & Electronics Technology", 10th Edition,Pearson Education.

REFERENCE BOOKS:

1. T.K. Nagsarkar & M.S Sukhija, "Basic Electrical Engineering", OXFORD Uni. Press.2004.
2. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press.
3. D.C. Kulshreshtha, "Basic Electrical Engineering", Mc Graw Hill.
4. Hayt & Kemmerly, "Engineering Circuit Analysis", Mc Graw Hill.
5. "Schaum's Outline of Electric Circuits", Mc Graw Hill.
6. A.K.Sawhney. A Course in Electronic Measurements and Instrumentation", Dhanpat Rai & Co.
7. S.K. Sahdev, "Basic Electrical Engineering" Pearson Education.

Note:

1. **The paper setter will set two questions (with/without parts) from each unit, and a ninth compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus. The examinee will attempt five questions in all, along with the compulsory question (with all it sub parts), selecting one question from each unit.**
2. **The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.**

B. Tech. Semester – I/II (For Chemical Engineering Only)

EE103C ELECTRICAL & ELECTRONICS ENGINEERING
CATEGORY : ENGINEERING SCIENCE COURSE

L	T	P	Credits			
3	1	0	4	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 hrs

Course Objectives:

1. To understand and analyze electrical circuits.
2. To design and synthesise resonant circuits networks.
3. To appreciate basic knowledge of electric machines.
4. To understand basic insight into power supplies and basic electronics devices.

UNIT- 1

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and Voltage laws, Nodal and Loop methods of Analysis, Star-Delta and delta-star transformations. Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum Power transfer theorem, Reciprocity theorem, Millman's theorem, Introduction to digital circuits. **(11 Hours)**

UNIT- 2

Phasor representation of AC circuits, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance, to study step response in RL, RC, RLC circuits. Resonance in series and parallel circuits. Q-factor , cut off frequencies and bandwidth.Three Phase Circuits: Phase and line voltages and currents, balanced and unbalanced star and delta circuits, power equation, measurement of power and p. f. by two wattmeter method **(11 Hours)**

UNIT-3

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections. Electromechanical energy conversion: principles and examples. Rotating Machines: Construction, operating principle of d.c. motors and its torque speed characteristics. Construction and working principle & type of single phase Induction motor & Three-phase Induction motor, concept of slip & torque-speed characteristics, construction and working of synchronous generators. **(11 Hours)**

UNIT- 4

Two port networks, study of diode, BJT, CE, and small signal model, operational amplifiers, model and applications**.** Introduction to Logic Gates, Basic principle, Construction, Theory & Applications of PMMC, moving iron, Electrodynamics type, voltmeters & ammeters, induction type wattmeter, energy meter, Elementary calculations for energy consumption, power factor

improvement and battery backup**. (12 Hours)**

Suggested Text / Reference Books

(1) E. Hughes, "Electrical and Electronics Technology", 10th Edition, Pearson Education.
(2) Del Toro, "Electrical Engineering Fundamentals", 2nd Edition, Pearson Education.
(3)D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill 2010.
(4) D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
(5) L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press,2011
(6) R.P.Jain " Modern Digital Electronics", McGraw Hill.
(7) S.K. Sahdev, "Basic Electrical Engineering" Pearson Education.

Course Outcomes

1. Understand the basic concepts of D.C. circuits, single phase and three phase A.C. supply and circuits, and solve basic electrical circuit problems.
2. Understand the basic concepts of transformers and motors.
3. To understand the working of electronics devices.
4. Understand the concept of power factor improvement for industrial installations.

Note:

1. **The paper setter will set two questions (with/without parts) from each unit, and a ninth compulsory question comprising of 6 to 10 sub parts, covering the entire syllabus. The examinee will attempt five questions in all, along with the compulsory question (with all it sub parts).Selecting one question from each unit.**

2. **The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of calculators will not be permitted during examination.**

B. Tech. Semester – I/II (Common to all Branches)

CSE101C PROGRAMMING FOR PROBLEM SOLVING

CATEGORY : ENGINEERING SCIENCE COURSE

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To make students understand basics of parts of computers and the programming.
2. To give knowledge of basic constructs of computer programming.
3. To make students understand Recursion.
4. To impart knowledge of Basic Algorithms.

Unit I (10 Lectures)

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.), Introduction to Programming ,Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/ Pseudocode with examples. **,**From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

Unit II (10 Lectures)

Arithmetic expressions and precedence**,** Conditional Branching and Loops**,** Writing and evaluation of conditionals and consequent branching **,**Iteration and loops Arrays*:* Arrays (1-D, 2-D), Character arrays and Strings, Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference

Unit III (10 Lectures)

Recursion: Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Structure**:** Defining structures and Array of Structures, Pointers *:*Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Unit IV (10 Lectures)

Basic Algorithms**:** Searching (Linear and binary search), Basic Sorting Algorithms (Bubble, Insertion, Quick sort), Finding roots of equations, notion of order of complexity through example

programs (no formal definition required)File handling (only if time is available, otherwise should be done as part of the lab)

Suggested Text Books:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

Suggested Reference Books :

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd Edition, Pearson Education.

Course Outcomes:

The student will learn

1. To formulate simple algorithms for arithmetic and logical problems.
2. To translate the algorithms to programs (in C language).
3. To test and execute the programs and correct syntax and logical errors
4. To implement conditional branching, iteration and recursion.
5. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
6. To use arrays, pointers and structures to formulate algorithms and programs.
7. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
8. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.

Note: The paper setter will set two questions (with or without parts) from each of four units , & a ninth compulsory question comprising of 5 to 10 sub-parts , covering the entire syllabus . The examinee will attempt 5 questions in all, alongwith the compulsory question (with all its sub-parts), selecting one question from each unit.

B. Tech. Semester – I/II (Common to all Branches)

ME101C ENGINEERING GRAPHICS AND DESIGN

CATEGORY : ENGINEERING SCIENCE COURSE

L	T	P	Credits			
1	0	4	3	**Class Work**	:	**25 Marks**
				Examination	:	**75 Marks**
				Total	:	**100 Marks**
				Duration of Examination	:	**3 Hours**

Pre-requisites : Nil

Objectives All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a CAD laboratory using engineering software. This course is designed :

- To prepare the students to communicate effectively through Traditional Engineering Graphics and using Computer Graphics Software.
- To prepare the students to use the techniques, skills, and modern engineering graphics tools necessary for engineering practice.

Detailed Contents

S. No.	Contents (L-12/P-48)	Contact Hours
1	**Introduction to Engineering Drawing:** Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales.	L-2 P-4
2	**Orthographic Projections:** Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes.	L-1 P-6
3	**Projections of Regular Solids:** those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.	L-1 P-6
4	**Sections and Sectional Views of Right Angular Solids:** Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only).	L-1 P-4
5	**Isometric Projections covering:** Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa,	L-1 P-4

Conventions.

6	**Overview of Computer Graphics:** Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects, Isometric Views of lines, Planes, Simple and compound Solids.	L-2 P-4
7	**Customisation & CAD Drawing:** Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles.	L-2 P-4
8	**Annotations, layering & other functions:** Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models. Part editing and two dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, multiview, auxiliary, and section views. Spatial visualization exercises. Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling.	L-1 P-8
9	**Demonstration of a simple team design project** that illustrates Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerancing; Use of solid-modeling software for creating associative models at the component and assembly levels; floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling; Introduction to Building Information Modelling (BIM).	L-1 P-8

Text Books

S. No.	Title	Author(s)	Publisher
1	Engineering Drawing	Bhatt N.D., Panchal V.M. & Ingle P.R.	Charotar Publishing House
2	Engineering Drawing and Computer Graphics	Shah, M.B. & Rana B.C.	Pearson Education

Reference Books

S. No	Title	Author(s)	Publisher
1	Engineering Graphics	Agrawal B. & Agrawal C.M.	TMH Publication
2	CAD Software Theory and User Manuals		

Course Outcomes

All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a computer designed CAD laboratory using engineering software.

This course is designed :

- to prepare the students to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- to prepare the students to communicate effectively to prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice

The student will learn:

1. Introduction to engineering design and its place in society
2. Exposure to the visual aspects of engineering design and engineering graphics standards
3. Exposure to solid modelling and computer-aided geometric design
4. Exposure to creating working drawings
5. Exposure to engineering communication

B. Tech. Semester – I/II (Common to all Branches)

ME103C WORKSHOP/MANUFACTURING PRACTICES

CATEGORY : ENGINEERING SCIENCE COURSE

L	T	P	Credits			
1	0	4	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75 Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Pre-requisites : Nil

Objectives This course is aimed to provide:

- Knowledge of different methods employed by manufacturing industries in the production/fabrication process and measurement of their quality parameters.
- Knowledge to decide about the appropriate methods and tool for manufacturing a given product/job.
- Training to fabricate components with their own hands safely while working with different machine tools and hand tools.
- Training to produce small devices through assembly of different components.

Detailed Contents (L-10/P-48)

S. No.	Contents	Contact Hours
1	**Lectures & videos: (10 hours)**	
i.	Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods	3
ii.	CNC machining, Additive manufacturing	2
iii.	Fitting operations & power tools	1
iv.	Carpentry	1
v.	Welding (arc welding & gas welding), brazing	1
vi.	Metal casting	1
vii.	Plastic moulding, glass cutting	1
2	**Workshop Practice: (48 hours)**	
i.	Machine shop	12
ii.	Fitting shop	6
iii.	Carpentry	6
iv.	Welding shop	6
v.	Casting	6
vi.	Smithy	6
vii.	Plastic moulding & Glass Cutting	6

Text Books

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S. No.	Title	Author(s)	Publisher
1	Elements of Workshop Technology, Vol. I and II	Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K.	Media promoters and publishers (P) limited
2	Manufacturing Engineering and Technology	Kalpakjian S. And Steven S. Schmid	Pearson Education India

Reference Books

S. No.	Title	Author(s)	Publisher
1	Manufacturing Technology – I	Gowri P. Hariharan and A. Suresh Babu	Pearson Education, India
2	Processes and Materials of Manufacture	Roy A. Lindberg	Prentice Hall, India
3	Manufacturing Technology, Vol. I and II	Rao P.N.	Tata McGraw Hill

Course Outcomes

The content delivery through lectures will enable the student to learn:

- The knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

The laboratory practices will enable the student:

- To decide about the appropriate methods and tool for manufacturing a given product/job which gives the desired dimensional accuracies and dimensional tolerances.
- Fabricate components with their own hands safely while working with different machine tools and hand tools.
- By assembling different components, they will be able to produce small devices of their interest.

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

B.Tech. Semester I/II (Common for All Branches)

HUM103C ENGLISH LANGUAGE LAB

CATEGORY : HUMANITIES

L	T	P	Credits			
0	0	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To develop English language skills especially speaking and listening of the students
2. To make the students excel in their professional lives through proficiency in communication
3. To enhance the students linguistic and communicative competence
4. To enable them to face the challenges of professional and social life

Course Outcomes:

The Students will be able to

1. Acquire basic proficiency in Spoken English
2. Enhance their listening skills with listening comprehension exercises
3. Polish their speaking skills in English both at social and professional platforms
4. Present themselves confidently and meaningfully in professional and social circles.

Course Contents:

(i) Listening comprehension
(ii) Recognition of phonemes in International Phonetic Alphabet
(iii) Self introduction and introduction of another person
(iv) Conversation and dialogues in common everyday situations
(iv) Communication at work place (Standard phrases and sentences in various situations)
(vi) Telephonic communication
(vii) Speeches for special occasions (Welcome speeches, Introduction speeches, Felicitation speeches and Farewell speeches)
(viii) Tag Questions
(ix) Formal Presentations on literary texts prescribed in theory paper

Note: Three hour time to each segment is recommended for instruction and practice.

Approved by Board of UG Studies, Department of Humanities on 19 March 2018

Scheme of End Semester Practical Exam:

1. A small passage may be read out to the examinees and they will have to write the answers to the questions asked at the end of the passage. Questions will be short answer type.
2. Examinees may be asked to identify the sounds of phonemes in given words.
3. Examinees may be asked to introduce themselves or others, participate in role play activities in mock situations, give short responses, engage in hypothetical telephonic conversation or supply the tag questions to statements etc.
4. Examinees may also be asked to deliver speeches on given situations or make presentation on the literary texts prescribed in Unit IV of theory paper.

Recommended Readings:

1. Bhatnagar, Nitin and Mamta Bhatnagar. *Communicative English for Engineers and Professionals*. Pearson Education, 2013.
2. Swan, Michael. *Practical English Usage*. OUP, 1995.
3. Gangal, J.K. *Practical Course in Spoken English*. New Delhi: PHI Learning, 2015.
4. Konar, Nira. *Communication Skills for Professionals*. New Delhi: PHI Learning Pvt. Ltd., 2009.
5. Bansal, R.K. and J.B. Harrison. *Spoken English*. Orient Longman, 1983.
6. Sharma, Sangeeta and Binod Mishra. *Communication Skills for Engineers and Scientists*. Delhi: PHI Learning Pvt. Ltd., 2015.

Approved by Board of UG Studies, Department of Humanities on 19 March 201

B. Tech. Semester – I/ II (For ECE, ME, AE and AERO)

PHY111C INTRODUCTION TO ELECTROMAGNETIC THEORY LAB.

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits			
0	0	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To make aware the students about very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. To understand precision and error calculation in measurements.
3. To perform, take reading, do calculations and analyze the results obtained for the experiments related to electricity and magnetism.
4. To seek and co-relate the application of studied practical's in daily life.

Course Outcomes:

1. Students will be able to understand to take readings on very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. Students will be aware about precision and error in measurements.
3. Students can take reading, do calculations and analyze the results obtained for the experiments related to electricity and magnetism.
4. Students are expected to co-relate the results of performed practicals in daily life and can also seek new applications.

Syllabus:

Note: Students will be required to learn to take readings of vernier calliper, screw gauge, spherometer, spectrometer etc. during their orientation labs at the starting and **will have to perform at least ten subject related experiments in a semester.**

Basic experiments on least count and error estimation (during orientation)

1. To aware about the least count of vernier calliper and screw gauge and to find the thickness of a slide using vernier calliper and diameter of wire using screw gauge.
2. Calculation of radius of curvature of a convex surface using spherometer.
3. Angel measurement using spectrometer.

List of Subject related Experiments:

1. To study Hall effect in semiconductors and measure the Hall coefficient.

2. To find frequency of AC mains using sonometer.

3. To study the magnetic properties of materials using B-H curve.
4. To study the Curies temperature of materials using Dielectric set up.
5. To verify the inverse square law with the help of a photovoltaic cell.
6. To determine Planks constant using photocell.
7. To study the characteristics of Solar cell and find out the fill factor.
8. To design and study Active and Passive filters.
9. To find impedance and Q factor using LCR circuit.
10. To study resonance phenomena in LCR circuit.
11. To measure e/m of electron using helical method.
12. To find temperature co-efficient of platinum using Callender Griffith bridge.
13. To study the forward and reverse characteristics of P-N junction diode.
14. To study the reverse characteristics of Zener diode and voltage regulation using Zener Diode.

B. Tech. Semester – I/ II (For Civil Engineering)

PHY113C MECHANICS LAB.

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits			
0	0	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To make aware the students about very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. To understand precision and error calculation in measurements.
3. To perform, take reading, do calculations and analyze the results obtained for the experiments related to mechanics.
4. To seek and co-relate the application of studied practical's in daily life.

Course Outcomes:

1. Students will be able to understand to take readings on very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. Students will be aware about precision and error in measurements.
3. Students can take reading, do calculations and analyze the results obtained for the experiments related to mechanics.
4. Students are expected to co-relate the results of performed practical in daily life and can also seek new applications.

Syllabus:

Note: Students will be required to learn to take readings of vernier calliper, screw gauge, spherometer, spectrometer etc. during their orientation labs at the starting and **will have to perform at least ten subject related experiments in a semester.**

Basic experiments on least count and error estimation (during orientation)

1. To aware about the least count of vernier calliper and screw gauge and to find the thickness of a slide using vernier calliper and diameter of wire using screw gauge.
2. Calculation of radius of curvature of a convex surface using spherometer.
3. Angel measurement using spectrometer.

List of Subject related Experiments:

1. To find the moment of inertia measurement of a fly wheel.

2. To find acceleration due to gravity using bar pendulum.
3. To study resonance phenomena in mechanical oscillators.
4. To examine the behaviour of coupled pendulum.
5. To examine air track experiment and study Collisions between objects, governed by the laws of momentum and energy.
6. To find the modulus of rigidity of a wire using Maxwell's Needle.
7. To determine the moment of inertia of the given disc using Torsion pendulum.
8. To perform experiment on Rotation and Gyroscopic Precession.
9. To measure spring constant using Hook's Law.
10. To measure height of a distant object using sextant.

B. Tech. Semester – I/ II (For BME, BT and CHE)

PHY115C OPTICS, FIBRE OPTICS, MAGNETISM AND QUANTUM MECHANICS (OFMQ) LAB.

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits			
0	0	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To make aware the students about very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. To understand precision and error calculation in measurements.
3. To perform, take reading, do calculations and analyze the results obtained for the experiments related to optics, magnetism and quantum mechanics.
4. To seek and co-relate the application of studied practical's in daily life.

Course Outcomes:

1. Students will be able to understand to take readings on very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. Students will be aware about precision and error in measurements.
3. Students can take reading, do calculations and analyze the results obtained for the experiments related to optics, magnetism and quantum mechanics.
4. Students are expected to co-relate the results of performed practical in daily life and can also seek new applications.

Syllabus:

Note: Students will be required to learn to take readings of vernier calliper, screw gauge, spherometer, spectrometer etc. during their orientation labs at the starting and **will have to perform at least ten subject related experiments in a semester.**

Basic experiments on least count and error estimation (during orientation)

1. To aware about the least count of vernier calliper and screw gauge and to find the thickness of a slide using vernier calliper and diameter of wire using screw gauge.
2. Calculation of radius of curvature of a convex surface using spherometer.
3. Angel measurement using spectrometer.

List of Subject related Experiments:

1. To find out wavelength of monochromatic light using Newton's ring experiment.
2. To find out wavelength of monochromatic light using Diffraction grating.
3. To find out wavelength of monochromatic light using Freshnel's bi-prism
4. To study interference phenomena using Michelson's Interferometer and to find out wavelength of monochromatic light.
5. To find specific rotation of sugar using Polarimeter
6. To study Hall effect in semiconductors and measure the Hall coefficient.
7. To study the magnetic properties of materials using B-H curve.
8. To determine Planks constant using photocell.
9. To verify the inverse square law with the help of a photovoltaic cell.
10. To measure e/m of electron using helical method.
11. To find temperature co-efficient of platinum using Callender Griffith bridge.
12. To study Zeeman splitting using EPS/ ESR.

B. Tech. Semester – I/ II (For EE and EEE)

PHY117C WAVES, OPTICS & QUANTUM MECHANICS LAB

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits			
0	0	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To make aware the students about very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. To understand precision and error calculation in measurements.
3. To perform, take reading, do calculations and analyze the results obtained for the experiments related to optics and quantum mechanics.
4. To seek and co-relate the application of studied practical's in daily life.

Course Outcomes:

1. Students will be able to understand to take readings on very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. Students will be aware about precision and error in measurements.
3. Students can take reading, do calculations and analyze the results obtained for the experiments related to optics and quantum mechanics.
4. Students are expected to co-relate the results of performed practical in daily life and can also seek new applications.

Syllabus:

Note: Students will be required to learn to take readings of vernier calliper, screw gauge, spherometer, spectrometer etc. during their orientation labs at the starting and **will have to perform at least ten subject related experiments in a semester.**

Basic experiments on least count and error estimation (during orientation)

1. To make aware the students about the least count of vernier calliper and screw gauge and to find the thickness of a slide using vernier calliper and diameter of wire using screw gauge.
2. Calculation of radius of curvature of a convex surface using spherometer.
3. Angel measurement using spectrometer.

List of Subject related Experiments:

4. To find out wavelength of monochromatic light using Newton's ring experiment.

5. To find out wavelength of monochromatic light using Diffraction grating.
6. To find out wavelength of monochromatic light using Freshnel's bi-prism
7. To study interference phenomena using Michelson's Interferometer and to find out wavelength of monochromatic light.
8. To find specific rotation of sugar using Polarimeter
9. To find thickness of hair using He-Ne laser.
10. To find Cauchy's constants of a prism by using spectrometer.
11. To find resolving power of a telescope
12. To determine Planks constant using photocell.
13. To study the characteristics of solar cell and find out the fill factor.
14. To verify the inverse square law with the help of a photovoltaic cell.
15. To study Zeeman splitting using EPS/ ESR.

B. Tech. Semester – I/ II (For Computer Science & Engineering)

PHY119C SEMI CONDUCTOR PHYSICS LAB.

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits			
0	0	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To make aware the students about very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. To understand precision and error calculation in measurements.
3. To perform, take reading, do calculations and analyze the results obtained for the experiments related to semiconductor physics.
4. To seek and co-relate the application of studied practical's in daily life.

Course Outcomes:

1. Students will be able to understand to take readings on very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. Students will be aware about precision and error in measurements.
3. Students can take reading, do calculations and analyze the results obtained for the experiments related to semiconductor physics.
4. Students are expected to co-relate the results of performed practical in daily life and can also seek new applications.

Syllabus:

Note: Students will be required to learn to take readings of vernier calliper, screw gauge, spherometer, spectrometer etc. during their orientation labs at the starting and **will have to perform at least ten subject related experiments in a semester.**

Basic experiments on least count and error estimation (during orientation)

1. To aware about the least count of vernier calliper and screw gauge and to find the thickness of a slide using vernier calliper and diameter of wire using screw gauge.
2. Calculation of radius of curvature of a convex surface using spherometer.
3. Angel measurement using spectrometer.

List of Subject related Experiments:

1. To study the forward and reverse characteristics of P-N junction diode.

2. To study the characteristics of transistor in common base configuration.

3. To study the characteristics of transistor in common emitter configuration.

4. To study the characteristics of Junction field effect (JFET) transistor.

5. To study the characteristics of Metal oxide semiconductor field effect (MOSFET) transistor.

6. To study the characteristics of Solar cell and find out the fill factor.

7. To design and study Active and Passive filters.

8. To study the reverse characteristics of Zener diode and voltage regulation using Zener Diode.

9. To determine Planks constant using photocell.

10. To measure e/m of electron using helical method.

11. To find capacitance of condenser using fleshing and quenching experiment.

12. To find temperature co-efficient of platinum using Callender Griffith bridge.

13. To find out low resistance by Carry Foster bridge.

14. To find resistance of galvanometer by post office box.

15. To compare the capacitance of two capacitors using De'Sauty Bridge.

B. Tech. Semester – I/II CHEMISTRY LAB (COMMON FOR ALL BRANCHES)

CHE103C CHEMISTRY LAB

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits			
0	**0**	**2**	**1**	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75 Marks**
				Total	**:**	**100 Marks**
				Duration of Exam.	**:**	**3 Hrs.**

LIST OF EXPERIMENTS:

1 .Determination of surface tension of given solvent by stalgmometer.

2. Removal of Ca^{2+} and Mg^{2+} hardness from given water sample using ion exchange coloumn.

3. Calculate the Rf value of given sample using thin layer chromatography.

4.Calculate the strength of strong acid by titrating it with strong base using conductometer.

5. Calculate the emf value of given cell.

6. Prepare the sample of urea formaldehyde and phenol formaldehyde.

7. Determination of chloride content in given water sample.

8.To study the kinetics of ethyl acetate with NaOH.

9. Preparation of asprin.

10. Calculate the sponification value of given oil sample.

11. Chemical analysis of two anions and two cations in given sample of salt.

12. Determination of the partition coefficient of a substance between two immiscible Liquids.

13. Determine the alkalinity of given water sample .

14.Study the adsorption phenomena using acetic acid and charcoal.

15. Lattice structures and packing of spheres.

16. Determine the viscosity of given liquid using Ostwald viscometer.

Course Outcomes:

1. The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering.
2. The students will learn to: Estimate rate constants of reactions from concentration of reactants/products as a function of time.
3. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.

4. Synthesize a small drug molecule and analyse a salt sample

Note: At least 10-12 experiments are to be performed by the students.

1.Each laboratory class/section shall not be more than about 20 students.

2.To allow fair opportunity of practical hands on experience to each student,each experiment may either done by each student individually or in groupofnotmore than 3-4 students. Larger groups be strictly discouraged/disallowed.

3.Pre-experimental &post experimentalquiz/questions may be offered for each lab experiment to reinforce &aid comprehension of the experiment.

Suggested Books:

1. A Text book on Experiments and Calculation –Engineering Chemistry by S.S.Dara, S.Chand &
   Company Ltd.
2. Essential of Experimental Engineering chemistry, Shashi Chawla, Dhanpat Rai Publishing Co.
3. Theory & Practice Applied Chemistry – O.P.Virmani, A.K. Narula (New Age).

B. Tech. Semester – I/II (Common for all Branches except Chemical Engg.)

EE105C BASIC ELECTRICAL ENGINEERING LAB.

CATEGORY : ENGINEERING SCIENCE COURSE

L	T	P	Credits			
0	0	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Exams.	:	3 Hrs.

LIST OF EXPERIMENTS

1. To study frequency response of a series R-L-C circuit and determine resonant frequency & Q-factors for various Values of R, L, C.
2. To study frequency response of a parallel R-L-C circuit and determine resonant frequency & Q-Factors for various values of R, L, C.
3. To perform Open circuit & Short circuit Tests on single phase Transformer.
4. To plot torque- speed characteristic of separately excited DC motor.
5. Demonstration of a DC-DC convertor and DC to AC Convertor and also draw PWM waveform.
6. Speed control of induction motor using DC-AC convertor.
7. Demonstration of Components of LT switch gear like MCB, MCCB, SFU, ELCB and earthing.
8. To obtain torque-slip characteristics of three phase induction motor.
9. To perform voltage control of synchronous generator through field excitation.
10. To study transient and steady state time response of RLC series circuits.

Laboratory Outcomes

1. Get an exposure to common electrical components and their ratings.
2. Understand the usage of common electrical measuring instruments.
3. Student will be able to understand and design resonant circuits.
4. Understand the basic characteristics of transformers and electrical machines.

Note:

1. **At least 10 experiments are to be performed by students in the semester.**
2. **At least 8 experiments should be performed from the above list; remaining two experiments may either be performed from the above list or designed and set by the Dept. as per the scope of the syllabus.**

B. Tech. Semester – I/II (Chemical Engg.)

EE107C ELECTRICAL & ELECTRONICS ENGINEERING LAB.

CATEGORY : ENGINEERING SCIENCE COURSE

L	T	P	Credits			
0	0	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Exams.	:	3 Hrs.

List of experiments/demonstrations:

1. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope; resistors, capacitors and inductors.
2. To Study and verify truth table of gates –AND, OR, NOT, NAND, NOR, EX-OR, EX NOR.
3. To design and verify operation of
   (a) Half wave rectifier. (b) Full wave central tap rectifier. (c) Bridge rectifier.
4. To verify KCL, KVL.
5. To verify Thevenin's & Norton's Theorems.
6. To verify maximum power transfer theorem in DC circuits
7. To verify Reciprocity & Superposition theorems.
8. To study frequency response of a series R-L-C circuit and determine resonant frequency & Q-factors for various values of R, L, C.
9. To study frequency response of a parallel R-L-C circuit and determine resonant frequency & Q-Factors for various values of R, L, C.
10. To perform Open circuit & Short circuit tests on single phase Transformer.
11. Three phase power and power factor measurement by two wattmeter method.
12. To measure energy with the help of Electronic Energy Meter.

Course Outcomes:

1. Get an exposure to common electrical components and their ratings.
2. Understand the usage of common electrical measuring instruments.
3. Understand the basic characteristics of transformers.
4. Get an exposure to the working of power electronic devices.

Note:

1. At least 10 experiments are to be performed by students in the semester.

2. At least 8 experiments should be performed from the above list; remaining two experiments may either be performed from the above list or designed and set by the Dept. as per the scope of the syllabus.

B. Tech. Semester – I/II (Common to all Branches)

CSE103C PROGRAMMING FOR PROBLEM SOLVING LAB.

CATEGORY : ENGINEERING SCIENCE COURSE

L	T	P	Credits			
0	0	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Exams.	:	3 Hrs.

The laboratory should be preceded or followed by one hour of tutorial to explain the approach or algorithm to be implemented for the problem given.

Tutorial 1: Problem solving using computers:

Lab1: Familiarization with programming environment

Tutorial 2: Variable types and type conversions:

Lab 2: Simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions:

Lab 3: Problems involving if-then-else structures

Tutorial 4: Loops, while and for loops:

Lab 4: Iterative problems e.g., sum of series

Tutorial 5: 1D Arrays: searching, sorting:

Lab 5: 1D Array manipulation

Tutorial 6: 2D arrays and Strings

Lab 6: Matrix problems, String operations

Tutorial 7: Functions, call by value:

Lab 7: Simple functions

Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):

Lab 8 and 9: Programming for solving Numerical methods problems

Tutorial 10: Recursion, structure of recursive calls

Lab 10: Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation

Lab 11: Pointers and structures

Tutorial 12: File handling:

Lab 12: File operations

Course Outcomes:

1. To formulate the algorithms for simple problems
2. To translate given algorithms to a working and correct program To be able to correct syntax errors as reported by the compilers
3. To be able to identify and correct logical errors encountered at run time
4. To be able to write iterative as well as recursive programs
5. To be able to represent data in arrays, strings and structures and manipulate them through a program
6. To be able to declare pointers of different types and use them in defining self-referential structures.
7. To be able to create, read and write to and from simple text files.

B. Tech. Semester – II (Computer Science & Engineering)

MATH102C MATHEMATICS-II

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits			
3	1	0	4	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To give adequate exposure of basics of Engineering Mathematics so as to enable them to visualize engineering problems by using Mathematical tools and to support their subsequent engineering studies
2. To familiarize with the uses of measure of dispersion and central tendency.
3. To equip with various types of Probability distributions.
4. To familiarize the analysis of statistical data using various distributions.
5. To form a specific relation for the given data using Principle of least square method.

UNIT-I (12 Lectures)

Measures of Central tendency: Moments, skewness and Kurtosis- Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameter for these three distributions, Correlation and regression — Rank correlation.

UNIT-II (12 Lectures)

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.
Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

UNIT-III (12 Lectures)

Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality.

UNIT-IV (12 Lectures)

Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Reference Books:

1. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
2. S. Ross, A First Course in Probability, 9th Ed., Pearson Education.
3 W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
4. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.

Course Outcomes:

1. The students will be able to apply the concepts of Central tendency in practical work.

2. The students will learn the concept of probability, probability distribution.

3. The students will understand and apply the concept of curve fitting

4. They will be to understood the concept related to , hypothesis tests and bivariate distributions techniques in engineering problems.

Note:

1. The paper setter will set two questions (with/without parts) from each units, and a ninth compulsory question comprising of 6 to 10 sub-parts, covering the entire syllabus. The examinee will attempt 5 questions in all, along with the compulsory question (with all it sub-parts), selecting one question from each unit.
2. The use of programmable devices such as programmable calculators, etc. is not allowed during the exam.

B. Tech. Semester – II (For Bio-Technology)

MATH104C MATHEMATICS-II

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits			
3	1	0	4	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To familiarize the students with basic concepts of functions, limits, continuity.
2. To equip with differential and integral calculus .
3. To know how to use differential and integral calculus in engineering problems.
4. To familiarize with the application of differential equation.
5. To give adequate exposure of basics of Engineering Mathematics so as to enable them to visualize engineering problems by using Mathematical tools and to support their subsequent engineering studies

Unit-I (12 Lectures)

Continuity and Differentiability: Introduction, Limits, Continuity, Differentiability, Exponential and Logrithmic Differentiation, Derivative of a functions, Indeterminate forms, Second order derivative.

Unit-II (12 Lectures)

Application of derivative: Increasing and decreasing functions, Maxima and Minima, Rolle's Theorem (without proof). Mean Value Theorem, Taylor and Maclaurin series (without proofs).

Unit-III (12 Lectures)

Integral Calculus: Integral as antiderivative. Integration: method of substitution, use of partial fractions and by parts. Definite integral and its properties, Integral as a limit of sum, Fundamental theorem of integral calculus.

Unit-IV (12 Lectures)

Differential Equations: Introduction & Basic concepts of differential equations, Formation of differential equation, General and particular solutions of a differential Equation.. Methods of solving First order and First degree Differential equations.

Text Books:

1. Mathematics, A Text book for Class XI, NCERT, New Delhi.
2. Mathematics, A Text book for Class XII, NCERT, New Delhi.

Reference Books:

1. Calculus by Thomas & Finney, 9th Edition, Pearson Education.
2. Mathematics for class XII volume I & II by R.D. Sharma, Dhanpat Rai Publication
3. Comprehensive Mathematics for class XII volume I & II by Luxmi Publication
4. Elements of Mathematics for class XII by M.L. Bhargava, Janardan Dinodia, Jeevansons Publication

Course Outcomes:

1. The students will understand the basic concepts of Continuity, Differentiability and apply these concepts in engineering.
2. The students will learn the basic concepts of Integral Calculus and differential equations and apply to various problems.
3. The students will be able to solve various problems related to problems application of derivatives.
4. They will be able to know physical and geometrical interpretation of mean value theorems.

Note:

1. The paper setter will set two questions (with/without parts) from each units, & a ninth compulsory question comprising of 6 to 10 sub-parts, covering the entire syllabus. The examinee will attempt 5 questions in all, along with the compulsory question (with all it sub-parts), selecting one question from each unit.
2. The use of programmable devices such as programmable calculators, etc. is Not allowed during the exam.

B. Tech. Semester – II (Common for all Branches except Bio-Tech. & CSE)

MAT`H106C MATHEMATICS-II

CATEGORY : BASIC SCIENCE COURSE

L	T	P	Credits			
3	1	0	4	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course objectives:

1. To familiarize the students with techniques in multivariate integration, ordinary and partial differential equations and complex variables.
2. To equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

Unit-I (12 Lectures)

Multiple Integration: Double integrals, change of order of integration, Triple integral and application, Change of variables, Applications to areas and volumes, Centre of mass and Gravity (constant and variable densities) of solids of revolution, orthogonal curvilinear coordinates, vector line integrals, surface integrals, Volume integral Theorems of Green, Gauss and Stokes.

Unit II (12 Lectures)

Ordinary differential Equations of first order and first degree: Exact, linear and Bernoulli's equations, Equations of first order but not of first degree, equation solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

Unit III (12 Lectures)

Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

Unit IV (12 Lectures)

Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem and Maximum-Modulus theorem (without proof); Taylor's series, Laurent's series; zeros of analytic functions, singularities, Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich contour.

Course outcomes:

1. The students will learn evaluating multiple integrals and apply it in calculating area and volumes.
2 They will solve first and second order differentiation equations.
3 They are familiar with analytical functions and their applications.
4. The students will know the concepts of singularity and residue and apply these concepts in evaluating definite integrals

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition,

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson Education.
2. W. E. Boyce and R. C. Diprima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India, 2009.
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
5. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
6. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed. Mc-Graw Hill, 2004.

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Note:

1. The paper setter will set two questions (with/without parts) from each units, & a ninth compulsory question comprising of 6 to 10 sub-parts, covering the entire syllabus. The examinee will attempt 5 questions in all, along with the compulsory question (with all it sub-parts), selecting one question from each unit.
2. The use of programmable devices such as programmable calculators, etc. is not allowed during the exam.

CURRICULUM

(Scheme of Studies and Examinations and Syllabus for 03rd-08th sem.)

('C' Scheme)

for

UNDERGRADUATE DEGREE

(B. Tech.) COURSE

IN

COMPUTER SCIENCE

&

ENGINEERING

[w.e.f. 2019-20]

FACULTY OF INFORMATION TECHNOLOGY AND COMPUTER SCIENCE
DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE AND TECHONOLOGY
(Established Under Haryana Legislature Act No. 29 of 2006)
Murthal-131039, Sonipat (Haryana)
www.dcrust.ac.in

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 2nd YEAR (SEMESTER –III) COMPUTER SCIENCE AND ENGINEERING
Choice Based Credit System Scheme of Studies & Examinations w.e.f. 2019-20

Sl. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
1	CSE201C	Data Structures & Algorithms	3	0	0	25	75	0	100	3	3
2	CSE203C	Computer Organization & Architecture	3	0	0	25	75	0	100	3	3
3	ECE203C	Digital System Design	3	0	0	25	75	0	100	3	3
4	MATH307C	Mathematics-III (PDE&T)	3	0	0	25	75	0	100	3	3
5	MGT201C	Engineering Economics	3	0	0	25	75	0	100	3	3
6	CSE205C	IT Workshop	1	0	4	25	0	75	100	3	3
7	CSE281C	Data Structures & Algorithms Lab	0	0	4	25	0	75	100	2	3
8	ECE283C	D S D lab	0	0	2	25	0	75	100	1	3
9	MC203C OR MC201C	Constitution of India (Gr-A)/ Environment Science (Gr-B)	3	0	0	25	75	0	100	0	3
Total			**19**	**0**	**10**	**225**	**450**	**225**	**900**	**21**	**27**

L = Lecture, T = Tutorial, P = Practical

NOTE:
1. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculators will not be permitted in the examinations
2. Environmental Studies (MC201C)/ Constitution of India (MC203C) are mandatory & qualifying courses.
3. For DCRUST Murthal: GROUP A: BME, BT, CSE, ECE. GROUP B: CE, CHE, EE, ME.

B. Tech. 3rd semester to 8th semester CSE: Approved in 15th meeting of Academic Council held on 14.08.2020. applicable to all students admitted in 2018-19 & onwards and trailing students.

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 2nd YEAR (SEMESTER –IV) COMPUTER SCIENCE AND ENGINEERING
Choice Based Credit System Scheme of Studies & Examinations w.e.f. 2019-20

Sl. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
1.	CSE202C	Web & Internet Technologies	3	0	0	25	75	0	100	3	3
2.	CSE204C	Operating Systems	3	0	0	25	75	0	100	3	3
3.	CSE206C	Design & Analysis of Algorithms	3	0	0	25	75	0	100	3	3
4.	CSE208C	Discrete Mathematics	3	0	0	25	75	0	100	3	3
5.	MGT202C	Organizational Behaviour	3	0	0	25	75	0	100	3	3
6.	CSE282C	Web & Internet Technologies Lab	0	0	4	25	0	75	100	2	3
7.	CSE284C	Operating Systems Lab	0	0	4	25	0	75	100	2	3
8.	CSE286C	Design & Analysis of Algorithms Lab	0	0	4	25	0	75	100	2	3
9.	MC203C OR MC201C	Constitution of India (Gr-A) / Environment Science (Gr-B)	3	0	0	25	75	0	100	0	3
Total			**18**	**0**	**12**	**225**	**450**	**225**	**900**	**21**	**27**

NOTE:

1. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculators will not be permitted in the examinations
2. Environmental Studies (MC201C)/ Constitution of India (MC203C) are mandatory & qualifying courses.
3. For DCRUST Murthal: GROUP A: BME, BT, CSE, ECE. GROUP B: CE, CHE, EE, ME.
4. Each students has to undergo Professional Training of at least 4 weeks from the industry, institute, research lab, training centre etc. during summer vacation and its evaluation shall be carried out in the V semester.

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 3rd YEAR (SEMESTER –V) COMPUTER SCIENCE AND ENGINEERING
Choice Based Credit System Scheme of Studies & Examinations w.e.f. 2020-21

Sl. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
1.	CSE301C	Object Oriented Programming	3	0	0	25	75	0	100	3	3
2.	CSE303C	Database Management Systems	3	0	0	25	75	0	100	3	3
3.	CSE305C	Computer Networks	3	0	0	25	75	0	100	3	3
4.	CSE307C	Formal Languages & Automata Theory	3	0	0	25	75	0	100	3	3
5.	CSE309C	Software Engineering	3	0	0	25	75	0	100	3	3
6.	PEC-I	Program Elective-I	3	0	0	25	75	0	100	3	3
7.	CSE381C	Object Oriented Programming Lab	0	0	4	25	0	75	100	2	3
8.	CSE383C	Database Management Systems Lab	0	0	4	25	0	75	100	2	3
9.	CSE385C	Professional Training (Level-2) Seminar	0	0	2	50	0	0	50	2	-
Total			**18**	**00**	**10**	**250**	**450**	**150**	**850**	**24**	**24**

For B.Tech (Hons) degree the students will study the following subjects in addition to the subjects mentioned above.

SEMESTER-V											
Sl. No.	**Course Code**	**Course Title**	**Teaching Schedule**			**Marks of Class work**	**Examination Marks**		**Total**	**Credits**	**Duration of Exam**
			L	**T**	**P**		**Theory**	**Practical**			
B.Tech. (Hons.) in CSE with specialization in Blockchain (H1)											
1.	CSEH301C	Network Security and Cryptography	3	0	0	25	75	0	100	3	3
2.	CSEH381C	Network Security and Cryptography Lab	0	0	4	25	0	75	100	2	3
B.Tech. (Hons.) in CSE with specialization in Cyber Security (H2)											
1.	CSEH301C	Network Security and Cryptography	3	0	0	25	75	0	100	3	3
2.	CSEH381C	Network Security and Cryptography Lab	0	0	4	25	0	75	100	2	3
B.Tech. (Hons.) in CSE with specialization in Data Science (H3)											
1.	CSEH303C	Introduction to Data Science	3	0	0	25	75	0	100	3	3
2.	CSEH383C	Python for Data Science Lab	0	0	4	25	0	75	100	2	3
Total(H1/H2/H3)			**3**	**0**	**4**	**50**	**75**	**75**	**200**	**5**	**6**

B. Tech. 3rd semester to 8th semester CSE: Approved in 15th meeting of Academic Council held on 14.08.2020. applicable to all students admitted in 2018-19 & onwards and trailing students.

Program Elective-I

Course Code	Course Title	Course Code	Course Title
CSE321C	Computer Graphics	CSEH301C	Network security and Cryptography[1,2]
CSE323C	Programming Languages	CSEH303C	Introduction to Data Science [3]
CSE325C	Wireless Communication		

[1]Not to be opted by B.Tech (Hons) students opting specialization in Blockchain.
[2]Not to be opted by B.Tech(Hons) students opting specialization in Cyber Security
[3]Not to be opted by B.Tech(Hons) students opting specialization in Data Sciences

NOTE:

1. Assessment of Professional Training (Level-2)(CSE385C), undergone at the end of semester-IV, will be based on seminar, viva-voce, report and certificate of professional training obtained by the student from the industry / institute / research lab / training centre etc.
2. Students will be permitted to opt for any one elective from the list of Program Elective-1. The minimum strength of the students should be 20 to run an elective course.
3. The student pursuing B.Tech (Hons.) will choose any one out of three specializations (Blockchain (H1), Cyber security (H2) and Data Science (H3) in this semester. The specialization once chosen will remain same for next subsequent semesters.
4. The students pursuing B.Tech (Hons.) can choose any subject from the list of Program Elective –I except the one from the selected specialization (Blockchain (H1), Cyber security (H2) and Data Science (H3))..
5. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculators will not be permitted in the examinations.

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 3rd YEAR (SEMESTER –VI) COMPUTER SCIENCE AND ENGINEERING
Choice Based Credit System Scheme of Studies & Examinations w.e.f. 2020-21

Sl. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
1.	CSE302C	Compiler Design	3	0	0	25	75	0	100	3	3
2.	PEC-II	Program Elective-II	3	0	0	25	75	0	100	3	3
3.	PEC-III	Program Elective-III	3	0	0	25	75	0	100	3	3
4.	OEC-I	Open Elective-I	3	0	0	25	75	0	100	3	3
5.	OEC-II	Open Elective-II (Humanities)	3	0	0	25	75	0	100	3	3
6.	CSE382C	Compiler Design Lab	0	0	4	25	0	75	100	2	3
7.	PEC-II Lab	Program Elective-II Lab	0	0	4	25	0	75	100	2	3
Total			**15**	**0**	**8**	**175**	**375**	**150**	**700**	**19**	**21**

For B.Tech (Hons) degree the students will study the following subjects in addition to the subjects mentioned above.

SEMESTER-VI											
Sl. No.	**Course Code**	**Course Title**	**Teaching Schedule**			**Marks of Class work**	**Examination Marks**		**Total**	**Credits**	**Duration of Exam**
			L	**T**	**P**		**Theory**	**Practical**			
B.Tech. (Hons.) in CSE with specialization in Blockchain (H1)											
1.	CSEH302C	Cryptocurrency with Ethereum	3	0	0	25	75	0	100	3	3
2.	CSEH382C	Cryptocurrency with Ethereum Lab	0	0	4	25	0	75	100	2	3
3.	CSEH304C	Foundations of Blockchain Technology	3	0	0	25	75	0	100	3	3
B.Tech. (Hons.) in CSE with specialization in Cyber Security (H2)											
1.	CSEH306C	Information Security and Data Hiding	3	0	0	25	75	0	100	3	3
2.	CSEH386C	Information Security and Data Hiding Lab	0	0	4	25	0	75	100	2	3
3.	CSEH308C	Mobile and Smart Forensics	3	0	0	25	75	0	100	3	3
B.Tech. (Hons.) in CSE with specialization in Data Science (H3)											
1.	CSEH310C	Data Analytics with Python	3	0	0	25	75	0	100	3	3
2.	CSEH390C	Data Analytics with Python Lab	0	0	4	25	0	75	100	2	3
3.	CSEH312C	Data Mining	3	0	0	25	75	0	100	3	3
Total(H1/H2/H3)			**6**	**0**	**4**	**75**	**150**	**75**	**300**	**8**	**9**

B. Tech. 3rd semester to 8th semester CSE: Approved in 15th meeting of Academic Council held on 14.08.2020. applicable to all students admitted in 2018-19 & onwards and trailing students.

Program Elective-II

Course Code	Course Title	Course Code	Course Title
CSE324C	Mobile Applications Development	CSE330C	IoT Architecture & Protocols [4]
CSE326C	Digital Image Processing	CSEH306C	Information Security and Data Hiding[2]
CSE328C	Advanced Java	CSEH310C	Data Analytics with Python[3]

Program Elective-II Lab

Course Code	Course Title	Course Code	Course Title
CSE384C	Mobile Applications Development Lab	CSE390C	IoT Architecture & Protocols Lab
CSE386C	Digital Image Processing Lab	CSEH386C	Information Security and Data Hiding Lab[2]
CSE388C	Advanced Java Lab	CSEH390C	Data Analytics with Python Lab[3]

Program Elective-III

Course Code	Course Title	Course Code	Course Title
CSE340C	Artificial Intelligence and Expert System	CSEH304C	Foundations of Blockchain Technology[1]
CSE342C	Advanced Computer Networks	CSEH312C	Data Mining[3]
CSE344C	Software Testing		

[1]Not to be opted by B.Tech (Hons) students opting specialization in Blockchain.
[2]Not to be opted by B.Tech(Hons) students opting specialization in Cyber Security
[3]Not to be opted by B.Tech(Hons) students opting specialization in Data Sciences
[4]Not to be opted by B.Tech(Hons) students opting specialization in IoT

NOTE:

1. Students will be permitted to opt for any one elective each from the list of Program Elective-II and Program Elective-III. The minimum strength of the students should be 20 to run an elective course.
2. The student pursuing B.Tech (Hons.) will choose subjects as per the specialization opted in the V semester.
3. The students pursuing B.Tech (Hons.) can choose one subject each from the list of Program Elective –II and Program Elective –III except already opted as per the specialization (Blockchain (H1), Cyber security (H2) and Data Science (H3)). The students should choose different subjects.
4. Each student has to undergo Professional Training (Level-3) of at least 4 weeks from the industry, institute, research lab, training centre etc. during summer vacation and its evaluation shall be carried out in the VII semester.
5. Students will be permitted to opt for one elective each from the list of Open Elective-I and Open Elective-II that are run by other departments. The minimum strength of the students should be 20 to run an elective course.
6. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculators will not be permitted in the examinations.

OPEN ELECTIVES

Open Elective-I			Open Elective-II		
S.No	**Course No.**	**Course Title**	**S.No**	**Course No.**	**Course Title**
1.	HUM350C	Communication Skills for Professionals (Except BME & BTE)	1.	CSE305C	Computer Networks
2.	HUM352C	Soft Skills And Interpersonal Communication	2.	CSE431C	Cyber Security
3.	MGT402C	Human Values, Ethics And IPR	3.	CHE457C	Industrial Safety
4.	MGT404C	Human Resource Management	4.	CE406C	Disaster Management
5.	HUM354C	Introduction To French Language	5.	ECE327C	Consumer Electronics
6.	HUM356C	Introduction To German Language			

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 4th YEAR (SEMESTER –VII) COMPUTER SCIENCE AND ENGINEERING
Choice Based Credit System Scheme of Studies & Examinations w.e.f. 2021-22

Sl. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
1.	PEC-IV	Program Elective-IV	3	0	0	25	75	0	100	3	3
2.	PEC-V	Program Elective-V	3	0	0	25	75	0	100	3	3
3.	PEC-VI	Program Elective-VI	3	0	0	25	75	0	100	3	3
4.	OEC-III	Open Elective-III	3	0	0	25	75	0	100	3	3
5.	BSC	Biology	3	0	0	25	75	0	100	3	3
6.	CSE481C	Professional Training Seminar (Level-3)	0	0	2	50	0	0	50	2	0
7.	CSE483C	Project-I	0	0	8	50	0	100	150	4	3
Total			**15**	**0**	**10**	**225**	**375**	**150**	**700**	**21**	**18**

For B.Tech (Hons) degree the students will study the following subjects in addition to the subjects mentioned above.

SEMESTER-VII											
Sl. No.	**Course Code**	**Course Title**	**Teaching Schedule**			**Marks of Class work**	**Examination Marks**		**Total**	**Credits**	**Duration of Exam**
			L	**T**	**P**		**Theory**	**Practical**			
B.Tech. (Hons.) in CSE with specialization in Blockchain (H1)											
1.	CSEH401C	Blockchain Technology and Applications	3	0	0	25	75	0	100	3	3
2.	CSEH481C	Project based on specialization	0	0	4	25	0	75	100	2	3
B.Tech. (Hons.) in CSE with specialization in Cyber Security (H2)											
1.	CSEH403C	Cyber Forensics and Cyber Laws	3	0	0	25	75	0	100	3	3
2.	CSEH481C	Project based on specialization	0	0	4	25	0	75	100	2	3
B.Tech. (Hons.) in CSE with specialization in Data Science (H3)											
1.	CSEH405C	Mathematical and Statistical Techniques	3	0	0	25	75	0	100	3	3
2.	CSEH481C	Project based on specialization	0	0	4	25	0	75	100	2	3
Total(H1/H2/H3)			**3**	**0**	**4**	**50**	**75**	**75**	**200**	**5**	**6**

Program Electives

Program Elective-IV		Program Elective-V		Program Elective-VI	
Course code	**Course title**	**Course code**	**Course title**	**Course code**	**Course title**
CSE401C	Cloud Architecture & Security[4]	CSE421C	Distributed Computing	CSE441C	Multimedia Technology
CSE403C	Machine Learning	CSE423C	Green Computing	CSE443C	Soft Computing
CSE405C	Software Design and Enterprise Computing	CSE425C	Software Agents	CSE445C	Software Measurements and Metrics
CSE407C	Natural Language Processing	CSEH403C	Cyber Forensics and Cyber Laws[2]	CSEH401C	Blockchain Technology and Applications[1]

[1]Not to be opted by B.Tech (Hons) students opting specialization in Blockchain
[2]Not to be opted by B.Tech (Hons) students opting specialization in Cyber Security
[4]Not to be opted by B.Tech (Hons) students opting specialization in IoT

NOTE:

1. Students will be permitted to opt for any one elective each from the list of Program Elective-IV, V and VI. The minimum strength of the students should be 20 to run an elective course.
2. The student pursuing B.Tech (Hons.) will choose subjects as per the specialization opted in the V semester.
3. The students pursuing B.Tech (Hons.) can choose one subject each from the list of Program Elective –IV, V and VI, except already opted as per the specialization (IoT (H1), Cyber security (H2) and Data Science (H3)). The students should choose different subjects.
4. Students will be permitted to opt for one elective from the list of Open Elective-III that is floated by other department. The minimum strength of the students should be 20 to run an elective course.
5. Assessment of Professional Training (Level-3) (CSE326C), undergone at the end of semester-VI, will be based on seminar, viva-voce, report and certificate of professional training obtained by the student from the industry/ institute/ research lab/ training centre etc.
6. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculators will not be permitted in the examinations.

OPEN ELECTIVES

Open Elective-III		
S.No	**Course No.**	**Course Title**
1.	CSE340C	Artificial Intelligence & Expert Systems
2.	EE452C	Electrical and Hybrid Vehicles
3.	MGT401C	Entrepreneurship
4.	ME452C	Fundamentals of Sustainable Manufacturing
5.	CHE459C	Nano-Science and Nano-Technology
6.	EE454C	Smart Grid

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 4th YEAR (SEMESTER –VIII) COMPUTER SCIENCE AND ENGINEERING
Choice Based Credit System Scheme of Studies & Examinations w.e.f. 2021-22

Sl. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
1.	CSE402C	Advanced Computer Architecture (Gr. A)	3	0	0	25	75	0	100	3	3
2.	CSE404C	Software Project Management (Gr. A)	3	0	0	25	75	0	100	3	3
3.	CSE482C Or	Project-II (Gr. A)	0	0	18	50	0	100	150	09	3
	CSE484C	Professional Training (Level-4) (Gr. B)	0	0	0	100	0	250	350	15	3
4.	GPCSE	General Fitness for the Profession	0	0	0	0	0	100	100	0	0
Total (Gr. A)			**6**	**0**	**18**	**100**	**150**	**200**	**450**	**15**	**9**
Total (Gr. B)			**0**	**0**	**0**	**100**	**0**	**350**	**450**	**15**	**3**

NOTE:

1. Gr. A students will have to do project in the department under the supervision of faculty member along with two subjects at sr. no. 1 and 2.
2. Gr. B students will have to undergo Professional Training (Level-4) of at least one semester from the industry, institute, research lab, training centre etc. Students who have CGPA of minimum 7.0 till VI sem. with no backlog will only be permitted to proceed for Professional Training.
3. Each student will be allotted a supervisor from the deptt for both project as well as professional training.
4. Internal evaluation of Project –II and Professional Training (Level-4) will be carried out four times in a semester.
5. General Fitness For The Profession(GPCSE) is a compulsory & qualifying course **(Audit Pass)** under which student will be evaluated for his performance in all types of activities like Academics, Cultural, Sports, NSS, organisation of camps, social activities etc., during his all 8 semesters, at the end of 8th semester. Regarding this course student will be motivated during the induction programme at the time of admission, so that he/she will be vigilant for motivation towards these activities.The evaluation of the student for his / her General Fitness for Profession shall be carried out by a team consisting of:-
    - Dean FIT&CS
    - Chairperson of the Department
    - Senior Most faculty of the department
    - Senior Most faculty of the University other than the department
6. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculators will not be permitted in the examinations.

TOTAL CREDITS
B.Tech. (CSE) = 159 (including first year)

Semester	1	2	3	4	5	6	7	8	Total
Credit	20	18	21	21	24	19	21	15	159

TOTAL CREDITS
B.Tech. (Hons.) in CSE with specialization in selected areas = 177 (including first year)

Semester	1	2	3	4	5	6	7	8	Total
Credit	20	18	21	21	29	27	26	15	177

CSE 201C DATA STRUCTURES & ALGORITHMS
B. Tech. Semester – III (Computer Science and Engg.)
w.e.f. 2019-2020

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Exam	:	3 Hours

Course Objectives:

1. To analyse algorithms in terms of time, space and computational complexities.
2. To learn searching algorithms (Linear Search and Binary search) and implement them.
3. To study Stacks, Queues, Linked lists, Graph search and traversal techniques.
4. To study sorting algorithms i.e. Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort and Heap sort and compare their performance.

UNIT-I

Introduction: Basic Terminologies: Elementary Data Organizations, Data Structure operations: insertion, deletion, traversal etc. Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. Searching: Linear Search and Binary Search Techniques and their complexity analysis.

UNIT-II

Stacks and Queues: ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

UNIT-III

Linked Lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, Doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis.

Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis. Applications of Binary Trees. B Tree, B+ Tree: definitions, algorithms and analysis.

UNIT-IV

Sorting and Hashing: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods, Hashing.

Graph: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

TEXT BOOKS :

1. **1. Fundamentals of Data Structures, Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.**

2. **Data Structures, Revised 1st Edition by Seymour Lipschutz , Scaum's Outline Series McGraw Hill**

REFERENCE BOOKS :

1. Algorithms, Data Structures, and Problem Solving with C++" , Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
2. How to Solve it by Computer , 2nd Impression by R. G. Dromey, Pearson Education.

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

Upon successful completion of the course, students will demonstrate the ability to:

1. Analyze the algorithm for a problem solution and determine the time and computation complexity and justify the correctness.
2. Write the algorithm for Search problem (Linear Search and Binary Search) .
3. Write an algorithm for Stack, Queue, Linked list, Graph search and traversal techniques and analyze the same to determine the time and computation complexity.
4. Write an algorithm for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap sort and compare their performance in term of Space and time complexity.

CSE 203C COMPUTER ORGANIZATION AND ARCHITECTURE
B. Tech. Semester – III (Common with ECE 3rd Sem)
w.e.f. 2019-2020

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To study functional blocks of a computer and their working.
2. To learn CPU organization along with Instruction Level Architecture, different addressing modes and pipelining.
3. To learn about I/O devices and their working principles.
4. The understand the current state of art in memory system design

UNIT-I

Functional blocks of a computer : CPU, Memory, input/output subsystems, control unit , Multilevel viewpoint of a machine: digital logic, micro architecture, ISA, operating systems, high level language , RTL Computer Buses (basic design using multiplexers), Bus width, Bus clocking(synchronous , asynchronous), bus arbitration, Bus examples(ISA bus, PCI bus, Universal serial bus) .

Data representation: signed number representation, fixed and floating point representations, character representation. Computer arithmetic: integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc., multiplication – shift-and add, Booth multiplier, carry save multiplier

UNIT-II

CPU Organization: Instruction set architecture of a CPU, interpretation of instructions, Instruction set based classification of processors (RISC, CISC, and their comparison), CPU Architecture types (accumulator, register, stack, memory/ register) Instruction cycle (Fetch-Decode-Execute)

Addressing modes (register, immediate, direct, indirect, indexed); Operations in the instruction set; Arithmetic and Logical, Data Transfer, Control Flow; Instruction set formats (fixed, variable, hybrid) Pipelining (basic concepts, throughput and speedup, hazards)

UNIT-III

Input /Output & Control Unit: Input Output Interface, Asynchronous data transfer (Strobe control, handshaking, serial transfer); Serial Vs parallel data transmission; Modes of data transfer, Programmed I/O, Interrupt driven, Direct Memory access (DMA).

Control Unit design:- Control unit design methods (hardwired & microprogrammed) Control Memory, Address Sequencing, Micro instructions.

UNIT-IV

Memory Organization: Memory device characteristics (access/ cycle time, cost per bit, volatility, storage density); Memory hierarchy; Main memory Design (Semiconductor RAM & ROM organization, memory expansion, Static & dynamic memory types, their comparison); Associative memory Design, Match logic, Locality of reference principle (Temporal & Spatial)

Cache mapping (Direct, associative, set associative); Cache writing policies (Copy-Back, Write-through); Virtual Memory (Address space, memory space, Address mapping using pages, Page replacement)

TEXT BOOKS:

1. **Computer System Architecture by M. Mano, Prentice-Hall.**

2. **Structured Computer Organisation by A.S. Tanenbaum, 6th edition, Prentice-Hall of India, Eastern Economic Edition**

REFERENCE BOOKS:

1. Computer Organization, 5th Edi, by Carl Hamacher, Zvonko Vranesic,2002, SafwatZaky.
2. Computer Organization and Design, 2nd Ed., by David A. Patterson and John L. Hennessy, Morgan 1997, Kauffmann.
3. Computer Architecture and Organization, 3rd Edi, by John P. Hayes, 1998, TMH
4. Computer Organisation& Architecture: Designing for performance by W. Stallings, 4th edition, 1996, Prentice-Hall International edition.

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After successful completion of the course students will learn the following:-

1. How Computer Systems work & the basic principles
2. Instruction Level Architecture and Instruction Execution pipelining, parallelism and microprogramming
3. How I/O devices are accessed and its principles.
4. The memory organization along with cache and virtual memory concepts.

CSE205C INFORMATION TECHNOLOGY WORKSHOP
B. Tech. Semester – III (Computer Science and Engg.)
w.e.f. 2019-2020

L	T	P	Credits			
1	0	4	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To study MATLAB for programming purposes
2. To learn and explore MATLAB programming constructs.
3. To introduce Arrays for matrices representation and Graphics for fractals.
4. To write and debug the code written in MATLAB

UNIT-I

Introduction: Data types and variables: Introduction to MATLAB, Data Types, Inter-conversion of Data types, MATLAB Variables, Keywords and Constant, Session Command. MATLAB Operators and Operations: Operators(Arithmetic, Relational, Logical, Bitwise), Set Operations, Operator Precedence, Mathematical Functions.

UNIT-II

MATLAB Programming : Script and Function, Decision Making, Loops, branches, Functions, Working on Script File (Creating, Saving and Executing), MATLAB I/O, Formatted I/O Method,.

UNIT-III

Arrays: Introduction to Matrices, Operations on Arrays/Matrices, Manipulations of Arrays/Matrices, Expansion of Matrix Size, Reduction of Matrices/Arrays order,
Graphics: Introduction to plot, Basic 2-D Plots(Style options, Labels, Axis control, etc.), specialized 2-D Plots, drawing multiple plots. Using MATLAB for fractals and chaos and Conway game of life

UNIT-IV

File Handling: File Handling: Introduction to file handling, working on files, accessing of Text File, Saving/ Loading MATLAB Variables, reading data without opening file, reading and writing Excel.
Debugging: Introduction to debugging, Break points, debugger, stepping, watching variable values, debugging commands.

TEXT BOOKS:

1. **Delores M. Etter, David C. Kuncicky, Holly Moore, "Introduction to MATLAB 7.0", Pearson, 2013.**
2. **RudraPratap, "Getting Started with MATLAB", OXFORD University Press, 2010.**
3. **Agam Kumar Tyagi, "MATLAB and Simulink for Engineers", University Press, 2012.**

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

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

1. Use MATLAB for programming purposes
2. Learn and explore MATLAB tools.
3. Use this learning experience to develop small applications/games.
4. To write and debug the code written in MATLAB

MATH307C MATHEMATICS-III
PARTIAL DIFFERENTAL EQUATIONS & TRANSFORMS
B. Tech. Semester – III (Computer Science and Engg.)
(w.e.f. Session 2019-2020)

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100Marks
				Duration of Exam.	:	3 Hours

UNIT-I

First order partial differential equations, solutions of first order linear and non linear PDEs. Solution to homogenous and non-homogenous linear partial differential equations second and higher order by complimentary function and particular integral method.

UNIT-II

Flows, vibrations and diffusions, second-order linear equations and their- classification, Initial and boundary conditions (with an informal description of well-posed problems), D'Alembert's solution of the wave equation; Duhamel's principle for one dimensional wave equation. Separation of variables method to simple problems in Cartesian coordinates. The Laplacian in plane, cylindrical and spherical polar coordinates, solutions with Bessel functions and Legendre functions. One dimensional diffusion equation and its solution by separation of variables. Boundary-value problems: Solution of boundary-value problems for various linear PDEs in Various geometries.

UNIT-III

Polynomials, Orthogonal Polynomials-Lagrange's, Chebysev Polynomials; Trigonometric Polynomials, LaplaceTransform, Properties of Laplace Transform, Laplace transform of periodic function. Finding inverse Laplace transform by different. methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs 'and PDEs by Laplace Transform method.

UNIT-IV

Fourier transforms, Z-transform and Wavelet transforms: properties, methods, inverses and their applications.

TEXT BOOKS :

1. **Erwin Kreyszig -Advanced Engineering Mathematics, 9th Edition, John' Wiley & Sons, 2006.**
2. **S.S. Sastry, Engineering Mathematics, PHI, Vol. I & II.**
3. **B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.**
4. **Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.**

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

1. The students will understand solutions of first and second order linear and non linear PDFs and their classifications.
2. The students will understand to solve various naming equations using separation of variables method.
3. The students will come across various Polynomials such as-Lagrange's, Chebysev Polynomials, Trigonometric Polynomials.
4. The students will be able to solve various engineering mathematical problems using various transforms such as Laplace Transform Fourier Transforms, Z-transform and Wavelet transforms.

ECE203C DIGITAL SYSYTEM DESIGN

B. Tech. Semester – III (Common with ECE and CSE)

w.e.f 2019-2020

L	T	P	Credits			
3	0	0	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total Marks	**:**	**100**
				Duration of Exam.	**:**	**3 Hours**

UNIT- I

Logic Simplification: Review of Boolean Algebra and DeMorgan's Theorem, SOP & POS forms, Canonical forms, Realization Using Gates. Karnaugh maps up to 6 variables, VEM technique, Binary codes, Code Conversion. Numericals.

UNIT- II

Combinational & Sequential Logic Design: Comparators, Multiplexers, Encoder, Decoder, Half and Full Adders, Subtractors, Parallel Adders, Adder with Look Ahead Carry, BCD Adder. Sequential Logic Design: Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Ripple and Synchronous counters, Sequence Generator, Shift registers.

UNIT III

Finite state machines: Introduction, Design of synchronous FSM Driver & Multiplexed Display: Serial Binary Adder, Sequence detector, Parity Bit Generator, pulse train generator. Algorithmic State Machines charts: Introduction, Component of ASM chart, Introductory examples of ASM chart.

UNIT IV

Logic Families and PLDs: TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families and their interfacing. Concept of Programmable logic devices like PAL, PLA, ROM, CPLD and FPGA. Logic implementation using Programmable Devices.

TEXT/REFERENCE BOOKS:

1. **R.P. Jain, "Modern digital Electronics", Tata McGraw Hill, 4th edition, 2009**
2. **A.Anand Kumar, "Switching Theory & Logic Design", PHI.**
3. **W.H. Gothmann, "Digital Electronics- An introduction to theory and practice", PHI, 2nd edition, 2006.**
4. **D.V. Hall, "Digital Circuits and Systems", Tata McGraw Hill, 1989.**
5. **Morris Mano, "Digital Design: With an Introduction to the Verilog HDL", 5th Edition, Pearson Education, 2013.**
6. **Morris Mano, "Logic & Computer Fundamentals", 4th Edition, Pearson Education.**

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.

2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

Upon successful completion of the course, students will demonstrate the ability to:

1. Understand binary codes, binary arithmetic, minimization techniques and their relevance to digital logic design.
2. Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder and sequential logic circuits.
3. Understand finite state machines and develop a digital logic to find out sustainable solution of a real life problem.
4. Understand and implement various digital integrated circuits using different logic families and simple systems composed of PLDs.

MGT201C ENGINEERING ECONOMICS

B. Tech. Semester – III (Common for all Branches Except BT& BME)

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total Marks	:	100
				Duration of Exam	:	3 Hours

UNIT-I

Concept of Economics- various definitions, nature of Economic problem, Micro and macro economics-their features and scope, production possibility curve, Relationship between Science, Engineering Technology and Economics. Utility: Concept and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility – its importance and practical applications**.**

UNIT-II

Demand: Concept, Individual and Market demand schedule, Law of demand, shape of demand curve. Elasticity of demand: Concept, measurement of elasticity of demand, factors affecting elasticity of demand, practical application of elasticity of demand. Various concepts of cost: Fixed cost, variable cost, average cost, marginal cost, money cost, real cost, opportunity cost.

UNIT III

Production : Meaning of production and factors of production; Law of variable proportions, Law of Return to Scale, Internet and External economics and diseconomies of scale. Meaning of Market, Type of Marker– perfect Competition, Monopoly, Oligopoly, Monopolistic competition (Main features of these markers).

UNIT-IV

Supply: Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on price. Nature and characteristics of Indian economy, privatization – meaning, merits and demerits. Globalisation – meaning, merits and demerits.

TEXT BOOKS:

1. **Ahuja H.L"Micro Ecomomic Theory" S. Chand Publication, New Delhi**
2. **Dewett K.K "Modern Ecomomic Theory" S. Chand Publication, New Delhi**
3. **Jain T.R, Grover M.L, Ohri V.K Khanna O.P,"Economics for engineers" V.K .Publication ,New Delhi**
4. **Dr. R.K. Agarwal & Rashmi Agarwal, " Principles and Applications of Economic", Pragati Prakashan.**

SUGGESTED BOOKS:

1. Jhingan 1. Jhingan M.L"Micro Ecomomic Theory" S.Chand Publication ,New Delhi
2. Chopra P.N "Principle of Economics" Kalyani Publishers, Delhi
3. Mishra S.K "Modern Micro Economics" Pragati Publication Mumbai. 44
4. Dwivedi D.N "Micro Economics " Pearson Education, New Delhi.

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.

2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

COURSE OUTCOMES:

Upon Successful Completion of this Course the students will:-

1. Acquire the skills to apply the basics of economics and cost analysis to engineering and take economically sound decision.
2. Acquaint students with the basic economic concepts and their operational significance.
3. Be able to think systematically and objectively about cotemporary economic problems.
4. Learn the ability to optimally utilize the limited resources of the organization.

CSE 281C DATA STRUCTURES & ALGORITHMS LAB

B. Tech. Semester – III (Computer Science and Engg)

L	T	P	Credits			
0	**0**	**4**	**2**	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To implement an algorithm for a problem and analyze its time and computation complexity.
2. To implement the algorithm for Search problem (Linear Search and Binary Search) .
3. Solve the given problem of Stack , Queue ,Linked list, Graph search and traversal implement it and analyze the same to determine the time and computation complexity.
4. To implement algorithms for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap sort and compare their performance in term of Space and time complexity.

List of Programs:

1. Write a program to perform binary search in an array.
2. Write a program to perform binary search using recursion.
3. Write a program to perform linear search in 2D array.
4. Write a program to perform various operations on matrices.
5. Write a program to swap two nos. using calls by value and reference.
6. Write a program to implement bubble sort.
7. Write a program to implement insertion sort.
8. Write a program to implement selection sort.
9. Write a program of link list implementation of a stack.
10. Write a program of link list implementation of a queue.
11. Write a program of array implementation of a stack.
12. Write a program of array implementation of a queue.
13. Write a program to search an element in a link list.
14. Write a program to maintain a link list.
15. Write a program to implement BST

The teacher concerned may give 10 more exercises based upon syllabus CSE201C

Course Outcomes:

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

1. Implement the algorithm for a problem solution, determine the time and computation complexity and justify the correctness.
2. Implement various searching algorithms (Linear Search and Binary Search) .
3. Solve the given problem of Stack, Queue, Linked list, Graph search and traversal, implement and analyze the same to determine the time and computation complexity.
4. Write and implement the algorithms for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap sort and compare their performance in term of Space and time complexity.

ECE283C Digital System Design Lab

B. Tech. Semester – III (Computer Science and Engg)

L	T	P	Credits			
0	0	2	1	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100Marks
				Duration of Examination	:	3 Hours

LIST OF EXPERIMENTS:

1. To study & design basic gates.
2. To realize and minimize five & six variables using K-Map method.
3. To verify the operation of Multiplexer & De-multiplexer.
4. To perform Half adder and Full adder
5. To perform Half substractor and Full substractor.
6. To verify the truth table of S-R,J-K,T & D Type flip flop .
7. To study FLIP- FLOP conversion.
8. To design & verify the operation of 3 bit synchronous counter.
9. To design & verify the operation of synchronous UP/DOWN decade counter using JK flip
10. To design & verify operation of Asynchronous counter.
11. To design and implement a circuit to detect a Count Sequence.
12. Conversion of state diagram to the state table and implement it using logical circuit.

Text/Reference Books:

1. **R.P. Jain, "Modern digital Electronics", Tata McGraw Hill, 4th edition, 2009**
2. **A.Anand Kumar, "Switching Theory & Logic Design", PHI.**
3. **W.H. Gothmann, "Digital Electronics- An introduction to theory and practice", PHI, 2nd edition, 2006.**

Note:

1. Each laboratory class/section shall not be more than about 20 students.
2. To allow fair opportunity of practical hands on experience to each student, each experiment may either done by each student individually or in group of not more than 3-4 students. Larger groups be strictly discouraged/ disallowed.

Course Outcomes: At the end of the course, students will demonstrate the ability to:

1. Implement the basic digital theory concepts practically and will be able to verify various results derived in theory.
2. Design, analyze and troubleshoot broad range of combinational and sequential circuits for various practical problems using basic gates and flip flops I.C's.
3. Develop technical writing skills to communication effectively and present one's own work.
4. Acquire teamwork skills for finding sustainable solution of a complex problem and working effectively in groups.

CSE202C WEB & INTERNET TECHNOLOGIES

B. Tech. Semester – IV (Computer Science and Engg.)

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100Marks
				Duration of Exam.	:	3 Hours

Course Objectives:

1. To understand the role of HTML, CSS, XML, JavaScript and protocols in the workings of web and web applications.
2. To design a responsive web site using HTML5 and CSS.
3. To build Dynamic web site using server side PHP Programming and Database connectivity.
4. To understand the various technologies to build dynamic content of website.

UNIT-I

Introduction to the Internet, The world wide web: The idea of hypertext and hyper media; How the web works-HTTP, HTML and URLs; How the browser works-MIME types, plugins and helper applications; The standards-HTML, XML, XHTML and the W3C.

Hypertext markup language: The anatomy of an HTML document; Marking up for structure and style: basic page markup, absolute and relative links, ordered and unordered lists, embedding images and controlling appearance, table creation and use, frames, nesting and targeting.

Descriptive markup: Meta tags for common tasks, semantic tags for aiding search, the doubling code and RDF.

UNIT-II

Separating style from structure with style sheets: Internal style specifications within HTML, External linked style specification using CSS, page and site design considerations.

Client side programming: Introduction to the JavaScript syntax, the JavaScript object model, Event handling, Output in JavaScript, Forms handling, miscellaneous topics such as cookies, hidden fields, and images; Applications.

UNIT-III

Server side programming: Introduction to Server Side Technologies CGI/ASP/JSP., Programming languages for server Side Scripting, Configuring the server to support CGI, applications; Input/ output operations on the WWW, Forms processing, (using PERL/VBSCRIPT/JavaSCIPT)

UNIT-IV

Other dynamic content Technologies: introduction to ASP & JSP, Delivering multimedia over web pages, The VRML idea, The Java phenomenon-applets and servelets, issues and web development.

Introduction to Microsoft .NET Technology and its comparison with the competing Technologies.

TEXT BOOKS:-

1. **Beginning XHTML by Frank Boumpery, Cassandra Greer, Dave Raggett, Jenny Raggett, Sebastian Schnitzenbaumer& ted Wugofski, 2000, WROX press (Indian Shroff Publ. SPD) 1st edition**
2. **Web Technologies By Achyut S Godbole, Atul Kahate, 2003, T.M.H**
3. **Internet & World Wide Web How to program by P.J Deitel & H.M Deitel, Pearson**

REFERENCE BOOKS:-

1. HTML &XHTML:The Definitive Guide by Chuck Musciano, Bill Kennedy, 2000, 4th Edi.
2. XHTML Black Book by Steven Holzner, 2000
3. CGI Programming on the World Wide Web. O'Reilly Associates.
4. Internet and Web Technologies – Raj Kamal, 2002, T.M.H

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

Upon completion of the course the students will be able to

1. Understand, analyze and apply the role of languages like HTML, CSS, XML, JavaScript and protocols in the workings of web and web applications.
2. Create a good, effective and dynamic website using HTML5 and CSS
3. Build Dynamic web site using server side PHP Programming and Database connectivity.
4. Understand the various technologies to build dynamic content of website.

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CSE204C OPERATING SYSTEMS

B. Tech. Semester –I V (Computer Science and Engg.)

w.e.f. 2019-2020

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To understand the mechanisms of OS to handle processes and threads and their communication.
2. To understand the process management mechanisms and scheduling algorithms.
3. To understand the mechanisms involved in memory management in OS and virtual memory concepts.
4. To understand the file management and deadlocks handling techniques in OS.

UNIT-I

Introduction: Introduction to Operating System Concepts (including Multitasking, multiprogramming, multi user, Multithreading etc)., Generations of operating systems Types of Operating Systems: Batch operating system, Time-sharing systems, Distributed OS, Network OS, Real Time OS; Various Operating system services, architecture, System programs and calls. Monolithic , microkernel operating systems, concept of virtual machine

Unix System and Windows NT Overview: Unix system call for processes and file system management, Shell interpreter, Windows NT architecture overview, Windows NT file system.

UNIT-II

Process Management: Process definition, different states of a process , process state transitions, process control box(PCB), context switching

Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads,

Process scheduling, Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time;

Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.

UNIT-III

Memory Management: Logical & Physical Address Space, swapping, contiguous memory allocation, non-contiguous memory allocation, fixed and variable partitions – internal and external fragmentation and compaction; Paging : principle of operation- page allocation – page allocation- hardware support for paging, Protection and sharing disadvantages of paging , Segmentation techniques, segmentation with paging;

Virtual Memory: basic concepts of VM, management - Demand Paging & Page-Replacement Algorithms; Demand Segmentation.

UNIT-IV

Process-Synchronization & Deadlocks: Critical Section Problems, semaphores; methods for handling deadlocks-deadlock prevention, avoidance & detection; deadlock recovery.

I/O Systems: I/O Hardware, Application I/O Interface, Kernel, Transforming I/O requests, Performance Issues.

File System: Different types of files and their access methods, directory structures, various allocation methods, disk scheduling and management and its associated algorithms, Introduction to distributed file system.

TEXT BOOKS:

1. **Operating System Concepts by Silberchatz et al, 5th edition, 1998, Addison-Wesley.**
2. **Modern Operating Systems by A. Tanenbaum, 1992, Prentice-Hall.**
3. **Operating Systems Internals and Design Principles by William Stallings,4thedition, 2001, Prentice-Hall**

REFERENCE BOOKS :

1. Operating System by Peterson, 1985, AW.
2. Operating System by Milankovic, 1990, TMH.
3. Operating System Incorporating With Unix& Windows By Colin Ritche, 1974, TMH.
4. Operating Systems by Mandrik& Donovan, TMH
5. Operating Systems – Advanced Concepts By MukeshSinghal , N.G. Shivaratri, 2003, T.M.H

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After successful completion of the course students will learn the following:-

1. Understand the mechanisms of OS to handle processes and threads and their communication.
2. Understand the process management mechanisms and scheduling algorithms.
3. Understand the mechanisms involved in memory management in OS and virtual memory concepts.
4. Understand the file management and deadlocks handling techniques.

CSE206C DESIGN AND ANALYSIS OF ALGORITHMS

B. Tech. Semester – IV (Computer Science and Engg.)

w.e.f. 2019-2020

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.
2. To apply the algorithms and design techniques to solve problems.
3. To explain the major graph algorithms and their analyses and to employ graphs to model engineering problems.
4. To understand the concepts of tractable and intractable problems and the classes P, NP and NP-complete problems.

UNIT-I

Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem.

UNIT-II

Fundamental Algorithmic Strategies: Brute-Force, Greedy, Dynamic Programming, Branch- and-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving, Bin Packing, Knap Sack TSP. Heuristics-characteristics and their application domains.

UNIT-III

Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm.

UNIT-IV

Tractable and Intractable Problems: Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques.
Advanced Topics: Approximation algorithms, Randomized algorithms, Class of problems beyond NP – P SPACE

TEXT BOOKS:

1. **Introduction to Algorithms, 4TH Edition, Thomas H Cormen, MIT Press/McGraw-Hill.**
2. **Fundamentals of Algorithms – E. Horowitz et al.**

REFERENCE BOOKS:

1. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.

2. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
3. Algorithms -- A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After successful completion of the course students will be able to:-

1. Analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.
2. Apply the algorithms and design techniques to solve problems;
3. Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems,
4. Understand the concepts of tractable and intractable problems and the classes P, NP and NP-complete problems.

CSE208C DISCRETE MATHEMATICS

B. Tech. Semester – IV(Computer Science and Engg.)

w.e.f. 2019-2020

L	T	P	Credits			
3	0	0	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75 Marks**
				Total	**:**	**100Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To Use set notation, terms related to sets, relations and functions and to construct induction proofs.
2. To understand the concept of logical equivalence, truthtables, rules of inference and predicate logic.
3. To classify the algebraic structures and evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
4. To develop a given problem as graph networks and solve with techniques of graph theory and tree concepts.

UNIT-I

Sets, Relation and Function: Operations and Laws of Sets, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets Cartesian Products, Disjunctive and Conjunctive Normal Form Binary Relation : representation of relations, Partial Ordering Relation, Equivalence Relation, Image of a Set, Function: Sum and Product of Functions, Bijective functions, Inverse and Composite

Principles of Mathematical Induction: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic.

UNIT-II

Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination. Introduction to recurrence relations and generating functions.

Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. Proof Techniques: Some Terminology, Proof, Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

UNIT-III

Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function,

UNIT-IV

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and

Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortest distances.

TEXT BOOKS:

1. **Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill**
2. **Susanna S. Epp, Discrete Mathematics with Applications,4th edition, Wadsworth Publishing Co. Inc.**
3. **C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill.**

REFERENCE BOOKS:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science" , TMG Edition, TataMcgraw-Hill
2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum's Outlines Series, Seymour Lipschutz, Marc Lipson,
3. Discrete Mathematics, Tata McGraw - Hill

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After successful completion of the course students will learn the following:-

1. Use set notation, terms related to sets, relations and functions and to construct induction proofs.
2. Understand the concept of logical equivalence, truthtables, rules of inference and predicate logic.
3. Classify the algebraic structures and evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
4. Develop a given problem as graph networks and solve with techniques of graph theory and tree concepts.

MC201C ENVIRONMENTAL STUDIES

B. Tech. Semester – III/IV(Computer Science and Engg.)

w.e.f. 2019-2020

L	T	P	Credits			
3	0	0	0	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

UNIT-I

The Multidisciplinary Nature of Environmental Studies, .Introduction to Environment: Definition, Scope, and importance of environmental studies; need for public awareness.
Environmental Pollution: Definition, Cause and effects of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Role of an individual in prevention of pollution, Pollution case studies

UNIT- II

Natural Resources: Water resources: over-utilization, floods, drought, dams-benefits and problems; Mineral resources: Use and exploitation, environmental effects; Food resources: changes caused by modern agriculture, fertilizer-pesticide problems, water logging, Energy resources: Growing energy needs, renewable and non renewable energy sources; Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT –III

Ecosystems and Biodiversity: Concept of an ecosystem, Structure and function, Energy flow, Ecological succession, ecological pyramids. Concept of Biodiversity, definition and types, Hot-spots of biodiversity; Threats to biodiversity, Endangered and endemic species of India, Conservation of biodiversity.

UNIT –IV

Social Issues and Environment: Water conservation, rain water harvesting, Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, Public awareness. Population growth, variation among nations, Family Welfare Programme. Human Population and the Environment - Population growth, Population explosion, Women and Child Welfare.

Field Work - Visit to a local area to document environmental assets—river/forest/grassland/hill/ mountain. Visit to a local polluted site—Urban/Rural/Industrial/Agricultural. Study of common plants, insects, birds. Study of simple ecosystems—pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

REFERNCE BOOKS:

1. **A Textbook of Environmental Studies by Asthana D.K. and Asthana Meera**
2. **Fundamental Concepts in Environmental Studies by Mishra D.D.**
3. **Environmental Studies by S.C Sharma M.P Poonia**
4. **Textbook of Environmental Studies for Undergraduate by Erach Bharucha**
5. **Environmental Studies: Third Edition by R. Rajagopalan**

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.

2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
   For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

   Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

On completion of the course, the students will be able to:

1. Develop concepts of basic environmental factors.
2. Understand the basic issues of ecosystem and its structural and functional aspects and vast biodiversity
3. Outline aspects of environmental issues.
4. Understand the knowledge of energy resources and their environmental implications

MC203C CONSTITUTION OF INDIA

B. Tech. Semester – III/IV(Computer Science and Engg.)

w.e.f. 2019-2020

L	T	P	Credits			
3	0	0	0	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75 Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

To make students conscious citizens of India and well equip them to explain and understand the importance of constitution of the country

Unit I

Philosophy of Indian Constitution: Ideological Basis and Salient Features of Indian Constitution, Fundamental Rights & Duties of the Citizens, Directive Principles of State Policy

Unit II

Nature and Dynamics of Indian Federalism: Federalism: Theory and Practice in India, Federal Features of the Indian Constitution, Legislative, Administrative and Financial Relations between the Union and the States

Unit III

Union and State Legislature: Parliament: Composition, Functions and Working of the Parliamentary system, State Legislature: Composition and Functions of Vidhan Sabha/ Vidhan Parishad

Unit IV

Centre and State: Executive and Judiciary: President, Prime Minister and Council of Ministers, Governor, Chief Minister and Council of Ministers, Judiciary: Supreme Court; High Court

Scheme of End Semester Examinations (Major Test):

1. The duration of examinations will be three hours.
2. Nine questions of 15 marks each will be set out of which the students will have to attempt five questions in all.
3. First question of 15 marks will be compulsory. It will cover all the four units of the syllabus. The nature of the questions in each unit will depend upon the nature of content therein. The questions may have sub-parts with marks assigned against each.
4. Question No 02 to 09 of 15 marks each will be set from the four units of the syllabus --- two from each unit.
5. In addition to first compulsory question the students will have to attempt four more questions, selecting one from each unit.

Recommended Readings:

1. **Austin G.,** ***The Indian Constitution: Corner Stone of a Nation,*** **New Delhi: Oxford University Press, 1966**
2. **Basu D.D.,** ***An Introduction to the Constitution of India,*** **New Delhi: Prentice Hall, 1994**

3. **Kothari R.,** ***Politics in India,*** **New Delhi: Orient Language, 1970**
4. **Siwach J.R.,** ***Dynamics of Indian Government andPolitics,*** **New Delhi: Sterling Publishers, 1985**

5. **Bhambhri C.P.,** ***The Indian State--FiftyYears,*** **New Delhi: Shipra, 1997**
6. **Ghai U.R.,** ***IndianPoliticalSystem,*** **Jalandhar: New Academic Publishing Company, 2010**

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

   For student admitted in B. Tech. 1st Semester (C-Scheme) in 2019 and all trailing students, Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

At the end of the course students will be able to

1. To understand basic features of the constitution and rights and duties of Indian citizens
2. To understand the basic structure of Centre and State Government
3. To get acquainted with the nature of parliamentary form of Government
4. To have knowledge of the executive and judiciary powers in Indian democratic set-up

MGT202C ORGANIZATIONAL BEHAVIOUR

B. Tech. Semester – IV(Computer Science and Engg.)

w.e.f. 2019-2020

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100Marks
				Duration of Examination	:	3 Hours

UNIT-I

Introduction: Definition and concept of Organizational Behaviour, nature and scope of OB, elements of OB, contributing disciplines to OB, challenges for OB, evolution of OB.

UNIT-II

Individual processes: Attitudes, Values; Perception – concept, process and applications; Personality - concept, determinants, theories and applications; Learning – concept and theories of learning.

UNIT-III

Team processes: Motivation – concept and theories of motivation; Group behaviour – concept, types of group, group development, group dynamics; Teams - types, creating effective teams.

UNIT-IV

Organizational processes and Stress management: organizational structure – elements of organizational structure; organizational change – concept, resistance to change, managing resistance to change, Lewin's three- step model of change; Stress – sources, consequences and management.

TEXT BOOKS:

1. Robbins Judge and Vohra, Organizational Behaviour, Pearson, New Delhi.
2. Khanka S S, Organizational Behavior, S.Chand& Company Pvt. Ltd., New Delhi.

REFERENCE BOOKS :

1. Greenberg Jerald, Behavior in Organizations, PHI, New Delhi.
2. Parikh and Gupta, OrganisationalBehaviour, Mc Graw Hill, New Delhi.
3. PareekUdai, Understanding Organizational Behaviour, Oxford University Press, New Delhi.
4. Aswathappa K., OrganisationalBehaviour, Himalaya Publishing House, New Delhi.
5. Luthans, F. Organizational Behavior, McGraw Hill Education.

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Year (C-Scheme) in 2019 and all trailing students.

Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

On completion of this course, the students will be able to

1. Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.
2. Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.
3. Analyze the complexities associated with management of the group behavior in the organization.
4. Demonstrate how the organizational behavior can integrate in understanding the motivation behind behavior of people in the organization.

CSE282C WEB & ITERNET TECHNOLOGIES LAB

B. Tech. Semester – III (Computer Science and Engg.)

L	T	P	Credits			
0	0	4	2	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75 Marks**
				Total	**:**	**100Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To develop web pages using mark up languages like HTML, DHTML and style sheets for making it more presentable to the user.
2. To develop dynamic web pages using client side programming and server side programming.
3. To develop interactive web applications using ASP.NET Framework.
4. To develop PHP programs for interactive web pages

List of practicals

1 A Simple HTML home page provide links to move to other pages like hobbies, educational info, personal info etc.
2 A HTML program to illustrate the use of frame and frameset tags of HTML.
3 A HTML Program which use a HTML controls to create a student information form to collect student's information like name, address, phone, email, sex, birth date, hobbies etc. Download
4 A HTML Program which demonstrates loops like for loop, do while, while in java script.
5 A HTML Program which demonstrates the use of functions in java script.
6 A HTML Program which demonstrates various events like onclick, ondbclick, onfocus, onblur, onchange, onmouseover, onmouseover, window event, onload, onunload event.
7 A HTML Program to create various functions and sub routines to validate the data entered by user in form.
8 Create a program to illustrate the concept of associative array in PHP.
9 Create PHP program to implement the concept of Session management.
10 Create a PHP program to display student information in webpage. Student's data is stored in My SQL database.
11 Create a PHP program to insert student information from HTML form. Student's data is stored in My SQL database.

Note: More exercises based on CSE202C may be given by the teacher

Course Outcomes:

After successful completion of the course, the students will be able to:

1. Develop web pages using mark up languages like HTML, DHTML and style sheets for making it more presentable to the user.
2. Develop dynamic web pages using client side programming and server side programming.
3. Develop interactive web applications using ASP.NET Framework.
4. Develop PHP programs for interactive web pages.

CSE 284-C OPERATING SYSTEMS LAB

B. Tech. Semester – IV (Computer Science and Engg)

L	T	P	Credits			
		4	1	**Class Work**	:	**25 Marks**
				Examination	:	**75 Marks**
				Total	:	**100Marks**
				Duration of Examination	:	**3 Hours**

Course Objectives:

1. To understand the concepts of operating system, features, advantage and disadvantage of different OS.
2. To demonstrate the Process scheduling algorithms in OS.
3. To understand the Windows and Linux administration.
4. To work in shell environment.

List of Practicals:

1) Study of WINDOWS 2000 Operating System.

2) Administration of WINDOWS 2000 (including DNS,LDAP, Directory Services).

3) Study of LINUX Operating System (Linux kernel, shell, basic commands pipe & filter commands).

4) Administration of LINUX Operating System.

5) Writing of Shell Scripts (Shell programming).

6) AWK programming.

Course Outcomes:

On successful completion of the course, the students will be able to:

1. Understand the concepts of operating system, features, advantage and disadvantage of different OS.
2. Demonstrate the Process scheduling algorithms in OS.
3. Understand the concepts of Windows and Linux administration.
4. Work in shell environment.

CSE 286-C DESIGN AND ANALYSIS OF ALGORITHMS LAB

B. Tech. Semester – IV (Computer Science and Engg.)

w.e.f. 2019-2020

L	T	P	Credits			
_	_	4	2	**Class Work**	:	**25 Marks**
				Examination	:	**75 Marks**
				Total	:	**100Marks**
				Duration of Examination	:	**3 Hours**

Course Objectives:

1. To develop and code program for the algorithms and analyze it to determine its computational complexity.
2. To identify and analyze worst-case running times of algorithms.
3. To model given engineering problem using graph and trees and write the corresponding algorithm to solve the problems.
4. To strengthen the ability to identify and apply the suitable algorithm for the given real world problem.

List of Programs:

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. 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. a. Obtain the Topological ordering of vertices in a given digraph.
   b. Compute the transitive closure of a given directed graph using Warshall's algorithm.
4. Implement 0/1 Knapsack problem using Dynamic Programming.
5. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijikstra‟s algorithm.
6. Find Minimum Cost Spanning Tree of a given undirected graph using Kristal‟s algorithm.
7. a. Print all the nodes reachable from a given starting node in a digraph using BFS method.

   b. Check whether a given graph is connected or not using DFS method.
8. Find a subset of a given set S = {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.
9. Implement any scheme to find the optimal solution for the Traveling Salesperson problem and then solve the same problem instance using any approximation algorithm and determine the error in the approximation.
10. Find Minimum Cost Spanning Tree of a given undirected graph using Prim‟s algorithm.

11. Implement All-Pairs Shortest Paths Problem using Floyd's algorithm. Parallelize this algorithm, implement it using Open and determine the speed-up achieved.
12. Implement N Queen's problem using Back Tracking.

Note:

More exercises based on CSE 206-C may be given by the teacher

Course Outcomes:

Upon successful completion of the course students will learn:-

1. Develop and code program for the algorithms and analyze it to determine its computational complexity.
2. Identify and analyze worst-case running times of algorithms.
3. Model given engineering problem using graph and trees and write the corresponding algorithm to solve the problems.
4. Identify and apply the suitable algorithm for the given real world problem.

CSE 301C OBJECT ORIENTED PROGRAMMING

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To familiarize students with basic concepts of object oriented programming
2. To familiarize students with operator overloading, inheritance, virtual functions and friend functions.
3. To familiarize students with advanced concepts of object oriented programming like templates and exception handling

UNIT- I

Basic Concepts Of Object Oriented Programming:- Procedural Vs. Object oriented Programming, C++ Standard Library, Preprocessor Directives, illustrative Simple C++ Programs. Header Files and Namespaces, library files. Object Oriented Concepts: Introduction to Objects and Classes, Data Abstraction, Encapsulation (Information Hiding), Access Modifiers: Controlling access to a class, method, or variable (public, protected, private), Polymorphism, Inheritance, and Reusability

Classes: - Introduction, Structure Vs. Class, Class Scope and Accessing Class Members, Initializing Class Objects: Constructors.

UNIT- II

Destructors, Friend Functions And Operator Overloading:- Destructors, Static Class Members, Const(Constant) Object And Const Member Functions, Object as Member of Classes, Friend Function and Friend Classes, Using This Pointer, Dynamic Memory Allocation with New and Delete, Container Classes and Iterators, Function overloading

Operator Overloading: - Introduction, Fundamentals of Operator Overloading, Restrictions on Operators Overloading, Operator Functions as Class Members vs. as Friend Functions, Overloading Binary Operators (+,-,*, /,=),Overloading Unary Operators(-,++,--,)

UNIT- III

Inheritance And Virtual Functions:- Introduction, Types of Inheritance, Base Classes And Derived Classes, Virtual Base class, Casting Base Class Pointers to Derived- Class Pointers, Using Member Functions, Overriding Base - Class Members in a Derived Class, Public, Protected and Private Inheritance, Using Constructors and Destructors in derived Classes, Composition Vs. Inheritance, Overloading Vs. Overriding. Run Time Polymorphism, Introduction to Virtual Functions, Pure Virtual Functions, Abstract Base Classes and Concrete Classes, Dynamic Binding, Virtual Destructors, Dynamic Binding.

UNIT-IV

Files, Templates And Exception Handling: - Files and I/O Streams and various operation on files. Stream Input/output Classes and Objects, Stream Output, Stream Input, Unformatted I/O (with read and write), Stream Manipulators, Stream Format States, Stream Error States.

Templates & Exception Handling: - Function Templates, Overloading Template Functions, Class Template, Class Templates and Non-Type Parameters, Templates and Inheritance, Templates and Friends.

Basics of C++ Exception Handling: - Try Throwing, Catch, and Throwing an Exception; - Catching an Exception, Re-throwing an Exception, Processing Unexpected Exceptions, Constructors, Destructors and Exception Handling.

TEXT / REFERENCE BOOKS:

1. **Object Oriented Programming in Turbo C++ by Robert Lafore ,1994, The WAITE Group Press.**
2. **Programming with C++ By D Ravichandran, 2003, T.M.H 3. Object oriented Programming with C++ by E Balagurusamy, 2001, Tata McGraw-Hill.**
3. **C++ How to Program by H M Deitel and P J Deitel, 1998, Prentice Hall**
4. **Computing Concepts with C++ Essentials by Horstmann, 2003, John Wiley,**
5. **The Complete Reference in C++ By Herbert Schildt, 2002, TMH.**
6. **C++ Programming Fundamentals by Chuck Easttom, Firewall Media.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After successful completion of the course, students will be able:

1. To understand the difference between object oriented programming and procedural programming.
2. To understand the basic concepts of object oriented programming
3. To understand and implement C++ features such as Operator overloading, inheritance, virtual functions and friend functions.
4. To understand and apply the concepts of templates and exception handling

CSE303C DATABASE MANAGEMENT SYSTEMS
B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To understand the different issues involved in the design and implementation of a database system.
2. To study the physical and logical database designs, database modeling, relational, hierarchical, and network models
3. To understand and use data manipulation language to query, update, and manage a Database
4. To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.

UNIT- I

Database system architecture: - Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML).

Data models: - Entity-relationship model, network model, relational and object oriented data models, integrity constraints, data manipulation operations.

UNIT-II

Relational query languages:- Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server.

Relational database design: - Domain and data dependency, Armstrong's axiom, Normal forms, Dependency preservation, Lossless design.

Query processing and optimization: - Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.

UNIT- III

Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.

UNIT- IV

Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection. Advanced topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining.

TEXT/REFERENCES BOOKS:

1. **"Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.**
2. **"Principles of Database and Knowledge – Base Systems", Vol 1 by J. D. Ullman, Computer Science Press.**

3. **"Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education**
4. **"Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes
After successful completion of the course, students will be able to:

1. Understand basic concepts of database system and data models for relevant problems.
2. Understand the basic elements of a relational database management system.
3. Design entity relationship model and convert entity relationship diagrams into rdbms and formulate SQL queries on the data.
4. Apply normalization for the development of application software.

CSE305C COMPUTER NETWORKS

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To learn the concepts, vocabulary and techniques currently used in the area of computer networks.
2. To understand the concepts of the OSI model and the TCP/IP model.
3. To be familiar with wireless networking concepts
4. To be familiar with contemporary issues in networking technologies.

UNIT- I

OSI Reference Model and Network Architecture: Introduction to Computer Networks, Example Networks ARPANET, Internet, Private Networks, and Network Topologies: Bus, Star, Ring, Hybrid, Tree, Complete, Irregular –Topology; Types of Networks: Local Area Networks, Metropolitan Area Networks, Wide Area Networks; layering architecture of networks, OSI model, Functions of each layer, Services and Protocols of each layer.

UNIT-II

TCP/IP: Introduction, History of TCP/IP, Layers of TCP/IP, Protocols, Internet Protocol, Transmission Control Protocol , User Datagram Protocol, IP Addressing, IP address classes, Subnet Addressing, Internet Control Protocols, ARP, RARP, ICMP, Application Layer, Domain Name System, Email – SMTP, POP,IMAP; FTP, NNTP, HTTP, Overview of IP version 6.

UNIT-III

Local Area Networks: Introduction to LANs, Features of LANs, Components of LANs, Usage of LANs, LAN Standards, IEEE 802 standards, Channel Access Methods, Aloha, CSMA, CSMA/CD, Token Passing, Ethernet, Layer 2 & 3 switching, Fast Ethernet and Gigabit Ethernet, Token Ring, LAN interconnecting devices: Hubs, Switches, Bridges, Routers, Gateways.

UNIT-IV

Wide Area Networks: Introduction of WANs, Routing, Congestion Control, WAN Technologies, Distributed Queue Dual Bus (DQDB), Synchronous Digital Hierarchy (SDH)/ Synchronous Optical Network (SONET), Asynchronous Transfer Mode (ATM), Frame Relay, Wireless Links

I**ntroduction to Network Management:** Management, Class of Service, Quality Firewalls, VLANs, Proxy Servers.

Remote Monitoring Techniques: Polling, Traps, Performance of Service, Security management, Digital signatures, SSL

Text Book/ Reference Books:

1. **Computer Networks (3rd edition), Tanenbaum Andrew S., International edition, 1996.**
2. **Data Communications, Computer Networks and Open Systems (4th edition), Halsall Fred, 2000, Addison Wesley, Low Price Edition.**
3. **Business Data Communications, Fitzgerald Jerry, Computer Networks – A System Approach, Larry L. Peterson & Bruce S. Davie, 2nd Edition.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After successful completion of the course, students will be able to:

1. Understand the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.
2. Apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission.
3. Design a network routing for IP networks.
4. Demonstrate proper placement of different layers of ISO model and illuminate its function and determine proper usage of the IP address, subnet mask and default gateway in a routed network.

CSE307C FORMAL LANGUAGES & AUTOMATA THEORY

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To understand the basic properties of formal languages and formal grammars
2. To understand the basic properties of deterministic and nondeterministic finite automata
3. To understand the basic properties of Turing machines and computing with Turing machines
4. To understand the concepts of tractability and decidability, the concepts of NP-completeness and NP-hard problems

UNIT- I

Basic Computational Constructs : Finite State Systems, Basic Definitions Non-Deterministic finite automata (NDFA), Deterministic finite automata (DFA), Equivalence of DFA and NDFA Finite automata with E-moves, Regular Expressions, Equivalence of finite automata and Regular Expressions, Regular expression conversion and vice versa. Conversion of NFA to DFA by Arden's Method Concept of basic Machine, Properties and limitations of FSM, Moore and Mealy Machines, Equivalence of Moore and Mealy machines.

UNIT-II

Regular Sets& Grammars : The Pumping Lemma for Regular Sets, Applications of the pumping lemma, Closure properties of regular sets, Myhill-Nerode Theorem and minimization of finite Automata, Minimization Algorithm. Definition, Context free and Context sensitive grammar, Ambiguity regular grammar, Reduced forms, Removal of useless Symbols and unit production, Chomsky Normal Form (CNF), Griebach Normal Form (GNF).

UNIT-III

Pushdown Automata &Turing Machines: Introduction to Pushdown Machines, Applications of Pushdown Machines Deterministic and Non-Deterministic Turing Machines, Design of T.M, Halting problem of T.M., Post's Correspondence Problem.

UNIT-IV

Chomsky Hierarchies &Computability: Chomsky hierarchies of grammars, unrestricted grammars, Context sensitive languages, Relation between languages of classes Primitive Recursive Functions.

TEXT BOOK/ REFERENCE BOOKS:

1. **Introduction to automata theory, language & computations- Hopcroaft & O.D.Ullman, R Mothwani, Addison Wesley Publishers.**
2. **Theory of Computer Sc.(Automata, Languages and computation):K.L.P.Mishra& N.Chandrasekaran, 2000, PHI.**
3. **Introduction to formal Languages & Automata-Peter Linz, 2001, NarosaPubl.**
4. **Fundamentals of the Theory of Computation- Principles and Practice by RamondGreenlaw and H. James Hoover, 1998, Harcourt India Pvt. Ltd..**
5. **Elements of theory of Computation by H.R. Lewis & C.H. Papaditriou, 1998, PHI.**

6. **Introduction to languages and the Theory of Computation by John C. Martin 2012, T.M.H.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After successful completion of the course, students will be able to:

1. Master regular languages and finite automata.
2. Master Context- free languages, push-down automata, and Turing recognizable languages.
3. Understand the theoretical foundations of computer science.
4. Analytically and intuitively solve problems in related areas of theory in computer science.

CSE309C SOFTWARE ENGINEERING

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To enable students to apply a systematic application of scientific knowledge in creating and building cost effective software solutions to business and other types of problems.
2. To make students understand different phases to make a software & study them in detail.
3. To make students understand different testing techniques for different projects, making the students understand to develop quality software, its maintenance & software reliability.
4. To make students aware about the design models & its principles (data design, component design, interface design & architectural design).

UNIT- I

Introduction:- Evolving role of software, Software Characteristics, Software crisis, Software myths, Software process, Software development Models: Waterfall Model, Prototype Model, Spiral, Model, RAD Model, Iterative Model, Incremental Model, Aspect-oriented Model, **Agile Methodology:** Pair and mob programming, high performance teams with core protocols, test driven development, behaviour driven development, continuous delivery, clean code, refactoring, extreme programming, Scrum.

UNIT- II

Requirements, Analysis & Specification:- Software Requirements engineering, Requirement Engineering Process, Requirement Engineering Tasks, Types of requirements, SRS.

System Modeling:- Data Modeling, Functional modeling and information flow: Data flow diagrams, Behavioral Modeling, The mechanics of structured analysis: Creating entity/ relationship diagram, data flow model, control flow model, the data dictionary.

UNIT- III

System Design:- Design principles, the design process; Design concepts: Abstraction, refinement, modularity, software architecture, control hierarchy, structural partitioning, data structure, software procedure, information hiding; Effective modular design: Functional independence, Cohesion, Coupling; Design Heuristics for effective modularity, Data Design, Architecture Design, Interface Design.

Software Testing And Maintenance:- Testing terminology: error, bug/defect/fault, failure, Verification and validation, Test case design, Static testing, Dynamic testing, Black box testing, Boundary value analysis, White box testing, basis path testing, Unit testing, Integration testing, Acceptance Testing, debugging, debugging process debugging approaches. Software maintenance categories, Models.

UNIT- IV

Software Quality Models And Standards:- Quality concepts, Software Quality Assurance, SQA activities, Formal approaches to SQA; Statistical software quality assurance; CMM, The ISO 9126 Standard, Configuration Management, Software reengineering, reverse engineering, restructuring, forward engineering,

Software Project Management:- Project management concepts, Planning the software project, Software Estimations, empirical estimation COCOMO, staffing, team structures, staffing, risk analysis and management..

TEXT/REFERENCES BOOK:

1. **Software Engineering – A Practitioner's Approach, Roger S. Pressman, 1996, MGH.**
2. **Fundamentals of software Engineering, Rajib Mall, PHI**

3. **Software Engineering by Ian sommerville, Pearson Edu., 5th edition, 1999,AW,**
4. **Software Engineering – David Gustafson, 2002, T.M.H**
5. **Software Engineering Fundamentals Oxford University, Ali Behforooz and Frederick J. Hudson1995, JW&S**
6. **An Integrated Approach to Software Engineering by Pankaj jalote, 1991, Narosa.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After successful completion of the course, students will be able to:

1. Understand basic concepts of software engineering, implement Software life cycle models and have knowledge of different estimation models.
2. Understand requirement and modeling concepts in software development.
3. Understand the different design principles of a software project and prepare soft testing strategies.
4. Understand and incorporate the Software Quality standards and build a robust software

CSE381C OBJECT ORIENTED PROGRAMMING LAB

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
0	0	4	2	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To apply the basic knowledge of Object and classes.
2. To implement features of Object oriented programming like inheritance, polymorphism, operator overloading
3. To apply the concepts of exception handling and templates.

List of hands-on experiments related to the course contents of CSE301C.

1. Raising a number n to a power p is the same as multiplying n by itself p times. Write a function called power ( ) that takes a double value for n and an int value for p, and returns the result as double value Use a default argument of 2 for p. so that if this argument is omitted, the number will be squared. Write a main ( ) function that gets values from the user to test this function.
2. Create the equivalent of a four function calculator. The program should request the user to enter a number, an operator, and another number. It should then carry out the specified arithmetical operation: adding. subtracting, multiplying, or dividing the two numbers. (It should use a switch statement to select the operation). Finally it should display the result.
3. When it finishes the calculation, the program should ask if the user wants to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with the program might look like this.
4. Enter first number. Operator, second number: 10/3 Answer = 3.333333
5. Do another (YI N)? Y Enter first number. Operator, second number 12 + 100 Answer = 11 Do another (Y I N)? N
6. Write a program to overload constructors.
7. Create two classes DM and DB which store the value of distances. DM stores distances in metres and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add one object of DM with another object of DB. Use a friend function to carry out the addition operation. The object that stores the results maybe DM object or DB object. depending on the units in which the results are required. The display should be in the format of feet and inches or metres and centimetres depending on object on display.
8. Write a Program to overload +,-,*,/,+= on a class of complex numbers.
9. Write a Program to overload +,== on a class of strings.
10. Create a class rational which represents a numerical value by NUMERATOR & DENOMINATOR . Write a Program to overload +,- for class of rational .
11. Make a class Employee with a name and salary. Make a class Manager inherit from Employee. Add an instance variable, named department, of type string. Supply a method to toString that prints the manager's name, department and salary. Make a class Executive inherit from Manager Supply a method to String that prints the string Executive followed by the information stored in the Manager superclass object. Supply a test program that tests these classes and methods.
12. Imagine a tollbooth with a class called toll Booth. The two data items of a type unsigned int to hold the total number of cars, and a type double to hold the total amount of money collected. A constructor

initializes both these to 0. A member function called payingCar ( ) increments the car total and adds 0.50 to the cash total. Another function, called nopayCar ( ). increments the car.

13. Write a program to create a class template to implement stack operations.
14. Write a program to demonstrate exception handling.

Course Outcomes:

After successful completion of the course, students will be able to:

1. Develop program using the concepts of object oriented programming like class, objects, constructors and destructors.
2. Develop programs using C++ features such as Operator overloading and
3. Develop programs to illustrate virtual functions and friend functions.
4. Develop programs to apply the concepts of templates and exception handling

CSE383C DATABASE MANAGEMENT SYSTEM LAB

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
0	0	4	2	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To have good knowledge of query formation using SQL.
2. To have knowledge of Storage and access techniques of Data from Database.
3. To be familiar with different functions used for data processing in DBMS

List of Experiments

1. To study Data Definition language
1.1. Create, alter, drop, truncate
1.2. To implement Constraints.
1.2.1. (a). Primary key, (b).Foreign Key, (c). Check, (d). Unique, (e). Null, (f). Not null , (g) . Default, (h). Enable Constraints, (i). Disable Constraints (j). Drop Constraints
2. To implementation on DML, TCL and DRL
2.1. (a).Insert, (b).Select, (c).Update, (d).Delete, (e).commit, (f).rollback,(g).save point, (h). Like'%', (i).Relational Operator (j) Logical operators
3. To implement Nested Queries & Join Queries
3.1. (a). To implementation of Nested Queries
3.2. (b). (a) Inner join, (b).Left join, (c).Right join (d).Full join(e) Natural Join (f) Theta Join (g) Cross Join
4. To implement Views
4.1. (a). View, (b).joint view, (c).force view, (d). View with check option
5. To implement Index
5.1 (a) Normal Index (b) Unique Index (c) Bitmap Index
(d) Composite (e) B-Tree (f) Clustered (g) Non- Clustered
6. To study various Date handling functions and their usage.
7. To Study String Handling Functions with Usage.
8.Case study of oracle 11g with emphasis on RECOVERY Techniques, Concurrency and Transaction Management.

Course Outcomes:

After successful completion of the course, students will be able:

1. To form queries using SQL.
2. To store and access data from database.
3. To use different data processing functions.

CSE385C PROFESSIONAL TRAINING(Level-2) Seminar

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	50 Marks
-	-	2	2	Total	:	50 Marks

Course Objectives:

1. Acquire knowledge of the industry in which the internship is done.
2. Apply knowledge and skills learned in the classroom in a work setting.
3. To decide the future application areas of Computer Science and Engineering.

At the end of 4th semester each student would undergo four weeks Professional Training in an Industry/ institute/ Professional / Organization/ Research Laboratory etc. with the prior approval. The student has to submit a typed report in the department along with a certificate from the organization. The typed report should be in a prescribed format.

The report will be evaluated in the 5th Semester by a Committee consisting of three teachers from different specialization to be constituted by the Chairperson of the department. The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization.

The student will interact with the committee through presentation to demonstrate his/her learning. Teachers associated with evaluation work will be assigned 2 periods per week load.

Course Outcomes:

After completing the course the students will have:

1. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
2. An ability to work in a multidisciplinary team
3. An ability to identify, formulate, and solve engineering problems
4. An understanding of professional and ethical responsibility.

Program Elective – I

CSE321C COMPUTER GRAPHICS
B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
3	0	3	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To list the basics concepts used in computer graphics.
2. To implement various algorithms to scan, convert the basic geometrical primitives, transformations, area filling, clipping.
3. To describe the importance of viewing and projections.
4. To design an application with the principles of virtual reality and understand a typical image processing.

Unit-I

Introduction to Computer Graphics: What is Computer Graphics, Computer Graphics Applications, Computer Graphics Hardware and software, Two dimensional Graphics Primitives: Points and Lines, Line drawing algorithms: DDA, Bresenham's; Circle drawing algorithms: Using polar coordinates, Bresenham's circle drawing, mid point circle drawing algorithm; Filled area algorithms: Scanline: Polygon filling algorithm, boundary filled algorithm.

Unit-II

Two/Three Dimensional Viewing: The 2-D viewing pipeline, windows, viewports, window to view port mapping; Clipping: point, clipping line (algorithms):- 4 bit code algorithm, Sutherland-cohen algorithm, parametric line clipping algorithm (Cyrus Beck).

Polygon clipping algorithm: Sutherland-Hodgeman polygon clipping algorithm. Two dimensional transformations: transformations, translation, scaling, rotation, reflection, composite transformation.

Three dimensional transformations: Three dimensional graphics concept, Matrix representation of 3-D Transformations, Composition of 3-D transformation.

Unit-III

Viewing in 3D: Projections, types of projections, the mathematics of planner geometric projections, coordinate systems.

Hidden surface removal: Introduction to hidden surface removal .Z- buffer algorithm , scanline algorithm, area sub-division algorithm.

Unit-IV

Representing Curves and Surfaces: Parametric representation of curves: Bezier curves, B-Spline curves. Parametric representation of surfaces; Interpolation method.

Illumination, shading, image manipulation: Illumination models, shading models for polygons, shadows, transparency. What is an image? Filtering, image processing, geometric transformation of images.

TEXT/REFERENCE BOOKS:

1. Computer Graphics Principles and Practices second edition by James D. Foley, Andeies van Dam, Stevan K. Feiner and Johb F. Hughes, 2000, Addision Wesley.
2. Computer Graphics by Donald Hearn and M.Pauline Baker, 2nd Edition, 1999, PHI.
3. Procedural Elements for Computer Graphics – David F. Rogers, 2001, T.M.H Second Edition

4. Fundamentals of 3Dimensional Computer Graphics by Alan Watt, 1999, Addision Wesley.
5. Computer Graphics: Secrets and Solutions by Corrign John, BPB
6. Graphics, GUI, Games & Multimedia Projects in C by Pilania & Mahendra, Standard Publ.
7. Computer Graphics Secrets and solutions by Corrign John, 1994, BPV
8. Introduction to Computer Graphics By N. Krishanmurthy T.M.H 2002

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After completing the course the student will be able to:

1. Understand the basics concepts used in computer graphics.
2. Implement various algorithms to scan, convert the basic geometrical primitives, transformations, area filling, clipping.
3. Understand the importance of viewing and projections.
4. Design an application with the principles of virtual reality and understand a typical image processing.

CSE323C PROGRAMMING LANGUAGES

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
3	0	3	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To understand the issues involved in programming language design and implementation.
2. To have an in-depth understanding of functional, logic, and object-oriented programming paradigms.
3. Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing.
4. To develop an understanding of the compilation and storage process.

Unit-I

Introduction: Syntactic and semantic rules of a Programming language, Characteristics of a good programming language, Programming language translators compiler & interpreters , Virtual Computers & Binding times; Introduction to procedural, non-procedural ,structured, functional and object oriented programming language, Comparison of C & C++ programming languages.

Unit-II

Elementary & Structured Data Types : Elementary data types – data objects, variable & constants, data types, Specification & implementation of elementary data types, Declarations ,type checking & type conversions , Assignment & initialization, Numeric data types, enumerations, Booleans & characters Structured data types& data Objects , specification & implementation of structured data types, Declaration & type checking of data structure ,vector & arrays, records Character strings, variable size data structures , Union, pointer & programmer defined data objects, sets, files.

Unit–III

Sequence Control& Data Control: Implicit & explicit sequence control ,sequence control within expressions, sequence control within statement, Subprogram sequence control: simple call return ,recursive subprograms, Exception & exception handlers, co routines, sequence control .

Data Control:-Names & referencing environment, static & dynamic scope, block structure, Local data & local referencing environment, Shared data (dynamic & static scope) ; Parameters& parameter transmission schemes.

Unit-IV

Storage Management& other features: Major run time elements requiring storage, programmer and system controlled storage management & phases, Static storage management, Stack based storage management, Heap storage management, variable & fixed size elements. Evolution of data type concept, abstraction, encapsulation & information hiding, Subprograms, type definitions, abstract data types

TEXT/REFERENCE BOOKS:

1. **P**rogramming languages Design & implementation by T.W. .Pratt, 1996, Prentice Hall Pub.
2. Programming Languages – Principles and Paradigms by Allen Tucker & Robert Noonan, 2002, TMH.
3. Fundamentals of Programming languages by Ellis Horowitz, 1984, Galgotia publications (Springer Verlag),
4. Programming languages concepts by C. Ghezzi, 1989, Wiley Publications.
5. Programming Languages – Principles and Pradigms, Allen Tucker, Robert Noonan 2002, T.M.H.

Note:

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Course Outcomes:

After completing the course the student will be able to:

1. Understand the concepts involved in programming language design and implementation.
2. Understand the functional, logic, and object-oriented programming paradigms.
3. Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing.
4. Understand the compilation and storage process.

CSE325C WIRELESS COMMUNICATION

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
3	0	0	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To know about the evolution of wireless communication systems and various generations of cellular systems.
2. To understand the basic design principles of cellular systems.
3. To understand the advanced multiple access techniques.
4. To understand the diverse reception techniques and applications of cellular networks.

UNIT 1:

INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS: Evolution of mobile radio communications, examples of wireless comm. systems, paging systems, Cordless telephone systems, comparison of various wireless systems.

MODERN WIRELESS COMMUNICATION SYSTEMS: Second generation cellular networks, third generation wireless networks, wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks.

UNIT 2:

INTRODUCTION TO CELLULAR MOBILE SYSTEMS: Spectrum Allocation, basic Cellular Systems, performance Criteria, Operation of cellular systems, analog cellular systems, digital Cellular Systems.

CELLULAR SYSTEM DESIGN FUNDAMENTALS: Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, tracking and trade off service, improving coverage and capacity.

UNIT 3:

MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION: Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, packet ratio, capacity of a cellular systems.

UNIT 4:

WIRELESS NETWORKING: Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless networks, wireless data services, common channel signaling, ISDN (Integrated Services digital Networks), advanced intelligent network**.**

INTELLIGENT CELL CONCEPT AND APPLICATION: Intelligent cell concept, applications of intelligent micro-cell Systems, in-Building Communication, CDMA cellular Radio Networks.

TEXT/REFERENCE BOOKS:

1. Wireless Communications: Theodore S. Rappaport; Pearsons.
2. Mobile Cellular Telecommunication: W.C.Y.Lee; McGraw Hill
3. Mobile Communications: Jochen Schiller; Pearson

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes

After completing the course the student will be able to

1. Understand the evolution of wireless communication systems and various generations of cellular systems.
2. Understand the basic design principles of cellular systems.
3. Understand the advanced multiple access techniques.
4. Understand the diverse reception techniques and applications of cellular networks.

CSEH301C NETWORK SECURITY AND CRYPTOGRAPHY

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
3	0	0	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To understand cryptography theories; algorithms & systems.
2. To understand the symmetric and asymmetric key algorithms.
3. To understand necessary approaches & techniques to build protection mechanisms in order to secure Computer Networks.
4. Acquire fundamental knowledge on the concepts of different security layers.

UNIT- I

Introduction: Plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography.

UNIT- II

Symmetric Key Algorithms:- Introduction, algorithms types and modes, DES, AES.

Asymmetric Key Algorithms: Introduction, history of asymmetric key cryptography, RSA symmetric and asymmetric key cryptography together, Digital signature.

UNIT- III

Internet Security Protocols: Basic concepts, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Hyper Text Transfer protocol (SHTTP), Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), S SL versus SET, Electronic Money, Email Security.

UNIT- IV

User Authentication And Kerberos:- Introduction, Authentication basics, Passwords, authentication tokens, certificate based authentication, biometric based authentication, Kerberos, key distribution center(KDC), Security handshake pitfalls, single Sign on(SSO) approach.

TEXT/ REFERENCE BOOKS:

1. **Cryptography and Network Security, 2nd Edition by Atul Kahate, TMH**
2. **Network Management Principles & Practices by Subramanian, Mani (AWL)**
3. **SNMP, Stalling, Willian (AWL)**
4. **SNMP: A Guide to Network Management (MGH)**
5. **Telecom Network Management by H.H. Wang (MGH)**
6. **Network Management by U. Dlack (MGH)**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After completing the course the student will be able to

1. Compare various cryptographic techniques.
2. Work with symmetric & asymmetric key algorithms.
3. Design secure applications.
4. Inject secure coding in the developed applications.

CSEH303C INTRODUCTION TO DATA SCIENCE

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To understand the basic concepts of Data science and data pre-processing
2. To analyze data using Statistics and Probability techniques
3. To understand the basic concepts of clustering and classification techniques
4. To understand of the key techniques and theory used in visualization, including data models, graphical perception and techniques for visual encoding and interaction.

UNIT- I

Introduction:- Benefits and uses of data science and big data , Facets of data , Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management , data science process, Data pre-processing: Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization , Data science toolkit.

UNIT- II

Data analysis:- Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance, Distribution properties and arithmetic, Samples/CLT Probability: Random experiments, trial, sample space, events. Approaches to probability - classical, empirical, subjective and axiomatic. Theorems on probabilities of events. Addition rules of probability. Conditional probability, independence of events and multiplication rule of probability.

UNIT- III

Classification:- Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule-Based Classification, Model Evaluation and Selection, Techniques to Improve Classification Accuracy, Support Vector Machines, Lazy Learners (or Learning from Your Neighbors)

Cluster Analysis:- Basic Concept and Methods Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering, Clustering High-Dimensional Data, Clustering Graph and Network Data.

UNIT- IV

Data visualization:- Introduction, Types of data visualization, Data for visualization: Data types, Data encodings, Retinal variables, Mapping variables to encodings, Visual encodings.

TEXT/ REFERENCE BOOKS:

1. **Davy Cielen Arno D. B. Meysman Mohamed Ali "Introducing data Science, "**
2. **Rachel Schutt and Cathy O'Neil, "Doing Data Science"**
3. **Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to DataMining", Person Education, 2007.**
4. **K.P. Soman, Shyam Diwakar and V. Ajay,"Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2016.**
5. **Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After completing the course the student will be able to

1. Perform the pre-processing of data and apply mining techniques on it.
2. Analyze data using data using Statistics and Probability techniques
3. Perform clustering and classification techniques
4. Present analyzed data using visualization tools

CSEH381C NETWORK SECURITY AND CRYPTOGRAPHY LAB

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
-	-	4	2	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75 Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To provide deeper understanding into cryptography, its application to network security, threats/vulnerabilities to networks and countermeasures.
2. To explain various approaches to Encryption techniques, strengths of Traffic Confidentiality, Message Authentication Codes.
3. To familiarize symmetric and asymmetric cryptography
4. Design secure applications

Lab Exercises to be given by the concerned faculty based on the subject CSEH301C Network Security and Cryptography

COURSE OUTCOMES:

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

1. Identify basic security attacks and services
2. Use symmetric and asymmetric key algorithms for cryptography
3. Make use of Authentication functions.
4. Design secure applications

CSEH383C PYTHON FOR DATA SCIENCE LAB

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
-	-	4	2	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75 Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. Implementation of basic constructs of Python programming language.
2. Familiarize with the strings and inbuilt functions.
3. Retrieval operations on data using lists, dictionaries, tuples and sets.
4. Learning the usage of regular expressions and built-in functions to navigate the file system.
5. To implement Object-oriented Programming concepts in Python.

The students should do the following:

1. Application of various control flow constructs
2. To learn application of various string handling functions.
3. Introduction Regular expression with operations
4. Implantation of List and various operations on it .
5. Implementation of Array & its operations using Numpy package.
6. Implementation of Dictionary with operations.
7. Implementation of User Defined functions in Python
8. Implementation of Exception Handling concepts
9. Implementation of File handling operations
10. Implementation of object oriented features: Class & Instances
11. Introduction to Series in Python Pandas library
12. Introduction to Dataframes with basic operations.

Text / Reference Books

1. **Gowrishankar S, Veena A, "Introduction to Python Programming", 1st Edition, CRC Press, Taylor & Francis, 2018. ISBN-13: 978-0815394372**
2. **Chun, J Wesley, Core Python Programming, Second Edition, Pearson, 2007 Reprint 2010.**
3. **Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", 1st Edition, O'Reilly Media, 2016. ISBN-13: 978-1491912058**
4. **Wesley J Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365**
5. **Miguel Grinberg, "Flask Web Development: Developing Web Applications with Python", 2nd Edition, O'Reilly Media, 2018. ISBN-13: 978-1491991732**

Course Outcomes:

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

1. Implement constructs, strings and inbuilt functions in Python.
2. Retrieve data using lists, dictionaries, tuples and sets.
3. Navigate file system using regular expression and built in functions.
4. Use Object-oriented Programming concepts in Python

CSE302C COMPILER DESIGN

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. Apply the knowledge of lex tool & yacc tool to develop a scanner & parser.
2. Design and conduct experiments for Intermediate Code Generation in compiler.
3. Develop program to solve complex problems in compiler
4. Learn the new code optimization techniques to improve the performance of a program in terms of speed and space.

UNIT-I

Introduction: Compilers and translators need of translators, structure of compiler: its different phases, Compiler construction tools**.**

Lexical Analysis: Role of lexical analyzer; Design of lexical analyzer; Regular expressions ;Specification and recognition of tokens; Input buffering; Finite automata; Conversion from regular expression to finite automata, and vice versa; Minimizing the number of states of DFA, Implementation of lexical analyzer.

UNIT-II

Syntactic Techniques & Parsing: Context free Grammars; Derivations & parse trees; Capabilities of CFGs; Role of parsers, Shift- Reduce Parsing ; Operator precedence parsing; top down parsing; predictive parsing, LR parsers; LR(0) items SLR, LALR and Canonical LR parser.

UNIT-III

Syntax Directed Translation , Symbol Table & Error Handling : Syntax directed definition, construction of syntax trees, syntax directed translation scheme, implementation of syntax directed translation, Intermediate Code ;Parse trees & Syntax trees; Three address code, quadruples and triples; Translation of Boolean Expressions. Symbol tables, its contents and data structure for symbol tables; trees, arrays, linked lists, hash tables ; Operations on symbol table; Errors(lexical phase error, syntactic phase error, semantic error).

UNIT-IV

Code Optimization & Code Generation: Sources of code optimization; Loop optimization (Denominators, Reducible flow graphs, depth first search, loop invariant computation, Induction variable elimination) ; Directed acyclic representation of basic blocks Code generation, forms of objects code, machine dependent code, register allocation for temporary and user defined variables; Problems in code generation; Peephole optimization.

TEXT / REFERENCE BOOKS:

1. **Compilers Principle, Techniques & Tools - Alfread V. AHO, Ravi Sethi& J.D. Ullman; - 1998Addison Wesley.**
2. **Theory and practice of compiler writing, Tremblay & Sorenson, 1985, Mc. Graw Hill.**
3. **System Software by Dhamdhare, 1986, MGH.**
4. **Principles of Compiler Design, Alfred V Aho , Jeffery D. Ullman , Narosa Publication**

Note:

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Course Outcomes:

1. Students will get the concepts of Compilers and the actual roles of the lexical analyzer
2. Students will get the concepts of different Parsing techniques and Construction of syntax trees
3. Students will get the concepts of Type checking and Run time environments
4. Students will get the concepts of Intermediate code generation, Code optimization and Code generations.

CSE324C MOBILE APPLICATIONS DEVELOPMENT

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To understand the basics of mobile computing devices and applications types.
2. To understand the mobile communication mechanisms.
3. To understand the communication mechanisms via Web
4. To understand the designing mechanisms of mobile applications for different platforms.

UNIT-I

Introduction to Mobile Application Development: Definition of mobile computing, various types of mobile computing devices (mobile computers, smart phones and dedicated devices). Web based applications, Native applications and Compare and contrast web-based mobile applications against native applications, history of mobile platforms (PDA's, Notebooks, Smartphones. Internet protocols for mobile applications i.e. WAP), evolution of browsers and Internet languages such as HTML and JavaScript.

UNIT-II

Infrastructure: Describe mobile and cell phone technologies (CDMA, GSM, 3G, 4G), Compare and contrast 3G and 4G, Internet terms: IP address, subnet mask, gateway, DNS, static vs Dynamic IP, transport including HTTP, routing, secure connections, proxies and reverse proxies. Need for storage, local Storage, storage on Web.

UNIT-III

HTML/CSS/DOM and Scripting: Basic HTML: validation, rendering and web browser, Cascading Style Sheets (CSS) and how to use them, document object model (DOM): document, objects, model, DOM tree and DOM's utilization in web design, basic JavaScript code and constructs of the JavaScript language.

UNIT-IV

Designing mobile user interfaces and Mobile Platforms: Design mobile interfaces, usability, ways to test user interfaces, various types of user interfaces for mobile apps: Interactive voice response (IVR), SMS/MMS, Mobile web, Native applications, Hybrids, mobile application development design considerations: Text entry, screen size, user interface and user context. Mobile Platforms: URIs for mobile apps, Compare and contrast native mobile platforms such as tightly controlled (IPhone), open (Android), and licensed (Windows Mobile), web as a mobile application platform.

Text Book:

Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011)

Reference Books:

1. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd (2011)
2. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd(2009)
3. Sayed Y Hashimi and Satya Komatineni, "Pro Android", Wiley India Pvt Ltd(2009)

4. Brian Fling, "Mobile Design and Development: Practical concepts and techniques for creating mobile sites and web

Note:

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Course Outcomes:

After completing the course the student will be able to:

1. Have an understanding of mobile computing devices and applications types for designing the simple mobile applications.
2. Have an ability to identify the need of mobile communication mechanisms.
3. Have an understanding of communication mechanisms via Web
4. Have the knowledge for designing mechanisms of mobile applications for different platforms.

CSE326C DIGITAL IMAGE PROCESSING

B. Tech. Semester – V (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To learn and understand the fundamentals of digital image processing.
2. To learn and understand various image Transforms.
3. To learn and understand Image Enhancement Techniques.
4. To learn image restoration Techniques and methods, image compression and Segmentation used in digital image processing.

UNIT- I

Digital Image Fundamental: - Elements of visual perception, image sensing and acquisition, image sampling and quantization, basic relationships between pixels – neighborhood, adjacency, connectivity, distance measures.

UNIT- II

Image Enhancements, Filtering And Restoration:- Enhancement in spatial domain; pixel grey level transformation, image negatives, logarithmic transformation; bit-plane slicing, histogram processing; enhancement in frequency domain; image smoothing (low pass filter), image sharpening (high pass filter), selective filtering (band pass and band reject filters); noise models for images, signal-to-noise ratio, image restoration in the presence of noise using spatial filtering, periodic noise reduction by frequency domain filtering; estimating the degradation function, inverse filtering.

UNIT- III

Color Image Processing & Image Segmentation:- Color fundamentals, color models, RGB, CMY and CMYK color models, HSI model; pseudocolor image processing, basics of full color processing, color transformations, smoothing and sharpening; noise in color images, grey level to color transformation; Image Segmentation: fundamentals, edge-based segmentation; image thresholding, intensity thresholding; basic global thresholding, multi-variable thresholding.

UNIT- IV

Image Compression:- Redundancy–inter-pixel and psycho-visual; Loss less compression – predictive, entropy; Lossy compression- predictive and transform coding; Discrete Cosine Transform; Still image compression standards – JPEG and JPEG-2000.

TEXT AND REFERENCE BOOKS:

1. **R.C. Gonzalez and R.E. Woods, Digital Image Processing, Second Edition, Pearson Education 3rd edition 2008.**
2. **Anil Kumar Jain, Fundamentals of Digital Image Processing, Prentice Hall of India.2nd edition 2004.**
3. **Murat Tekalp , Digital Video Processing" Prentice Hall, 2nd edition 2015.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

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Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1. Represent various types of images and analyze them.
2. Process these images for the enhancement of certain properties or for optimized use of the resources.
3. Work with colored images and perform image segmentation.
4. Develop algorithms for image compression and coding.

CSE328C ADVANCED JAVA

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To study the fundamental concepts of programming in Java including the designing of interactive applications.
2. To learn the concepts of connecting with databases.
3. To gain the insights of servlet concept.
4. To understand the fundamental concepts of JSP.

UNIT-I

Introduction: Concepts of Classes and Objects, Constructors, Inheritance, Function Overloading, Polymorphism, Packages and Interfaces, exception handling, file streams and their manipulation. AWT & Applet Programming Design of User Interfaces: Swing, Japplet, Icons and Labels, Text Fields, Buttons, Jbutton Class, Check Box, Radio Buttons, The Container, Panel, Windows, and Frame Classes, Combo Box, Tabbed Panes, Scroll Panes, Trees, Tables, Custom Rendering of Jlist Cells.

UNIT-II

JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface, working with statements, Creating and Executing SQL statements, working with Result Set Object & Result Set Meta Data. Java Beans: Java Bean, Installing, Starting Bean Development Kit, Use of JAR files and the use of Java Beans API.

UNIT-III

Servlets: Introduction to Servlets, Life cycle of Servlets, Creating, Compiling and running servlet, Reading the servlet Parameters, Reading Initialization parameter, Packages- javax.servletPackage, Handling HTTP Request and Response (GET / POST Request), Cookies and Session Tracking.

UNIT-IV

JSP: JSP Architecture, JSP Access Mode, JSP Syntax Basic (Directions, Declarations, Expression, Scriplets and Comments, JSP Implicit Object, Object Scope, Synchronization Issue, Session Management.

Text/Reference Books:

1. **Gary Cornell and Horstmann Cay S., Core Java, Vol I and Vol II, Sun Microsystems Press.**
2. **Herbert Schildt, Java: The Complete Reference, McGraw-Hill.**
3. **Philip Hanna, JSP: The Complete Reference, McGraw-Hill.**
4. **Deital and Deital, Java How to Program, Prentice Hall (2007).**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

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Course Outcomes:

1. Have an ability to apply the core Java concepts for designing applications.
2. Have an ability to use the Java concepts for accessing a database.
3. Have an ability to understand the utility of server side technologies.
4. Have basic understanding and knowledge of JSP.

CSE330C IoT ARCHITECTURE & PROTOCOLS

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75 Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To understand the basics of IoT.
2. To learn IoT Architecture and enabling technologies
3. To know about IoT protocols at different layers
4. To know about the application areas of IoT

UNIT- I

Introduction to IoT:-

Introduction to IoT, Market Trends, Opportunities in IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT: Functional blocks of IoT, Difference between IoT and M2M, Software defined Network(SDN) for IoT, Network Function Virtualization(NFV) for IoT, Data Handling and Analytics, Challenges in IoT(Design, Development, Security). An IoT Security Framework,SDN and NFV over IoT Deployment , IoT entities---Sensors,actuators,gateway,cloud,Mobile/web apps.

UNIT- II

IOT Architecture And enabling technologies-

IoT Architecture:- IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations, IoT communication Architecture, IoT Communication models & APIs, Reference Model- IoT reference Model, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, SOA based Architecture, API-based Architecture, OPENIoT Architecture for IoT/Cloud Convergence..

IOT Enabling Technologies:-

Introduction to Big Data Analytic, Embedded Systems, Cloud Computing-Cloud Service Management and IOT - Connecting IOT to cloud – Cloud Storage for Iot ,Wireless Sensor Networks-Industrial sensors, Integrated IoT Sensors, Sensors' Swarm

UNIT- III

IoT protocols:-Wireless communication protocols: Wifi, IPV4/IPV6, 6LOWPAN, ZigBee(IEEE802.15.4), Bluetooth, Bluetooth Low Energy(BLE)

Application layer protocols: MQTT/MQTTS, CoAP, REST/HTTP,XMPP,SCADA Authentication Protocols; IEEE 802.15.4., comparison of the different IoT protocols, advantages and disadvantages (limitations) of these IoT protocols.

UNIT- IV

Applications of IoT And Research Perspective:- IoT Strategic Research and Innovation Directions , Domain specific applications of IoT, Home automation, Surveillance applications, Industrial IoT,IoT in Energy, IoT in Healthcare, Internet of Robotic Things, Green IoT, home, infrastructures, buildings, security, Industries, Home appliances,Internet of Nano Things,IoT application in Drones, Internet of Vehicles(IoV),Internet of Everything(IoE)

TEXT/REFERENCES:

1. **Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-OnApproach"**
2. **Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory andPractice"**
3. **Cuno Pfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1-4493- 9357-1.**
4. **David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", CISCO Press, 2017**
5. **Hersent, Olivier, David Boswarthick, and Omar Elloumi. The internet of things: Key applications and protocols. John Wiley & Sons, 2011.**
6. **Buyya, Rajkumar, and Amir Vahid Dastjerdi, eds. Internet of Things: Principles and paradigms. Elsevier, 2016.**
7. **Dr. Guillaume Girardin , Antoine Bonnabel, Dr. Eric Mounier, 'Technologies & Sensors for the Internet of Things Businesses & Market Trends 2014 - 2024',Yole Développement Copyrights ,2014**
8. **Editors OvidiuVermesan Peter Friess,'Internet of Things – From Research and Innovation to Market 4. 4.Deployment', River Publishers, 2014**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

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Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

On successful completion of the course, the student will:

1. Comprehend the essentials of IoT
2. Understand IoT Architecture & enabling technologies
3. Understand various IoT protocols
4. Understand IoT applications in different domain and be able to analyze their performance.

CSEH306C INFORMATION SECURITY AND DATA HIDING

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To learn about data hiding applications and their techniques.
2. To learn about hacking.
3. To learn security based protocols, attacks and intrusions.
4. To work with advance data hiding techniques.

UNIT- I

Introduction: - The need for security, security approach, principles of security, types of attack, denial of service, IP spoofing, Phishing. Digital signature, Firewall.

UNIT- II

Hacking:- Basics, Email hacking, computer hacking, types of hacking, practice against hacking, Access Authorization, Compression, LZW Compression and Decompression Method.

UNIT- III

Data hiding:- Terms related to data hiding, Differences between cryptography, stenography & watermarking, history of stenography. Applications of data hiding.

UNIT- IV

Advance data hiding techniques :- Transform domain, difference between special domains and transform domain, wavelets, advantages of wavelet, and wavelet based techniques for data hidings.

TEXT REFERENCE BOOKS:

1. **Cryptography and Network Security by Atul Khat e, Mc Graw Hill Publisher**
2. **E-mail Hacking by Ankit Fadia, Vikash Publishers**
3. **Data communication and Networking , Behrouz A. Forouzan .**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:
After completing the course the student will be able to:

1. Explain information security.
2. Give an overview of access control of relational databases.

3. State the basic concept in information systems security, including security technology and principles, software security and trusted systems and IT security management.
4. Learn advance data hiding techniques.

CSEH310C DATA ANALYTICS WITH PYTHON

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To get the students familiar about the Concepts of Descriptive Statics through tests.
2. To study the concepts of Inferential Statistics and ANOVA.
3. To study in detail the techniques and history of Data Visualization.
4. To study the basic and concepts of Big Data Analytics, Data Mining and Clustering.

UNIT-I

Descriptive Statistics:- Statistical Analysis of Data, Descriptive Statistics, Frequency Distributions, Histograms, Histograms, Shapes of Distributions, Measures of Central Tendency Computing the Mean, Measuring Variability, Measures of Relationship, Reliability Indices, Standard Scores (Z-scores),Inferential Statistics, Populations and Samples, Sampling Techniques.

UNIT-II

Inferential Statistics:- Hypothesis testing, chi square test and T-test, Statistical decisions, Statistical decision process, Testing for mean differences, statistical versus practical significance, Effect of sample size, Regression (single).

UNIT-III

Data Visualization:- Data Visualization: Meaning and significance, Traits of Meaningfull Data, Brief History of Information Visualization, Power of visual perception, Making abstract data Visible, Building Blocks of information Visualization, Analytical Techniques.

UNIT-IV

Big Data, Data Mining & Clustering:- Big Data, In-memory processing, limitations of In-memory processing, Data mining process along-with techniques, Tools and platforms for data mining, Clustering and its techniques (K-means, Agglomerative, Hierarchical clustering, and DBSCAN).

TEXT/ REFERENCES BOOKS:

1. **Prem S. Mann, "Introductory Statics," Wiley.**
2. **Anil Maheshwari, "Data Analytics," Mcgraw Hill.**
3. **Hastie, Trevor et al. The elements of statistical learning. Vol. 2. No. 1. New York: springer, 2009.**
4. **Montgomery, Douglas C., and George C. Runger, "Applied statistics and probability for engineers" John Wiley & Sons,2010.**
5. **Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.**
6. **Pang-Ning Tan et al, "Introduction to Data Mining," Pearson.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

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Course Outcomes:

After completion of the course:

1. Students will be able to understand the Statistical analysis methods.
2. Students will be able to understand the Inferential Statistics and ANOVA.
3. Students will be able to understand the details of Data Visualization.
4. Students will be able to understand the concepts of Big Data Analytics, Data Mining and Clustering.

CSE340C ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To understand the basic concepts of AI and problem solving
2. To analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search techniques to solve them
3. To represent knowledge and draw inferences
4. To explore learning techniques and existing expert systems

UNIT- I

Introduction: The AI problems; what is an AI technique; Characteristics of AI applications Problem Solving, Search and Control Strategies General Problem solving; Production systems; Control strategies: forward and backward chaining Exhaustive searches: Depth first Breadth first search.

UNIT- II

Heuristic Search Techniques: Hill climbing; Branch and Bound technique; Best first search and A* algorithm; AND/OR Graphs; Problem reduction and AO* algorithm; Constraint Satisfaction problems Game Playing Minmax search procedure; Alpha-Beta cutoffs; Additional Refinements

UNIT- III

Knowledge Representation & Reasoning:- Propositional logic, First order predicate logic, Inference in FOPL, Skolemnisation; Resolution Principle and Unification; Forward & Backward chaining, Inference Mechanisms Horn's Clauses; Semantic Networks; Frame Systems and Value Inheritance; Conceptual Dependency

UNIT- IV

Learning Techniques: - Supervised and unsupervised learning, Decision trees, Statistical learning models, Reinforcement learning.

Expert Systems: Introduction to Expert Systems, Architecture of Expert Systems; Expert System Shells; Knowledge Acquisition; Case Studies: MYCIN, Learning, Rote Learning; Learning by Induction; Explanation based
learning.

TEXT/REFERENCES BOOKS:

1. Elaine Rich and Kevin Knight: Artificial Intelligence- Tata McGraw Hill.
2. Dan W.Patterson, Introduction to Artificial Intelligence and Expert Systems- Prentice Hall of India.
3. Nils J.Nilsson: Principles of Artificial Intelligence- Narosa Publishing house.
4. Artificial Intelligence : A Modern Approach, Stuart Rusell, Peter Norvig, Pearson Education
5. Artificial Intelligence, Winston, Patrick, Henry, Pearson Education

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

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Course Outcomes:

After completion of course, students would be able to:

1.Analyze and formalize problem and solve them using AI techniques
2.Use Heuristic search techniques for game playing and other problems
3.Represent diverse knowledge using AI and analyze
4.Understand and design an expert system

CSE342C ADVANCED COMPUTER NETWORKS

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To educate concepts, vocabulary and techniques currently used in the area of computer networks.
2. To master the terminology and concepts of socket programming.
3. To be familiar with wireless networking concepts
4. To be familiar with contemporary security issues in networking technologies.

UNIT-I

Binding Protocol Address: Address Resolution Protocol & RARP, ARP & RARP, packet format, Encapsulation. Internet protocol: Introduction, Ipv4 header, Ipv4Datagrams, Encapsulation, Fragmentation and Reassembly, IP routing, Subnet addressing, Subnet mask, Supernetting-special case of IP addresses IPv6-Motivation, frame format and addressing, comparison of IPv4 and IPv6.

UNIT-II

Socket Programming: Creating sockets, Posix data type, Socket addresses, Assigning address to a socket, Java socket programming, Thread programming, Berkeley Sockets: Overview, socket address structures, byte manipulation & address conversion functions, elementary socket system calls –socket, connect, bind, listen, accept, fork, exec, close, TCP ports (ephemeral, reserved), Berkeley Sockets: I/O asynchronous & multiplexing models, select & poll functions, signal & fcntl functions, socket implementation (client & server programs), UNIX domain protocols.

UNIT-III

GSM Overview, GSM Network signaling, GSM Mobility Management, GSM Short Message Service, Mobile Number portability General Packet Radio Service: Functional Groups, Architecture, GPRS Network nodes and Interfaces, Introductory ideas about WAP.

UNIT-IV

Network Security Practice: Authentication Applications- Kerberos, X.509 Authentication Service; Electronic Mail Security-Pretty Good Privacy, S/MIME; IP Security- IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations; Web Security- Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

TEXT/REFERENCE BOOKS

1. Jawin, "Networks Protocols Handbook", Jawin Technologies Inc., 2005.
2. Bruce Potter and Bob Fleck, "802.11 Security", O'Reilly Publications, 2002.
3. Ralph Oppliger "SSL and TSL: Theory and Practice", Arttech House, 2009.
4. Forouzen, Data Communication and Networking, TMH
5. Behrouz A.Forouzan, TCP/IP Protocol Suite
6. William Stalling, Network Security Essentials, 2nd Edition. PHI New Delhi

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:
After completing the course the student will be able to:

1. Have an understanding of the concepts, vocabulary and techniques currently used in the area of computer networks.
2. Have an ability of terminologies and concepts of socket programming.
3. Have knowledge of wireless networking concepts.
4. Have the understanding of contemporary security issues in networking technologies.

CSE344C SOFTWARE TESTING

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
2. To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
3. To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
4. To gain the techniques and skills on how to use modern software testing tools to support software testing projects.

UNIT- I

Introduction:- What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory.

Functional Testing:- Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

UNIT- II

Structural Testing:- Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.

Testing Activities:- Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, DomainTesting.

UNIT- III

Reducing the number of test cases:- Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, and Slice based testing.

Object Oriented Testing:- Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.

UNIT- IV

Testing Tools: Static Testing Tools, Dynamic Testing Tools, and Characteristics of Modern Tools and Implementation with example. Advanced topics in software testing: web based testing, Client server testing, Automated test cases generation, Regular expression and FSM based testing.

TEXT/ REFERENCE BOOKS:

1. **William Perry, Effective Methods for Software Testing , John Wiley & Sons, New York, 1995.**
2. **Cem Kaner, Jack Falk, Nguyen Quoc, Testing Computer Software , Second Edition, Van Nostrand Reinhold, New York, 1993.**

3. **Boris Beizer, Software Testing Techniques , Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.**
4. **Louise Tamres, Software Testing , Pearson Education Asia, 2002**
5. **Roger S. Pressman, Software Engineering – A Practitioner's Approach , Fifth Edition, McGraw-Hill International Edition, New Delhi, 2001.**
6. **Boris Beizer, Black-Box Testing – Techniques for Functional Testing of Software and Systems , John Wiley & Sons Inc., New York, 1995.**
7. **K.K. Aggarwal & Yogesh Singh, Software Engineering , New Age International Publishers, New Delhi, 2003.**
8. **Marc Roper, Software Testing , McGraw-Hill Book Co., London, 1994.**
9. **Gordon Schulmeyer, Zero Defect Software , McGraw-Hill, New York, 1990.**
10. **Watts Humphrey, Managing the Software Process , Addison Wesley Pub. Co. Inc., Massachusetts, 1989.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
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Course Outcomes:

After completing the course the student will be able to:

1. Have an ability to apply software testing knowledge and engineering methods and design and conduct a software test process for a software testing project.
2. Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.
3. Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
4. Have basic understanding and knowledge of contemporary issues in software testing, such as component-based software testing problems

CSEH304C FOUNDATIONS OF BLOCKCHAIN TECHNOLOGY

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To introduce basic concepts of Blockchain.
2. To understand abstract models for Blockchain technology
3. To learn about usage of Blockchain technology in financial services.
4. To visualize the scope of blockchain & its role in futuristic development.

Introduction to Blockchain:- Overview of blockchain, need for blockchain, history of centralized services, trusted third party, Distributed consensus in open environments, Distributed Vs Decentralized Network, 51 % attack theory, Public blockchains, Private blockchains, Blockchain Architecture and working, Mining, Limitations of blockchain, Applications of blockchain

UNIT- II

Models for blockchain:- GARAY model, RLA Model, Proof of Work (PoW), HashcashPoW, PoW Attacks and the monopoly problem, Proof of Stake(PoS), hybrid models(PoW+PoS), Proof of Burn and Proof of Elapsed Time.

UNIT- III

Permissioned Blockchain:- Permissioned model and use cases, Design issues for Permissioned blockchains, State machine replication, Consensus models for permissioned blockchain, Distributed consensus in closed environment, Paxos, RAFT Consensus, Byzantine general problem, Byzantine fault tolerant system, Lamport-Shostak-Pease BFT Algorithm, BFT over Asynchronous systems.

UNIT- IV

Blockchain in Financial Service:- Digital Currency, Cross border payments, Steller and Ripple protocols, Project Ubin, Know Your Customer (KYC), Privacy Consents, Mortgage over Blockchain, Blockchain enabled Trade, We Trade – Trade Finance Network, Supply Chain Financing, Insurance.

Blockchain Security: Security properties, Security considerations for Blockchain, Intel SGX, Identities and Policies, Membership and Access Control, Blockchain Crypto Service Providers, Privacy in a Blockchain System, Privacy through Fabric Channels, Smart Contract Confidentiality.

TEXT/REFERENCES BOOKS:

1. **Blockchain: Blueprint for a New Economy, by Melanie Swan.**
2. **Blockchain: The blockchain for beginners guide to blockchain technology and leveraging blockchain programming, by Josh Thompsons**
3. **Blockchain Basics by Daniel Drescher, Apress**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

At the end of the course, students will develop understanding for:

1. Recognizing goals of Blockchain.
2. Smart Contracts, transactions in Blockchain and Permissioned Blockchain.
3. Analyzing usage of Blockchain in finance.
4. Security issues in Blockchain.

CSEH302C CRYPTOCURRENCY WITH ETHEREUM

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To introduce the concepts of cryptocurrency.
2. To understand working of Bitcoin and Ethereum
3. To study the security issues and safeguards related to bitcoin trading
4. To study governing cryptocurrency regulations and its impact on economy.

UNIT- I

Cryptocurrency:- History, Distributed Ledger Technology (DLT), cryptocurrency in blockchain, Cryptographic basics for cryptocurrency: overview of Hashing, signature schemes, encryption schemes and elliptic curve cryptography

UNIT- II

Bitcoin:- Creation of coins, Wallet, Genesis Block, Merkel Tree, Bitcoin Scripts, Bitcoin P2P Network, hardness of mining, Transaction in Bitcoin Network, transaction verifiability, anonymity, forks, payments and double spending, Consensus in a Bitcoin network, mathematical analysis of properties of Bitcoin, Bitcoin protocols – Bitcoin Mining strategy and rewards, life of a Bitcoin Miner, Mining Difficulty, Mining Pool.

UNIT- III

Ethereum:- Ethereum Virtual Machine (EVM), Wallets for Ethereum, Ethereum Programming Language: Solidity, Smart Contracts, The turing completeness of smart contract languages, attacks on smart contracts, Ethereum Construction, DAO, GHOST, Vulnerability, Attacks, Sidechain: another type of blockchain, Namecoin

UNIT- IV

Cryptocurrency Regulation:- Stakeholders, Roots of Bitcoin, Bitcoin scripting vs Ethereum smart contracts, Legal Aspects - Cryptocurrency Exchange, Black Market and Global Economy, Global Acceptability perspective

TEXT/REFERENCES BOOKS/ARTICLES

1. **Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction by Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Princeton University Press (July 19, 2016).**
2. **Mastering Bitcoin: Unlocking Digital Cryptocurrencies by Antonopoulos**
3. **Bitcoin: A Peer-to-Peer Electronic Cash System by Satoshi Nakamoto**
4. **ETHEREUM: A Secure Decentralized Transaction Ledger by Gavin Wood, Yellow paper.2014.**
5. **A survey of attacks on Ethereum smart contracts by Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

At the end of the course, students will develop understanding for:

1. Cryptocurrency : Bitcoin and Ethereum
2. Building efficient blockchain models to carry out tasks with the practical approach.
3. Evaluating the use and risks involved with cryptocurrency
4. Smart contracts and their implications.

CSEH308C MOBILE AND SMART PHONE FORENSICS

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To understand mobile device forensics.
2. To learn different types of digital evidence.
3. To gain knowledge of different system like and roid and ios.
4. To understand mobile file system & data structures.

UNIT- I

Mobile Forensic:- Cell phone and mobile device forensics, Understanding Mobile device forensics, Understanding acquisition procedure ,Cell phone Crimes, SIM Architecture, Data Storage, Data Extraction, Files Stored on SIM, Mobile Operating System.

UNIT- II

Digital Evidence:- Mobile Device Forensics, Types of Evidence on Mobile Devices, Handling Mobile Devices as Sources of Evidence, Forensic Preservation of Mobile Devices, Forensic Examination and Analysis of Mobile Devices, Forensic Acquisition and Examination of SIM Cards, Investigative Reconstruction Using Mobile Devices Future Trends.

UNIT- III

Andriod and IOS Systems:- Architecture, Differentiation, Technological Composition, Introduction to Andriod Platform, Introduction to IOS Platform.

UNIT- IV

Mobile File Systems and Data Structures:- Introduction, What and How of Data, Types of Memory, File Systems, Rootfs, devpts, sysfs, cgroup, yaffs2, Procedure for handling an Andriod Devices, Logical Techniques VS Digital Techniques, Introduction to Mobile Malware.

TEXT/REFERENCES BOOKS:

4. **Guide to Computer Forensics and Investigations By Bill Nelson, Amelia Phillips, Christopher Stuart.**
5. **Digital Evidence on Mobile Devices.**
6. **Digital Evidence and Computer Crime, Third Edition Eoghan Casey. Published by Elsevier Inc. All rights reserved.**
7. **Andriod Forensic, Investigation, and Security by Andrew Hogg, Publisher Synergy Security in Mobile Communication by Professor Noureddine Boudriga. Mobile Malware Attacks and Defense By Ken Dunham.**

Note:

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For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

At the end of the course, students will develop understanding for:

1. Mobile device forensics.
2. Different type of mobile file system & digital forensic.
3. Technological composition of android & ios systems.
4. Mobile file system & data structures.

CSEH312C DATA MINING

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To learn data mining and Data preprocessing concepts.
2. To know about the association rules in data mining.
3. To perform various Classification and clustering algorithms.
4. To understand the strengths and limitations of various data mining models**.**

UNIT - I

Introduction to Data Mining:- Introduction**,** What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Preprocessing, Data Cleaning, Missing data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation, Data Transformation; Measures of Similarity and Dissimilarity- Basics.

UNIT - II

Association Rules:- Problem Definition, Frequent Item Set Generation, Frequent Itemsets, Closed Itemsets, and Association Rules. Apriori Algorithm: Finding Frequent Itemsets by Confined Candidate Generation, Generating Association Rules from Frequent Itemsets , Improving the Efficiency of Apriori, A Pattern-Growth Approach for Mining Frequent Itemsets ,Mining Frequent Itemsets Using Vertical Data Format, Mining Closed and Max Patterns.

UNIT - III

Classification:- Problem Definition, General Approaches to solving a classification problem , Evaluation of Classifiers , Classification techniques, Decision Trees-Decision tree Construction ,Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics.

Clustering:- Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms**,** Partitioning Clustering-K-Means Algorithm, PAM Algorithm, Hierarchical Clustering - Agglomerative Methods and divisive methods, Strengths and Weakness; Outlier Detection.

UNIT - IV

Web and Text Mining:- Introduction, web mining, web content mining, web structure mining, Text mining –unstructured text, episode rule discovery for texts, hierarchy of categories, text clustering.

TEXT/ REFERENCE BOOKS:

1. **Data Mining- Concepts and Techniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition,2006.**
2. **Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, PearsonEducation.**
3. **Data mining Techniques and Applications, Hongbo Du Cengage IndiaPublishing**
4. **Data Mining Techniques, Arun K Pujari, 3rd Edition, UniversitiesPress**
5. **Data Mining Principles & Applications – T.V Sveresh Kumar, B. Esware Reddy,Jagadish S Kalimani,Elsevier.**
6. **Data Mining, Vikaram Pudi, P Radha Krishna, Oxford UniversityPress**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
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Course Outcomes:

After completing the course the student will be able to:

1. Perform the preprocessing of data and apply mining techniques onit.
2. Identify the association rule applied on datasets.
3. Perform Classification and clustering algorithms
4. Classify web pages, extract knowledge from the Web.

Open Elective-I

(Common for All Branches except Bio Technology and Bio-Medical Engg for all Semesters)

HUM 350 C Communication Skills for Professionals

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To hone verbal and written communication
2. To acquaint students with multiple forms and formats of various technical and business reports
3. To develop competence for report writing with a focus on its techniques
4. To develop English Language Proficiency

UNIT I

(Contact hours 8)

Mechanics of Report Writing: Objectives of Report Writing; Types of Reports on the basis of forms and content. Introduction to Formats of Reports; Structure of Reports: Front Matter, Main Body, Back Matter

UNIT II

(Contact hours 10)

Writing Business and Technical Report: Preliminary Strategies for Report Writing: Data Collection, Report Planning, Use of Illustrations, Point Formation, Preparing Notes/Drafts Using Appropriate Formats: Memo Format, Letter Format, Manuscript Format, Printed Forms

UNIT III

(Contact hours 10)

Oral Communication and Soft Skills: Group Discussions; Interviews for jobs: preparation and facing them Professional Presentations: Power Point Presentation, Oral Presentation, Role of Kinesics (Body Language) in Communication, General Etiquettes in Office areas, corporate lunch and dinner Handling, Telephone calls

UNIT IV

(Contact hours 8)

Resumes and Job application: Writing of Resume--Chronological Resume and Functional Resume, Request for Reference/Recommendation, Writing Application Letters for Job; Writing Covering letter

RECOMMENDED READING

1. **Sharma,Sangeeta, and Binod Mishra. Communication Skills for Engineers and Scientists. PHI,2009.**
2. **Tyagi,Kavita, and Padma Mishra. Advanced Technical Communication. PHI, 2011.**
3. **Rizvi, M. Ashraf. Effective Technical Communication. McGraw Hill Education, 2014.**

4. **Kumar, Sanjay, and PushpLata. Communication Skills. OUP, 2011.**
5. **Raman, Meenakshi and SangeetaSharma.Communication Skills. OUP,2011.**
6. ***Bhatnagar, Nitin, and MamtaBhatnagar. Communicative English for Engineers and Professionals. Pearson Education, 2013.**
   (The soft copy of the book is available in the university library)
7. **Mitra,Barun K. Personality Development and Soft Skills. OUP,2011.**
8. **Kaul, Asha. Business Communication. PHI, 2nd Edition.**
9. **Namee, Patrick Mc. Success in Interviews: How to Succeed in any Job Interview, Ist Edition.**
10. **Argenti, Paul. Corporate Communication.6th Edition. McGraw Hill Education, 2012.**

Note:

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For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Learning Outcomes:
At the end of the course, students will be able to:
1. Get acquainted with multiple forms and formats of various technical and business reports
2. Develop competence for report writing with a focus on its complex writing techniques and procedures.
3. Develop their speaking skills with professional proficiency.
4. Equip themselves for Letter Writing Skills.

Open Elective-I

(Common for All Branches)

HUM 352 C Soft Skills and Interpersonal Communication

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	0	3	**Class Work**	:	**25 Marks**
				Examination	:	**75Marks**
				Total	:	**100 Marks**
				Duration of Examination	:	**3 Hours**

Course Objective:

- To train students to learn Soft Skills and engage in a successful and fruitful Interpersonal Communication

.

UNIT I

(Contact hrs 08)

Soft Skills: Introduction to Soft Skills & their classification, Importance of Soft Skills: Writing Resume/CV, Engaging in Group discussion, Appearing for Job interviews

UNIT II

(Contact hrs 10)

Interpersonal Skills, Behaviour, Relationships and Communication: Development and Role of Effective Interpersonal Skills, Development of Effective Speaking and Listening Skills

UNIT III

(Contact hrs 10)

Non-Verbal Elements in Interpersonal Communication: Role of Body Language, Paralinguistic Features, Proxemics/Space Distance and Haptics in Interpersonal Communication

UNIT IV

(Contact hrs 08)

Personality Development for Personal and Professional Growth: Desirable Personality, Personality Types, Analysis of Personality Development (Freudian and Swami Vivekananda's Concept), Grooming Personality for Personal and Professional Life

RECOMMENDED READING:

1. **Mitra, Barun K. Personality Development and Soft Skills. Delhi: OUP, 2nd Edition, 2016.**
2. **Butterfield, Jeff.Soft Skills for Everyone. Cengage Learning, 2017.**
3. **Raman, Meenakshi and Sangeeta Sharma. Communication Skills. OUP, 2011.**
4. **Ramesh, Gopalaswamy and Mahadevan Ramesh. The ACE of Soft Skills, Pearson India,2010.**
5. **Ribbons, Geoff and Richard Thompson.Body Language.Hodder& Stoughton, 2007.**
6. **Sharma, Sangeeta and Binod Mishra.Communication Skills for Engineers and Scientists. PHI, 2017.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

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For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
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Course Learning Outcomes:

At the end of the course, students will be able to:
1. Know now how soft skills complement hard skills for career growth
2. Enhance communicative competence for professional enhancement
3. Learn desirable body language and other non-verbal elements in interpersonal communication
4. Groom personality for handling effectively various situations of personal and professional life

Open Elective-I

(Common for All Branches for all Semesters)

HUM 354 C Introduction to French Language

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	0	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To enable students to understand the elementary communication structures of French language
2. To enable students to know and learn elementary vocabulary and grammar of French language
3. To enable students to engage in simple dialogues in French language

UNIT I

(Contact hours 10)

VOCABULAIRE: Les Salutations, Les jours de la semaine, Les moins de l'année, Les couleurs, Les professions, Les nombrescardinaux, Les lieux de la ville, Les nationalites, Personnesetobjetscaractéristiques d'un pays, Civilisation: France,de la sociétéfrancaise, les monuments, les fêtes

UNIT II

(Contact hours 10)

GRAMMAIRE: Conjugation des verbeetre, avoir, aller; Conjugation des verbe –er, -ir, -re Masculin/feminine,Singulier/ pluriel, Accord des nomset des adjectives, Articles indéfinisetdéfines, Négation simple, Interrogation, Futurproche, On= Nous, Articles partitifsetcontractes, La date etl'heure

UNIT III

(Contact hours 8)

ECRITURE (comprehension des écrits, Production écrite), Presentez- vous, Mon meuillierami, Ma famille, Carteset messages d'invitation, d'acceptationou de refus, Ecrives des scenes

UNIT IV

(Contact hours 8)

COMPREHENSION (écouter, production orale): Se presenter à ungroupe, Parlez/ écoutezdevotreville, Parlez/écoutezdesesactivités de loisirs, Parlez /écoutez de vosgoûts, Demander/ donnerun explication, Identifier unepersonneouun objet, Demander/dire cequ'ona fait

RECOMMENDED READING

1. **Echo – A1 Methode de Francais, CLE International (Distributed in India by W. R. Goyal Publishers & Distributors, Delhi)**
2. **Connexions, niveau 1, Yves Loiseau and R_gineM_rieux(Goyal Publishers)**
3. **Alter Ego-1, Hachette (Distributed in India by W. R. Goyal Publishers & Distributors, Delhi)**
4. **Forum- Methode de Francais 1, Hachette (Distributed in India by W. R. Goyal Publishers & Distributors, Delhi)**
5. **450 Exercises de Grammaire, CLE International (Distributed in India by W. R. Goyal Publishers & Distributors, Delhi)**
6. **Audio- Video study material**

7. Supplementary handouts
Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

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Course Learning Outcomes:
At the end of the course, students will be able to:
1. Familiarize with the basics of French language
2. Understand and express vocabulary and grammar through writing
3. Demonstrate understanding through simple dialogues in French

Open Elective-I

(Common for All Branches for all Semesters)

HUM 356 C Introduction to German Language

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To enable students to understand the elementary communication structures of German language
2. To enable students to know and learn elementary vocabulary and grammar
3. To enable students to engage in simple dialogues in German

UNIT I

(Contact hours 10)

Introduction to German alphabets, Numbers 0- 100 (basic algebraic expressions), Vocabulary of days and months, Adverbs of time, Ordinal numbers in German, Phonetics and pronunciation

UNIT II

(Contact hours 10)

Introduction to the simple possessive pronouns, Sentence: statement, question, (question for completion and decision) command, Coordination of clauses, Placing of the verb in the sentence: first, second and last place, Word order in main clause, Details of time, manner and place (casual)

UNIT III

(Contact hours 8)

Verb: infinitive, imperative, indicative – Präsens, Perfekt, Präteritum of auxiliary and modal verbs, modal verbs (meaning, indicative Präsens&Präteritum, möchten), Verbs with prefixes – separable and inseparable, Nouns: Gender, plural, Nominative, Accusative, Dative Articles: Definite and Indefinite, Adjectives: predicative use

UNIT IV

(Contact hours 8)

Day-to-day conversation in German: Introducing oneself and other, greeting and taking leave, Meeting people, Time and date, months and weekdays, Inquire and name the country of origin, languages, Introduce family members and friends

RECOMMENDED READING

1. **Tangram AktuellNiveau A1, Max HeuberVertag, Ismaning, 2005 (Published and distributed in India by German Book Depot, Delhi)**
2. **Netzwerk A1, KlettVerlag, Muenchen, 2013 (Published and distributed in India by German Book Centre, Delhi, 2015).**
3. **Sprachkurs Deutsch I &2. Diesterweg (Moritz) Verlag, Frankfurt am Main, 1989, (Published and distributed in India by Goyal Saab Publishers & Distributors, New Delhi)**
4. **Schuelerduden Grammatik, BibliographischesInstitutand F.ABrockhaus, 2000.**
5. **ThemenAktuell 1, Kursbuch, Max HeuberVerlag, Ismaning, Deutschland, 2003 (Published and distributed in India by German Book Centre, Delhi,2010).**
6. **Audio-video Study Material**
7. **Supplementary Handouts**

Note:

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Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Learning Outcomes:
At the end of the course, students will be able to:
1. Familiarize with the basics of German language
2. Understand and express vocabulary and grammar through writing
3. Demonstrate understanding through simple dialogues in German

Open Elective-I

MGT402C HUMAN VALUES, ETHICS AND IPR

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

To help the students appreciate the essential complementarities between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

Unit-I

Human Values: Understanding the need, basic guidelines, Self Exploration - its content and process; 'Natural Acceptance' and Experiential Validation, Continuous Happiness and Prosperity-Human Aspirations, Right understanding, Relationship and Physical Facilities, Understanding Happiness and Prosperity correctly.

Unit-II

Different kinds of value: Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya.

Unit-III

Modern approach to the study of values: Understanding Harmony in the Family and Society-Harmony in Human-Human Relationship Understanding harmony in the Family, Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman).

Unit-IV

Professional Ethics & IPR: Values in Work-life, Professional Ethics and Ethos, Code of conduct, Whistle Blowing, Corporate Social Responsibility.IPR: meaning, nature, scope and relevance of IPR. Kinds of IPR: Copyright, Patents, Trademark, Geographical Indication, Industrial design, Plant Variety. Benefits, Emerging dimensions and Rational for protection of IPR.

Suggested Readings:

1. **R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics, Excel Books, New Delhi**
2. **A.N. Tripathy, 2003, Human Values, New Age International Publishers.**
3. **E G Seebauer& Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.**
4. **M Govindrajan, S Natrajan& V. S Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.**
5. **S. B. Gogate, Human Values & Professional Ethics, Vikas Publishing House Pvt. Ltd., Noida.**

Reference Books

1. A Nagraj, 1998 JeevanVidyaekParichay, Divya Path Sansthan, Amarkantak.
2. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
3. Prof. A.R.Aryasri, DharanikotaSuyodhana, Professional Ethics and Moral, Maruthi Publications.
4. A. Alavudeen, R.Kalil Rahman and M. Jayakumaran, Professional Ethics and Human Values, University Science Press.
5. Prof.D.R.Kiran, 2013, Professional Ethics and Human Values, Tata McGraw-Hill
6. Jayshree Suresh and B. S. Raghavan, Human Values And Professional Ethics, S.Chand Publications

Note:

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Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:
At the end of the course:

1. Students will be able to understand the significance of value inputs in a classroom and start applying them in their life and profession
2. Understand and can distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
3. Understand the role of a human being in ensuring harmony in society and nature.
4. Students will be aware of the significance of Intellectual Property as a very important driver of growth and development in today's world and to be able to statutorily acquire and use different types of intellectual property in their professional life.

Open Elective-I

MGT404C HUMAN RESOURCE MANAGEMENT

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

To help the students develop an understanding of the management of human resources and develop abilities and skills required to manage them.

Unit-I

Introduction – nature and scope of human resource management, HRM objectives and functions, HRM policies, HRM in globally competitive environment; strategic human resource management.

Unit-II

Acquiring human resources – Man power planning, Job evaluation, job analysis and job design. Recruitment: Sources, Methods, constraints & challenges, selection: objectives and process, placement and induction.

Unit-III

Developing human resources: Training: types, methods, training vs. development and evaluation of a training programme and training need assessment, career planning and development.

Unit-IV

Performance appraisal: methods, process and challenges of performance appraisal, performance appraisal vs. potential appraisal, Compensation: wages & salaries administration and factors influencing compensation levels.

Suggested Readings:

1. **Jyothi, Human Resource Management, Oxford University Press**
2. **Bohlander George and Scott Snell, Management Human Resources, Cengage, Mumbai**
3. **Bhattacharyya, Dipak Kumar, Human Resource Management, Excel Books, NewDelhi**
4. **Cascio Wayne F., Managing Human Resources, TMH, New Delhi**
5. **DeCenzo, David A, and Stephan P. Robbins, Fundamentals of Human Resource Management, Wiley India, New Delhi**
6. **Denisi, Angelo S, and Ricky W Griffin, Human Resource Management, Biztantra, New Delhi**

Note:

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Course Outcomes:
At the end of the course:

1. To have an understanding of the basic concepts, functions and processes of human resource management
2. To be aware of the role, functions and functioning of human resource department of the organizations.
3. To Design and formulate various HRM processes such as Recruitment, Selection, Training, Development, Performance appraisals and Reward Systems, Compensation Plans and Ethical Behavior.
4. Develop ways in which human resources management might diagnose a business strategy and then facilitate the internal change necessary to accomplish the strategy.

CSE431C CYBER SECURITY

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To understand cyber crime and its laws.
2. To work with tools and methods used in cyber crime.
3. To understand the life cycle of digital forensics.
4. To learn and understand web threats, challenges and protection policies.

UNIT- I

Introduction To Cybercrime:- Cybercrime and Information Security, Classifications of Cybercrimes, The need for Cyber laws, The Indian IT Act Challenges to Indian Law and Cybercrime Scenario in India, Weakness in Information Technology Act and it consequences, Digital Signatures and the Indian IT Act, Cybercrime and Punishment; Technology, Students and Cyber law; Survival tactics for the Netizens, Cyber-offenses: Cybers talking, Cyber cafe and Cyber crimes, Botnets, Attack Vector, Cloud Computing;

UNIT- II

Tools And Methods Used In Cybercrime:- Proxy Servers and Anonymizers, Phishing and identity theft, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Stenography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow; Cybercrime: Mobile and Wireless Devices: Trends in Mobility, Attacks on Wireless Networks, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges, Registry Settings for Mobile Devices, Authentication Service Security Attacks on Mobile/Cell Phones

UNIT- III

Understanding Computer Forensics:- The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Computer Forensics and Stenography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics, Forensics Auditing, Anti forensics.

UNIT- IV

Cyber security Organizational Implications:- Cost of Cybercrimes and IPR Issues, Web Threats for Organizations, Security and Privacy Implications from Cloud Computing, Social Media Marketing, Social Computing and the Associated Challenges for Organizations, Protecting People's Privacy in the Organization, Organizational Guidelines for Internet Usage, Safe Computing Guidelines and Computer Usage Policy, Incident Handling, Forensics Best Practices, Media and Asset Protection, Importance of Endpoint Security in Organizations.

TEXT/ REFERENCE BOOKS:

1. "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Nina Godbole, Sunit Belapur, Wiley India Publications, April, 2011.

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

1. Able to demonstrate cyber crime its laws and related terms.
2. Work with SQL injection, DOS attacks etc.
3. Explain computer forensic, Network forensic cyber forensic.
4. Understand safe computing guidelines, usage policies and incident handling.

Open Elective-II

CHE457C : INDUSTRIAL SAFTEY

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

The purpose of this course is

1. To teach the students the concept of industrial safety and provide useful practical knowledge for workplace safety.
2. To identify, evaluate control the hazards to prevent or mitigate harm or damage to people, property and the environment.
3. To understand about fire and explosion, preventive methods, relief and its sizing methods
4. To analyze industrial hazards and its risk assessment

UNIT-I

Introduction: Concept of loss prevention, origin of process hazards, types of process hazards, acceptable risks, accident and loss statics, nature of accident process, concepts of inherent safety in plants or Factories, dose Vs response curve, toxicants entry route, thresh limit values, safety regulations.

UNIT-II

Hazards: Fire, Chemical (industrial and laboratory scale), electrical, mechanical, biohazards (natural and anthropogenic), toxic materials, their types and preventive measures, Liquid and vapor phase hazardous methods, storage and handling, containment, precautions, Personal safety precautions.

UNIT-III

Risk management principles, risk analysis techniques, risk control, hazards operability studies, hazard analysis, Fault tree analysis, Consequences analysis, human error analysis, accidental error analysis, economics of risk management, check list, reliability theory, event tree, HAZOP, safety reviews, what if analysis.

UNIT-IV

Safety audit, procedure for safety auditing, audit report, safety report, safety training, emergency planning and disaster management, introduction to security risk factors tables.

TEXT BOOKS:

1. **Chemical Hazards and safety, 2nd Edition, DawandeDenet& Co. , 2012**
2. **Loss preventions in process industries, Lees Butterworth-Heinemann, 1980.**
3. **Industrial safety Handbook, William and Handley, McGraw Hill.**

REFERENCE BOOKS:

1. Safety and Hazard management in Chemical Industries, Vyas, Atlantic 2013.
2. Industrial safety, health environment & Security, Basudev Panda, Laxmi publication ISBN-97893-81159-43-9
3. Industrial Safety and Health Management, 4th Edition, C. Ray Asfahl, Prentice Hall International Series, 1984

4. Industrial Accident Prevention : A Safety Management Approach, Herbert William Heinrich

NOTES:

1. **Part A: Till academic session 2020-2021:**In Semester Examinations, the paper setter will set two questions from each unit (total 8 questions in all), covering the entire syllabus. Students will be required to attempt only five questions, selecting at least one question from each unit.
   Part B: From Academic Session 2021-2022 onwards: For the semester examination, nine questions are to be set by the examiner. Question no. 1, containing 6-7 short answer type questions, will be compulsory & based on the entire syllabus. Rests of the eight questions are to be set by setting two questions from each of the four units of the syllabus. The candidates will be required to attempt five questions in all, selecting one from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.
3. For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students:
   Examinations and evaluations of students shall be conducted, covering the entire syllabus, as per guidelines "AICTE Examination Reforms". Students shall be informed about these reforms.

Course Outcomes:

Students will be able to:

1. Analyze the effect of release of toxic substances.
2. Understand the industrial laws, regulations and source models.
3. Understand the methods of hazard identification and preventive measures and develop safety programs to prevent the damage or loss.
4. Conduct safety audits and improve safety practices.

Open Elective-II

CE406C : DISASTER MANAGEMENT

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	0	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Unit-I

Introduction to Disaster Management: Disaster, Emergency, Hazard, Mitigation, Disaster Prevention, Preparedness and Rehabilitation, Risk and Vulnerability, Classification of Disaster, Natural and Man-made Disasters, International day and Decade of Disaster Reduction.

Risk and Vulnerability to disaster mitigation and management options: Warning and Forecasting.

Unit-II

Hydro-meteorological based disasters I: Disaster Management Act 2005, Role of NDMA, NDRF, NIDM, Tropical Cyclones, Floods, droughts, mechanism, causes, role of Indian Metrological Department, Central Water Commission, structure and their impacts, classifications, vulnerability, Early Warning System, Forecasting, Flood Warning System, Drought Indicators, recurrence and declaration, Structural and Non-structural Measures.

Hydro-meteorological based disasters II: Desertification Zones, causes and impacts of desertification, Characteristics, Vulnerability to India and Steps taken to combat desertification, Forest Fires; Causes of Forest Fires; Impact of Forest Fires, Prevention.

Unit-III

Geological based disasters: Earthquake, Reasons, Compression, Shear, Rayleigh and Love Waves; Magnitude and Intensity Scales, Direct and Indirect Impact of Earthquake; Seismic Zones in India, Factors, Indian Standards Guidelines for RCC and Masonry Structures, Prevention and Preparedness for Earthquake, Tsunamis, Landslides and avalanches: Definition, causes and structure; past lesson learnt and measures taken; their Characteristic features, Impact and prevention, Atlas (BMTRPC); structural and non-structural measures.

Unit-IV

Manmade Disasters I: Chemical Industrial hazards; causes and factors, pre- and post-disaster measures; control; Indian Standard Guidelines and Compliance;

Traffic accidents; classification and impact, Fire hazards; Classification as per Indian Standards;

Fire risk assessment; Escape routes; fire-fighting equipment; classification of buildings, fire zones, occupancy loads; capacity and arrangements of exits,

Use of remote sensing and GIS in disaster mitigation and management.

Text Books:

1. **Thomas D. Schneid., Disaster Management and Preparedness, CRC Publication, USA, 2001**
2. **Patrick Leon Abbott, Natural Disasters, Amazon Publications, 2002**
3. **Ben Wisner., At Risk: Natural Hazards, People vulnerability and Disaster, Amazon Publications, 2001**
4. **Oosterom, Petervan, Zlatanova, Siyka, Fendel, Elfriede M., "Geo-information for Disaster Management", Springer Publications, 2005**

5. **Savindra Singh and Jeetendra Singh, Disaster Management, Pravalika Publications, Allahabad**
6. **NidhiGaubaDhawan and AmbrinaSardar Khan, Disaster Management and Preparedness, CBS Publishers & Distribution**

Reference Books:

1. Selected Resources Published by the National Disaster Management Institute of Home Affairs, Govt. of India, New Delhi.

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

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

1. Knowledge of the significance of disaster management,
2. Analyze the occurrences, reasons and mechanism of various types of disaster
3. Understand the preventive measures as Civil Engineer with latest codal provisions
4. Apply the latest technology in mitigation of disasters

Open Elective-II

ECE327C Consumer Electronics

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Unit I

(12 Lectures)

Monochrome TV (Introduction): Elements of a TV System, Picture transmission, Sound transmission, Picture reception, Sound reception, Synchronization, Receiver control, Image continuity, Scanning Process, Aspect Ratio, Flicker, Composite Video Signal, Picture Elements, Kell factor, Vertical Resolution, Horizontal Resolution, Video bandwidth, Interlacing, 625 Line System, Bandwidths for TV Transmission, Vertical and horizontal synch detail, Vestigial Side Band transmission(Advantages and Disadvantages)

Monochrome TV (Picture and Camera Tubes): Monochrome picture tube, beam reflection, Beam focusing, Screen Phosphor, Faceplate, Picture tube characteristics, picture tube circuit controls, Monochrome Camera Tubes: Basic principle, Image Orthicon, Vidicon, Plumbicon

Unit II

(12 Lectures)

Colour TV Essentials: Compatibility , Colour perception, Three Colour theory, Luminance, Hue and Saturation, Dispersion and Recombination of light, Primary and secondary colours, luminance signal, Chrominance Signal, Colour picture tube, colour TV Camera, Colour TV display Tubes, colour Signal Transmission, Bandwidth for colour signal transmission, Colour TV controls. Cable TV, Block Diagram and principle of working of cable TV.

Plasma and LCD: Introduction, liquidcrystals, types of LCD's,TN, STN, TFT, Power requirements, LCD working, Principle of operation of TN display, Construction of TN display, Behaviour of TN liquid crystals, Viewing angle, colour balance, colour TN display, limitatons, advantages, disadvantages, applications.

Unit III

(10 Lectures)

LED and DMD : Introduction to LED Television , comparison with LCD and Plasma TV's, schematic of DMD, introduction to Digital Micro Mirror device, Diagram of DMD, principle of working, emerging applications of DMD.

Microwave Ovens and Air Conditioners: Microwaves, Transit Time, Magnetron, Waveguides, Microwave Oven, Microwave Cooking. Air conditioning, Components of air conditioning systems, all water Air conditioning systems, all air conditioning Systems, Split air conditioner.

Unit IV

(11 Lectures)

Microphones: Introduction, characteristics of microphones, types of microphone: carbon, movingcoil, wireless, crystal, introduction to tape recorder.

Loudspeaker: Introduction to ideal and basic loudspeaker, loudspeaker construction types of loudspeaker: Dynamic and permanent magnet, woofers, tweeters, brief introduction to baffles, equalisers.

Text Books :

1. **Consumer Electronics by S. P. Bali, Pearson Education.**
2. **Complete Satellite and Cable T.V by R.R Gulati, New Age International Publishers**

Reference Books:

1. Monochrome and ColourTelevision by R. R. Gulati, New Age International Publishers

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course outcomes: At the end of the course, students will demonstrate the ability to:

1. Identify and explain basic working of electronics products like TV, Microphone, loudspeaker, AC, Microwave ovens.
2. Learn various components of composite video signal and differentiate between line, brightness, saturation and to design the lower power consumption device, the primary challenge is how to minimize overall cost.
3. Acquire ability to design different display screen so that effect of radiations on eyes will be reduced.
4. Understand the general importance of product safety to consumers & producers will reduce the various adverse impacts of these devices on common man.

CSE382C COMPILER DESIGN LAB

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
0	0	4	2	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To acquire knowledge in different phases and passes of Compiler.
2. To use the Compiler tools like LEX, YACC, etc.
3. To design different types of compiler tools to meet the requirements of the realistic constraints of compilers.
4. To use Top-down and Bottom-up parsers. Construction of LL, SLR, CLR and LALR parse table.

List of Practicass:

1. Practice of LEX/YACC of compiler writing.
2. Write a program to check whether a string belong to the grammar or not.
3. Write a program to generate a parse tree.
4. Write a program to find leading terminals.
5. Write a program to find trailing terminals.
6. Write a program to compute FIRST of non-terminal.
7. Write a program to compute FOLLOW of non-terminal.
8. Write a program to check whether a grammar is left Recursion and remove left Recursion.
9. Write a program to remove left factoring.
10. Write a program to check whether a grammar is operator precedent.
11. To show all the operations of a stack.
12. To show various operations i.e. red, write and modify in a text file.

Course Outcomes:

After completing the course the students will be able to:

1. Understand the concepts of Compilers
2. Understand the concepts of The actual roles of the lexical analyzer
3. Understand the concepts of different Parsing techniques and Construction of syntax trees
4. Understand the concepts of Type checking

CSE384C MOBILE APPLICATIONS DEVELOPMENT LAB

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
0	0	4	2	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75 Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To describe and compare different mobile application models/architectures and patterns.
2. To apply mobile application models/architectures and patterns to the development of a mobile software application.
3. To describe the components and architecture of a mobile development framework (Google's Android Studio).
4. To apply a mobile development framework to the development of a mobile application.

List of Practicals:

1. Getting Started with Android Development.
2. Activities and Views: Android Manifest.xml, Activity Class, Basic View Components: Layouts and Buttons.
3. Navigation with Data: Working with Intent, Sharing Data Between Activities, Application Class.
4. Android Resources: String Resources, Loading Strings in XML, Loading Strings in Code, The Resource Values Folder.
5. Drawables - Image Basics, Drawable Folders and Qualifiers, Dimensions, Image Padding, The ImageButton Widget.
6. Lists: Implementing an Android List, ListView, ListActivity, Empty Lists, ListAdapter, Sorting the Adapter, Overriding ArrayAdapter, List Interaction.
7. Dialogs, New and Old: AlertDialog, Custom Dialog, Support Library, Fragments, DialogFragment
8. Menus: Options Menu, Modifying an Options Menu, Context Menu.
9. Saving Data with Shared Preferences: Shared Preferences, Getting Started with SharedPreferences, PreferenceActivity.
10. Saving Data with a Database: Setting Up SQLite, Creating a Helper, using the Helper, Cursor and CursorAdapater.
11. Threading with AsyncTasks: Threading in Android, AsyncTask, Tracking Progress.
12. Styles and Themes: Introduction to Styling: Defining Styles, Defining Themes, Style Inheritance, Direct Theme References.

Course Outcomes:

After completing the course the student will be able to:

1. Understand the concepts of mobile application models/architectures and patterns.
2. Apply mobile application models/architectures and patterns to the development of a mobile software application.
3. Understand the components and architecture of a mobile development framework (Google's Android Studio).
4. Apply a mobile development framework to the development of a mobile application.

CSE386C DIGITAL IMAGE PROCESSING LAB

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
0	**0**	**4**	**2**	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To review the fundamental concepts of a digital image processing system.
2. To analyze the images in the frequency domain using various transforms.
3. To evaluate the techniques for image enhancement and image restoration.
4. To categorize various compression techniques.

The students will be required to carry out 10 or 12 Lab exercises covering the theory course **CSE326C: Digital Image Processing** as assigned by concerned faculty.

Course Outcomes:

After completing the course the student will be able to:

1. Review the fundamental concepts of a digital image processing system.
2. Analyze the images in the frequency domain using various transforms.
3. Evaluate the techniques for image enhancement and image restoration.
4. Categorize various compression techniques.

CSE388C ADVANCED JAVA LAB

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
0	0	4	2	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To use graphics, Animations and Multithreading for designing Simulation and Game based applications.
2. To design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
3. To design and develop Web applications
4. To design Enterprise based applications by encapsulating an application's business logic.

The students will be required to carry out 10 or 12 experiments covering the theory course **CSE328C: Advanced Java** as assigned by the concerned faculty.

Course Outcomes:

After completing the course the student will be able to:

1. Use graphics, Animations and Multithreading for designing Simulation and Game based applications.
2. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
3. Design and develop Web applications.
4. To design Enterprise based applications by encapsulating an application's business logic.

CSE390C IoT ARCHITECTURE & PROTOCOLS LAB

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
0	0	4	2	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75 Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

Students should be able to work with

1. Python
2. Raspberry Pie
3. Arduino

List of Practicals

1. To study and configure raspberry pie and arduino
2. Write a Program for data types in python.
3. Write a Program for arithmetic operation in Python.
4. Write a Program for looping statement in Python
5. Write program for Blink LED using arduino/raspberry pie.
6. Write Program for RGB LED using Arduino/ raspberry pie.
7. Study the Temperature sensor and write a program for monitoring temperature using Arduino/ raspberry pie.
8. Write a Program to upload temperature and humidity data on cloud

Course outcomes:

On successful completion of the course, the student will be able to

1. Write programs in Phython
2. Work with Raspberry Pie
3. Work with Arduino
4. Device small projects using all hardware and software

CSEH382C CRYPTOCURRENCY WITH ETHEREUM LAB

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
--	--	4	2	**Class Work**	:	**50 Marks**
				Examination	:	**50Marks**
				Total	:	**100 Marks**
				Duration of Examination	:	**3 Hours**

Course Objectives:

1. To understand working of Ethereum platform.
2. To study the security issues and safeguards related to trading.
3. To create smartcontracts using Remix.
4. To create a blockchain application.

Learn the basics of Ethereum platform with Ethereum Studio, a web-based IDE to create and test smart contracts and build a frontend.

The student should do the following using the learned concepts:

i. Naive Blockchain construction
ii. Implement Memory Hard algorithm - Hashcash implementation
iii. Implement Direct Acyclic Graph
iv. Play with Go-ethereum
v. Smart Contract Construction using Remix - an Ethereum IDE and tools for the web. Remix is an open source tool written in JavaScript with support for writing of Solidity contracts, testing, debugging and deploying of smart contracts.
vi. Develop Toy application using Blockchain
vii. Implement Mining puzzles

Course Outcomes:

After completing the course the student will be able to:

1. Understand Ethereum platform.
2. Implement the security issues and safeguards related to trading.
3. Create smartcontracts using Remix.
4. Develop a blockchain application.

CSEH386C INFORMATION SECURITY AND DATA HIDING LAB

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
0	0	4	2	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75 Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To learn the concept of information hiding.
2. To provide an insight to steganography techniques.
3. To learn Watermarking techniques
4. To understand the attacks on data hiding and how integrity of data is maintained.

The students will be required to carry out 10 or 12 experiments covering the theory course **CSEH306C** Information Security and Data Hiding as assigned by the concerned faculty.

Course Outcomes:

After completing the course the student will be able to:

1. Learn the concept of information hiding.
2. Understand the steganography techniques.
3. Learn Watermarking techniques
4. Understand the attacks on data hiding and how integrity of data is maintained.

CSEH390C DATA ANALYTICS WITH PYTHON LAB

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits			
0	0	4	2	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To learn the basic process of data science.
2. To learn Python notebooks.
3. To have an applied understanding of how to manipulate and analyze uncurated datasets, basic statistical analysis and machine learning methods.
4. To have an understanding on how to effectively visualize results.

The students will be required to carry out 10 or 12 experiments covering the theory course **CSE310C: Data Analytics with Python** as assigned by the concerned faculty.

Course Outcomes:

After completing the course the student will be able to:

1. Find a dataset, formulate a research question, use the tools and techniques of this course to explore the answer to that question.
2. Learn Python notebooks.
3. Understand the manipulation and analysis of uncurated datasets, basic statistical analysis and machine learning methods.
4. Understand to effectively visualize results.

CSE401C CLOUD ARCHITECTURE & SECURITY

B. Tech. Semester – VIII (Computer Science and Engg.)

L	T	P	Credits			
3	-	-	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To understand the basics of Cloud Computing and its delivery models.
2. To study the concepts, processes, and best practices needed to successfully secure information within Cloud Infrastructures.
3. To get through the risk and compliance responsibilities along-with challenges for each Cloud service delivery models.
4. To know of intuition of data intensive computing and its solutions.

UNIT- I

Cloud Computing Architecture:- Cloud introduction and overview, Requirements for Cloud Computing, Introduction of Cloud computing architecture, On Demand Computing, Novel applications of cloud computing, Pricing models of Cloud Computing and associated risks, Virtualization at the infrastructure level, Security in Cloud computing environments, CPU Virtualization, Hypervisor and its types, Storage Virtualization, The SPI Framework for Cloud Computing, The Traditional Software Model, The Cloud Services Delivery Models, Cloud Deployment Models, Key Drivers to Adopting the Cloud services, The Impact of Cloud Computing on Users, Barriers to Cloud Computing Adoption in the Enterprise, Cloud Computing v/s Grid Computing.

UNIT-II

Security Issues In Cloud Computing:- Infrastructure Security: The Network Level, The Host Level, The Application Level, Data Security and Storage, Aspects of Data Security, Data Security Mitigation, Provider Data and Its Security, Identity and Access Management, Trust Boundaries and IAM, IAM Challenges, Relevant IAM Standards and Protocols for Cloud Services, IAM Practices in the Cloud, Cloud Authorization Management.

UNIT-III

Security Management In The Cloud:- Security Management Standards in the Cloud, Availability Management: SaaS, PaaS, IaaS. Privacy Issues, Data Life Cycle, Key Privacy Concerns in the Cloud, Privacy protection mechanisms in the Cloud Computing, Governance, Risk, and Compliance (GRC) in relation to Cloud Computing, Legal and Regulatory Implications, International Laws and Regulations, Cloud Security Alliance, Auditing the Cloud for Compliance.

UNIT-IV

Data Intensive Computing:- Map-Reduce Programming Models, Characterizing Data-Intensive Computations, Technologies for Data-Intensive Computing, Programming Platforms, Example Application, HDFS, HIVE, Introduction to Google App Engine, Fog Computing and its Architecture.

TEXT/ REFERENCES BOOK:

1. **Rajkumar Buyya, James Broberg, and Andrzej M. Goscinski, "Cloud Computing Principles and Paradigms," Wiley & Sons pub.**
2. **Michael J. Kavis, "Architecting the Cloud: Design Decisions for Cloud Computing Service Models", Wiley.**
3. **Gautam Shroff, "Enterprise Cloud Computing Technology Architecture Applications", Cambridge University Press.**
4. **R. Buyya, C. Vecchiola and S. Thamarai Selvi, "Mastering Cloud Computing," McGraw Hill.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After completion of course, students would be able to:

1. Get well verse with the basic terminologies of Cloud Computing.
2. Identify security aspects of each Cloud model.
3. Develop a risk and compliance management strategy for moving to the Cloud.
4. Indentify the intuition of data intensive computing mechanisms.

CSE403C MACHINE LEARNING

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To learn the concept of how to learn patterns and data without being explicitly programmed.
2. To design and analyses various clustering and machine learning algorithms with a modern outlook focusing on recent advances.
3. Explore modeling and estimation paradigms of machine learning.
4. To explore the use cases of learning technique.

UNIT-I

Basic methods:- Distance-based methods, Nearest-Neighbours, Decision Trees, Naive Bayes Linear models: Linear Regression, Logistic Regression, Generalized Linear Models, Support Vector Machines, Nonlinearity and Kernel Methods , Beyond Binary Classification: Multi-class/Structured Outputs, Ranking.

UNIT- II

Clustering:- K-means/Kernel K-means Dimensionality Reduction: PCA and kernel PCA Matrix Factorization and Matrix Completion, Generative Models (mixture models and latent factor models)

Evaluating Machine Learning algorithms and Model Selection, Introduction to Statistical Learning Theory, Ensemble Methods (Boosting, Bagging, Random Forests)

UNIT- III

Sparse Modeling and Estimation, Modeling Sequence/Time-Series Data, Deep Learning and Feature Representation Learning.

UNIT- IV

Scalable Machine Learning (Online Learning and Inference, Recent trends classification methods. and Distributed Learning), Introduction to Bayesian in various learning techniques of machine learning

TEXT/REFERENCES BOOKS:

1. **Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012**
2. **Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer 2009 (freely available online)**
3. **Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

B. Tech. 3rd semester to 8th semester CSE: Approved in 15th meeting of Academic Council held on 14.08.2020. applicable to all students admitted in 2018-19 & onwards and trailing students.

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After successful completion of the course, a student should be able to:

1. Get verse with the concept of learning patterns.
2. Learn clustering and machine learning algorithms.
3. Understand modeling and estimation paradigms of machine learning.
4. Use learning technique for practical applications.

CSE405C SOFTWARE DESIGN AND ENTERPRISE COMPUTING

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To fix software flaws and bugs in various software.
2. To make students aware of various issues like weak random number generation, information leakage, poor usability, and weak or no encryption on data traffic.
3. To learn techniques for successfully implementing and supporting network services on an enterprise scale and heterogeneous systems environment.
4. To learn methodologies and tools to design and develop secure software containing minimum vulnerabilities.

UNIT-I

Secure Software Design: Identify software vulnerabilities and perform software security analysis, Master security programming practices, Master fundamental software security design concepts.

UNIT-II

Enterprise Application Development: Describe the nature and scope of enterprise software applications, Design distributed N-tier software application, Research technologies available for the presentation, business and data tiers of an enterprise software application, Design and build a database using an enterprise database system, Develop components at the different tiers in an enterprise system, design and develop a multi-tier solution to a problem using technologies used in enterprise system, present software solution.

UNIT-III

Enterprise Systems Administration: Design, implement and maintain a directory-based server infrastructure in a heterogeneous systems environment, monitor server resource utilization for system reliability and availability, Install and administer network services (DNS/DHCP/Terminal Services/ clustering/ Web /Email).

UNIT-IV

Software containing minimum vulnerabilities and flaws, perform security testing and quality assurance. Managing software quality in an organization, software configuration management, software measurement and metrics.

TEXT/REFERENCE BOOKS:

1. **Theodor Richardson, Charles N Thies, Secure Software Design, Jones & Bartlett.**
2. **Kenneth R. van Wyk, Mark G. Graff, Dan S. Peter, Diana L. Burley, Enterprise Software Security, Addison Wesley.**
3. **Nina S. Godbole, Software Quality Assurance: Principles and Practices, Narosa Publication.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After successful completion of the course, a student should be able to:

1. Differentiate between various software vulnerabilities
2. Understand the Software process vulnerabilities for an organization.
3. Monitor resources consumption in a software.
4. Inter relate security and software development process.

CSE407C NATURAL LANGUAGE PROCESSING

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To know the basic terminologies of natural language processing.
2. To understand the formalization mechanisms of grammars.
3. To explore the mechanisms for drawing inferences from the given logic.
4. To identify and apply the learning mechanisms to the NLP applications.

UNIT-1

Components of natural language processing: Linguistic Essentials: lexicography, parts of speech and morphology, syntax, semantics, pragmatics: word level representation of natural languages prosody & natural languages.

UNIT-II

Grammar formalisms and treebanks: chomsky hierarchy, Left-Associative grammars, ambiguous grammars, resolution of ambiguities, Efficient parsing for context-free grammars (CFGs), Statistical parsing and probabilistic CFGs (PCFGs), Lexicalized PCFGs. Computation linguistics: recognition and parsing of natural language structures: ATN & RTN, General techniques of parsing: CKY, Earley & Tomitas algorithm.

UNIT-III

Semantics-knowledge representation semantic networks logic and inference pragmatics, graph models and optimization, prolog for natural language semantic.

UNIT-IV

Application of NLP: intelligent work processors: Machine translation and learning, user interfaces, Man-Machine interfaces, natural language querying, tutoring and authoring systems, speech recognition, commercial use of NLP, Natural Language Generation.

TEXT/REFERENCE BOOKS:

1. **"Natural Language Understanding" James Allen ,Benjamin-1995, cummings Pub. Comp. Ltd., Reference Books.**
2. **"Speech And Language Processing: An Introduction to Natural Language Processing " Dan Jurafsky, James H. Martin, Prentice Hall, 2009.**
3. **"Foundations of Statistical Natural Language Processing" Christopher D. Manning, Hinrich Schütze, MIT press 1999.**
4. **Radford, Andrew et. al., Linguistics, An Introduction, Cambridge University Press, 1999.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:
After successful completion of the course, a student should be able to:

1. Get verse with the basic terminologies of natural language processing.
2. Know the various types of formalization mechanisms of grammars.
3. Apply the inference mechanisms for drawing conclusions.
4. Use learning mechanism for solving NLP problems.

CSE421C DISTRIBUTED COMPUTING

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To understand the basic terminologies of distributed computing systems.
2. To learn about the distributed operating system and its implications.
3. To explore the mechanisms of high performance computing.
4. To study the working mechanisms of contemporary distributed systems.

UNIT-I

Fundamentals of Distributed Computing: Architectural models for distributed and mobile computing systems. Basic concepts in distributed computing such as clocks, message ordering, consistent global states, and consensus. Basic Algorithms in Message: Passing Systems, Leader Election in Rings, and Mutual Exclusion in Shared Memory, Fault-Tolerant Consensus, Causality and Time. Message Passing: PVM and MPI.

UNIT-II

Distributed Operating Systems and network operating systems, Distributed File systems. Client/server model for computing, common layer application protocols (RPC, RMI, streams), distributed processes, network naming, distributed synchronization and distributed object-based systems. Simulation: A Formal Model for Simulations, Broadcast and Multicast, Distributed Shared Memory, Fault-Tolerant Simulations of Read/Write Objects Simulating Synchrony, Improving the Fault Tolerance of Algorithms, Fault-Tolerant Clock Synchronization.

UNIT-III

Advanced Topics: Randomization, Wait-Free Simulations of Arbitrary Objects, and Problems Solvable in Asynchronous Systems, Solving Consensus in Eventually Stable Systems, High Performance Computing-HPF, Distributed and mobile multimedia systems. Adaptability in Mobile Computing, Grid Computing and applications.

UNIT-IV

Distributed Environments: Current systems and developments (DCE, CORBA, JAVA).
Case study- Distributed information searching on the network- Mobile Agent Approach.

TEXT/REFERENCE BOOKS

1. **Hagit Attiya, Jennifer Welch, Distributed Computing: Fundamentals, Simulations, and Advanced Topics, 2nd Edition, March 2004.**
2. **R. B. Patel, Mobile Computing-A Practical Approach, 1st edition, Khanna Publishing House Delhi**
3. **Mullendar S. Distributed Systems, 2nd Ed. Addison, Wesley 1994.**
4. **Tannenbaum, A. Distributed Operating Systems, Prentice Hall 1995.**
5. **Helal, Abdelsalam A. et al. Anytime, Anywhere Computing: Mobile Computing Concepts and Technology, Kluwer Academic Publishers 1999.**
6. **George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems: Concepts and Design Third Edition Addison-Wesley, Pearson Education, 2001.**

7. **Cay S Horstmann and Gary Cornell, Java 2 Vol I and II-Sun Micro Systems-2001**

Note:

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For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:
After successful completion of the course, a student should be able to:

1. Get verse with the basic terminologies of distributed computing systems.
2. Know the distributed operating system and its implications.
3. Understand the mechanisms of high performance computing.
4. Get familiar with working mechanisms of contemporary distributed systems.

CSE423C GREEN COMPUTING

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. Give an account of the concepts pertaining to Green computing
2. Give an account of standards and certifications related to sustainable computing products
3. Relate Green computing to sustainable development
4. Discuss how the choice of hardware and software can facilitate a more sustainable operation

UNIT-I

Definition of the term, Origins, Fundamentals, Regulations and industry initiatives- Government, Industry. approaches to green computing- Middleware Support, Compiler Optimization, Product longevity.

UNIT-II

Algorithmic efficiency, High performance computing, Sustainable computing, Resource allocation, Virtualization, Server Consolidation.

UNIT-III

Terminal servers, Power management, Operating system support, Power supply, Storage, Video card, Display, Tools for monitoring.

UNIT-IV

Green mobile, optimizing for minimizing battery consumption, Web, Temporal and Spatial Data Mining Materials recycling, Telecommuting, metrics for green computing.

Text Book:

Green Computing and Green IT Best Practices on Regulations and Industry Initiatives, Virtualization, Power Management, Materials Recycling and Telecommuting by Jason Harris, Emereo Publishing.

TEXT/REFERENCE BOOKS:

1. **Green Data Center: The steps for the journey by A. Galea, M. Schafer, M. Ebbers, IBM Press.**
2. **The Greening of IT: How companies can make a difference for the environment by John Lamb, IBM Press**
3. **Green Computing: Large-Scale Energy Efficiency by Wu-chun Feng, Virginia Polytechnic Institute and State University, Blacksburg, USA (Eds.), CRC Press**
4. **Green Computing with Emerging Memory: Low-Power Computation for Social Innovation by Kawahara, Takayuki; Mizuno, Hiroyuki (Eds.), Springer Press**
5. **Sustainable ICTs and Management Systems for Green Computing by Wen-Chen Hu (University of North Dakota, USA) and Naima Kaabouch (University of North Dakota, USA), IGI Global Press**
6. **Green IT for Sustainable Business Practice: A Foundation Guide by Mark O'Neill, British informatics Society Limited.**

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For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:
After successful completion of the course, a student should be able to:

1. Get verse with the concepts pertaining to Green computing
2. Get an understanding of standards and certifications related to sustainable computing products
3. Relate Green computing to sustainable development
4. Understand the hardware and software choices for facilitating in sustainable operations.

CSE425C SOFTWARE AGENTS

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. List the defining characteristics of an intelligent agent and how an agent differs from an object.
2. Understanding Agent architectures at Micro and Macro level.
3. Understanding how multi agents interact using pure and mixed strategy, Nash equlibria; zero-sum and other interactions; how cooperation occurs in the Prisoner's dilemma.
4. Understanding allocation of scarce resources through auction types; combinatorial auctions and winner determination.

UNIT- I

Agents Introduction:-

Agents Definition:- **Autonomy vs. Agency,** Agent vs Object - Mobile Agents - Agent Programming Paradigms - Frameworks - Agent Reasoning-Mobile Agent Context-Description-Components-Features-Life Cycle.

UNIT- II

Agent Communication, Collaboration, and Mobility:-

Agent Communication Languages-Interaction between agents- Reactive Agents- Cognitive Agents – Rational Agents-Interaction protocols - Agent coordination - Agent negotiation - Agent Cooperation - Agent Organization.

UNIT- III

Mobile Agents Models and Framework:- Standardization and Evolution,

Generating Useable Metrics-Evaluating Semantic Alignment -Evaluating System Agility- Evaluating Loose Coupling- Survey of Mobile Agent System: JADE, SPRINGS, Voyager, Jini, Aglets, Choosing a Mobile Agent Framework.

UNIT- IV

Agent Security Issues:– Threats in Mobile Agents Security – Mobile Agent Threat Models- Protecting Agents against Malicious Hosts - Untrusted Agent -Black Box Security - Authentication for agents - Security issues for aglets.

TEXT/ REFERENCES BOOKS:

1. **Bigus & Bigus, " Constructing Intelligent agents with Java ", Wiley, 1997.**
2. **Bradshaw, " Software Agents ", MIT Press, 2000.**
3. **Russel & Norvig, " Artificial Intelligence: a modern approach ", Prentice Hall, 1994.**
4. **Danny Lange & Mitsuru Oshima, Programming and Deploying Java Mobile Agents with Aglets, Addison-Wesley, 1998,**

5. **Richard Murch, Tony Johnson, " Intelligent Software Agents ", Prentice Hall, 2000.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

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Course Outcomes:

After completing the course the students will be able to:

1. Understand resource allocation via Bargaining
2. Understand FIPA, Abstract Architecture, Reference Model, Agent Communication Standards
3. Understand integration of agents applications with agents support technologies like Web Services Architecture, Java Enterprise Architecture
4. Use any Agent Development Environment to develop the project.

CSEH403C CYBER FORENSICS AND CYBER LAWS

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To learn the overview of cybercrime.
2. To learn the issues of cybercrime.
3. To learn the various methods to investigate cybercrime and learn about digital forensics.
4. To understand the laws and acts behind.

UNIT I

Introduction: Overview of Cyber Crime, Nature and Scope of Cyber Crime, Types of Cyber Crime, Social Engineering, Categories of Cyber Crime, Property Cyber Crime. Unauthorized Access to Computers, Computer Intrusions, White collar Crimes, Viruses and Malicious Code, Internet Hacking and Cracking, Virus Attacks, Pornography, Software Piracy, Intellectual Property, Mail Bombs, Exploitation ,Stalking and Obscenity in Internet, Digital laws and legislation, Law Enforcement Roles and Responses.

UNIT-II

Introduction to Digital Forensics: Forensic Software and Hardware, Analysis and Advanced Tools, Forensic Technology and Practices, Forensic Ballistics and Photography, Face, Iris and Fingerprint Recognition, Audio Video Analysis, Windows System Forensics, Linux System Forensics, Network Forensics.

UNIT III

Introduction to Cyber Crime Investigation Investigation Tools, eDiscovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, Email Recovery, Hands on Case Studies, Encryption and Decryption Methods, Search and Seizure of Computers, Recovering Deleted Evidences, Password Cracking.

UNIT IV

Cyber Laws and Ethics: Digital Evidence Controls - Evidence Handling Procedures - Basics of Indian Evidence ACT IPC and CrPC - Electronic Communication Privacy ACT - Legal Policies. Digital, Indian IT Act

TEXT/REFERENCE BOOKS:

1. **Bernadette H Schell, Clemens Martin, Cybercrime, ABC , CLIO Inc, California, 2004.**
2. **Understanding Forensics in IT , NIIT Ltd, 2005.**
3. **Nelson Phillips and Enfinger Steuart, Computer Forensics and Investigations, Cengage Learning, New Delhi, 2009.**
4. **Kevin Mandia, Chris Prosise, Matt Pepe, Incident Response and Computer Forensics, Tata McGraw -Hill, New Delhi, 2006.**
5. **Robert M Slade, Software Forensics, Tata McGraw - Hill, New Delhi, 2005.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines AICTE Examinations reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

Students should be able:

1. To have various ideas about cybercrime.
2. To have knowledge of the various issues of cybercrime.
3. To investigate and find the cybercrime.
4. To have clear idea of the various laws and acts.

CSE441C MULTIMEDIA TECHNOLOGY

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives

1. To understand the characteristics of different multimedia systems.
2. To identify the encoding and quantization mechanisms for images.
3. To explore the audio and video processing mechanisms.
4. To know the practical applications of multimedia systems.

UNIT-I

Basics of Multimedia Technology: Computers, communication and entertainment; multimedia an introduction; framework for multimedia systems; multimedia devices; CD- Audio, CD-ROM, CD-I, presentation devices and the user interface; multimedia presentation and authoring; professional development tools; LANs and multimedia; internet, World Wide Web & multimedia distribution network-ATM & ADSL; multimedia servers & databases; vector graphics; 3D graphics programs; animation techniques; shading; anti aliasing; morphing; video on demand.

UNIT-II

Image Compression & Standards: Making still images; editing and capturing images; scanning images; computer color models; color palettes; vector drawing; 3D drawing and rendering; JPEG-objectives and architecture; JPEG-DCT encoding and quantization, JPEG statistical coding, JPEG predictive lossless coding; JPEG performance; overview of other image file formats as GIF, TIFF, BMP, PNG etc.

UNIT-III

Audio & Video: Digital representation of sound; time domain sampled representation; method of encoding the analog signals; subband coding; fourier method; transmission of digital sound; digital audio signal processing; stereophonic & quadraphonic signal processing; editing sampled sound; MPEG Audio; audio compression & decompression; brief survey of speech recognition and generation; audio synthesis; musical instrument digital interface; digital video and image compression; MPEG motion video compression standard; DVI technology; time base media representation and delivery.

UNIT-IV

Virtual Reality: Applications of multimedia, intelligent multimedia system, desktop virtual reality, VR operating system, virtual environment displays and orientation making; visually coupled system requirements; intelligent VR software systems. Applications of environment in various fields.

TEXT /REFERENCE BOOKS:

1. **An introduction, Villamil & Molina, Multimedia Mc Milan, 1997**
2. **multimedia: Sound & Video, Lozano, 1997, PHI, (Que)**
3. **Multimedia: Production, planning and delivery, Villamil & Molina,Que, 1997**
4. **Multimedia on the PC, Sinclair,BPB**
5. **Multimedia: Making it work, Tay Vaughan, fifth edition, 1994, TMH.**
6. **Multimedia in Action by James E Shuman, 1997, Wadsworth Publ.,**
7. **Multimedia in Practice by Jeff coate Judith, 1995,PHI.**

8. Multimedia Systems by Koegel, AWL
9. Multimedia Making it Work by Vaughar, etl.

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:
After successful completion of the course, a student should be able to:
1. Get familiar with the characteristics of different multimedia systems.
2. Learn the encoding and quantization mechanisms for images.
3. Understand the audio and video processing mechanisms.
4. Learn the practical applications of multimedia systems.

CSE443C SOFT COMPUTING

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To introduce soft computing concepts and techniques and foster their abilities in designing appropriate technique for a given scenario.
2. To implement soft computing based solutions for real-world problems.
3. To give students knowledge of non-traditional technologies and fundamentals of artificial neural networks, fuzzy sets, fuzzy logic, genetic algorithms.
4. To provide students a hand-on experience on MATLAB to implement various strategies.

UNIT-I

Introduction to soft computing:- Evolution of Computing: Soft Computing Constituents, From Conventional AI to Computational Intelligence: Machine Learning Basics.

UNIT-II

Fuzzy Logic:- Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functisons: Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making.

UNIT-III

Neural Networks:- Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks: Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance architectures, Advances in Neural networks.

UNIT-IV

Genetic Algorithms & Matlab:- Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning: Machine Learning Approach to Knowledge Acquisition. Study of neural network toolbox and fuzzy logic toolbox, Simple implementation of Artificial Neural Network and Fuzzy Logic

TEXT AND REFERENCE BOOKS:

1. **George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic: Theory and Applications",PHI**
2. **Satish Kumar, "Neural Networks: A classroom approach" Tata McGrawHill.**
3. **Haykin S., "Neural Networks-A Comprehensive Foundations",PHI**
4. **Anderson J.A., "An Introduction to Neural Networks",PHI**
5. **M.Ganesh, "Introduction to Fuzzy sets and Fuzzy Logic" PHI.**
6. **N P Padhy and S P Simon, " Soft Computing with MATLAB Programming", Oxford University Press.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After completion of course, students would be able to:

1. Identify and describe soft computing techniques and their roles in building intelligent Machines.
2. Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.
3. Apply genetic algorithms to combinatorial optimization problems.
4. Evaluate and compare solutions by various soft computing approaches for a given problem.

CSE445C SOFTWARE MEASUREMENTS & METRICS

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To understand the characteristics of the different performance measurement techniques of software systems.
2. To identify the metrics and attributes for measuring the performance of software systems.
3. To explore the implications of reliability mechanisms.
4. To provide the knowledge of component based systems and dynamic metrics.

UNIT-I

Basics of measurement:- Measurement in everyday life, measurement in software engineering, scope of software metrics, representational theory of measurement, measurement and models, measurement scales, meaningfulness in measurement, goal-based framework for software measurement, classifying software measures, determining what to measure, software measurement validation, empirical investigation, types of investigation, planning and conducting investigations.

UNIT-II

Software: - Metrics data collection and analysis: What is good data, how to define the data, how to collect the data, how to store and extract data, analyzing software-measurement data, frequency distributions, various statistical techniques. **Measuring internal product attributes**: Measuring size, aspects of software size, length, functionality and complexity, measuring structure, types of structural measures, control-flow structure, and modularity and information flow attributes, data structures.

UNIT-III

Measuring external product attributes: Modeling software quality, measuring aspects of software quality, software reliability, basics of software reliability, software reliability problem, parametric reliability growth models, predictive accuracy, recalibration of software reliability growth predictions, importance of operational environment, wider aspects of software reliability.

Resource measurement: Measuring productivity, teams, tools, and methods.

UNIT-IV

Metrics for object-oriented systems: The intent of object-oriented metrics, distinguishing characteristics of object-oriented metrics, various object-oriented metric suites LK suite, CK suite and MOOD metrics.

Dynamic Metrics: Runtime Software Metrics, Extent of Class Usage, Dynamic Coupling, Dynamic Cohesion, and Data Structure Metrics.

Metrics for component-based systems: The intent of component-based metrics, distinguishing characteristics of component-based metrics, various component-based metrics.

TEXT/REFERENCE BOOKS:

1. **Software Metrics: A rigorous and Practical Approach by Norman E. Fenton and Shari Lawrence Pfleeger, International Thomson Computer Press (1997) 2nd ed.**
2. **Applied Software Measurement by Capers Jones, McGraw Hill (2008).**
3. **Object-Oriented Software Metrics by Mark Lorenz, Jeff Kidd, Prentice Hall (1994).**
4. **Practical Software Metrics For Project Management And Process Improvement byRobert B Grady, Hewlett Packard Professional Books (2004) 1st ed.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
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Course Outcomes:

After successful completion of the course, a student should be able to:

1. Get familiar with the performance measurement techniques of software systems.
2. Understand the metrics and attributes for measuring the performance of software systems.
3. Know the implications of reliability mechanisms.
4. Learn the component based systems and importance of dynamic metrics.

CSEH401C BLOCKCHAIN TECHNOLOGY AND APPLICATIONS

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To get acquainted with distributed computing,
2. To create distributed and replicated ledger of events.
3. To study the security and privacy concerns.
4. To know about applications of blockchain.

UNIT- I

Distributed System concepts: Need of distributed record keeping, Modeling faults and adversaries, Byzantine Generals problem, distributed consensus and atomic broadcast, Byzantine Models of fault-tolerance , Consensus algorithms and their scalability problems, reason for Blockchain based cryptocurrency, Technologies Borrowed in Blockchain – hash pointers, consensus, byzantine fault-tolerant distributed computing, digital cash etc.

UNIT- II

Hyperledger: Hyperledger-Fabric fundamentals: Nodes, channels, components in a blockchain solution, Hyperledger transaction flow, participants identities & access control, Hyperledger Fabric blockchain creation, the plug and play platform and mechanisms in permissioned blockchain, Exploring Hyperledger frameworks

UNIT -III

Privacy &Security issues: Zero Knowledge proofs and protocols in Blockchain - Succinct non interactive argument for Knowledge (SNARK) - pairing on Elliptic curves - Zcash , Pseudo-anonymity vs. anonymity, Zcash and Zk-SNARKS for anonymity preservation, attacks on Blockchains – such as Sybil attacks, selfish mining, attacks - advent of algorand, and Sharding based consensus algorithms, Authenticated Agreement.

UNIT IV

Applications: Corda, Uses of Blockchain in E-Governance and other contract enforcement mechanisms, Land Registration, cyber security, integrity of information, supply chain, Medical Information Systems, Decentralized Internet of Things, Domain Name Service and prospects of Blockchain

TEXT/REFERENCES BOOKS

1. **Blockchain Technology: Cryptocurrency and Applications by S. Shukla, M. Dhawan, S. Sharma and S. Venkatesan, Oxford University Press, 2019.**
2. **Blockchain: The Blockchain for Beginnings, Guide to Blockchain Technology and Blockchain Programming by Josh Thompson, Create Space Independent Publishing Platform, 2017.**
3. **A Step by Step guide to Enterprise Blockchain with Hyperledger Fabric: Develop De-centralized applications with Hyperledger Fabric by Mustafa Husain , Sandeep Kumar, ebook**
4. **The Science of the Blockchain by Wattenhofer ebook**

Note:
In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

At the end of the course, students will develop understanding for:

1. Hyperledger and transaction flow.
2. Authenticated agreement
3. Privacy and security issues pertaining to blockchain
4. Blockchain in IoT and supply chain.

CSEH405C MATHEMATICAL AND STATISTICAL TECHNIQUES

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To understand mathematical foundation of Data science and Statistical Modelling
2. To analyze data using Statistics and Probability techniques
3. To understand the basic concepts sampling, distributions and hypothesis testing techniques
4. To understand of the key techniques and theory used in visualization, including data models, graphical perception and functions used for analysis of various data distributions.

Unit I

Statistics: Definition and scope, concepts of statistical population and sample, Data: quantitative and qualitative, Scales of measurement: nominal, ordinal, interval and ratio, Frequency distribution, Measures of Central Tendency: Mean, Median, Mode, Measures of Dispersion: range, mean deviation, standard deviation, coefficient of variation, Gini's Coefficient, Lorenz Curve. Moments, skewness and kurtosis, Quantiles, Box Plot. Outlier Detection, Quantile-Quantile Plot.

Unit-II

Inferential statistics: The Central Limit Theorem, distributions of the sample mean and the sample variance for a normal population, Sampling distributions (Chi-Square, t, F, z). Test of Hypothesis- Testing for Attributes – Mean of Normal Population – One-tailed and two-tailed tests, F-test and Chi-Square test -- Analysis of variance ANOVA – One way and two way classifications.

Unit-III

Probability: Introduction, random experiments, sample space, events and algebra of events. Definitions of Probability–classical, statistical, and axiomatic. Conditional Probability, laws of addition and multiplication, independent events, theorem of total probability, Bayes' theorem and its applications.

Unit-IV

Random variables: Random variables: discrete random variables, probability mass function (p.m.f) and Cumulative Distribution Function (c.d.f), statement of properties of p.m.f, illustrations and properties of random variables, Two dimensional random variables: discrete type, joint, marginal and conditional p.m.f and c.d.f., statement of properties of c.d.f, independence of variables, trinomial distribution.

Textbooks/Reference books:

1. **Sheldon Ross, Introduction to Probability and Statistics for Engineers, 5/e (2014), Elsevier**
2. **Morris H. DeGroot and Mark J. Schervish, Probability and Statistics (4/e)(2012), AddisonWesley.**
3. **Blitzstein and Hwang, Intoduction to Probability (2015), CRC Press.**
4. **William Feller, An Intoroduction to Probability, (3/e) (2008), Volume 1, Wiley.**
5. **Freedman, Pisani, Purves, Statistics (4/e)(2014), W. W. Norton & Company.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcome:

After completing the course the student will be able to

1. Perform simple statistics methods for data analysis
2. Perform statistical analysis of data using Inferential statistics and test hypothesis
3. Perform probability models and evaluate event probabilities, conditional probability and Bayes theorem
4. Find relations between random variables

CSE481C PROFESSIONAL TRAINING SEMINAR (LEVEL-3)

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits			
-	-	2	2	**Examination**	:	**50 Marks**
				Total	:	**50 Marks**

Course Objectives:

1. Acquire knowledge of the industry in which the internship is done.
2. Apply knowledge and skills learned in the classroom in a work setting.
3. To decide the future application areas of Computer Science and Engineering.

At the end of 6th semester each student would undergo four weeks Professional Training in an Industry/ institute/ Professional / Organization/ Research Laboratory etc. with the prior approval. The student has to submit a typed report in the department along with a certificate from the organization. The typed report should be in a prescribed format.

The report will be evaluated in the 7th Semester by a Committee consisting of three teachers from different specialization to be constituted by the Chairperson of the department. The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization.

The student will interact with the committee through presentation to demonstrate his/her learning. Teachers associated with evaluation work will be assigned 2 periods per week load.

Course Outcomes:

After completing the course the students will have:

1. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
2. An ability to work in a multidisciplinary team
3. An ability to identify, formulate, and solve engineering problems
4. An understanding of professional and ethical responsibility.

CSE483C PROJECT-I

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	50 Marks
-	-	8	4	Examination	:	100Marks
				Total	:	150 Marks

Course Objectives:

1. To align student's skill and interests with a realistic problem or project
2. To understand the significance of problem and its scope.
3. Students will make decisions within a framework

Project involving design/ fabrication/ testing/ computer simulation/ case studies etc. will be evaluated through a panel of examiners consisting of the following:

Chairman of Department	Chairperson
Project coordinator	Member Secretary
Respective project supervisor	Member

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).
Project coordinator will be assigned the project load of maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.
The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

Course Outcomes:

After completing the course the students will be able to:

1. Develop the professional quality of employing technical knowledge obtained in the field of Engineering & Technology.
2. Design and make analysis augmented with creativity, innovation and ingenuity.
3. Develop an understanding on how to work in actual industry environment.
4. Utilise the technical resources and write the technical report.

CSEH481C PROJECT BASED ON SPECIALIZATION

B. Tech. Semester – VII (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
-	-	4	2	Examination	:	75 Marks
				Total	:	100 Marks

Course Objectives:

1. To align student‟s skill and interests with a realistic problem or project
2. To understand the significance of problem and its scope.
3. Students will make decisions within a framework

Project involving design/ fabrication/ testing/ computer simulation/ case studies etc. will be evaluated through a panel of examiners consisting of the following:

Chairperson of Department	Chairman
Project coordinator	Member Secretary
Respective project supervisor	Member

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).
Project coordinator will be assigned the project load of maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.
The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

Course Outcomes:

After completing the course the students will be able to:

1. Develop the professional quality of employing technical knowledge obtained in the field of Engineering & Technology.
2. Design and make analysis augmented with creativity, innovation and ingenuity.
3. Develop an understanding on how to work in actual industry environment.
4. Utilise the technical resources and write the technical report.

EEH452C ELECTRICAL AND HYBRID VEHICLES
(OPEN ELECTIVE-III)

L	T	P	Credits			
3	-	-	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the basic concept and history of EV and HEV.
2. Understand the models to describe hybrid vehicles and their performance.
3. Understand the different possible ways of energy storage.
4. Understand the different strategies related to energy management systems.

UNIT I

Introduction: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern electric vehicles on energy supplies. Electric Vehicle Composition and Configurations, Basic concept of hybrid Electric vehicle, HEV configuration types – series, parallel, series-parallel and complex hybrid, Power flow control.

UNIT II

Electric Propulsion: major requirements of EV motor drive, characteristics and control of DC motor, Induction motor, Switched Reluctance motor and Permanent Magnet motor, power converters devices/topology, control hardware, software and strategy vehicle, power source characterization, transmission characteristics.

UNIT III

Energy Storage: Introduction to energy storage requirements in Hybrid and Electric Vehicles, Energy sources, Battery based energy storage and its analysis, Fuel fell based energy storage and its analysis, super capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis.

UNIT IV

Energy Management Strategies: Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies, implementation issues of energy management strategies. Plug-in electric vehicles, Vehicle to grid (V2G) and Grid to vehicle (G2V) fundamentals

Text / References:

1. **C. Mi, M. A. Masrur and D. W. Gao, "Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives", John Wiley & Sons, 2011.**
2. **S. Onori, L. Serrao and G. Rizzoni, "Hybrid Electric Vehicles: Energy Management Strategies", Springer, 2015.**
3. **M. Ehsani, Y. Gao, S. E. Gay and A. Emadi, "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design", CRC Press, 2004.**
4. **T. Denton, "Electric and Hybrid Vehicles", Routledge, 2016.**

NOTE:

1. In Semester Examinations, the paper setter will set two questions from each unit (total 8 questions in all), covering the entire syllabus. Students will be required to attempt only five questions, selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.
3. For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students: Examinations and evaluations of students shall be conducted, covering the entire syllabus, as per guidelines "AICTE Examination Reforms". Students shall be informed about these reforms.

MGT401C ENTREPRENEURSHIP
(OPEN ELECTIVE-III)

L	T	P
3	0	0

External Marks: 75
Internal Marks: 25
Total Marks : 100
Duration of Examination: 3 Hours

Course Objective:

The main objective of the course is to expose the students to the growth of entrepreneurship in developing countries and acquaint with the establishment and running of a new enterprise

Unit-I

Entrepreneurship: Concept and Definitions of Entrepreneur & Entrepreneurship; Classification and Types of Entrepreneurs; Traits/Qualities of an Entrepreneurs; Entrepreneurship's Challenges; Factor affecting Entrepreneurial Growth – Economic &Non-Economic Factors; Entrepreneur Vs. Intrapreneur .EDP Programmes.

Unit-II

Innovation Technology Management: Entrepreneurial Opportunity Search and Identification; recognition of a good business opportunity; Conducting Feasibility Studies. Business Plan: Purpose of Business Plan; Contents of Business Plan; Presenting of Business Plan; Why Business plan Fails.

Unit –III

Indian Models in Entrepreneurship: Social Entrepreneur: Introduction; Characteristics, Need, Types and Motivations of Social Entrepreneur. Women Entrepreneurship: Role & Importance, Profile of Women Entrepreneur, Problems of Women Entrepreneurs, Women Entrepreneurship Development in India.

Unit-IV

Developments of Entrepreneur: Micro, Small and Medium Enterprises: Concept & definitions; Role & Importance; MSMED Act 2006, Current Scheme of MSME- Technology Up-gradation Scheme , Marketing Assistance Scheme ,Certification Scheme, Credit- rating scheme , Problems facing MSME.
Financing the venture: Introduction, features and process of Venture Capital, Funding from Banks.

Recommended Books

1. **Roy Rajeev, Entrepreneurship 2/e, Oxford University Press.**
2. **Charantimath, Poornima, "Entrepreneurship Development and Small Business Enterprises", Pearson Education, New Delhi.**

Suggested Readings

1. **Roy Rajeev, Entrepreneurship 2/e, Oxford University Press.**
2. **Charantimath, Poornima, "Entrepreneurship Development and Small Business Enterprises", Pearson Education, New Delhi.**
3. **Norman M. Scarborough, "Essentials of Entrepreneurship & Small Business Management", PHI, New Delhi.**
4. **Vasant Desai, "Entrepreneurial Development and Management", Himalaya Publishing House, New Delhi.**
5. **Kumar Arya, "Entrepreneurship: creating and leading an entrepreneurial organization", Seventh Impression, Pearson Education.**
6. **Holt, "Entrepreneurship: New Venture Creation", Prentice Hall, New Delhi.**

7. **Hisrich, Robert D., Michael Peters and Dean Shephered, "Entrepreneurship", Tata McGraw Hill, New Delhi.**
8. **Bridge, S et al., "Understanding Enterprise: Entrepreneurship and Small Business", Palgrave Publication.**
9. **Donald F. Kuratko, "Entrepreneurship: Theory, Process, and Practice", South Western College Publications.**

Note:

1. In Semester Examinations, the paper setter will set two questions from each unit (total 8 questions in all), covering the entire syllabus. Students will be required to attempt only five questions, selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.
3. For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students: Examinations and evaluations of students shall be conducted, covering the entire syllabus, as per guidelines "AICTE Examination Reforms". Students shall be informed about these reforms.

Course Outcomes:

At the end of the course:

1. Students will be able to understand the concept of entrepreneurship, traits required to become an entrepreneur.
2. Students will be able to design and formulate the basic principles of business plans, they can choose and present their business plan
3. Students will know about the different types of entrepreneur
4. Students will be aware of the role of MSME in the development of Small Scale industries.

ME452C FUNDAMENTALS OF SUSTAINABLE MANUFACTURING
(OPEN ELECTIVE-III)

L	T	P	Credits			
3	0	--	3	**Class Work**	:	**25 Marks**
				Examination	:	**75Marks**
				Total	:	**100 Marks**
				Duration of Examination	:	**3 Hours**

Course Outcomes:

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

1. Summarize sustainability issues and driversof sustainability.
2. Understand various standards for Environmental Impact Assessment.
3. Apply various tools and technique to access manufacturing sustainability.
4. Comprehend sustainability advantages associated with various manufacturing initiatives.

UNIT I

Introduction: Introduction to sustainability and drivers for sustainable development and sustainable Sustainable Manufacturing - Concept of Triple bottom line, Environmental, Economic and Social Dimensions of Sustainability, Sustainable Product Development – Various Phases.

UNIT II

Tools and Techniques: Environmental Conscious Quality Function Deployment, Life cycle assessment, Design for Environment, R3 and R6 cycles, loop production systems, Reverse supply chain, product acquisition management Design for Disassembly.

UNIT III

EIA Standards: CML, EI 95 and 99, ISO 14001 EMS and PAS 2050 standards, Environmental Impact parameters Energy in manufacturing (assessment and minimization)the
Design for recycling: Eco friendly product design methods – Methods to infuse sustainability in early product design phases

UNIT IV

Sustainability Assessment: Concept, Models and Various Approaches, Toxic substances in industry, Product Sustainability and Risk/Benefit assessment– Corporate Social Responsibility, Industry cooperation for reducing Carbon footprint
Green Manufacturing: Dry and near-dry machining, edible oil-based cutting fluids, cryogenic machining, improving work environment, of lean manufacturing, Lean techniques for green manufacturing and strategies for waste reduction in green manufacturing.

Textbooks:

1. **G. Atkinson, S. Dietz, E. Neumayer —Handbook of Sustainable Manufacturing‖. Edward Elgar Publishing Limited, 2007.**
2. **D. Rodick, Industrial Development for the 21st Century: Sustainable Development Perspectives, UN New York, 2007.**

Reference Books

1. **P. Lawn, Sustainable Development Indicators in Ecological Economics, Edward Elgar Publishing Limited.**
3. **S. Asefa, The Economics of Sustainable Development, W.E. Upjohn Institute for Employment Research, 2005.**

Notes:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
3. For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students:

Examinations and evaluations of students shall be conducted, covering the entire syllabus, as per guidelines "AICTE Examination Reforms". Students shall be informed about these reforms.

CHE459C : NANOSCIENCE AND NANOTECHNOLOGY
(OPEN ELECTIVE-III)

L	T	P	Credits			
3	0	--	3	**Class Work**	:	**25 Marks**
				Examination	:	**75Marks**
				Total	:	**100 Marks**
				Duration of Examination	:	**3 Hours**

Course Objectives:

1. To initiate the student in the area of development of new materials / nanomaterials for novel applications and devices.
2. To impart foundational knowledge of nanoscience and related fields.
3. To make the students acquire an understanding of the analytical techniques in nanoscience and nanotechnology fields.
4. To help them understand in broad application areas of nanoscienceand nanotechnology in engineering.

UNIT-I

Types of materials; bonding in materials; crystal structures and defects; amorphous materials; origins of properties of materials; Effect of nanostructures on properties of materials.

The science of materials – materials science; Historical use of nanoparticles; discovery of the carbon nanotubes; fullerenes; nanostructured materials

UNIT-II

Particle-wave duality; de-Broglie waves; Schrodinger equation in 1-Dimension; Superposition; Energy eigenstates; Interpretation of wave function; Fermions and Bosons; Electron density of states; Energy bandgaps; Fermi energy; Excitons and Bohr radius.

UNIT-III

AFM; STM; Transport in nanostructures; 0,1 and 2 dimensional nanostructures; Bandgap engineering; Molecular motors; MEMS and NEMS devices. Biomaterials and nano-biotechnology.

UNIT-IV

Synthesis of Nanomaterials – ZnO and Fe_3O_4. Characterization of phases and quantification of phases. Applications of Nanomaterials: In textile industry, in catalytic operations, in energy generation, in energy storage, in environmental remediation and in sensors and devices.

TEXT BOOKS:

1. **NANO:The Essentials Understanding Nanoscience and Nanotechnology, T. Pradeep, Tata McGraw Hill Publishing Company Limited, 2007, 0-07-154830-0.**
2. **Material Science and Engineering, 7thed. , William D. Callister, Johan Wiley & Sons, Inc.**
3. **Nanostructured Materials and Nanotechnology, Hari Singh Nalwa, Academic Press, 2002.**
4. **Nanostructures and Nanomaterials, synthesis, properties and applications., Guozhong Cao, Imperial College Press, 2004.**

REFERENCE BOOKS:

1. **Introduction to Nanoscience, S.M. Lindsay, Oxford University Press, 2010, ISBN: 978–019–954421–9 (Pbk).**
2. **Nanoscience, Hans-Eckhardt Schaefer, Springer, 2010, ISBN 978-3-642-10558-6.**

3. **Chemistry of nanomaterials: Synthesis, Properties and applications. C.N.R. Rao, Achim Muller, A.K. Cheetham, Wiley-VCH, 2004.**

NOTES:

1. Part A: Till academic session 2020-2021:In Semester Examinations, the paper setter will set two questions from each unit (total 8 questions in all), covering the entire syllabus. Students will be required to attempt only five questions, selecting at least one question from each unit.
   Part B: From Academic Session 2021-2022 onwards: For the semester examination, nine questions are to be set by the examiner. Question no. 1, containing 6-7 short answer type questions, will be compulsory & based on the entire syllabus. Rests of the eight questions are to be set by setting two questions from each of the four units of the syllabus. The candidates will be required to attempt five questions in all, selecting one from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.
3. For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students:

Examinations and evaluations of students shall be conducted, covering the entire syllabus, as per guidelines "AICTE Examination Reforms". Students shall be informed about these reforms.

Course Outcomes:

After completing this course, students will be able to:

1. Learn about the background on nanoscience and give a general introduction to different classes of nanomaterials.
2. Develop an understanding of the science behind the nanomaterial properties.
3. Apply their learned knowledge to study and characterize nanomaterials.
4. Familiarize themselves with the variety of nanotechnology applications, and know how to approach the synthesis of nanomaterials with a set of desirable properties.

EE454C SMART GRID
(OPEN ELECTIVE-III)

L	T	P	Credits			
3	0	--	3	**Class Work**	**:**	**25 Marks**
				Examination	**:**	**75Marks**
				Total	**:**	**100 Marks**
				Duration of Examination	**:**	**3 Hours**

UNIT-I

Introduction: Concept of smart grid, smart grid control, Communications and Sensing in a Smart Grid, Hardware Architecture, Software architecture, Protocol detail, application & benefits, PLCs Vs RTUs, IED's, RTU Block diagram, PMU communication interface.

UNIT-II

Cyber Security of the Smart Grid: Smart Grid Threats, Vulnerabilities and Cyber Security Strategies, Cyber Security Environment, False Data Injection and Attacks in Electric Power Grids Cyber-Physical System Security.

UNIT-III

Smart Grid Technologies: Energy Management System, Demand side management: peak clipping, valley filling, load shifting etc., state estimation, load forecasting. Time of the day pricing(TOD), Time of use pricing(TOU).

UNIT-IV

Distributed Generation & Control: Concept of distributed generation, Introduction of various distributed generation sources like wind, solar, fuel-cell, micro-hydro, PHEV's etc., Grid integration and control of distributed generation sources.

TEXT BOOKS:

1. **T. Gönen, Electric Power Distribution System Engineering, McGraw-Hill, 1986. ISBN: 0-8493- 5806-X.**
2. **Distribution System Protection Manual, McGraw-Edison Power Systems, 1990.**
3. **Westinghouse Electric Utility Ref. Book, Vol.3, Distribution Systems, 1965.**
4. **R. E. Brown, Electric Power Distribution Reliability, Marcel Dekker Inc., 2002**

REFERENCE BOOKS:

1. **IEEE Power and Energy Magazine, July/August 2007 Issue**
2. **James Burke, Power Distribution Engineering, Mercel Dekker, 1994.**
3. **A.J. Pansini, Electrical Distribution Engineering McGrawHill, 1983.**
4. **E. Lakervi, E.J.Holmes, Electricity Distribution Network Design, IEE series, 1989.**
5. **J. Gers and E. J. Holmes Protection of Electricity Distribution Networks 2nd Edition.**

NOTE:

1. In Semester Examinations, the paper setter will set two questions from each unit (total 8 questions in all), covering the entire syllabus. Students will be required to attempt only five questions, selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.

3. For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students: Examinations and evaluations of students shall be conducted, covering the entire syllabus, as per guidelines "AICTE Examination Reforms". Students shall be informed about these reforms.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the features of Smart Grid.
2. Understand to make conventional grid more smart, reliable, and efficient.
3. Understand the technical expertise in the emerging area of smart grid.
4. Understand the concepts of distributed generation.

CSE401C ADVANCED COMPUTER ARCHITECTURE

B. Tech. Semester – VIII (Computer Science and Engg.)

L	T	P	Credits			
3	0	--	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To learn the concept of modern computers along-with performance analysis measures.
2. To understand the architectures of various processor types of processors.
3. To explore the paradigms of memory organization.
4. To understand the concepts of parallelization techniques for processing of instructions.

UNIT-I

Introduction: Elements of modern computers (computing problems, algorithms, hardware, OS, system software); Evolution of computer architecture; Factors affecting system performance; architectural development tracks (Multiple-processor tracks, Multivector & SIMD tracks, Multithread & Dataflow tracks) Conditions of parallelism (Data dependence, Resource dependence, control dependence, Bernstein's Conditions); Hardware & Software parallelism; Program partitioning & Scheduling; Program flow machines (Control flow, Data flow, Demand driven); Parallel processor applications; Speedup performance laws (Amdahl's law, Gustafson's law); Scalability (Goals, Metrics, evolution of scalable architectures, open issues)

UNIT-II

Advanced processor Technology: Design space; Instruction pipelines; Instruction set architecture (RISC, CISC, RISC scalar processors, CISC scalar processors); Superscalar Processors, VLIW architecture; Vector & Symbolic processors; Pipelining: Linear pipeline processors, Nonlinear pipeline processors, Instruction pipeline(pipelined instruction processing, mechanisms for instruction pipelining, dynamic instruction scheduling, branch handling techniques) Parallel & Scalable Architectures: Hierarchical bus system, Crossbar switch & multiport memory, multistage & combining networks; Cache coherence & synchronization mechanisms (cache coherence problem, Snoopy bus protocols, directory based protocols.

UNIT-III

Advanced Memory Technology: Bus system (Backplane bus specification, addressing & timing protocols, Arbitration, Transaction and Interrupt, IEEE futurebus) Cache organizations (Cache addressing models, cache performance issues); Shared memory organizations (Interleaved memory organization, Bandwidth and fault tolerance, memory allocation schemes, Sequential & weak consistency models. Latency hiding techniques.

UNIT-IV

Parallel Models and Languages: Parallel Programming Models (Shared-Variable, Message passing, Data-Parallel, Object-Oriented); Parallel languages & Compilers (language features for parallelism, parallel language constructs, optimizing compilers for parallelism); Code optimization & partitioning (Scalar optimization, Local & Global optimization, Vectorization, code generation & scheduling, Trace scheduling compilation); Parallel programming environments (S/W Tools, Y-MP, Paragon, CM-5 Environments , Visualization & Performance tuning)

TEXT /REFERENCE BOOKS:

1. **Advance Computer Architecture: Parallelism, Scalability, Programmability; 2nd Edition by Kai Hwang & Naresh Jotwani, 2012, TMH.**
2. **Pipelined and Parallel processor design by Michael J. Fiynn – 1995, Narosa.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:
After successful completion of the course, a student should be able to:

1. Have an understanding of concept of modern computers along-with performance analysis measures.
2. Have an ability to identify the architectures of various processor types of processors.
3. Understand the paradigms of memory organization.
4. Understand the concepts of simultaneous processing of instructions.

CSE404C SOFTWARE PROJECT MANAGEMENT

B. Tech. Semester – VIII (Computer Science and Engg.)

L	T	P	Credits			
3	-	-	3	Class Work	:	25 Marks
				Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To explain needs for software specifications and to study different types of software requirements gathering techniques.
2. To convert the requirements model into the design model and demonstrate use of software and user interface design principles.
3. To justify the role of SDLC in Software Project Development and to study risks associated with a project.
4. To generate project schedule and can construct, design and develop network diagram for different type of Projects.

UNIT- I

Introduction to Software Project Management (SPM): Definition of a Software Project (SP), SP Vs. other types of projects activities covered by SPM, Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, project as a system, management control, requirement specification, information and control in organization, Project management and CMM.

Stepwise Project planning: Introduction, selecting a project, identifying project scope and objectives, identifying project infrastructure, analyzing project characteristics, identifying project products and activities, estimate efforts each activity, identifying activity risk, allocate resources, review/ publicize plan.

UNIT- II

Project Evaluation & Estimation:- Cost benefit analysis, cost benefit evaluation techniques, risk evaluation. Selection of an appropriate project approacht;, structured methods, rapid application development, water fall-, V-process-, spiral-models. Prototyping, delivery. Albrecht function point analysis.

Project Scheduling:- Objectives of activity planning, project schedule, projects and activities, Identifying activities, sequencing and scheduling activities, network planning model, Network Diagrams, CPM**,** representation of lagged activities, backward and forward pass, identifying critical path, activity throat, shortening project , precedence networks.

Risk Management:- Introduction, the nature of risk, managing risk, risk identification, risk analysis, reducing the risks, evaluating risks to the schedule, calculating the z values.

UNIT- III

Project Monitoring & control:- identifying resource requirements, scheduling resources, PERT, Gantt Charts, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Error

Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.

Managing contracts and people-: Introduction, types of contract, stages in contract, placement, typical terms of a contract, contract management, acceptance, Managing people and organizing terms: Introduction, understanding behavior, organizational behavior: a back ground, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures, conclusion, further exercises.

UNIT- IV

Software quality Assurance and Testing:- Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Clean room process.

Software Project Management Tools:- CASE Tools, Planning and Scheduling Tools, MS-Project.

TEXT/ REFERENCE BOOK:

1. **Software Project Management (2nd Edition), by Bob Hughes and Mike Cotterell, 1999, TMH**
2. **Software Engineering – A Practitioner's approach, Roger S. Pressman (5th edi), 2001, MGH**
3. **Software Project Management, Walker Royce, 1998, Addison Wesley.**
4. **Project Management 2/c. Maylor**
5. **Managing Global software Projects, Ramesh, 2001, TMH.**
6. **S. A. Kelkar, Software Project Management, PHI Publication.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:
Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes: After completing the course the students will be able to:

1. Explain needs for software specifications and different types of software requirements gathering techniques.
2. Convert the requirements model into the design model and demonstrate use of software and user interface design principles.
3. Justify the role of SDLC in Software Project Development and identify the risks associated with a project.
4. Generate project schedule and can construct, design and develop network diagram for different type of Projects.

CSE482C PROJECT-II

B. Tech. Semester – VIII (Computer Science and Engg.)

L	T	P	Credits			
-	-	18	9	**Class Work**	**:**	**50 Marks**
				Examination	**:**	**100Marks**
				Total	**:**	**150 Marks**
				Duration of Examination	**:**	**3 Hours**

Course Objectives:

1. To align student‟s skill and interests with a realistic problem or project
2. To understand the significance of problem and its scope.
3. Students will make decisions within a framework

Project involving design/ fabrication/ testing/ computer simulation/ case studies etc. will be evaluated through a panel of examiners consisting of the following:

Chairman of Department	Chairperson
Project coordinator	Member Secretary
Respective project supervisor	Member

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).
Project coordinator will be assigned the project load of maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her. Internal evaluation will be carried out four times in a semester.
The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

Course Outcomes:

After completing the course the students will be able to:

1. Develop the professional quality of employing technical knowledge obtained in the field of Engineering & Technology.
2. Design and make analysis augmented with creativity, innovation and ingenuity.
3. Develop an understanding on how to work in actual industry environment.
4. Utilise the technical resources and write the technical report.

CSE484C PROFESSIONAL TRAINING (LEVEL-4)

B. Tech. Semester – VIII (Computer Science and Engg.)

L	T	P	Credits			
-	-	-	15	Class Work	:	100 Marks
				Examination	:	250Marks
				Total	:	350 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. Acquire knowledge of the industry in which the internship is done.
2. Apply knowledge and skills learned in the classroom in a work setting.
3. To decide the future application areas of Computer Science and Engineering.

Pre-requisite: Students will have to undergo Professional Training (Level-4) of at least one semester from the industry, institute, research lab, training centre etc. who have CGPA of minimum 7.0 till VI sem. with no backlog will only be permitted to proceed for Professional Training.

In the 8th semester student can opt for Professional Training in an Industry/ Institute/ Professional / Organization/ Research Laboratory etc. with the prior approval and submit a typed report in the department along with a certificate from the organization.
The student will be assigned internal supervisor from the department who will be responsible for internal evaluation and interaction with the industry/place of training. Internal evaluation will be carried out four times in semester.
The final report should be in a prescribed format. The final internal evaluation will be done by a Committee consisting of three teachers from different specialization to be constituted by the Chairperson of the department. The basis of evaluation will primarily be the technical knowledge and exposure of the student towards different processes and the functioning of the organization along with the presentation to demonstrate his/her learning.
Internal supervisor will be assigned 2 periods per week load.

Course Outcomes:

After completing the course the students will have:

1. An ability to apply knowledge of mathematics, science, and engineering.
2. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
3. An ability to function on multidisciplinary teams and to identify, formulate, and solve engineering problems.
4. An understanding of professional and ethical responsibility.