

**ANNA UNIVERSITY, CHENNAI**  
**UNIVERSITY DEPARTMENTS**  
**B.E. COMPUTER SCIENCE AND ENGINEERING**  
**REGULATIONS – 2015**  
**CHOICE BASED CREDIT SYSTEM**

**PROGRAMME EDUCATIONAL OBJECTIVES:**

**The objectives of a programme can be broadly defined on five counts:**

1. Prepare students to comprehend the fundamental concepts in Computer Science and Engineering
2. Enable students to apply the interaction between theory and practice for problem solving
3. Equip students to critically analyze current trends and learn future issues from a system perspective at multiple levels of detail and abstraction
4. Motivate students to continue to pursue lifelong multidisciplinary learning as professional engineers and scientists and effectively communicate technical information, function effectively on teams, and develop and apply computer engineering solutions within a global, societal, and environmental context
5. Prepare students to critically analyze existing systems in a specific area and develop innovative solutions that cater to the dynamic nature of the computer industry, and may lead to entrepreneurial initiatives.

**PROGRAMME OUTCOMES:**

**Students will be able to:**

- a. Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer based systems of varying complexity.
- b. Critically analyze a problem, identify, formulate and solve problems in the field of Computer science and Engineering considering current and future trends.
- c. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, and sustainability in the field of computer engineering.
- d. Function effectively on teams to accomplish a common goal.
- e. Communicate effectively with a range of audiences and prepare technical documents and make effective oral presentations.
- f. Analyze the local and global impact of computing on individuals, organizations, and society.
- g. Recognize the need for and possess an ability to engage in lifelong learning, leading to continuing professional development.
- h. Use current techniques, skills, and tools necessary for computing practice.
- i. Demonstrate advanced knowledge of a selected area within the computer science discipline.
- j. Critically analyze existing systems in an area of specialization and develop innovative solutions.

## MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the programme objective and the outcomes is given in the following table

PROGRAMME EDUCATIONAL OBJECTIVES	PROGRAMME OUTCOMES									
	a	b	c	d	e	f	g	h	i	j
1.	√	√	√					√		
2.	√	√	√	√	√	√		√	√	√
3.	√	√	√			√	√	√	√	√
4.			√	√	√	√	√	√	√	√
5.		√	√			√	√	√	√	√

**ANNA UNIVERSITY, CHENNAI**  
**UNIVERSITY DEPARTMENTS**  
**B.E. COMPUTER SCIENCE AND ENGINEERING**  
**REGULATIONS – 2015**  
**CHOICE BASED CREDIT SYSTEM**  
**CURRICULA I - VIII SEMESTERS**  
**AND**  
**SYLLABI I & II SEMESTERS**

**SEMESTER I**

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>								
1.	HS7151	<u>Foundational English</u>	HS	4	4	0	0	4
2.	MA7151	<u>Mathematics I</u>	BS	4	4	0	0	4
3.	PH7151	<u>Engineering Physics</u>	BS	3	3	0	0	3
4.	CY7151	<u>Engineering Chemistry</u>	BS	3	3	0	0	3
5.	GE7151	<u>Computing Techniques</u>	ES	3	3	0	0	3
<b>PRACTICALS</b>								
6.	BS7161	<u>Basic Sciences Laboratory</u>	BS	4	0	0	4	2
7.	GE7161	<u>Computer Practices Laboratory</u>	ES	4	0	0	4	2
<b>TOTAL</b>				<b>25</b>	<b>17</b>	<b>0</b>	<b>8</b>	<b>21</b>

### SEMESTER II

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>								
1.	HS7251	<u>Technical English</u>	HS	4	4	0	0	4
2.	MA7251	<u>Mathematics II</u>	BS	4	4	0	0	4
3.	GE7251	<u>Environmental Science and Engineering</u>	HS	3	3	0	0	3
4.	GE7152	<u>Engineering Graphics</u>	ES	5	3	2	0	4
5.	EC7253	<u>Electronic Devices and Circuits For Computer Engineers</u>	ES	3	3	0	0	3
6.	CS7251	<u>Programming and Data Structures I</u>	PC	3	3	0	0	3
<b>PRACTICALS</b>								
7.	GE7162	<u>Engineering Practices Laboratory</u>	ES	4	0	0	4	2
8.	CS7211	<u>Programming and Data Structures Laboratory I</u>	PC	4	0	0	4	2
<b>TOTAL</b>				<b>30</b>	<b>20</b>	<b>2</b>	<b>8</b>	<b>25</b>

### SEMESTER III

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>								
1.		Object Oriented Programming	PC	3	3	0	0	3
2.		Algebra and Number Theory	BS	5	3	2	0	4
3.		Digital Principles and System Design	ES	3	3	0	0	3
4.		Electrical Engineering and Control Systems	ES	3	3	0	0	3
5.		Programming and Data Structures II	PC	3	3	0	0	3
6.		Computer Architecture	PC	3	3	0	0	3
<b>PRACTICALS</b>								
7.		Digital Laboratory	ES	4	0	0	4	2
8.		Programming and Data Structures Laboratory II	PC	4	0	0	4	2
<b>TOTAL</b>				<b>28</b>	<b>18</b>	<b>2</b>	<b>8</b>	<b>23</b>

### SEMESTER IV

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>								
1.		Probability and Queuing Theory	BS	5	3	2	0	4
2.		Design and Analysis of Algorithms	PC	3	3	0	0	3
3.		Database Management Systems	PC	3	3	0	0	3
4.		Software Engineering	PC	4	4	0	0	4
5.		Operating Systems	PC	3	3	0	0	3
6.		Principles of Management	HS	3	3	0	0	3
<b>PRACTICALS</b>								
7.		Database Management Systems Laboratory	PC	4	0	0	4	2
8.		Operating Systems Laboratory	PC	4	0	0	4	2
<b>TOTAL</b>				<b>29</b>	<b>19</b>	<b>2</b>	<b>8</b>	<b>24</b>

### SEMESTER V

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>								
1.		Computer Networks	PC	3	3	0	0	3
2.		Object Oriented Analysis and Design	PC	3	3	0	0	3
3.		Embedded Systems	PC	4	4	0	0	4
4.		Digital Signal Processing	PC	3	3	0	0	3
5.		Theory of Computation	PC	3	3	0	0	3
6.		Professional Elective-I	PE	3	3	0	0	3
<b>PRACTICALS</b>								
7.		Computer Networks Laboratory	PC	4	0	0	4	2
8.		Case Tools Laboratory	PC	4	0	0	4	2
<b>TOTAL</b>				<b>27</b>	<b>19</b>	<b>0</b>	<b>8</b>	<b>23</b>

### SEMESTER VI

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>								
1.		Compiler Design	PC	3	3	0	0	3
2.		Machine Learning Techniques	PC	5	3	2	0	4
3.		Security in Computing	PC	3	3	0	0	3
4.		Parallel and Distributed Computing	PC	3	3	0	0	3
5.		Professional Elective-II	PE	3	3	0	0	3
6.		Professional Elective-III	PE	3	3	0	0	3
<b>PRACTICALS</b>								
7.		Compiler Laboratory	PC	4	0	0	4	2
8.		Security Laboratory	PC	4	0	0	4	2
9.		Employability Skills	EEC	2	0	0	2	1
<b>TOTAL</b>				<b>30</b>	<b>18</b>	<b>2</b>	<b>10</b>	<b>24</b>

### SEMESTER VII

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>								
1.		Web Technology	PC	3	3	0	0	3
2.		Cloud Computing Techniques	PC	4	4	0	0	4
3.		Programming Paradigms	PC	3	3	0	0	3
4.		Professional Elective-IV	PE	3	3	0	0	3
5.		Professional Elective-V	PE	3	3	0	0	3
6.		Open Elective-I *	OE	3	3	0	0	3
<b>PRACTICALS</b>								
7.		Web Technology Laboratory	PC	4	0	0	4	2
8.		Comprehension and Technical Report	EEC	2	0	0	2	1
9.		Creative and Innovative Project	EEC	4	0	0	4	2
<b>TOTAL</b>				<b>29</b>	<b>19</b>	<b>0</b>	<b>10</b>	<b>24</b>

**SEMESTER VIII**

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>								
1.		Professional Elective-VI	PE	3	3	0	0	3
2.		Open Elective-II*	OE	3	3	0	0	3
<b>PRACTICALS</b>								
3.		Project Work	EEC	3	0	0	20	10
<b>TOTAL</b>					<b>6</b>	<b>0</b>	<b>20</b>	<b>16</b>

**TOTAL NO. OF CREDITS:180****\* Course from the curriculum of other UG programmes**

### HUMANITIES AND SOCIAL SCIENCES (HS)

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.		Foundational English	HS	4	4	0	0	4
2.		Technical English	HS	4	4	0	0	4
3.		Environmental science and Engineering	HS	3	3	0	0	3
4.		Principles of Management	HS	3	3	0	0	3

### BASIC SCIENCES (BS)

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.		Mathematics I	BS	4	4	0	0	4
2.		Engineering Physics	BS	3	3	0	0	3
3.		Engineering Chemistry	BS	3	3	0	0	3
4.		Basic Science Laboratory	BS	4	0	0	4	2
5.		Mathematics II	BS	4	4	0	0	4
6.		Algebra and Number Theory	BS	5	3	2	0	4
7.		Probability and Queuing Theory	BS	5	3	2	0	4

### ENGINEERING SCIENCES (ES)

S. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.		Computing Techniques	ES	3	3	0	0	3
2.		Computer Practices Lab	ES	4	0	0	4	2
3.		Engineering Graphics	ES	5	3	2	0	4
4.		Electronic Devices and Circuits For Computer Engineers	ES	3	3	0	0	3
5.		<u>Engineering Practices Laboratory</u>	ES	4	0	0	4	2
6.		Digital Principles and System Design	ES	3	3	0	0	3
7.		Electrical Engineering and Control Systems	ES	3	3	0	0	3
8.		Digital Laboratory	ES	4	0	0	4	2



**PROFESSIONAL CORE (PC)**

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.		Programming and Data Structures I	PC	3	3	0	0	3
2.		Programming and Data Structures Laboratory I	PC	4	0	0	4	2
3.		Object oriented Programming	PC	3	3	0	0	3
4.		Programming and Data Structures II	PC	3	3	0	0	3
5.		Computer Architecture	PC	3	3	0	0	3
6.		Programming and Data Structures Laboratory II	PC	4	0	0	4	2
7.		Design and Analysis of Algorithms	PC	3	3	0	0	3
8.		Database Management Systems	PC	3	3	0	0	3
9.		Software Engineering	PC	4	4	0	0	4
10.		Operating Systems	PC	3	3	0	0	3
11.		Database Management Systems Laboratory	PC	4	0	0	4	2
12.		Operating Systems Laboratory	PC	4	0	0	4	2
13.		Computer Networks	PC	3	3	0	0	3
14.		Object Oriented Analysis and Design	PC	3	3	0	0	3
15.		Embedded Systems	PC	4	4	0	0	4
16.		Digital Signal Processing	PC	3	3	0	0	3
17.		Theory of Computation	PC	3	3	0	0	3
18.		Computer Networks Laboratory	PC	4	0	0	4	2
19.		Case Tools Laboratory	PC	4	0	0	4	2
20.		Compiler Design	PC	3	3	0	0	3
21.		Machine Learning Techniques	PC	5	3	2	0	4
22.		Security in Computing	PC	3	3	0	0	3

23.		Parallel and Distributed Computing	PC	3	3	0	0	3
24.		Compiler Laboratory	PC	4	0	0	4	2
25.		Security Laboratory	PC	4	0	0	4	2
26.		Web Technology	PC	3	3	0	0	3
27.		Cloud Computing Techniques	PC	4	4	0	0	4
28.		Programming Paradigms	PC	3	3	0	0	3
29.		Web Technology Laboratory	PC	4	0	0	4	2

**PROFESSIONAL ELECTIVES (PE)**

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.		Adhoc & Sensor Networks	PE	3	3	0	0	3
2.		Advanced Mobile Computing	PE	3	3	0	0	3
3.		Advanced Topics on Databases	PE	3	3	0	0	3
4.		Agile methodologies	PE	3	3	0	0	3
5.		Artificial Intelligence	PE	3	3	0	0	3
6.		Big Data Analytics	PE	3	3	0	0	3
7.		Bio Informatics Technologies	PE	3	3	0	0	3
8.		Cyber Forensics	PE	3	3	0	0	3
9.		Data gathering, Processing and Analytics	PE	3	3	0	0	3
10.		Data Warehousing and Data Mining	PE	3	3	0	0	3
11.		Database Tuning	PE	3	3	0	0	3
12.		Digital Image Processing	PE	3	3	0	0	3
13.		Engineering Ethics and Human Values	PE	3	3	0	0	3
14.		Foundation Skills in Integrated Product Development(FSIPD)	PE	3	3	0	0	3
15.		Free and Open Source Software	PE	3	3	0	0	3
16.		Fundamentals of Software Engineering and Development	PE	3	3	0	0	3
17.		Game Programming	PE	3	3	0	0	3

18.		GPU Architecture and Programming	PE	3	3	0	0	3
19.		Graph Theory	PE	3	3	0	0	3
20.		Graphics and Multimedia	PE	3	3	0	0	3
21.		Green Computing	PE	3	3	0	0	3
22.		Information Retrieval Techniques	PE	3	3	0	0	3
23.		Internet of Things	PE	3	3	0	0	3
24.		Java Programming	PE	3	3	0	0	3
25.		Knowledge Management	PE	3	3	0	0	3
26.		Microprocessors and Micro Controllers	PE	3	3	0	0	3
27.		Middleware Technologies	PE	3	3	0	0	3
28.		Mobile application Development	PE	3	3	0	0	3
29.		Models of Computation	PE	3	3	0	0	3
30.		Multimedia Tools and Techniques	PE	3	3	0	0	3
31.		Nano Computing	PE	3	3	0	0	3
32.		Natural Language Processing	PE	3	3	0	0	3
33.		Robotics	PE	3	3	0	0	3
34.		Semantic Web	PE	3	3	0	0	3
35.		Service Oriented Architecture	PE	3	3	0	0	3
36.		Soft Computing	PE	3	3	0	0	3
37.		Software Agents	PE	3	3	0	0	3
38.		Software defined Networks	PE	3	3	0	0	3
39.		Software Process Models	PE	3	3	0	0	3
40.		Software Project Management	PE	3	3	0	0	3
41.		Software Quality & Testing	PE	3	3	0	0	3
42.		TCP/IP Design Implementation	PE	3	3	0	0	3
43.		Total Quality Management	PE	3	3	0	0	3
44.		Unix Internals	PE	3	3	0	0	3
45.		Visualization Techniques	PE	3	3	0	0	3
46.		Web Design and Management	PE	3	3	0	0	3
47.		Python	PE	3	3	0	0	3
48.		Wireless Networks	PE	3	3	0	0	3
49.		Disaster Management	PE	3	3	0	0	3
50.		Human Rights	PE	3	3	0	0	3

**EMPLOYABILITY ENHANCEMENT COURSES (EEC)**

<b>S.NO</b>	<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>CATEGORY</b>	<b>CONTACT PERIODS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
1.		Employability Skills	EEC	2	0	0	2	1
2.		Comprehension and Technical Report	EEC	2	0	0	2	1
3.		Creative and Innovative Project	EEC	4	0	0	4	2
4.		Project Work	EEC	20	0	0	20	10

## SUMMARY

S.NO.	SUBJECT AREA	CREDITS AS PER SEMESTER								CREDITS TOTAL
		I	II	III	IV	V	VI	VII	VIII	
1.	HS	4	7		3					14
2.	BS	12	4	4	4					24
3.	ES	5	9	8						22
4.	PC		5	11	17	20	17	12		82
5.	PE					3	6	6	3	18
6.	OE							3	3	6
7.	EEC						1	3	10	14
	<b>Total</b>	<b>21</b>	<b>25</b>	<b>23</b>	<b>24</b>	<b>23</b>	<b>24</b>	<b>24</b>	<b>16</b>	<b>180</b>
8.	<b>Non Credit / Mandatory</b>									

**COURSE DESCRIPTION:**

This course aims at developing the language skills necessary for the first year students of Engineering and Technology.

**OBJECTIVES:**

- To develop the four language skills – Listening, Speaking, Reading and Writing.
- To improve the students' communicative competence in English.
- To teach students the various aspects of English language usage.

**CONTENTS****UNIT I GREETING AND INTRODUCING ONESELF 12**

**Listening**- Types of listening – Listening to short talks, conversations; **Speaking** – Speaking about one's place, important festivals etc. – Introducing oneself, one's family/ friend;**Reading** – Skimming a passage– Scanning for specific information;**Writing**- Guided writing - Free writing on any given topic ( My favourite place/ Hobbies/ School life, writing about one's leisure time activities, hometown, etc.); **Grammar** – Tenses (present and present continuous) -Question types - Regular and irregular verbs; **Vocabulary** – Synonyms and Antonyms.

**UNIT II GIVING INSTRUCTIONS AND DIRECTIONS 12**

**Listening** – Listening and responding to instructions; **Speaking** – Telephone etiquette - Giving oral instructions/ Describing a process – Asking and answering questions; **Reading** – Reading and finding key information in a given text - Critical reading - **Writing** –Process description( non-technical)- **Grammar** – Tense (simple past& past continuous) - Use of imperatives – Subject – verb agreement – Active and passive voice; - **Vocabulary** – Compound words – Word formation – Word expansion ( root words).

**UNIT III READING AND UNDERSTANDING VISUAL MATERIAL 12**

**Listening**- Listening to lectures/ talks and completing a task; **Speaking** –Role play/ Simulation – Group interaction; **Reading** – Reading and interpreting visual material;**Writing**- Jumbled sentences – Discourse markers and Cohesive devices – Essay writing (cause & effect/ narrative);**Grammar** – Tenses (perfect), Conditional clauses –Modal verbs; **Vocabulary** –Cause and effect words; Phrasal verbs in context.

**UNIT IV CRITICAL READING AND WRITING 12**

**Listening**- Watching videos/ documentaries and responding to questions based on them; **Speaking**Informal and formal conversation;**Reading** –Critical reading (prediction & inference);**Writing**–Essay writing ( compare & contrast/ analytical) – Interpretation of visual materials;**Grammar** – Tenses (future time reference);**Vocabulary** – One word substitutes (with meanings) – Use of abbreviations & acronyms – Idioms in sentences.

**UNIT V LETTER WRITING AND SENDING E-MAILS 12**

**Listening**- Listening to programmes/broadcast/ telecast/ podcast;**Speaking** – Giving impromptu talks, Making presentations on given topics- Discussion on the presentation;**Reading** –Extensive reading;**Writing**- Poster making – Letter writing (Formal and E-mail) ;**Grammar** – Direct and Indirect speech – Combining sentences using connectives;**Vocabulary** –Collocation;

**TEACHING METHODS:**

Interactive sessions for the speaking module.

Use of audio – visual aids for the various listening activities.

Contextual Grammar Teaching.

**EVALUATION PATTERN:**

Internals – 50%

End Semester – 50%

**TOTAL:60 PERIODS**

**LEARNING OUTCOMES:**

- Students will improve their reading and writing skills
- Students will become fluent and proficient in communicative English
- Students will be able to improve their interpersonal communication

**TEXTBOOK:**

1. Richards, Jack.C with Jonathan Hull and Susan Proctor **New Interchange : English for International Communication. (level2, Student's Book)** Cambridge University Press, New Delhi: 2010.

**REFERENCES:**

1. Bailey, Stephen. **Academic Writing: A practical guide for students.** New York: Rutledge,2011.
2. Morgan, David and Nicholas Regan. **Take-Off: Technical English for Engineering.** London: Garnet Publishing Limited, 2008.
3. Redston, Chris & Gillies Cunningham **Face2Face** (Pre-intermediate Student's Book& Workbook) Cambridge University Press, New Delhi: 2005
4. Comfort, Jeremy, et al. **Speaking Effectively : Developing Speaking Skills for Business English.** Cambridge University Press, Cambridge: Reprint 2011.

**MA7151****MATHEMATICS – I****L T P C**

**(Common to all branches of B.E. / B.Tech. Programmes in I Semester) 4 0 0 4**

**OBJECTIVES:**

- The goal of this course is for students to gain proficiency in calculus computations. In calculus, we use three main tools for analyzing and describing the behavior of functions: limits, derivatives, and integrals. Students will use these tools to solve application problems in a variety of settings ranging from physics and biology to business and economics.
- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

**UNIT I DIFFERENTIAL CALCULUS****12**

Representation of functions - New functions from old functions - Limit of a function - Limits at infinity - Continuity - Derivatives - Differentiation rules - Polar coordinate system - Differentiation in polar coordinates - Maxima and Minima of functions of one variable.

**UNIT II FUNCTIONS OF SEVERAL VARIABLES****12**

Partial derivatives – Homogeneous functions and Euler's theorem – Total derivative – Differentiation of implicit functions – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Errors and approximations – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

**UNIT III INTEGRAL CALCULUS 12**  
Definite and Indefinite integrals - Substitution rule - Techniques of Integration - Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals.

**UNIT IV MULTIPLE INTEGRALS 12**  
Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.

**UNIT V DIFFERENTIAL EQUATIONS 12**  
Method of variation of parameters – Method of undetermined coefficients – Homogenous equation of Euler’s and Legendre’s type – System of simultaneous linear differential equations with constant coefficients.

**TOTAL: 60 PERIODS**

**OUTCOMES:**

- Understanding of the ideas of limits and continuity and an ability to calculate with them and apply them.
- Improved facility in algebraic manipulation.
- Fluency in differentiation.
- Fluency in integration using standard methods, including the ability to find an appropriate method for a given integral.
- Understanding the ideas of differential equations and facility in solving simple standard examples.

**TEXTBOOKS:**

1. James Stewart, "Calculus with Early Transcendental Functions", Cengage Learning, New Delhi, 2008.
2. Narayanan S. and Manicavachagom Pillai T. K., "Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2007.
3. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley and Sons, 9<sup>th</sup> Edition, New Delhi, 2014.
4. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43<sup>rd</sup> Edition, 2014.

**REFERENCES:**

1. Ramana. B.V., "Higher Engineering Mathematics", Tata McGraw Hill Co. Ltd., New Delhi, 11<sup>th</sup> Reprint, 2010.
2. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 3<sup>rd</sup> Edition, 2007.
3. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7<sup>th</sup> Edition, 2009.
4. Greenberg M.D., "Advanced Engineering Mathematics", Pearson Education, New Delhi, 2<sup>nd</sup> Edition, 5<sup>th</sup> Reprint, 2009.
5. Peter V.O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, New Delhi, 2007.



**OBJECTIVE:**

- To introduce the basic physics concepts relevant to different branches of Engineering and Technology.

**UNIT I PROPERTIES OF MATTER****9**

Elasticity – Poisson's ratio and relationship between moduli (qualitative) - stress-strain diagram for ductile and brittle materials, uses - factors affecting elastic modulus and tensile strength - bending of beams - cantilever - bending moment - Young's modulus determination - theory and experiment - uniform and non-uniform bending - I shaped girders - twisting couple - hollow cylinder - shaft - torsion pendulum - determination of rigidity modulus- moment of inertia of a body (regular and irregular).

**UNIT II ACOUSTICS AND ULTRASONICS****9**

Classification of sound - loudness and intensity - Weber-Fechner Law - standard intensity and intensity level - decibel - reverberation - reverberation time - calculation of reverberation time for different types of buildings – sound absorbing materials - factors affecting acoustics of buildings : focussing, interference, echo, echelon effect, resonance - noise and their remedies. Ultrasonics: production - magnetostriction and piezoelectric methods - detection of ultrasound - acoustic grating – ultrasonic interferometer - industrial applications – Non-destructive testing - ultrasonic method: scan modes and practice.

**UNIT III THERMAL AND MODERN PHYSICS****9**

Thermal expansion - thermal stress - expansion joints - bimetallic strips - thermal conductivity- heat conductions in solids – flow of heat through compound media - Forbe's and Lee's disc method: theory and experiment- Black body radiation – Planck's theory (derivation) – Compton effect – wave model of radiation and matter – Schrödinger's wave equation – time dependent and independent equations – Physical significance of wave function – particle in a one dimensional box.

**UNIT IV APPLIED OPTICS****9**

Interference - Michelson interferometer: construction, working, determination of wave length and thickness - anti-reflection coating - air wedge and its applications - Lasers – principle and applications – Einstein's coefficients – CO<sub>2</sub> and Nd:YAG laser - semiconductor lasers: homo junction and hetro junction - construction and working – applications. Optical fibres - classification (index & mode based) - principle and propagation of light in optical fibres - acceptance angle and numerical aperture - fibre optic communication system - active and passive sensors.

**UNIT V CRYSTAL PHYSICS****9**

Single crystalline, polycrystalline and amorphous materials – Single crystals: unit cell, crystal systems, Bravais lattices, directions and planes in a crystal, Miller indices - interplanar distance for a cubic crystal - coordination number and packing factor for SC, BCC, FCC, HCP and diamond structures - structure and significance of NaCl, CsCl, ZnS and graphite - crystal imperfections: point defects, line defects – Burger vectors, dislocations and stacking faults – Growth of single crystals: Bridgman and Czochralski methods.

**TOTAL: 45 PERIODS****OUTCOMES:**

- The students will acquire knowledge on the basics of physics related to properties of matter, optics, acoustics etc., and they will apply these fundamental principles to solve practical problems related to materials used for engineering applications.

**TEXTBOOKS:**

- Gaur R.K. and Gupta S.L., "Engineering Physics", Dhanpat Rai Publications (2013)
- Palanisamy P.K., "Engineering Physics", Scitech Publications (P) Ltd. (2006).
- Arumugam M., "Engineering Physics", Anuradha Publications (2000)

**REFERENCES:**

1. Serway R.A. and Jewett, J.W. "Physics for Scientists and Engineers with Modern Physics". Brooks/cole Publishing Co. (2010).
2. Tipler P.A. and Mosca, G.P., "Physics for Scientists and Engineers with Modern Physics". W.H.Freeman, (2007).
3. Markert J.T.,Ohanian, H. and Ohanian, M. "Physics for Engineers and Scientists". W.W.Norton & Co. (2007).

**CY7151****ENGINEERING CHEMISTRY**

L	T	P	C
3	0	0	3

**OBJECTIVE**

To develop an understanding about fundamentals of polymer chemistry.

Brief elucidation on surface chemistry and catalysis.

To develop sound knowledge photochemistry and spectroscopy.

To impart basic knowledge on chemical thermodynamics.

To understand the basic concepts of nano chemistry.

**UNIT I POLYMER CHEMISTRY****9**

Introduction: Functionality-degree of polymerization. Classification of polymers- natural and synthetic, thermoplastic and thermosetting. Types and mechanism of polymerization: addition (free radical, cationic, anionic and living); condensation and copolymerization. Properties of polymers: T<sub>g</sub>, tacticity, molecular weight-weight average, number average and polydispersity index. Techniques of polymerization: Bulk, emulsion, solution and suspension.

**UNIT II SURFACE CHEMISTRY AND CATALYSIS****9**

Adsorption-Types of adsorption-adsorption of gases on solids- adsorption from solutions-Types of isotherms–Frendlich adsorption isotherm,Langmuir adsorption isotherm.Industrial applications of adsorption. Catalysis: Characteristics and types of catalysts-homogeneous and heterogeneous, auto catalysis. Enzyme catalysis -factors affecting enzyme catalysis, Michaelis-Menton equation.Industrial applications of catalysts.

**UNIT III PHOTOCHEMISTRY AND SPECTROSCOPY****9**

Photochemistry: Laws of photochemistry-Grotthuss-Draper law, Stark-Einstein law and Lambert-Beer Law. Photo processes-internal conversion, inter-system crossing, fluorescence, phosphorescence, chemiluminescence and photo-sensitization. Spectroscopy: Electromagnetic spectrum-absorption of radiation-electronic, vibrational and rotational transitions. Width and intensities of spectral lines.Spectrophotometric estimation of iron.UV-Vis and IR spectroscopy- principles, instrumentation (Block diagram) and applications.

**UNIT IV CHEMICAL THERMODYNAMICS****9**

Second law: Entropy-entropy change for an ideal gas, reversible and irreversible processes; entropy of phase transitions; Free energy and work function: Helmholtz and Gibbs free energy functions; Criteria of spontaneity; Gibbs-Helmholtz equation; Clausius Clapeyron equation; Maxwell relations-Van't Hoff isotherm and isochore. Chemical potential; Gibbs-Duhem equation- variation of chemical potential with temperature and pressure.

**UNIT V NANO CHEMISTRY****9**

Basics-distinction between molecules, nanoparticles and bulk materials; size-dependent properties.Preparation of nanoparticles – sol-gel and solvothermal.Preparation of carbon nanotube by chemical vapour deposition and laser ablation.Preparation of nanowires by VLS growth, electrochemical deposition and electro spinning.Properties and uses of nanoparticles, nanoclusters, nanorods, nanotubes and nanowires.

**TOTAL: 45 PERIODS**

**OUTCOME:**

- Will be familiar with polymer chemistry, surface chemistry and catalysis.
- Will know the photochemistry, spectroscopy and chemical thermodynamics.
- Will know the fundamentals of nano chemistry.

**TEXTBOOKS:**

1. Jain P. C. & Monica Jain., "Engineering Chemistry", DhanpatRai Publishing Company (P) Ltd, New Delhi, 2014.
2. Kannan P., Ravikrishnan A., "Engineering Chemistry", Sri Krishna Hitech Publishing Company Pvt. Ltd. Chennai, 2014

**REFERENCES:**

1. Pahari A., Chauhan B., "Engineering Chemistry", Firewall Media, New Delhi, 2012.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2012.
3. AshimaSrivastava. Janhavi N N, "Concepts of Engineering Chemistry", ACME Learning Private Limited., New Delhi., 2010.
4. Vairam S., Kalyani P., Suba Ramesh., "Engineering Chemistry", Wiley India Pvt Ltd., New Delhi., 2011.

<b>GE7151</b>	<b>COMPUTING TECHNIQUES</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Common to all branches of Engineering and Technology)</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES:**

- To learn programming using a structured programming language.
- To provide C programming exposure.
- To introduce foundational concepts of computer programming to students of different branches of Engineering and Technology.

**UNIT I INTRODUCTION 9**

Introduction to Computers – Computer Software – Computer Networks and Internet - Need for logical thinking – Problem formulation and development of simple programs - Pseudo code - Flow Chart and Algorithms.

**UNIT II C PROGRAMMING BASICS 9**

Introduction to C programming – Fundamentals – Structure of a C program – Compilation and linking processes - Constants, Variables – Data Types – Expressions - Operators –Decision Making and Branching – Looping statements – Solving Simple Scientific and Statistical Problems.

**UNIT III ARRAYS AND STRINGS 9**

Arrays – Initialization – Declaration – One dimensional and two dimensional arrays - Strings-String operations – String Arrays - simple programs- sorting- searching – matrix operations.

**UNIT IV POINTERS 9**

Macros - Storage classes –Basic concepts of Pointers– Pointer arithmetic - Example Problems - Basic file operations

**UNIT V FUNCTIONS AND USER DEFINED DATA TYPES 9**

Function – definition of function – Declaration of function – Pass by value – Pass by reference – Recursion –Enumerators – Structures - Unions

**TOTAL : 45 PERIODS**

**OUTCOMES:****At the end of the course, the student should be able to:**

- Write C program for simple applications
- Formulate algorithm for simple problems
- Analyze different data types and arrays
- Perform simple search and sort.
- Use programming language to solve problems.

**TEXTBOOKS:**

1. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013
2. Ashok N. Kamthane, "Computer programming", Pearson Education, 2007.
3. Yashavant P. Kanetkar. "Let Us C", BPB Publications, 2011.

**REFERENCES:**

1. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2006
2. Byron S Gottfried, "Programming with C", Schaums Outlines, Second Edition, Tata McGraw-Hill, 2006.
3. R.G. Dromey, "How to Solve it by Computer", Pearson Education, Fourth Reprint, 2007

**BS7161****BASIC SCIENCES LABORATORY**  
**(Common to all branches of B.E. / B.Tech Programmes)****L T P C**  
**0 0 4 2****OBJECTIVE:**

To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and liquids.

**PHYSICS LABORATORY: (Any Seven Experiments)**

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of disc
2. Non-uniform bending - Determination of young's modulus
3. Uniform bending – Determination of young's modulus
4. Lee's disc Determination of thermal conductivity of a bad conductor
5. Potentiometer-Determination of thermo e.m.f of a thermocouple
6. Laser- Determination of the wave length of the laser using grating
7. Air wedge - Determination of thickness of a thin sheet/wire
8. a) Optical fibre -Determination of Numerical Aperture and acceptance angle  
b) Compact disc- Determination of width of the groove using laser.
9. Acoustic grating- Determination of velocity of ultrasonic waves in liquids.
10. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids
11. Post office box -Determination of Band gap of a semiconductor.
12. Spectrometer- Determination of wavelength using gating.
13. Viscosity of liquids - Determination of co-efficient of viscosity of a liquid by Poiseuille's flow

**TOTAL: 30 PERIODS****OUTCOMES:**

The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials.

**(CHEMISTRY LABORATORY) (Minimum of 8 experiments to be conducted)**

1. Estimation of HCl using  $\text{Na}_2\text{CO}_3$  as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by Iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1, 10-Phenanthroline/thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
11. Determination of molecular weight of poly vinyl alcohol using Ostwald viscometer.
12. Pseudo first order kinetics-ester hydrolysis.
13. Corrosion experiment-weight loss method.
14. Determination of CMC.
15. Phase change in a solid.

**TOTAL: 30 PERIODS**

**TEXTBOOKS**

1. Vogel's Textbook of Quantitative Chemical Analysis (8<sup>TH</sup> edition, 2014)
2. Laboratory Manual- Department of Chemistry, CEGC, Anna University (2014).

**GE7161**

**COMPUTER PRACTICES LABORATORY**

L	T	P	C
0	0	4	2

**OBJECTIVES**

- To understand the basic programming constructs and articulate how they are used to develop a program with a desired runtime execution flow.
- To articulate where computer programs fit in the provision of computer-based solutions to real world problems.
- To learn to use user defined data structures.

**LIST OF EXPERIMENTS**

1. Search, generate, manipulate data using MS office/ Open Office
2. Presentation and Visualization – graphs, charts, 2D, 3D
3. Problem formulation, Problem Solving and Flowcharts
4. C Programming using Simple statements and expressions
5. Scientific problem solving using decision making and looping.
6. Simple programming for one dimensional and two dimensional arrays.
7. Solving problems using String functions
8. Programs with user defined functions
9. Program using Recursive Function
10. Program using structures and unions.

**TOTAL: 60 PERIODS**

## OUTCOMES

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

- Write and compile programs using C programs.
- Write program with the concept of Structured Programming
- Identify suitable data structure for solving a problem
- Demonstrate the use of conditional statement.

## LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS

30 Systems with C compiler

HS7251

TECHNICAL ENGLISH

L T P C

4 0 0 4

### OBJECTIVES:

- To enable students acquire proficiency in technical communication.
- To enhance their reading and writing skills in a technical context.
- To teach various language learning strategies needed in a professional environment.

### CONTENTS:

#### UNIT I ANALYTICAL READING 12

**Listening-** Listening to informal and formal conversations; **Speaking** – Conversation Skills(opening, turn taking, closing )-explaining how something works-describing technical functions and applications; **Reading** –Analytical reading, Deductive and inductive reasoning; **Writing-** vision statement–structuring paragraphs.

#### UNIT II SUMMARISING 12

**Listening-** Listening to lectures/ talks on Science & Technology;**Speaking** –Summarizing/ Oral Reporting, **Reading** – Reading Scientific and Technical articles; **Writing-** Extended definition –Lab Reports – Summary writing.

#### UNIT III DESCRIBING VISUAL MATERIAL 12

**Listening-** Listening to a panel discussion; **Speaking** – Speaking at formal situations; **Reading** – Reading journal articles - Speed reading; **Writing-**data commentary-describing visual material-writing problem-process- solution-the structure of problem-solution texts- writing critiques

#### UNIT IV WRITING/ E-MAILING THE JOB APPLICATION 12

**Listening-** Listening to/ Viewing model interviews; **Speaking** –Speaking at different types of interviews – Role play practice ( mock interview); **Reading** – Reading job advertisements and profile of the company concerned; **Writing-** job application – cover letter –Résumé preparation.

#### UNIT V REPORT WRITING 12

**Listening-** Viewing a model group discussion;**Speaking** –Participating in a discussion - Presentation;**Reading** – Case study - analyse -evaluate – arrive at a solution;**Writing-** Recommendations- Types of reports (feasibility report)- designing and reporting surveys- – Report format.- writing discursive essays.

### TEACHING METHODS:

Practice writing

Conduct model and mock interview and group discussion.

Use of audio – visual aids to facilitate understanding of various forms of technical communication.

Interactive sessions.

### EVALUATION PATTERN:

Internals – 50%

End Semester – 50%

**TOTAL:60 PERIODS**

**OUTCOMES:**

- Students will learn the structure and organization of various forms of technical communication.
- Students will be able to listen and respond to technical content.
- Students will be able to use different forms of communication in their respective fields.

**TEXTBOOK:**

1. Craig, Thaine. **Cambridge Academic English: An integrated skills course for EAP(Student's Book)Level: Intermediate** Cambridge University Press, New Delhi: 2012

**REFERENCES:**

1. Laws, Anne. **Presentations**. Hyderabad: Orient Blackswan, 2011.
2. Ibbotson, Mark. **Cambridge English for Engineering**. Cambridge University Press, Cambridge, New Delhi: 2008
3. Naterop, Jean B. and Rod Revell. **Telephoning in English**. Cambridge: Cambridge University Press, 2004.
4. Rutherford, Andrea J. **Basic Communication Skills for Technology**. New Delhi: Pearson Education, 2001.
5. Bailey, Stephen. **Academic Writing A practical Guide for Students**. Routledge, London: 2004
6. Hewings, Martin. **Cambridge Academic English: An integrated skills course for EAP(Student's Book)Level: Intermediate** Cambridge University Press, New Delhi: 2012.

**MA7251****MATHEMATICS - II****L T P C**

**(Common to all branches of B.E. / B.Tech. Programmes 4 0 0 4  
in II Semester)**

**OBJECTIVES:**

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow of the electric current.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

**UNIT I MATRICES****12**

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of eigenvalues and eigenvectors – Cayley-Hamilton theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

**UNIT II VECTOR CALCULUS****12**

Gradient and directional derivative – Divergence and Curl – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral - Area of a curved surface - Volume integral - Green's, Gauss divergence and Stoke's theorems – Verification and application in evaluating line, surface and volume integrals.

**UNIT III ANALYTIC FUNCTION 12**

Analytic functions – Necessary and sufficient conditions for analyticity - Properties – Harmonic conjugates – Construction of analytic function - Conformal mapping – Mapping by functions  $w = z+c$ ,  $az$ ,  $\frac{1}{z}$ ,  $z^2$  - Bilinear transformation.

**UNIT IV COMPLEX INTEGRATION 12**

Line integral - Cauchy's integral theorem – Cauchy's integral formula – Taylor's and Laurent's series – Singularities – Residues – Residue theorem – Application of residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour with no pole on real axis.

**UNIT V LAPLACE TRANSFORMS 12**

Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems -Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem – Transform of periodic functions – Application to solution of linear ordinary differential equations with constant coefficients.

**TOTAL: 60 PERIODS**

**OUTCOMES:**

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

- Evaluate real and complex integrals using the Cauchy integral formula and the residue Theorem
- Appreciate how complex methods can be used to prove some important theoretical results.
- Evaluate line, surface and volume integrals in simple coordinate systems
- Calculate grad, div and curl in Cartesian and other simple coordinate systems, and establish identities connecting these quantities
- Use Gauss, Stokes and Greens theorems to simplify calculations of integrals and prove simple results.

**TEXTBOOKS:**

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley and Sons, 9th Edition, New Delhi, 2014.
2. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.

**REFERENCES:**

1. Ramana, B.V. "Higher Engineering Mathematics", Tata McGraw Hill, New Delhi, 2010.
2. Glyn James, "Advanced Modern Engineering Mathematics", Pearson Education, New Delhi, 2007.
3. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 3rd Edition, 2007.
4. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.
5. Peter V. O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, New Delhi, 2007.



**OBJECTIVES:****To the study of nature and the facts about environment.**

- To find and implement scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

**UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY****14**

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Field study of common plants, insects, birds

Field study of simple ecosystems – pond, river, hill slopes, etc.

**UNIT II ENVIRONMENTAL POLLUTION****8**

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

**UNIT III NATURAL RESOURCES****10**

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

**UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT****7**

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act– Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

**UNIT V HUMAN POPULATION AND THE ENVIRONMENT****6**

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

**TOTAL: 45 PERIODS****OUTCOMES:**

Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.

- Public awareness of environment at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions.
- Development and improvement in standard of living has lead to serious environmental disasters.

**TEXT BOOKS:**

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2<sup>nd</sup> edition, Pearson Education 2004.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.

**REFERENCES:**

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press 2005.

**GE7152****ENGINEERING GRAPHICS**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**OBJECTIVES**

- To develop in students, graphic skills for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings.

**CONCEPTS AND CONVENTIONS (NOT FOR EXAMINATION)****1**

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

**UNIT I PLANE CURVES AND FREE HANDSKETCHING 14**

Basic Geometrical constructions, Curves used in engineering practices-Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves. Visualization concepts and Free Hand sketching: Visualization principles – Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

14

**UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES**

Orthographic projection- principles-Principal planes-First angle projection-Projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes- Determination of true lengths and true inclinations by rotating line method and trapezoidal method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

**UNIT III PROJECTION OF SOLIDS 14**

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to both the principal planes by rotating object method and auxiliary plane method.

**UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 14**

Sectioning of solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes.

**UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 15**

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems.

Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method and vanishing point method.

**COMPUTER AIDED DRAFTING (DEMONSTRATION ONLY) 3**

Introduction to drafting packages and demonstration of their use.

**L=45+T=30, TOTAL: 75 PERIODS**

**OUTCOMES:**

On Completion of the course the student will be able to

- Perform free hand sketching of basic geometrical shapes and multiple views of objects.
- Draw orthographic projections of lines, planes and solids
- Obtain development of surfaces.
- Prepare isometric and perspective views of simple solids.

**TEXT BOOK:**

1. N.D.Bhatt and V.M.Panchal, “Engineering Drawing”, Charotar Publishing House, 50th Edition, 2010.

**REFERENCES:**

1. K.R.Gopalakrishna., “Engineering Drawing” (Vol I&II combined) SubhasStores, Bangalore, 2007
2. Luzzader, Warren.J., and Duff,John M.,” Fundamentals of Engineering Drawingwith an introduction to Interactive Computer Graphics for Design and Production”, Eastern Economy Edition, Prentice Hall of India Pvt Ltd, New Delhi, 2005



**UNIT III SEMICONDUCTOR DEVICES****6**

PN-Junction Diode- Drift and Diffusion Current-Zener Diode-Zener Regulator- BJT- VI Characteristics-CE Configuration-Current Equation h-Parameter Model.JFET- VI Characteristics- Current Equation- Transconductance MOSFET-Types DMOS, EMOS – V-I Characteristics-Moll Current Equation.

**UNIT IV RECTIFIERS, AMPLIFIERS AND OSCILLATORS****9**

FWR-Filter-Capacitance Input Filter-Choke Input Filter – CE Amplification with and without feedback – Analysis and Frequency Response – CS MOSFET Amplifier – Analysis

**UNIT V OPERATION AMPLIFIER****12**

Introduction of an Inverting Amplifier, Non Inverting Amplifier, Basic Application of Operation Amplifier: Subtractor, Summing Amplifier, Analog to Digital Converter, Digital to Analog Converter, Low Pass Filter, First Order Low Pass Filter, First Order High Pass Filter, Integrator, Differentiator

**TOTAL: 45 PERIODS****OUTCOMES:****At the end of the course, the student should be able to:**

- Perform circuit analysis using various laws and theorems.
- Provide the characteristics and operation of PN junction diode, zener diode, laser diode and tunnel diode.
- Plot the V-I characteristics of BJT and MOSFET devices.
- Analyze the behavior of various amplifiers and oscillators.
- Point out the operation of operational amplifier and perform different applications using it.

**TEXT BOOKS:**

1. David A.Bell, "Electronic Devices and Circuit", Oxford press, 2008.
2. Robert T.Paynter, "Introductory Electronic Devices and Circuits", Pearson education, 2008.

**REFERENCES:**

1. Donald A.Neamen,"Electronic Circuit Analysis and Design" Third Edition Tata MC Graw Hill, 2011.
2. Adel S.Sedra Kenneth C. Smith, "Micro Electronic Circuit" Sixth Edition, Oxford University Press 2009.

**CS7251****PROGRAMMING AND DATA STRUCTURES I****L T P C****3 0 0 3****OBJECTIVES:**

- To design, analyze and implement of basic data structures and algorithms using C.
- To solve problems using linear and Non-linear data Structures.
- To judge efficiency trade-offs among alternative data structure implementations or combinations.

**UNIT I FUNCTIONS AND POINTERS IN C****9**

Functions - Storage classes - Recursion - Preprocessor directives - Arrays - Strings - Multidimensional arrays - Pointers – Pointer and Address arithmetic - Arrays and pointers - Pointers and strings

**UNIT II ARRAY BASED LINEAR DATA STRUCTURES****9**

Arrays and its representation - Abstract Data Types - Stack ADT - Queue ADT – Circular Queues- Evaluation of expressions

<b>UNIT III</b>	<b>OTHER FEATURES OF C</b>	<b>9</b>
Two-dimensional Arrays and Pointers - Pointers to functions - Dynamic Memory Allocation - Structures - Unions - Enumeration Types – Bit fields - Files		
<b>UNIT IV</b>	<b>LINKED LIST BASED LINEAR DATA STRUCTURES</b>	<b>9</b>
Single Linked lists - Stack ADT - Queue ADT - Polynomial ADT - Circularly linked lists - Doubly linked lists		
<b>UNIT V</b>	<b>NON LINEAR DATA STRUCTURES</b>	<b>9</b>
Binary Trees – Binary Tree Traversals – Additional Binary Tree Operations – Threaded Binary Trees – Binary Search Trees- Disjoint Sets.		

**TOTAL: 45 PERIODS**

**OUTCOMES:**

- To apply advance C programming techniques such as pointers, dynamic memory allocation, structures to develop solutions for particular problems.
- To explain how to choose the appropriate data structure to solve a programming problem
- To compare and contrast the benefits of dynamic and static data structures implementations

**TEXT BOOKS:**

1. Pradip Dey and Manas Ghosh,“ Programming in C”, Second Edition, Oxford University Press India, 2011.
2. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, “Fundamentals of Data Structures in C”, Second Edition, University Press (India), 2008.

**REFERENCES:**

1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, Second Edition, Pearson Education, Reprint 2011.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “Data Structures and Algorithms”, 1<sup>st</sup> Edition, Pearson Education, Reprint 2001.
3. Robert Kruse,C.L.Tondo, Bruce Leung, Shashi Mogalla , “ Data Structures and Program Design in C”, Second Edition, Pearson Education India, 2007.
4. Jean-Paul Tremblay and Paul G. Sorenson, “An Introduction to Data Structures with Applications”, Second Edition, Tata McGraw-Hill, 2001.

<b>GE7162</b>	<b>ENGINEERING PRACTICES LABORATORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Common to all Branches of B.E. / B.Tech. Programmes)</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>

**OBJECTIVES**

- To provide exposure to the students with hands-on experience on various Basic Engineering Practices in Civil, Mechanical, Electrical and Electronics Engineering.

**GROUP – A (CIVIL & ELECTRICAL)**

<b>1. CIVIL ENGINEERING PRACTICES</b>	<b>15</b>
<b>PLUMBING</b>	

Basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings. Preparation of plumbing line sketches.

- Laying pipe connection to the suction side of a pump.
- Laying pipe connection to the delivery side of a pump.
- Practice in connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

### **WOOD WORK**

- Sawing, planing and making joints like T-Joint, Mortise and Tenon joint and Dovetail joint.

### **STUDY**

- Study of joints in door panels and wooden furniture
- Study of common industrial trusses using models.

## **2. ELECTRICAL ENGINEERING PRACTICES 15**

- Basic household wiring using Switches, Fuse, Indicator and Lamp etc.,
- Stair case light wiring
- Tube – light wiring
- Preparation of wiring diagrams for a given situation.
- Study of Iron-Box, Fan Regulator and Emergency Lamp

## **GROUP – B (MECHANICAL AND ELECTRONICS) 15**

### **3. MECHANICAL ENGINEERING PRACTICES**

#### **WELDING**

- Arc welding of Butt Joints, Lap Joints, and Tee Joints
- Gas welding Practice.
- Basic Machining - Simple turning, drilling and tapping operations..
- Study and assembling of the following:
  - a. Centrifugal pump
  - b. Mixie
  - c. Air Conditioner.

#### **DEMONSTRATION ON FOUNDRY OPERATIONS.**

## **4. ELECTRONIC ENGINEERING PRACTICES 15**

- Soldering simple electronic circuits and checking continuity.
- Assembling electronic components on a small PCB and Testing.
- Study of Telephone, FM radio and Low Voltage Power supplies.

**TOTAL: 60 PERIODS**

### **OUTCOMES**

- Ability to fabricate carpentry components and to lay pipe connections including plumbing works.
- Ability to use welding equipments to join the structures
- Ability to do wiring for electrical connections and to fabricate electronics circuits.

**OBJECTIVES:**

- To understand and implement basic data structures using C
- To apply linear and non linear data structures in problem solving

1. Programs using Arrays and Functions
2. Programs using Structures
3. Array Implementation of List, Stack and Queue ADTs.
4. Programs using pointers and dynamic memory allocation.
5. Linked list implementation of List, Stack and Queue ADTs.
6. Applications of List, Stack and Queue ADTs.
7. Programs using file processing
8. Implementation of binary trees, traversal
9. Operations on binary trees
10. Operations on binary search trees.

**TOTAL: 60 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

- Implement data structures using C
- Develop applications based on data structures

**LABORATORY REQUIREMENTS FOR BATCH 30 STUDENTS**

30 Systems with C Compiler.