ACADEMIC REGULATIONS

B. Tech, Four Year Degree Programme with CBCS
(For the batches admitted from the academic year 2015-16)
and
B. Tech. Lateral Entry Scheme
(For the batches admitted from the academic year 2016-17)

The following rules and regulations will be applicable for the batches of Four year B. Tech. degree admitted from the academic year 2015-16 onwards.

1. ADMISSION:

1.1 Admission into First year of Four year B. Tech. Degree programme of study in Engineering:

As per the existing stipulations of Andhra Pradesh State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made into the first year of four year B. Tech. Degree programme as per the following pattern.

a) Category-A seats will be filled by the Convener, AP-EAMCET.

b) Category-B seats will be filled by the Management as per the norms stipulated by Govt. of Andhra Pradesh.

1.2 Admission into the Second Year of Four year B. Tech. Degree programme (lateral entry).

As per the existing stipulations of Andhra Pradesh State Council of Higher Education (APSCHE), Government of Andhra Pradesh.

2. PROGRAMMES OF STUDY OFFERED BY AITS LEADING TO THE AWARD OF B.TECH DEGREE:

Following are the four year undergraduate Degree Programmes of study offered in various disciplines at Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous) leading to the award of B. Tech. (Bachelor of Technology) Degree:

1. B. Tech. (Computer Science and Engineering)
2. B. Tech. (Electrical and Electronics Engineering)
3. B. Tech. (Electronics and Communication Engineering)
4. B. Tech. (Information Technology)
5. B. Tech. (Mechanical Engineering)
6. B. Tech. (Civil Engineering)

and any other programme as approved by the concerned authorities from time to time.

3. ACADEMIC YEAR:

The entire course of study is of four academic years and each year will have **TWO** Semesters (Total **EIGHT** Semesters). The minimum instruction days for each semester shall be 90.

4. COURSE STRUCTURE:

Each programme of study shall consist of:

4.1 General Courses comprising of the following :(5 to 10%)

a) Language / Communication Skills

b) Humanities and Social Sciences : Environmental Science

c) Economics and Accounting

d) Principles of Management

4.2 Basic Science Courses comprising of the following: (15 to 20%)

a) Computer Literacy with Numerical Analysis
b) Mathematics
c) Physics
d) Chemistry

4.3 Basic Engineering Courses comprising of the following (depending on the branch):(15 to 20%)

a) Engineering Drawing
b) Engineering and IT Workshop
c) Engineering Mechanics
d) Basic Mechanical Engineering
e) Electrical and Electronics Engineering
f) Basic Civil Engineering
g) Computer Programming

4.4 Compulsory Discipline Courses :(30 to 40%)

The lists of professional subjects are chosen as per the suggestions of the experts, to impart broad based knowledge needed in the concerned branch of study.

4.5 Professional subjects - Electives: (10 to 15%)

Electives will be offered to the students to diversify the spectrum of knowledge, based on the interest of the student to broaden his individual skill and knowledge.

4.6 Open Electives-(5 to 10%)

Open subjects will be offered from other technical and / or emerging subject areas

4.7 Project work, seminar and /or internship :(10-15%)

Project work, seminar and /or internship in industry or elsewhere.

4.8 Mandatory courses:

Environmental studies, Technical English and Technical Communication & Soft Skills are included as subjects under mandatory courses but with credit weightage.

4.9 There shall be a subject like comprehensive Computer Science and Engineering with 2 hours per week introduced in final year first semester.

4.10 Every programme of study shall be designed to have 42-44 theory courses and 19-22 laboratory/seminar/comprehensive courses.

4.11 Every programme has included foundation courses to the extent of 30%, programme core and programme elective subjects to the extent of 60%,open electives and mandatory courses to the tune of 10% approximately of the total credits.

4.12 Audit Courses(to be included in III B.Tech. I Sem & II Sem)

Interested students who want to supplement their knowledge can opt for audit courses namely Professional Ethics/Stress Management & Advanced English Communication laboratory and can appear/Pass in Continuous Internal Evaluation and Semester End Examination of these courses,will be included in marks memo only when they pass.

4.13 Open Elective

IV Year I Semester student has to necessarily select a subject from the list of open electives.

4.14 Contact Hours: Depending on the complexity and volume of the course, the number of contact hours per week will be assigned.

5. CREDIT SYSTEM:

Credits are assigned based on the following norms.

	Semester Pattern	
	Period(s) / Week	Credit(s)
Theory	01	01
Practical	3	02
Comprehensive Course	02	02
Seminar	–	02
Final Year Project	12	08

6. EXAMINATION SYSTEM: All components in any programme of study will be evaluated continuously through internal evaluation and an external evaluation component conducted as semester-end examination.

6.1 Distribution of Marks:

S. No.	Description	Marks	Examination and Evaluation	Scheme of Evaluation
1.	Theory	70	Semester-End examination.	The question paper shall be of subjective type with **Five** questions with internal choice to be answered in 180 Minutes duration.
		30	Mid-Examinations of 120 Minutes duration to be evaluated for 20marks. The question paper shall be of subjective type in which four questions with an internal choice are to be answered. Remaining 10 marks is for continuous evaluation. The method of allotting these marks will be decided by the teacher dealing that subject in consultation with the Head of the Department. Teacher has to announce the evaluation method in the beginning of the semester.	**Two** MID - Examinations are to be conducted for 20 marks each in a semester. 80% weightage for better performance and 20% for other shall be considered. **MID-I:** after first spell of instructions(I & II-Units). **MID-II:** after second spell of instructions (III, IV & V-Units). The student who has missed both the Mid examinations will be permitted to appear for a substitute examination covering the total syllabus. This substitute examination will be given a weightage of 80%. This is to be conducted before the commencement of end semester exams, can be even outside the working hours, can be even two mid exams a day also.

S. No.	Description	Marks	Examination and Evaluation	Scheme of Evaluation
2.	Laboratory or Drawing	70	Semester - End Lab Examination	**For laboratory courses:** **180 minutes** duration – two examiners. For Drawing and /or Design: like for the theory examination.
		30	**20 Marks** for Day to Day evaluation	Performance in laboratory experiments
			10 Marks for Internal evaluation	Performance of one best out of two tests to be considered.
3	Seminar	100	Internal Evaluation 20 Marks for Report 20 Marks for subject content 40 Marks for presentation 20 Marks for Question and Answers	Continuous evaluation during a semester by the Departmental Committee (DC) consisting of two/three faculty members allotted by Head of the Department.
4	Comprehensive Course	100	The marks can be allotted based on the performance in viva-voce conducted by Head of the department and two senior faculty members in the department.	
5	Project Work	100	70 Marks for External evaluation	Semester-end Project Viva-Voce Examination by Committee as detailed under 6.2
			30 Marks for Internal evaluation	Continuous evaluation by the DC 15 Marks by DC as detailed under 6.2.1 15 Marks by Supervisor

6.2 Project Work Evaluation:

6.2.1 The Internal Evaluation shall be made by the Departmental Committee, on the basis of average of two seminars presented by each student on the topic of his project, the best one to be considered. The presentations shall be evaluated by the Departmental Committee (DC) consisting of Head of the Department, supervisor and a senior faculty member.

6.2.2 The Semester-End Examination (viva-voce) shall be conducted by a Committee consisting of External examiner nominated by the Chief Controller of Examinations, HOD and Supervisor. The evaluation of project work shall be conducted at the end of the IV year II Semester.

6.3 Eligibility to appear for the Semester-End examination:

6.3.1 A student shall be eligible to appear for end examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in the semester.

6.3.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the Institute Academic Committee if the reason for shortage is convincing.

6.3.3 Shortage of Attendance below 65% in aggregate shall in no case be condoned.

6.3.4 A stipulated fee shall be payable towards condonation of shortage of attendance to the Institute as per following slab system

1st Slab : Less than 75% attendance but equal to or greater than 70% a normal condonation fee can be collected from the student.

2nd Slab : Less than 70% but equal to or greater than 65%, double the condonation fee can be collected from the student.

6.3.5 Students whose shortage of attendance is not condoned in any semester are not eligible to take their End examination of that class and their registration for that semester shall stand cancelled.

6.3.6 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the current semester, as applicable.

6.3.7 A student detained due to shortage of attendance, will have to repeat that semester when offered next.

6.4 Revaluation / Recounting:

Students shall be permitted to request for recounting/ revaluation of the end theory examination answer scripts within a stipulated period after payment of prescribed fee.

After recounting or revaluation, records are updated with changes if any and the student will be issued a revised memorandum of marks. If there are no changes, the student shall be intimated the same through a letter or a notice.

6.5 Improvement of marks:

Students are permitted for improvement examinations once for a maximum of four subjects after completion of the study course but before applying for provisional certificate and consolidated marks memo after payment of prescribed fee.

6.6 Supplementary Examination:

All Regular examinations are understood as Regular/Supplementary examinations. The supplementary students have to appear for the supplementary examinations along with their regular examinations conducted at the end of each semester. However, separate supplementary examinations will be conducted for the II-Semester subjects at the end of I-Semester and vice-versa.

6.7 Internship Programme:

The weightage of two credits given for an internship of three weeks duration and more, when a student undergoes internship / industrial training from the specified industries / research organizations / Universities. In such a case, the student has to submit a report on that internship which will be evaluated by a team of three faculty members (decided by the HOD) of the department for those two credits. Student is given a chance to drop one seminar in place of a successful internship / industrial training.

6.8 Massive Open Online Course (MOOC):

MOOC is one of the courses introduced in IV year II semester. The list of subjects under MOOC will be intimated before commencement of class work.

7. ACADEMIC REQUIREMENTS FOR PROMOTION/ COMPLETION OF B.TECH PROGRAMME OF STUDY:

The following academic requirements have to be satisfied in addition to the attendance requirements for promotion/ completion of B. Tech. Programme of study.

7.1 For students admitted into B. Tech. (Four Year) programme:

7.1.1 A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, drawing subject if he secures not less than 35% of marks in the End examination and a minimum of 40% of marks in the sum total of the internal evaluation and End examination taken together.

7.1.2 For promotion from I B.Tech.to II B. Tech. a student must satisfy the attendance requirements in I year (two semesters).

7.1.3 A Student shall be promoted from II year to III year, if he fulfills the academic requirements of securing a minimum of **50** credits from I year I and II-Semesters, II year I and II Semesters examinations conducted till that time.

7.1.4 A student shall be promoted from III year to IV year if he / she fulfills the academic requirements of securing a minimum of **74** credits from I year I and II-Semesters, II year I and II-Semesters and the III year I and II- Semester examinations conducted till that time.

7.1.5 A student shall register for all the subjects and earn all the**195**credits. Marks obtained in all the credits shall be considered for the calculation of the class based on CCPA.

7.1.6 A student who fails to earn all the **195** credits as indicated in the course structure within **eight** academic years from the year of admission shall forfeit his seat in B. Tech. Programme and his admission stands cancelled.

7.2 For Lateral Entry Students (batches admitted from 2016-2017):

7.2.1 Academic requirements for pass in a subject are the same as in 7.1.1 and attendance requirements as in 6.3.

7.2.2 A student shall be promoted from II year to III year if he fulfills the academic requirements of securing a minimum of **22** credits from II year I and II-Semesters examinations conducted till that time.

7.2.3 A student shall be promoted from III year to IV year if he fulfills the academic requirements of securing a minimum of **46** credits from II year I and II-Semesters and the III year I and II-Semester examinations conducted till that time.

7.2.4 A student shall register for all the subjects and earn all **139** credits. Marks obtained in all such credits shall be considered for the calculation of the class based on CCPA.

7.2.5 A student who fails to earn all the **139** credits as indicated in the course structure within **six** academic years from the year of his admission shall forfeit his seat in B. Tech. Programme and his admission stands cancelled.

8. TRANSITORY REGULATIONS:

Students who got detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work for the next batch or later batches with the same (or) equivalent subjects as and when subjects are offered and they continue to be in the academic regulations of the batch he is joining later.

9. CREDIT POINT AVERAGE (CPA) AND CUMULATIVE CREDIT POINT AVERAGE (CCPA):

9.1 For a semester:

Credit Point Average [CPA] $=\frac{1}{10}\frac{\sum_i C_i T_i}{\sum_i C_i}$

Where C_i= Credits earned for Course i in any semester,

T_i= Total marks obtained for course i in any semester

9.2 For the entire programme:

Cumulative Credit Point Average [CCPA] $= \frac{1}{10} \frac{\sum_n \sum_i C_{ni} T_{ni}}{\sum_n \sum_i C_{ni}}$

Where *n*= the semester in which such courses were credited

9.3 Overall Performance:

CCPA	Classification of final result
7.0 & above	First class with distinction
6.0 & above but below 7.0	First class
5.0 & above but below 6.0	Second class
4.0 & above but below 5.0	Pass

10. TRANSCRIPTS:

After successful completion of the entire programme of study, a transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee. Partial transcript will also be issued up to any point of study to a student on request.

11. ELIGIBILITY:

A student shall be eligible for the award of B. Tech. Degree if he fulfills all the following conditions:

(i) Registered and successfully completed all the components prescribed in the programme of study to which he is admitted.

(ii) Successfully acquired all **195/139 credits** as specified in the curriculum corresponding to the branch of study within the stipulated time.

(iii) No disciplinary action is pending against him.

12. AWARD OF B.TECH DEGREE:

12.1 A student is permitted to select one of the extracurricular / extension activities like NSS / Sports / Games / Cultural activities. A certificate in one of these activities is a must for the student to become eligible for the award of Provisional Certificate or Degree.

12.2 The B. Tech. Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu on the recommendations of the Principal of Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous).

13. AMENDMENTS TO REGULATIONS:

The chairman, Academic Council of Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

14. Any legal issues are to be resolved in Rajampet Jurisdiction.

15. **GENERAL:**

Where the words "he", "him", "his", "himself" occur in the regulations, there include "she", "her", "herself".

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CURRICULUM STRUCTURE

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Regulations : **R15** Programme Code: **G1**

I Year B. Tech. I Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GC11	English through Literature	2	1	0	2
5GC12	Engineering Chemistry	4	1	0	4
5GC14	Engineering Mathematics-I	3	1	0	3
5G111	Problem solving techniques and Introduction to C Programming	3	1	0	3
5GC15	Mathematical Methods –I	3	1	0	3
5G513	Engineering Drawing –I	1	--	3	3
5GC16	ELCS Lab-I	1	--	3	2
5GC17	Engineering Chemistry Lab	--	--	3	2
5G112	Programming in C Lab	--	--	6	4
5G113	IT Workshop	--	--	3	2
		17	5	18	28

I Year B. Tech. II Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GC21	Technical English	2	1	0	2
5GC23	Engineering Physics	4	1	0	4
5GC24	Engineering Mathematics-II	3	1	0	3
5G121	C programming and Data Structures	3	1	0	3
5GC25	Mathematical Methods –II	3	1	0	3
5G523	Engineering Drawing –II	1	--	3	3
5GC26	ELCS Lab-II	1	--	3	2
5GC28	Engineering Physics Lab	--	--	3	2
5G122	Data structures Lab	--	--	6	4
5G524	Engineering workshop	--	--	3	2
	Total	**17**	**5**	**18**	**28**

Note: L - Lecture; T-Tutorial; P – Practical; C – Credits

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Regulations : **R15** Programme Code: **G1**

II Year B. Tech. I Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GC33	Probability & Statistics	4	1	0	4
5G236	Electrical Engineering and Electronics Engineering	4	1	0	4
5G131	Advanced Data Structures Through C++	4	1	0	4
5G132	Digital Logic Design	4	1	0	4
5G133	Principles of Programming Languages	4	1	0	4
5G431	Discrete Mathematics	4	1	0	4
5GC35	Aptitude and Reasoning Skills	0	0	2	2
5G240	Electrical Engineering And Electronics Engineering Lab	0	0	3	2
5G134	Advanced Data Structures Lab Using C++	0	0	3	2
	Total	**24**	**6**	**8**	**30**

II Year B. Tech. II Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GC43	Environmental Science	4	1	0	4
5G141	Computer Organization	4	1	0	4
5G142	Design and Analysis of Algorithms	4	1	0	4
5G143	Formal Languages and Automata Theory	4	1	0	4
5G144	Object Oriented Programming	4	1	0	4
5G441	Database Management Systems	4	1	0	4
5G145	Seminar-1	0	0	2	2
5G146	JAVA Lab	0	0	3	2
5G443	Database Management Systems Lab	0	0	3	2
	Audit Course 1: Professional Ethics	2	0	0	0
Total		**26**	**6**	**8**	**30**

Note: L - Lecture; T-Tutorial; P – Practical; C – Credits

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I Year B. Tech. I Semester

(5GC11) ENGLISH THROUGH LITERATURE
(Common to all branches)

Course Objectives:

- To improve the language proficiency of the students in English through literature
- To enhance the vocabulary of the students in English through the use of diverse authentic materials
- To enable the students absorb the human values expressed in literature

Text Books:

1.For Detailed study: Texts from Open Sources (Available on Web)

2.For Non-detailed study: *Trailblazers* published by Orient Black Swan

- Texts from open sources are included in the syllabus to make the teaching-learning process more interesting and inspiring. Also, the literary texts from open sources will allow the student learn language through literature. The book for the non-detailed study allows the student to have an insight into the lives and careers of some legendary personalities.
- The text for non-detailed study is meant for extensive reading by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements etc.

Unit I

Detailed Study: *Cabuliwallah* by Rabindranath Tagore; *The Road not Taken* by Robert Frost

Non-detailed Study: G. D. Naidu

Unit II

Detailed Study: *A Dog's Tale* by Mark Twain*; If* by Rudyard Kipling

Non-detailed Study: Sudha Murthy

Unit III

Detailed Study: *The Gift of Magi* by O. Henry; *Leisure* by W. H. Davies

Non-detailed Study: Vijay Bhatkar

Unit IV

Detailed Study: *An Astrologer's Day* by R. K. Narayan: *Night of the Scorpion* by Nissim Ezekiel*;*

Non-detailed Study: Jagadish Chandra Bose

Unit V

Detailed Study: *The Proposal* by Anton Chekhov

Non-detailed Study: HomiJehangir Baba

Course Outcomes:

- The student will appreciate the significance of silent reading and comprehension
- The student develops critical thinking and creative writing skills through exposure to literary texts
- The student will understand the components of different forms of writing

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I Year B. Tech. I Semester

(5GC12) ENGINEERING CHEMISTRY
(Common to CSE, IT, ME and CE)

Course Objectives:

- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- The lucid explanation of the topics will help students understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.
- The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.
- After completion of the course, the student would understand about the concepts of chemistry in respect of Electrochemical cells, fuel cells, mechanism of corrosion and factors to influence, polymers with their applications, analytical methods, engineering materials and water chemistry.

Unit I

Water Treatment: Impurities in water, Hardness of water and its Units, Disadvantages of hard water, Estimation of hardness by EDTA method, Numerical problems on hardness, Estimation of dissolved oxygen, Alkalinity and chlorides in water, Water treatment for domestic purpose Disinfection- Definition, Kinds of disinfectants (Bleaching powder, Ozone, chloramine, UV light and Chlorine), Break point chlorination.

Industrial Use of water: For steam generation, Boiler troubles: Scale & Sludge, Priming and Foaming, Caustic Embrittlement and Boiler Corrosion.

Treatment of Boiler Feed water: Internal Treatment: Colloidal, Phosphate, Carbonate, Calgon and sodium aluminate conditioning. External Treatment: Permutit / Zeolite process, Ion-Exchange process, Desalination of brackish water by Reverse Osmosis.

Unit II

Electrochemistry: Electrochemical cells: Basic concepts, classification of electrochemical cells, numerical calculations, Batteries: classification of batteries: Primary (Leclanche battery, mercury battery) and Secondary /rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries) Fuels cells: (Hydrogen-Oxygen and Methanol-Oxygen)

Electrochemical sensors: Potentiometric Sensors and Voltammetric sensors. Examples: analysis of Glucose and urea.

Corrosion: Definition & Types (dry & wet Corrosions), Electrochemical Theory of corrosion, concentration cell corrosion, galvanic corrosion, factors affecting the corrosion, Prevention: Anodic and Cathodic protection, Electroplating (Nickel, copper and chromium) & Electroless plating

Unit III

POLYMERS: Introduction to polymers, Polymerization process- types (without mechanism), Plastics: Thermosetting and Thermoplastics, Preparation, properties and Engineering applications of PVC, Bakelite, nylons.

Natural Rubber: Processing, vulcanization and compounding of rubber. Elastomers: Preparation, properties and engineering applications of Buna-S, Buna-N and polyurethane rubbers.

Conducting polymers: Mechanism, synthesis and applications of polyacetylene, polyaniline. Biodegradable polymers Carbohydrates, proteins

Inorganic Polymers: Basic Introduction Silicones, polyphosphazines.

Unit IV

FUEL TECHNOLOGY: Classification of Fuels – Characteristics of Fuels- Calorific Value – Units, its determination using bomb calorimeter, Numerical Problems. Solid Fuels-Coke: Manufacture of Metallurgical Coke by Otto Hoffmann's by product oven processes.

Liquid Fuels: Petroleum: Refining of Petroleum, Gasoline: Knocking, Octane Number, Synthetic Petrol: Bergius Processes, Fischer Tropsch's synthesis. Diesel and Cetane number. Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol

Gaseous Fuels: Origin, Production and uses of Natural gas, Producer gas, Water gas, Coal gas and Biogas. Flue Gas analysis by Orsat's apparatus, Solving of problems on Combustion.

Unit V

CHEMISTRY OF ENGINEERING MATERIALS

Cement: Composition & manufacture of Portland cement, Setting and Hardening (Hydration and Hydrolysis), Refractories: Classification with suitable examples, properties and applications

Lubricants: Definition and properties of lubricants, theory of lubrication, and applications of lubricants.

Rocket Propellants: Classification, Characteristics of a good propellant

Text Books:

1. Engineering Chemistry by K. N. Jayaveera, G. V. Subba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, New Delhi, Fourth Edition, 2012.
2. A Text Book of Engineering Chemistry, Jain and Jain, Dhanapath Rai Publishing Company, New Delhi, 15th Edition, 2010.

Reference Books:

1. A Text book of Engineering Chemistry by S.S Dhara, S.S.Umare, S. Chand Publications, New Delhi, 12th Edition, 2010.
2. Engineering Chemistry by K. B. Chandra Sekhar, U N. Das and Sujatha Mishra, SCITECH, Publications India Pvt Limited, Chennai, 2nd Edition, 2012.
3. Concepts of Engineering Chemistry- Ashima Srivastava and N.N. Janhavi, Acme Learning Pvt Ltd, First Edition, 2013.
4. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.AgarwalandAndra Naidu, BS Publications, Hyderabad, 3rd Edition, 2008.
5. Text Book of Engineering Chemistry, Shashichawla, DhanapathRai Publications, New Delhi, 4th Edition, 2011.
6. Engineering Chemistry, K. SeshaMaheswaramma and MrudulaChugh, Pearson Education, First Edition, 2013.

Course Outcomes:

The student is expected to:

- Understand the functions of fuel cells, batteries and extends the knowledge to the processes of corrosion and its prevention.
- Understand industrially based polymers, various engineering materials.
- Differentiate between hard and soft water.
- Understand the disadvantages of using hard water domestically and industrially.
- Select and apply suitable water treatment methods domestically and industrially.
- Understand the manufacture of synthetic petrol.
- Differentiate between thermoplastics and thermosetting plastics.
- Understand the manufacture, setting and hardening of cement.

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I Year B. Tech. I Semester

(5GC14) ENGINEERING MATHEMATICS – I
(Common to all branches)

Course Objectives:

The course aims to provide the student with the ability

- To understand the Differential equations of first, second and higher orders with their applications.
- To understand the concept of partial differentiation and its applications.
- To understand the concept of curve tracing in various forms

Unit I

Linear and Bernoulli equations, Applications to Newton's law of cooling, law of natural growth and decay, Rate of decay of radio-active materials, Chemical reaction and solutions, orthogonal trajectories.

Unit II

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, sinax and cosax, polynomials in x, e^{ax} V(x), xV(x), method of variation of parameters. Applications to oscillatory electrical circuits.

Unit III

Series solutions of differential equations: Validity of series solution of the equation, series solution when x=0 is an ordinary point of the equation, Frobenius method .

Rolle's Theorem – Lagrange's Mean Value Theorem (without proof). Simple examples of Taylor's and Maclaurin's Series

Unit IV

Functions of several variables – Partial differentiation- Chain rule-Jacobian – Maxima and Minima of functions of two variables, Lagrangian method of Multipliers with three variables only.

Unit V

Curve tracing – Tracing of Cartesian, polar and parametric curves.

Text Books:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers-43rd Edition (2014)

Reference Books:

1. Higher Engineering Mathematics, by Kreyszing
2. A Text Book of Engineering Mathematics, B.V. Ramana, Tata McGraw Hill.
3. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and others, S.Chand& Company.

Course Outcomes:

Upon completion of the course, students should be able to

- Understand the various types of ordinary differential equations
- Have the knowledge on functions of several variables.
- Understand the concepts of curve tracing

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I Year B. Tech. I Semester

(5G111) PROBLEM SOLVING TECHNIQUES AND INTRODUCTION TO C PROGRAMMING
(Common to ALL branches)

Course Objectives:

- Introduction to computer peripherals, Software development.
- Describe when and how to use the C statement and to Write, Compile and Debug basic C programs using an IDE
- Write and debug programs using an IDE and the principles of designing
- Structured programs when and how to use the appropriate statements available in the C language
- Write basic C programs using, Selection statements, Repetitive statements, Functions, Pointers, Arrays and Strings
- Implementation of C applications for data structures, Sorting and Searching.

Unit I

Introduction to Computer Problem Solving: Introduction to Computer Systems, Computer Environments, Computer Languages, Introduction to Problem Solving Aspect, Top- down Design, Implementation of Algorithms, Flow Charts, SDLC.

Unit II

Introduction to C Language: Structure of a C Language program, Creating and Running C programs, Keywords, Identifiers, Data Types, Typedef, enumerated Types variables, constants, input/output. Operators and Expressions, precedence and associatively, Type Conversions, Bitwise Operators. Example programs for each topic.

Unit III

C Program Statements, Selection and Decision making Statements-two way selection –if…else statements, multi way selection-switch statements. Loop Control Statements-concept of a loop, Loops in C-while loop, do…while loop, for loop, Other Related Statements -break, continue, goto. Example programs for each topic.

Unit IV

ARRAYS: Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Multidimensional Arrays.

Strings: String Basics, String Library Functions, Array of Strings. Example programs for each topic.

Unit V

Functions: Library Functions in C, User defined Functions,-declaration, definition, calling of function, types of User defined functions, Parameter passing methods-pass by value, pass by reference, Scope, Storage Classes - Auto, Register, Static, Extern, Scope rules, Type Qualifiers, Recursion - Recursive Functions, Preprocessor Commands. Using Array Elements as Function Arguments. Example programs for each topic.

Text Books:

1. C Programming and Data Structures.B.AForouzan,R. F.Gilberg,Cengage learning, Indian edition.
2. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
3. C and Data Structures, E.Balaguruswamy, Tata McGraw Hill.
4. How to Solve it By Computer, R.G.Dromey,PHI.

Reference Books:

1. C and Data Structures, A snapshot oriented treatise with live engineering examples, Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand.
2. LET US C, YeswanthKanitkar, Ninth Edition, BPB Publication.

Course Outcomes:

After completion of the course student will be able to

- Understand the importance of the software development process and System development tools.
- Understand general principles of C programming language and able to write simple program in C. Able to develop programs based on arrays and functions.

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I Year B. Tech. I Semester

(5GC15) MATHEMATICAL METHODS-I

(Common to CSE and IT)

Course Objectives:

- This course aims at providing the student with the concepts of Matrices, which find the applications in engineering.
- Emphasis will be more on logical and problem solving development in Numerical methods and their applications.

Unit I

Matrices: Real Matrices -Types - definitions - Elementary row transformations – Rank – Echelon form, Normal form – Solution of Linear System of Homogenous and Non Homogeneous equations by Gauss Elimination method.

Unit II

Eigen Values, Eigen vectors – Properties, Cayley – Hamilton Theorem –Diagonalization of matrix-Calculation of powers of matrix.

Unit III

Reduction of quadratic form to canonical form and their nature - Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian, Unitary matrices-Eigen Values, Eigen vectors – Properties.

Unit IV

Solution of Algebraic and Transcendental Equations – Bisection Method – Method of False Position – Newton-Raphson Method.

Unit V

Interpolation - Introduction – Forward Differences – Backward Differences – Newton's forward and backward difference interpolation formulae – Lagrange's Interpolation formula.

Numerical Differentiation - Numerical Integration: Newton-Cotes quadrature formula- Simpson's 3/8 Rule, Boole's rule, Weddle's rule.

Text Books:

Higher Engineering Mathematics, B. S. Grewal, Khanna publishers, 43rd Ed, 2014

Reference Books:

1. Numerical Methods for Scientific and Engineering Computation, M.K. Jain, S.R.K. Iyengar & R.K. Jain, New Age international Publishers.
2. Introduction to Numerical Analysis – S.S. Sastry, Prentice Hall of India.
3. Mathematical Methods, T.K.V. Iyengar, B. Krishna Gandhi and Others, S. Chand & company.

Course Outcomes:

- The student becomes familiar with the application of Mathematical techniques like Matrices.
- The student gains the knowledge to tackle the engineering problems using the concepts of Partial differential equations and Numerical methods.

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I Year B. Tech. I Semester

(5G513) ENGINEERING DRAWING- I
(Common to EEE, ECE, CSE and IT)

Course Objectives:

- To enable the students with various concepts like Dimensioning, Conventions and standards related to working drawing in order to become professionally efficient.
- To introduce fundamental concepts of curves used in engineering, projection of points, lines.
- To impart and inculcate proper understanding of the theory of projections.
- To improve the visualization skills.

Unit I

INTRODUCTION: Lettering –Geometrical constructions - Construction of polygons by General method – Inscribing a triangle, square. Pentagon, hexagon in a circle.

Unit II

CONICS: Ellipse, Parabola and Hyperbola (General method only). Special Methods: Ellipse - Concentric Circles method, Oblong method & Arcs of Circles method - Drawing tangent& normal to the conics.

Unit III

CYCLOIDAL CURVES: Cycloid, Epi cycloid, Hypo cycloid (simple problems) - Drawing tangent & normal to the cycloidal curves.

Unit IV

PROJECTIONS OF POINTS & LINES: Projections of points - Projections of lines inclined to one reference plane.

Unit V

PROJECTIONS OF LINES INCLINED TO BOTH REFERENCE PLANES: Projections of lines; inclined to both reference planes.

Text Books:

Engineering drawing by N.D.Bhatt

Reference Books:

1. Engineering graphics by K.L. Narayana& P. Kannayya
2. Engineering drawing and graphics by Venugopal/ New age
3. Engineering drawing by Johle / TMI

Course Outcomes:

- Students will be able to know and understand the conventions and the methods of Engineering Drawing.
- Able to understand the application of industry standards and techniques applied in Engineering Drawing.
- Dimension and annotate two-dimensional engineering drawings.
- Students will be able to improve their visualization skills.

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I Year B. Tech. I Semester

(5GC16) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB – I
(Common to all branches)

Course Objectives:

- To train students to use language effectively in everyday conversations
- To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
- To enable the students learn better pronunciation through emphasis on individual speech sounds

SYLLABUS:

The following course content is prescribed for the **English Language Laboratory** sessions:

1. **Introduction to the Sounds of English- Vowels, Diphthongs & Consonants**
2. **Situational Dialogues and Role-play**
3. **Telephone Skills**
4. **Describing Objects / Situation / People**

Manual cum Record, prepared by the Faculty Members of English of the college will be used by Students.

Minimum Requirement:

The English Language Lab shall have two parts:

- **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
- **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V. an LCD projector, a digital stereo –audio & video system and camcorder etc.

Suggested Software:

Sky Pronunciation Suite

Connected Speech from Clarity

Clarity Pronunciation Power – Part I

Mastering English in Vocabulary, Grammar, Spellings, Composition

English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

Dorling Kindersley - Series of Grammar, Punctuation, Composition etc.

Language in Use, Foundation Books Pvt Ltd with CD

Learning to Speak English - 4 CDs

Microsoft Encarta with CD

Cambridge Advanced Learners' English Dictionary with CD.

Murphy's English Grammar, Cambridge with CD

Course Outcomes

- The student will be able to express himself fluently in social and professional contexts
- The student will learn how to neutralize his accent

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I Year B. Tech. I Semester

(5GC17) ENGINEERING CHEMISTRY LAB
(Common to CSE, IT, ME and CE)

Course Objectives:

- The student will learn practical understanding of the redox reaction.
- The student will learn the preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications.
- The student will also learn the hygiene aspects of water would be in a position to design methods to produce potable water using modern technology.

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed

VOLUMETRIC ANALYSIS

Redox Titrations

1. Estimation of iron (II) using Diphenylamine indicator (Dichrometry – Internal indicator method)
2. Estimation of Chloride ion using potassium Chromite indicator (Mohr's method)

Water analysis

3. Determination of total hardness of water by EDTA method
4. Estimation of Dissolved Oxygen by Winkler's method
5. Determination of acidity of Water
6. Determination of Alkalinity of Water.

Complexometry

7. Determination of Copper by EDTA method

Iodometry

8. Determination of Copper by Iodometry

INSTRUMENTATION

Colorimetry

9. Estimation of Iron in Cement by Colorimetry.

Conductometry

10. Conductometric titration of strong acid Vs strong base (Neutralization titration)

Fuel analysis

11. Determination of Calorific Value of fuel by using Bomb Calorimeter

Lubricants

12. Determination of Viscosity of oils using Redwood Viscometer I
13. Determination of Viscosity of oils using Redwood Viscometer II

PREPARATION OF POLYMERS

14. Preparation of Bakelite
15. Preparation of Thiokol rubber

Manual cum Record: Prepared by the Faculty Members of Engineering Chemistry of the college will be used by Students.

Equipment Required:

- ✓ Analytical weighing balance
- ✓ Digital Conductometer
- ✓ Photo-colorimeter
- ✓ Bomb calorimeter
- ✓ Redwood viscometers
- ✓ Deionizer plant
- ✓ Digital electronic balance

Glassware Required:

Pipettes, burettes, conical flasks, standard flasks, beakers, reagent bottles, spatulas, wash bottles, BOD Bottles, measuring cylinders, glass rods, Bunsen burners, funnels, thermometers etc.

Chemicals Required:

EDTA, Hypo, Mohr Salt Solution, HCl, Sulphuric Acid, Copper Solution, Iron Solution, Potassium Dichromate Solution, Potassium Iodide Solution, Buffer Solution, diphenyl amine, EBT indicator, NaOH solution, Benzoic acid Urea, distilled water etc.

REFERENCE BOOKS:

1. Vogel's Text book of Quantitative Chemical Analysis, J. Mendham et al, Pearson Education, Sixth Edition, 2012.
2. Chemistry Practical – Lab Manual by K.B.ChandraSekhar, G.V. Subba Reddy and K.N.Jayaveera, SM Publications, Hyderabad, 3rd Edition, 2012.

Course Outcomes:

- The student would be confident in understanding of redox systems
- The student would have acquired the practical skill to handle the analytical methods with confidence.
- The student would feel comfortable to think of design materials with the requisite properties
- The student would be in a position to technically address the water related problems.

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I Year B. Tech. I Semester

(5G112) PROGRAMMING IN C LAB
(Common to CSE and IT branches)

Course Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C to solve the problems.
- To introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:

Intel based desktop PC with ANSI C/ TURBO C Compiler and Supporting Editors

Exercise l:

Minimum of 4 programs on Data types, Variables, Constants and Input and Output.

Exercise 2:

Minimum of 4 programs on each Operator, Expressions and Type Conversions.

Exercise 3:

Minimum of 4 programs on Conditional Statements [two way and multipath].

Exercise 4:

Minimum of 4 programs on each Loop Control Statements[for, while and do-While]

Exercise 5:

Minimum of 4 programs on Unconditioned JUMP Statements- break, continue, Goto.

Exercise 6:

Minimum of 4 programs on Declaring Arrays, Referencing Arrays, Array Subscripts. Using for loop for sequential Access.

Exercise 7:

Minimum of 4 programs on Multidimensional Arrays.

Exercise 8:

Minimum of 4 programs on String Basics, String Library Functions and Array of Strings.

Exercise 9:

Minimum of 4 programs on simple user defined functions, Parameter passing methods- pass by value, pass by reference.

Exercise 10:

Minimum of 4 programs on Storage classes- Auto, Register, Static and Extern

Exercise 11:

Minimum of 4 programs on Recursive Functions, Preprocessor commands.

Exercise 12:

Minimum of 4 programs on using Array Elements as Function Arguments.

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I Year B. Tech. I Semester

(5G113) I.T. WORKSHOP
(Common to CSE, EEE, ECE and IT)

Course Objective:

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer by installing the operating system
- To learn about Networking of computers and use Internet facility for Browsing and Searching.

Preparing your Computer

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: Operating system features: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD / DVD drives, write CD / DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet

Task 5: Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

Task 6: Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, search process using different natural languages, and creating e-mail account.

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools

Task 8: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell

checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 9: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 10: Presentations: creating, opening, saving and running the presentations, selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Optional Tasks:

Task 11: Laboratory Equipment: Students may submit a report on specifications of various equipment that may be used by them for the laboratories in their curriculum starting from I B.tech to IV. B.Tech. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop computer
- Server computer
- Switch (computer science related)
- Microprocessor kit
- Micro controller kit
- Lathe machine
- Generators
- Construction material
- Air conditioner
- UPS and Inverter
- RO system
- Electrical Rectifier
- CRO
- Function Generator
- Microwave benches

Task 12: Software: Students may submit a report on specifications of various software that may be used by them for the laboratories in their curriculum starting from I B. Tech. to IV. B. Tech. The software may be proprietary software or Free and Open source software. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop operating system
- Server operating system
- Antivirus software
- MATLAB
- CAD/CAM software
- AUTOCAD

REFERENCE BOOKSS:

1. Introduction to Computers, Peter Norton, Mc Graw Hill
2. MOS study guide for word, Excel, Powerpoint & Outlook Exams", Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs", Bigelows, TMH

Course Outcome:

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
- Prepare the Documents using Word processors
- Prepare Slide presentations using the presentation tool
- Interconnect two or more computers for information sharing
- Access the Internet and Browse it to obtain the required information
- Install single or dual operating systems on computer

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I Year B. Tech. II Semester

(5GC21) TECHNICAL ENGLISH
(Common to all branches)

Course Objectives:

- To improve the language proficiency of the students in English with an emphasis on LSRW skills
- To equip the students with comprehension skills to study academic subjects with greater facility.
- To develop English communication skills of the students in formal and informal situations

Text Books:

Sure Outcomes **published by Orient Black Swan (with CD)**

- The book prescribed serves as students' handbook. The reader comprises essays which are particularly relevant to engineering students.
- The teacher should focus on developing LSRW skills of students while using the prescribed text and exercises. The classes should be interactive. The students should be encouraged to participate in the classroom proceedings and also to write short paragraphs and essays. The main aim is to encourage two-way communication in place of one-sided lecture.

Unit I

Sure Outcomes: Technology with a Human Face

Grammar: Kinds of Verbs and their Use; Writing: Official Letters; Vocabulary: Synonyms and Antonyms, Prefixes and Suffixes, Idioms and Phrases

Unit II

Sure Outcomes: Climatic Change and Human Strategy

Grammar: Tenses; Writing: Letters of Application; Vocabulary: One-word Substitutes

Unit III

Sure Outcomes: Emerging Technologies: Solar Energy in Spain

Grammar: Types of Sentences: Simple, Compound and Complex; Declarative, Interrogative, Imperative and Exclamatory; Writing: E-mails; Vocabulary: Commonly Confused Words

Unit IV

Sure Outcomes: Water: The Elixir of Life

Grammar: Subject-Verb Agreement; Writing: Official Reports, Technical Reports; Vocabulary: English Spelling, Commonly misspelt words

Unit V

Sure Outcomes: The Secret of Work

Grammar: Active and Passive Voice; Writing: Note-making; Vocabulary: Connotations

Reference Books:

1. Essential Grammar in Use, (with CD), Raymond Murphy, 3/e, Cambridge University Press, 2009
2. Basic Communication Skills for Technology, Andrea J Ruthurford, Pearson Education, Asia.
3. English for Technical Communication, AyshaViswamohan, Tata Mc-Graw Hill
4. English Grammar and Composition, David Grene, Mc Millan India Ltd.
5. Murphy’s English Grammar, Raymond Murphy, CAMBRIDGE
6. Everyday Dialogues in English by Robert J. Dixson, Prentice-Hall of India Ltd., 2006.
7. Communication Skills for Technical Students, Farhathullah, T.M., Orient Blackswan, 2008

8. Developing Communication Skills, 2/e. by Krishna Mohan &MeeraBanerji, Macmillan, 2009
9. English for Technical Communication, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.
10. Longman Dictionary of Contemporary English with DVD, Pearson Longman

Course Outcomes:

- The student will demonstrate the ability to guess the contextual meaning of the words and grasp the overall message of the text to draw inferences
- The student will understand the components of different forms of writing
- The student will exhibit effective writing skills through his understanding of English Grammar

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I Year B. Tech. II Semester

(5GC23) ENGINEERING PHYSICS
(Common to CSE, IT, ME and CE)

Course Objectives:

- The mission of the Engineering Physics course is to prepare students for careers in engineering where physics principles can be applied to the advancement of technology.
- The Engineering Physics course educates the principles of optical science and engineering necessary to understand optical systems.
- The Crystallography, X-ray diffraction of crystals and crystal defects explains how basic structure modulates properties of materials.
- The principles of quantum mechanics and electron theory of metals gives an idea on basic development of energy in metals.
- The main objective of this course is to provide basic understanding of different engineering materials (semiconductors, magnetic, superconducting and nano materials).

Unit I

PHYSICAL OPTICS, LASERS AND FIBRE OPTICS:

Physical Optics: Introduction - Interference in thin films by reflection – Newton's Rings – Fraunhofer diffraction due to single slit, double slit and diffraction grating.

Lasers: Introduction - Characteristics of laser – Spontaneous and stimulated emission of radiation - Einstein's coefficients - Population inversion – Ruby laser - He-Ne laser - Semiconductor laser - Applications of lasers. Holography: Construction and Re-Construction of hologram - Applications

Fiber optics**:** Introduction– Construction and working principle of optical fiber – Numerical Aperture and acceptance angle – Types of optical fibers – Optical fiber communication system – Applications of optical fibers in communications, sensors and medicine.

Unit II

CRYSTALLOGRAPHY AND ULTRASONICS:

Crystallography: Introduction – Space lattice –Unit cell – Lattice parameters – Bravias lattice – Crystal systems – Packing fractions of SC, BCC and FCC - Directions and planes in crystals – Miller indices – Inter planar spacing in cubic crystals – X-ray diffraction - Bragg's law – Powder method– Defects in solids: point defects and types.

Ultrasonics**:** Introduction – Properties – Production of ultrasonics by piezoelectric method and detection – Applications in non-destructive testing.

Unit III

QUANTUM MECHANICS AND FREE ELECTRON THEORY:

Quantum Mechanics: Introduction to matter waves – de-Broglie's hypothesis - Heisenberg's uncertainty principle - Schrodinger's time independent wave equation – Significance of wave function - Particle in a one dimensional infinite potential well.

Free electron theory: Classical free electron theory –- Sources of electrical resistance – Equation for electrical conductivity - Quantum free electron theory – Fermi-Dirac distribution – Kronig - Penny model (qualitative) – Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

Unit IV

SEMICONDUCTORS AND MAGNETIC MATERIALS:

Semiconductors: Introduction – Intrinsic and extrinsic semiconductors – Drift & diffusion currents and Einstein's equation – Hall Effect - Direct and indirect band gap semiconductors – Working principle of p-n junction diode, LED and photodiode.

Magnetic materials: Introduction and basic definitions – Origin of magnetic moments – Bohr magneton – Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials – Hysteresis - Soft and hard magnetic materials and applications.

Unit V

SUPERCONDUCTIVITY AND NANOMATERIALS:

Superconductivity: Introduction –Properties of superconductors - Meissner effect – Type I and type II superconductors – Flux quantization – London penetration depth – BCS theory (qualitative) –ac and dc Josephson effects- Applications of superconductors.

***Nanomaterials*:** Introduction - Significance of nanoscale –Basic principles of nano materials (Surface area and quantum confinement) – Physical properties: optical, thermal, mechanical and magnetic properties –Synthesis of nanomaterials: ball mill, chemical vapor deposition, sol-gel, plasma arcing methods – Carbon nanotubes (CNT) and properties – Applications of nanomaterials.

Text Books:

1. Engineering physics –K.Thyagarajan, MacGraw Hill Publishers,2013.
2. Engineering Physics – S. ManiNaidu, Pearson Education, I Edition, 2012.
3. Engineering physics –P.K.palanisamy,scietech publisher,Edition,2013.

Reference Books:

1. Engineering Physics – RV.S.S.N. Ravi Kumar and N.V. Siva Krishna, Maruthi Publications, 2013
2. Engineering Physics – D.K.Battacharya and A.Bhaskaran,OxfordHeigher Education I Edi 2010.
3. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning, I Edition, 2012.
4. Engineering Physics – D.K.Bhattacharya and A.Bhaskaran, Oxford University press.
5. Engineering Physics – M. Arumugam, Anuradha Publications II Edition, 1997.
6. Engineering physics – M.N. Avadhanulu and P.G. KrshiSagar, Chand and Co, Revised Edi 2013.
7. Solid State Physics – A.J. Dekkar, McMillan Publishers, Latest edition, 2012.
8. Engineering Physics – Gaur and Gupta Dhanapati, RaiPublishers, 7th Edition, 1992.
9. Text book of Nanoscience and Nanotechnology: B S Murthy, P.Shankar, Baldev Raj B B Rath, James Murday, University Press, I Edition, 2012.

Course Outcomes:

The student is able to

- Understand basic principles of optics, optical engineering materials and incorporation of optics in engineering field.
- Identify different types of crystal structures in materials and x-ray diffraction through crystals.
- Know about importance of ultrasonic's in engineering field.
- Analysis of basic concepts of quantum mechanics and electron theory and consequences.
- Explain about basic mechanism of different types of advanced materials used in engineering field.
- Get brief idea about synthesis, properties and applications of nano materials.

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I Year B. Tech. II Semester

(5GC24) ENGINEERING MATHEMATICS – II
(Common to all branches)

COURSE OBJECTIVES:

The course aims to provide the student with the ability

- To apply this knowledge to evaluate the multiple integrals in real life situations.
- To apply the knowledge of Laplace transforms and vector calculus for engineering problems

Unit I

Multiple integral: –Double integral – Evaluation - Change of Variables - Change of order of integration- Area and volumes using double integral. Triple integral - Evaluation.

Unit II

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Second shifting theorem– Laplace transform of Periodic functions – Inverse Laplace transform – Convolution theorem.

Unit III

Application of Laplace transforms to ordinary differential equations of first and second order.

Unit IV

Vector Calculus: Scalar and vector point functions, Gradient and its geometrical interpretation, Divergence –physical interpretation of divergence, Curl -physical interpretation of curl, Del applied twice to point functions, Line integral - Area, Surface and volume integrals.

Unit V

Vector Integral Theorems: Green's theorem – Stoke's theorem and Gauss's Divergence Theorem (without proofs) and their applications.

TEXT BOOK:

Higher Engineering Mathematics, B.S.Grewal, Khanna publishers- 43rd Edition (2014)

REFERENCE BOOKSS:

1. Higher Engineering Mathematics, by Kreyszing
2. A Text Book of Engineering Mathematics, B.V. Ramana, Tata McGraw Hill.
3. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and others, S. Chand & Company.

COURSE OUTCOMES:

Upon completion of the course, students should be able to

- Understand the concepts of applications of integration.
- Have the knowledge of Laplace transforms and their applications.
- Master vector integral theorems.

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I Year B. Tech. II Semester

(5G121) C PROGRAMMING AND DATA STRUCTURES
(Common to ALL branches)

Course Objectives:

- Structured programs when and how to use the appropriate statements available in the C language
- Write basic C programs using, Selection statements, Repetitive statements, Functions, Pointers, Arrays and Strings
- Implementation of C applications for data structures, sorting and searching.

Unit I

Pointers - Introduction, Features of Pointers, Pointer Declaration and Definition, Void Pointers, pointers for inter function communication, Pointers to Pointers, Pointer Applications: arrays and pointers, pointer arithmetic, Dynamic Memory Allocation, Pointers to Functions, pointer to void and command line arguments.

Unit II

Structures – Definition, initialization, accessing structures, nested structures, array of structures, structures and functions. Pointers and Structures. Unions. Sample programs

Files: Introduction to Streams and Files, Standard library input / output functions, formatted input / output functions, character input/output functions; Text verses binary Streams, Standard library functions for files. File examples.

Searching and Sorting - Exchange (Bubble) Sort, Selection Sort, Quick Sort, Insertion Sort, Merge Sort, Searching- Linear and Binary Search Methods.

Unit III

Data Structures: Overview of Data Structure. **Stack:** Representation of a Stack, Operation on a Stack, Implementation of a Stack using Arrays and Pointers, Representation of Arithmetic Expressions, Infix, Prefix, and Postfix Notations, Evaluation of Postfix Expression, Recursion.

Queues: Representation of Queue, Insertion, Deletion, Searching Operations, Circular Queues.

Unit IV

Linked List: Singly Linked List, Linked List with and without header, Insertion, Deletion and Searching Operations.

Doubly Linked List: Insertion, Deletion and Searching Operations.

Circular Linked List: Insertion, Deletion and Searching Operations.

Unit V

Trees: Introduction to Trees, Binary Trees, creation of binary tree, Operations on Binary Tree. Introduction to Binary Search Tree, Operations on Binary Search Trees.

Graphs: Defining graph, basic terminology, graph representation.

Text Books:

1. C Programming and Data Structures.B.AForouzan,R. F.Gilberg,Cengage learning, Indian edition.
2. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
3. Data Structures and Algorithms: Concepts, Techniques and ApplicationsG.A.V. Pai [UNIT-V]

Reference Books:

1. C and Data Structures, A snapshot oriented treatise with live engineering examples, Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand.
2. LET US C, Yeswanth Kanitkar, Ninth Edition, BPB Publication.

Course Outcomes:

- Understand the purpose of pointers for parameter passing, referencing and dereferencing and understands the concepts of structures, unions and File management.
- Understand what and how to design data structure programs using C programming language.
- Understand how to solve applications like searching and sorting using C Programming language.

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I Year B. Tech. II Semester

(5GC25) MATHEMATICAL METHODS-II
(Common to CSE and IT)

Course Objectives:

- This course aims at providing the student with the concepts of Matrices, Fourier series and partial differential equations which find the applications in engineering.
- Emphasis will be more on logical and problem solving development in Numerical methods and their applications.

Unit I

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

Unit II

Numerical solution of Ordinary Differential equations - Taylor's series - Euler's Method – Picard's Method –Runge-Kutta Fourth Order Method – Milne's Predictor-Corrector Method.

Unit III

Fourier series: Determination of Fourier coefficients – Fourier series of Even and odd functions – Fourier series in an arbitrary interval – Half-range Fourier sine and cosine expansions.

Unit IV

Fourier transforms – Fourier sine and cosine transforms- Finite Fourier sine and cosine transforms.

Unit V

Partial differential equations: Formation of a PDE by elimination of arbitrary constants and functions- Solution of first order linear equation and nonlinear equations of standard types.Method of separation of variables.

Text Book:

Higher Engineering Mathematics, B. S. Grewal, Khanna publishers, 43rd Ed, 2014.

Reference Books:

1. Numerical Methods for Scientific and Engineering Computation, M.K. Jain, S.R.K. Iyengar& R.K. Jain, New Age international Publishers.
2. Introduction to Numerical Analysis – S.S. Sastry, Prentice Hall of India.
3. Mathematical Methods, T.K.V. Iyengar, B. Krishna Gandhi and Others, S. Chand & company.

Course Outcomes:

- The student becomes familiar with the application of Mathematical techniques like Fourier series, Matrices.
- The student gains the knowledge to tackle the engineering problems using the concepts of Partial differential equations and Numerical methods.

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I Year B. Tech. II Semester

(5G523) ENGINEERING DRAWING- II
(Common to EEE, ECE, CSE and IT)

Course Objectives:

- To impart and inculcate proper understanding of the theory of projections of planes, solids and simple machine components.
- To improve the visualization skills of the student.
- To prepare the student for future engineering positions.

Unit I

PROJECTIONS OF PLANES: Projection of planes inclined to one reference plane - and inclined to both the reference planes.

Unit II

PROJECTIONS OF SOLIDS: Cylinder, Cone, Prism and Pyramid - Axis Inclined to one reference plane.

Unit III

PROJECTIONS OF SOLIDS: Cylinder, Cone, Prism and Pyramid - Axis inclined to both the reference planes.

Unit IV

ISOMETRIC PROJECTIONS: Projections of Lines, Planes and Simple Solids – Prism, Pyramid, Cylinder and Cone in simple positions only.

Unit V

CONVERSION OF VIEWS: Conversions of Orthographic views into Isometric views and Conversion of Isometric views to Orthographic views.

TEXT BOOKS:

Engineering drawing by N.D. Bhatt

REFERENCE BOOKSS:

1. Engineering graphics by K.L. Narayana& P. Kannayya
2. Engineering drawing and graphics by Venugopal/ New age
3. Engineering drawing by Johle / TMI

Course Outcomes:

- Comprehend general projection theory, with an emphasis on the use of orthographic projection to represent three-dimensional objects in two-dimensional views.
- Can employ 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideas graphically.
- Analyze a drawing and bring out any inconsistencies to put forth inferences graphically

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I Year B. Tech. II Semester

(5GC26) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB - II
(Common to all branches)

Course Objectives:

- To enable a learner sharpen his public speaking skills
- To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
- To enable the student learn better pronunciation through emphasis on word accent, intonation, and rhythm

SYLLABUS

The following course content is prescribed for the **English Language Laboratory** sessions:

1. Introduction to Stress and Intonation
2. 'Just A Minute' (JAM)
3. Oral Presentations
4. Information Transfer

Manual cum Record, prepared by the Faculty Members of English of the college will be used by Students.

Minimum Requirements:

The English Language Lab shall have two parts:

- **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
- **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V. an LCD projector, a digital stereo –audio & video system and camcorder etc.

Suggested Software:

- Sky Pronunciation Suite
- Connected Speech from Clarity
- Clarity Pronunciation Power – Part I
- Language in Use, Foundation Books Pvt Ltd with CD
- Learning to Speak English - 4 CDs
- Cambridge Advanced Learners' English Dictionary with CD.
- Murphy's English Grammar, Cambridge with CD

Course Outcomes

- The student will enhance his skills to make a presentation confidently
- The student will learn how to neutralize his accent
- The student will be able to decipher information from graphics and describe it professionally

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I Year B. Tech. II Semester

(5GC28) ENGINEERING PHYSICSLAB
(Common to CSE, IT, ME and CE)

Course Objectives:

- The student will be able to handle and understand different apparatus to perform experiments.
- The student will learn practical measurement of different physical quantities.
- The student will be able to characterize the materials and their properties.
- The student will be allowed to learn practical experience of theory conceptual values.

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed

1. Determination of wavelengths of various colors of mercury spectrum using diffraction grating in normal incidence method
2. Determination of dispersive power of the prism
3. Determination of thickness of thin object by wedge method
4. Determination of radius of curvature of lens by Newton's Rings
5. Laser : Diffraction due to single slit
6. Laser : Diffraction due to double slit
7. Laser: Determination of wavelength using diffraction grating
8. Determination of Numerical aperture of an optical fiber
9. Meldi's experiment: Determination of the frequency of tuning fork
10. Determination of particle size by using laser.
11. Energy gap of a material using p-n junction diode
12. Hall effect : Determination of mobility of charge carriers in Semiconductor
13. B-H curve
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
15. Determination of rigidity modulus –Torsional pendulum

Manual Cum Record:

Prepared by Engineering Physics Faculty Members of Annamacharya Institute of Technology and Sciences.

Reference Books:

1. Engineering Physics Practicals – Dr. B. Srinivasa Rao V.K.V. Krishna K.S Rudramamba
2. Engineering Practical Physics – S.L Kakani& Shubra Kakani

Equipment required:

- Spectrometers
- Microscopes
- Meldi's apparatus
- Stewart-Gee's apparatus
- Torsional pendulum
- Light sources
- Optical fiber cables

Course Outcomes:

- The student would be confident in handling apparatus to perform experiments.
- The student would have developed practical skill.
- The student would have knowledge in practical values and applications

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I Year B. Tech. II Semester

(5G122) DATA STRUCTURES LAB
(Common to CSE and IT)

Course Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C to solve the problems.
- To introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:

Intel based desktop PC with ANSI C/ TURBO C Compiler and Supporting Editors

Exercise 1 : Minimum of 4 Programs on pointer basics.

Exercise 2 : Minimum of 4 Programs on Pointers applications.

Exercise 3 : Minimum of 4 programs on structures and unions

Exercise 4 : Minimum of 4 programs on basic File operations.

Exercise 5 : Minimum of 4 programs on searching and sorting techniques .

Exercise 6 : Implementation of Stack and perform all Stack operations using
i) Arrays ii) Pointers

Exercise 7 : Implementation of Queue and perform all Queue operations using
i) Arrays ii) Pointers

Exercise 8 : Implement Circular Queue (its operations) using
i) Arrays ii) Pointers

Exercise 9 : Implementation of Single Linked List and its operations using
i) Arrays ii) Pointers

Exercise 10 : Implementation of Double Linked List and its operations using
i) Arrays ii) Pointers

Exercise 11 : Implementation of Circular Linked List and its operations using
i) Arrays ii) Pointers

Exercise 12 : C program that uses Stack operations to perform the following:
i) Write Converting infix expression into postfix expression
ii) Evaluating the postfix expression

Exercise 13 : Implement Binary Tree using Double Linked List and its operations.

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I Year B. Tech. II Semester

(5G524) ENGINEERING WORKSHOP
(Common to CSE, EEE, ECE and IT)

Course Objectives:

The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially, know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

1. TRADES FOR EXERCISES:

- **A. CARPENTRY SHOP**– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 50 x 50 mm soft wood stock
- **B. FITTING SHOP**– Two joints (exercises) from: square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock.
- **C. SHEET METAL SHOP**– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 gauge G.I. sheet.
- **D. HOUSE-WIRING**– Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.
- **E. Foundry–**Preparation of two moulds (exercises): for a single pattern and a double pattern.
- **F. WELDING** – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint

2. TRADES FOR DEMONSTRATION:

A. PLUMBING

B. MACHINE SHOP

C. METAL CUTTING

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

Reference Books:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas.
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

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II Year B. Tech. I Semester

(5GC33)PROBABILITY AND STATISTICS

Course Objectives:

- To understand the measure of uncertainty.
- To apply this knowledge to insurance, statistics, Engineering.

Unit I

Probability: Sample space and events – Probability – The axioms of probability – Some Elementary theorems - Conditional probability – Baye's theorem. Random variables – Discrete and continuous – Distribution functions - mean and variance.

Unit II

Binomial distribution –Poison distribution- Uniform distribution - Normal distribution.

Unit III

Sampling distribution: Population and sample - Sampling distributions of means (σ known and unknown).

Estimation: Point estimation – interval estimation - one mean –two means (large sample) and one proportion – two proportions (large sample).

Unit IV

Test of Hypothesis – Large samples: hypothesis concerning one and two means. Test of proportions (one and two).Small samples: t- test.

Unit V

F-test, $\chi 2$–Tests– goodness of fit, rxc contingency tables.

Text Books:

1. Fundamentals of Mathematical Statistics, S C Gupta and V K Kapoor, Sultan s.chand & sons.
2. A text book of Probability & Statistics, B. V. Ramana, Tata McGraw Hill.

Reference Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 8^{th} edition, New Age International (Pvt) Limited.
2. Probability & Statistics, T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
3. Probability & Statistics for Engineers, Miller and John E. Freund, Prentice Hall of India.

Course Outcomes:

Upon the completion, the student will be:

- Able to understand the concepts of sample space and events.
- Gain the knowledge on probability distributions.
- Able to understand the concepts of random variables, sampling distributions of means.

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II Year B. Tech. I Semester

(5G236) ELECTRICAL ENGINEERING AND ELECTRONICS ENGINEERING
(Common for CSE & IT)

Course Objective:

- To impart the basic knowledge about the Electric circuits.
- To understand the working of various Electrical Machines.
- To know about various electronic devices.
- To understand the various parts of CRO.

Unit I

ELECTRICAL CIRCUITS: Basic definitions, types of elements, ohm's law, resistive, inductive, capacitive networks, Series- parallel circuits, star and delta transformations, and Kirchhoff's laws.

Unit II

DC MACHINES: DC Generator: Constructional Details of DC machine, Principle of operation, emf equation, types of generators, applications.

DC Motor: principle of operation, torque equation, types, three point starter, losses and efficiency, applications

Testing: brake test, Swinburne's test, and Speed control methods.

Unit III

AC MACHINES: 1-φTransformers: Principle of operation, emf equation, losses, efficiency and regulation. OC and SC tests.

Alternator: Principle of operation of alternators-Regulation by synchronous impedance method.

3-φ Induction motor: Principle of operation of induction motor-slip-torque characteristics.

Test: Brake Test on 3- φ induction motor.

Unit IV

DIODE AND TRANSISTORS: Diode: PN junction diode, symbol, V-I characteristics, applications, Half wave, full wave and bridge rectifiers (simple problems).

Transistors: PNP and NPN junction transistors, Characteristics of CE configuration, Transistor as an amplifier, single stage CE amplifier, Frequency response of CE amplifier

Unit V

ELECTRIC HEATING AND CRO: Induction Heating: Theory of induction heating, applications in industries.

Dielectric heating: Theory of dielectric heating and its industrial application

CRO: Block diagram of CRO, Principle of CRT (cathode ray tube), applications of CRO, voltage, current and frequency measurements.

Text Books:

1. V. K. Mehta, Principles of Electrical and Electronics Engineering. S. Chand & Co.
2. T. Thyagarajan, *Fundamentals of Electrical and Electronics Engineering*. SciTech publications, 2007, 5th Ed.

Reference Books:

1. M.S Naidu and S.Kamakshaiah, *Introduction to Electrical Engineering.* TMH Publications.
2. Kothari and Nagrath, *Basic Electrical Engineering*, TMH, 2nd Ed.
3. Mill man and Halkias, *Electriconics devices and circuits*.

Course Outcome:

After the completion of the course, the student should be able

- Able to apply fundamental concepts to find response of electrical circuits.
- Able to identify the types of DC-Machines and their applications
- Able to calculate the efficiency of DC-Machines.
- Able to explain the principle operation of Transformer, Induction Motor and their application.
- Able to draw the slip-Torque characteristics of Induction motor.
- Able to identify the semi-conductor devices and their applications.
- Able to explain the types of heating
- Able to explain the working principle of CRO.

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II Year B. Tech. I Semester

(5G131) Advanced Data Structures through C++
(Common for CSE & IT)

Course Objectives:

The Primary **Objectives** of This Course are as Follows:

- To learn New & Advanced Data Structures
- To acquire knowledge on Algorithmic Design and Analysis
- To solve problems Using Different Data Structures and Design Techniques, and Compare Their Performance and Tradeoffs
- To implement Algorithms and Data Structures in C++

Unit I

INTRODUCTION TOC++: Introduction, Class Overview: Class, Objects, Class Members, I/O Streams, Access Control, Class Scope, Static Class Members: Static Member Variables, Static Member Functions, Static Object, Functions: Parameter Passing Methods, Inline Functions, The Friend Function, This Pointer, Dynamic Memory Allocation and Deallocation: New Operator, Delete Operator, Exception Handling.

Unit II

OBJECT ORIENTED CONCEPTS: Constructors, Constructor Overloading, Destructors, Function Overloading, Operator Overloading: Plus, Minus, Unary, Inheritance: Base Class Access Control, Types of Inheritance, Reasons for the usage of Inheritance, Polymorphism: Virtual Functions, Pure Virtual Functions, Abstract Classes, Generic Programming with Templates: Function Templates, Class Templates.

Algorithms: Performance Analysis, Space Complexity, Time Complexity: Bubble Sort, Selection Sort.

Unit III

STACKS AND QUEUES: Stack ADT, Queue ADT, Operations of Stack & Queue ADT

DICTIONARIES: Dictionaries, Linear List Representation, Skip List Representation: Operations, Searching, Insertion, Deletion, Hash Table: Hash Functions, Collisions: Separate Chaining, Open Addressing - Linear Probing, Quadratic Probing, Double Hashing or Rehashing, Extendible Hashing, Comparison of Chaining and Open Addressing.

Unit IV

BINARY TREES: Binary Trees, Representation of Binary Trees, Binary Trees Operations, Binary Trees Traversals.

PRIORITY QUEUES: Priority Queue ADT, Priority Queue Implementation Using Heaps, External Sorting.

SEARCH TREES (PART I): Binary Search Trees ADT, Representation of Binary Search Tree, Operations on Binary Search Trees: Insertion, Deletion and Searching, AVL Trees, Operations of AVL Trees: Insertion, Deletion and Searching.

Unit V

SEARCH TREES (PART II): Introduction to Red–Black and Splay Trees, B-Trees, Operations on B-Trees: Insertion, Deletion and Searching, Height of B Tree.

PATTERN MATCHING AND TRIES: Pattern Matching Algorithms, Fixed Pattern Matching Algorithms: Brute Force, Boyer–Moore, Knuth-Morris-Pratt Algorithms, Tries: Standard Tries, Compressed Tries, Suffix Tries.

Text Books:

1. Akepogu Ananda Rao, Palagiri Radhika Raju, Data Structures and Algorithms Using C++, Pearson Education.
2. Sartaj Sahni Data Structures, Algorithms and Applications in C++, Universities Press (India) Pvt. Ltd, 2nd Edition.
3. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, Pearson Education, 2nd Edition.

Reference Books:

1. Data Structures And Algorithms in C++, Michael T.Goodrich, R.Tamassia and Mount, Wiley Student Edition, John Wiley And Sons.
2. Data Structures and Algorithms in C++, 3rd Edition, Adam Drozdek, Thomson
3. Data Structures Using C and C++, Langsam, Augenstein and Tanenbaum, Phi.
4. Problem Solving With C++, The OOP, 4th Edition, W.Savitch, Pearson Education.

Course Outcomes:

After the completion of this course, the student will be :

- Able to use C++ functions and the concepts
- Able to understand numerous examples of relationships between data;
- Able to understand the purpose and mathematical background of algorithm analysis and be able to apply this to determine the run time and memory usage of algorithms;
- Able to understand the abstract data types of stacks and queues;
- Able to understand the characteristics and implementation of dictionaries using various techniques.
- Able to understand various searching tree & pattern matching algorithms and the run-time analysis required to determine their efficiencies.

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II Year B. Tech. I Semester

(5G132)DIGITAL LOGIC DESIGN

Course Objective:

- To understand how logic circuits are used to solve engineering problems.
- To understand how logic circuits are analyzed, designed, verified, and tested.
- To understand the relationship between abstract logic characterizations and practical electrical implementations

Unit I

Introduction to Binary System and Codes: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements. Signed Binary Numbers, Binary Codes, Binary Logic.

Boolean algebra and Logic Gates: Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations.

Unit II

Gate-Level Minimization: Digital Logic Gates, Integrated Circuits, The Map Method, Four-Variable Map, Five-Variable Map, Product of Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Other Two- Level Implementations, Exclusive-OR Function.

Unit III

Combinational Logic: Combinational Circuits, Analysis Procedure of Combinational Circuits, Design Procedure, Binary Adder, Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers.

Unit IV

Synchronous Sequential Logic: Sequential circuits, Latches, Flip-Flops, Analysis of clocked sequential circuits, state reduction and Assignment, Design Procedure

Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other Counters.

Unit V

Asynchronous Sequential Logic: Introduction, Analysis Procedure, Circuits with Latches. Design Procedure, Hazards.

Memory and Programmable Logic: Introduction, Random-Access Memory, Error Detection and Correction, Read-Only Memory, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices, Introduction to HDL.

Text Book:

Digital Design, 4^{th} Edition,M.MorrisMano,PearsonEducation,Inc.,2002

Reference Books:

1. Digital Logic Design Principles, Norman Balabanian and Bradley Carlson, John Wiley & Sons(Asia) Pte.Ltd.,2002.
2. Fundamentals of Digital Circuits, A. Ananda Kumar, PHI, 2002.

Course Outcomes:

After the completion of this course, the student will:

- Able to understand different number systems, binary arithmetic, and complement representations.
- Able to understand different switching algebra theorems and apply them for logic functions.
- Able to understand the Karnaugh map representation and perform operations on it.
- Able to analyze and design of different combinational circuits.
- Able to understand storage elements, counters, registers and programmable logic devices.
- Able to understand the synchronous and asynchronous sequential circuits.

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II Year B. Tech. I Semester

(5G133) PRINCIPLES OF PROGRAMMING LANGUAGES

Course Objectives:

- To understand the main principles of imperative, functional, object oriented and logic oriented programming languages.
- To know an introduction to formalisms for specifying syntax and semantics of programming languages, including an introduction to the theory of formal languages.
- To know various important programming methodologies, such as functional programming, logic programming, programming with abstract data types and object-oriented programming.

Unit I

Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories.

Programming Paradigms: Imperative, Object Oriented, functional Programming, Logic Programming, Programming Language Implementation-compilation and virtual machines, Programming environments.

Syntax and Semantics: General Problem of describing Syntax and Semantics, formal methods of describing syntax, BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, Denotational semantics and axiomatic semantics for common programming language features.

Unit II

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types, Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

Expressions: Arithmetic, relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements.

Unit III

Control Structures: Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions, user defined overloaded operators, co routines.

Unit IV

Abstract Data types: Abstractions and Encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT,

Concurrency: Subprogram level concurrency, semaphores, monitors, message passing, Java threads

Exception handling: Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

Unit V

Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

Text Books:

1. Concepts of Programming Languages Robert W. Sebesta, Pearson Education, Eighth Edition 2008.
2. Programming Languages-Louden,second edition, Thomson.

Reference Books:

1. Programming Languages-Ghezzi, 3/e,John Wiley.
2. Programming Languages Design and implementation-Pratt and Zelkowitz, Fourth Edition PHI/Pearson Education.
3. Programming Languages-Watt,WileyDreamtech.
4. LISP, Patric Henry Winston and Paul Horn, Pearson Education.
5. Programming in PROLOG Clocksin, Springer.

Course Outcomes:

After completion of this course, the student will:

- Able to understand the comparison of different Programming languages
- Able to understand the importance and evolution of programming language
- Able to identify the central formalisms used in the description of programming languages.
- Able to analyze the principles of an imperative, functional, object oriented or logic oriented programming language.
- Able to learn new programming languages.

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II Year B. Tech. I Semester

(5G431) DISCRETE MATHEMATICS
(Common for CSE and IT)

Course Objective:

This course aims at designing ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

Unit I

MATHEMATICAL LOGIC: Statements and Notation, Connectives, Statement Formulas and Truth Tables, Conditional and Biconditional, Well-Formed Formulas, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications, Normal Forms, Validity using Truth Tables, Rules of Inference, Consistency of Premises and Indirect Method of Proof, Automatic Theorem Proving, Predicates, The Statement Function, Variables and Quantifiers, Predicate Formulas, Free and Bound Variables, The Universe of Discourse.

Unit II

RELATIONS AND ALGEBRAIC STRUCTURES: Properties of binary Relations in a Set, Relation Matrix and the Graph of a Relation, Partition and Covering of a Set, Equivalence Relations, Compatibility Relations, Partial Ordering, Hasse Diagram. Functions, Composition of Functions, Inverse Functions, Recursive Functions, Lattice and its Properties, Algebraic Systems, Simple Algebraic Systems and General Properties, Semi Groups and Monoids, Groups, Subgroups, Homomorphism, Isomorphism.

Unit III

ELEMENTARY COMBINATORICS: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion-Exclusion, Pigeonhole Principle and its Applications.

Unit IV

RECURRENCERELATIONS: Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, The Method of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relations.

Unit V

GRAPH THEORY: Basic Concepts, Representation of Graphs, Isomorphism and Subgraphs, Depth First Search, Breadth First Search, Trees and Their Properties, Spanning Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

Text Books:

1. J.P.Tremblay, R.Manohar, Discrete Mathematical Structures with Applications to Computer Science. TMH (UNITS 1 & 2).
2. J.L.Mott,A.Kandel, T.P.Baker,Discrete Mathematics for Computer Scientists &Mathematicians. Prentice Hall (UNITS 3,4 & 5)

Reference Books:

1. Thomas Koshy, Discrete Mathematics with Applications. Elsevier.
2. N. Chandrasekaran, M. Umaparvathi, Discrete Mathematics,PHI Learning Pvt. Ltd.
3. BernandKolman, Roberty C. Busby, Sharn Cutter Ross, Discrete Mathematical Structures. Pearson Education/PHI.

4. Malik &Sen, Discrete Mathematical Structures Theory and application.
5. Garry Haggard and others, Discrete Mathematics for Computer science, Thomson.

Course Outcomes:

Upon successful completion of this course students will be :

- Able to design comprehend mathematical principles and logic
- Able to understand the concepts associated with predicates, free and bound variables and Automatic theorem proving**.**
- Able to understand the basic concepts associated with relations, functions and draw the Lattice and Hasse diagrams.
- Able to identify skills and insights in a wide range of algebraic topics with important applications.
- Able to understand the basic concepts of permutations, combinations, probability, Pigeon hole principle and its applications.
- Able to understand the various types of recurrence relations and the methods to find out their solutions also to calculate Coefficient of generating function.
- Able to manipulate and analyze data numerically and/or graphically.

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II Year B. Tech. I Semester

(5GC35) APTITUDE AND REASONING SKILLS

Quantitative Aptitude:

Number Systems, Averages, Problems on ages, Allegations, Percentages, Profit and loss, Simple interest and Compound interest, Ratio and Proposition and variation, Time and Work, Time and Distance, Mensuration, Permutation and Combinations.

Progressions, Inequalities, Logarithms, HCF and LCM, Decimal Fractions, Simplification, Square Roots and Cube Roots, Pipes and Cisterns, Area, Volume and Surface Areas, Calendar, Clocks, True Discount, Banker's Discounts, Data Interpretation, Tabulation, Bar Graphs, Pie charts, Line Graphs

Reasoning:

Directions, Blood Relations, Problems on Cubes, Series and Sequences, Odd man out, Coding and Decoding, Data sufficiency, Logical deductions, Arrangements and Combinations, Groups and Teams, Puzzles to Puzzle you. More puzzles, Brain Teasers, Puzzles and Teasers

Reference Books:

1. Arun Sharma, How to Prepare for Quantitative Aptitude, TMH Publishers, New Delhi, 2003.
2. R.S. Agarwal, Quantitative Aptitude, S. Chand Publishers, New Delhi, 2005.
3. Sharon Weiner-Green, IrnK.Wolf, Barron's GRE, Galgotia Publications, New Delhi, 2006.
4. R.S.Agarwal, Verbal and Non-Verbal Reasoning, S.Chand Publishers, New Delhi, 1998.
5. Shakuntala Devi, Puzzles to Puzzle you, Orient Paper Backs Publishers(OPB), New Delhi, 2005.
6. Shakuntala Devi, More Puzzles, OPB, New Delhi, 2006.
7. Ravi Narula, Brain Teasers, Jaico Publishing House, New Delhi, 2005.
8. George J Summers, Puzzles and Teasers, Jaico Publishing House, Mumbai, 2005.

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II Year B. Tech. I Semester

(5G240) ELECTRICAL ENGINEERING AND ELECTRONICS ENGINEERING LAB
(Common for CSE & IT)

Any **ten** Experiments to be conducted.

Electrical Engineering Lab

1. Swinburne's test on D.C shunt machine (pre determination of efficiency of a given D.C shunt machine working as generator and motor).
2. OC and SC tests on single phase transformer (pre determination of efficiency and regulation at a given power factors).
3. Brake test on three phase induction motor (determination of performance characteristics).
4. Regulation of alternator by synchronous impedance method.
5. Speed control of D.C shunt motor by
   (a) Armature control method (b) field flux control method.
6. Brake test on D.C shunt motor (determination of performance characteristics).

Electronics Engineering Lab

1. Study of CRO (Measurement of voltage frequency and phase of periodic signals).
2. V-I Characteristics of PN junction diode.
3. Full wave rectifier with and without capacitive filter.
4. Input and output characteristics of Common Emitter (CE) Configuration.
5. Frequency response of a single stage CE amplifier.
6. Sinusoidal signal generation using RC phase shift oscillator circuit.

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II Year B. Tech. I Semester

(5G134) ADVANCED DATA STRUCTURES LAB THROUGH C++
(Common to CSE and IT)

Course Objectives:

- To make the student learn an object oriented way of solving problems.
- To make the student write ADTS for all data structures.
- To make the student learn different algorithm design techniques.

Week1: a). Write a C++ program to implement the access control.
b). Write a C++ program to implement the static member function.
c). Write a C++ program to implement the parameter passing.

Week2: a). Write a C++ program to implement the friend function.
b). Write a C++ program to implement the inline method.
c). Write a C++ program to implement the dynamic memory allocation and deallocation.

Week 3: a). Write a C++ program to implement the exception handling.
b). Write a C++ program to implement the constructor overloading.
c). Write a C++ program to implement the function overloading.

Week4: a). Write a C++ program to implement the Operator overloading.
b). Write a C++ program to implement the simple inheritance.
c). Write a C++ program to implement the multiple inheritance.

Week5: a). Write a C++ program to implement the virtual function.
b). Write a C++ program to implement the abstract class.
c). Write a C++ program to implement the class template.

Week6: Write a C++ programs to implement the following using an array.
a) Stack ADT b)Queue ADT

Week7: Write a C++ programs to implement the following using a singly linked list.
a) Stack ADT b)Queue ADT

Week8: Write a C++ program to implement all the functions of a dictionary ADT using hashing.

Week9: Write a C++ program to perform the following operations on Binary Trees.
a) Insertion b) Deletion c) Searching

Week10: Write C++ programs to perform the traversals for the given binary tree.
a) preorder b) inorder c) postorder

Week11: Write C++ programs for priority queue implementation using Heaps.
a) Min Heap Insertion b) Min Heap Deletion c) Max Heap Insertion
d) Max Heap Deletion

Week12: Write a C++ program to perform the following operations on Binary Search Trees.
a) Insertion b) Deletion c) Searching

Week13: Write a C++ program to perform the following operations on B-Trees.
a) Insertion b) Deletion c) Searching

Week14: Write a C++ program to perform the following operations on AVL Trees.
a) Insertion b) Deletion c) Searching

Week15: Write a C++ Program to implement Boyer-Moore pattern matching algorithm.

Week16: Write a C++ Program to implement Knuth-Morris-Pratt pattern matching algorithm.

(Note: Use Class Templates for the above Data Structure Programs)

Text Books:

1. Adam Drozdek, *Thomson. Data Structures and Algorithms in C++*. 2007-2008, 3rd Ed. Page 36 of 95.
2. D.S. Malik, *Data Structures using C++*. Thomson.

Course Outcomes:

Upon successful completion of this Lab the student will be :

- Able to know about Object oriented programming.
- Able to use Abstract Data Types in the programs.
- Able to design application of Non recursive functions.
- Able to understand the OOP principles like Encapsulation, Inheritance, Polymorphism were frequently used.
- Able to design Trees –B and AVL Trees and their operations.
- Able to understand different sorting techniques.
- Able to understand different Hashing Techniques are implemented.

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II Year B. Tech. II Semester

(5GC43) ENVIRONMENTAL SCIENCE

Course Objectives:

- Understand & appreciate the importance of Environmental Science.
- In order to make the students environmentally educated
- To protect the environment by preventing environmental pollution& degradation.

Unit I

Multidisciplinary nature of environmental studies - Scope & Importance of environmental studies - Need for public awareness - Global environmental crisis (over-exploitation of natural resources, decline of ecosystems, loss to biodiversity, environmental pollution, and population growth) – People in environment – Institutions in environment

Unit II

Renewable & non-renewable natural resources. Forest resources: Use – deforestation, case studies - dams & their effects on forest & tribal people Water resources: Use - floods, drought- conflicts over water. Mineral resources: Use - environmental effects of extracting mineral resources, case studies. Food resources: Impacts of over grazing, traditional agriculture and modern agriculture, Energy resources: Renewable and non – renewable energy resources - use of alternate energy resources. Land resources: Land as a resource, land degradation, soil erosion. Role of an individual in the conservation of natural resources.

Unit III

ECOSYSTEMS: Producers, consumers & decomposers - Food chains, food webs & ecological pyramids - Energy flow in the ecosystem- Cycling of nutrients (Bio geo chemical cycles-water, oxygen, carbon, nitrogen & energy cycles) – Types and characteristic features of the following ecosystems :(a)Forest ecosystems (b) Grass land ecosystems (c) Desert ecosystems (d) Aquatic ecosystems (lakes, rivers, oceans, estuaries)

BIODIVERSITY AND ITS CONSERVATION: Definition - Values of biodiversity: consumptive value, productive value, social value, ethical value, aesthetic value & option values - Hot spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wild life - Conservation of biodiversity: In –situ & Ex-situ conservation

Unit IV

ENVIRONMENTAL POLLUTION: Definition, causes, effects & control measures of: Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Marine pollution, Nuclear hazards - Solid waste management: Causes, effects and control measures of urban wastes.

Unit V

SOCIAL ISSUES AND THE ENVIRONMENT: Rain water harvesting - Environmental ethics: Issues & possible solutions - Global warming - Acid rain - Ozone layer depletion – Wasteland reclamation - Environment protection Act.-Air (Prevention & Control of Pollution) Act.-Water (Prevention & Control of Pollution) Act.-Wildlife Protection Act-Forest Conservation Act.

HUMAN POPULATION & ENVIRONMENT: Population explosion – Family Welfare Program -Environment & human health - Human Rights (in relation to environment) - Value Education (environmental values) - HIV/AIDS.

Text Books:

1. Text book of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission, University press.
2. Environmental Studies by R. Rajagopalan Oxford University Press.
3. Perspectives in Environmental Studies by AnubhaKaushik and C.P.kaushik, New Age International Publishers.

Reference Books:

1. Comprehensive Environmental Studies by J.P.Sharma, Laxmi Publications.
2. Environmental Studies by AninditaBasak – Pearson education.
3. Environmental Studies by Benny Joseph, Mc.graHill Publications.

Course Outcomes:

Upon completion of the course, students will

- To aware about global environment crisis & to understand the different resources and their problems.
- To make the student know about different types of pollution, their sources, effects & control measures.
- Broad awareness about ecosystems, biodiversity, solid waste & disaster management.
- Understand the main social issues & population issues related to the environment.

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II Year B. Tech. II Semester

(5G141) COMPUTER ORGANIZATION

Course Objectives:

The objective of this course is to make the students to

- Understanding of the basic structure and operation of a digital computer.
- Learn in detail the operation of the arithmetic unit including the algorithms & implementation of Fixed-point and floating-point addition, subtraction, multiplication & division.
- Understand register-transfer-level to implement instruction fetching and execution in a processor which includes processor implementation by both hardwired and Micro programmed control unit.
- Understand the concepts of cache memory and virtual memory.
- Understand the basics concepts of I/O data transfer, synchronization, interrupts and direct memory access with the PCI, SCSI and USB standards
- Understands the basic foundations for Parallel Processing techniques

Unit I

DIGITAL COMPUTERS: Digital computers, Logic gates, Boolean algebra, Map simplification, Combinational Circuits, Data Representation. Data Types, Complements, Fixed Point Representation. Floating – Point Representation, Error Detection codes.

Unit II

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS: Register Transfer language, register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit, Instruction codes, computer registers, and Computer instructions – Instruction cycle.

Memory – Reference Instructions, Input – Output and Interrupt, STACK organization, Instruction format, addressing modes, DATA Transfer and manipulation, Program control, Reduced Instruction set computer.

Unit III

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

Unit IV

COMPUTER ARITHMETIC: Algorithms for fixed point and floating point addition, subtraction, multiplication and division operations, hardware implementation of arithmetic and logical operations.

MEMORY ORGANIZATION: Memory hierarchy, main memory, Auxiliary Memory, Cache Memory, Virtual Memory.

Unit V

INPUT-OUTPUT ORGANIZATION: Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt Direct memory Access, Input – Output Processor (IOP) Serial communication. **PIPELINE AND VECTOR PROCESSING:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

Text Book:

M. Morris Mano, *Computer Systems Architecture.* Pearson/PHI, 3rd Ed.

Reference Books:

1. William Stallings, *Computer Organization and Architecture.* Pearson/PHI, 6th Ed.
2. Carl Hamacher, ZvonksVranesic, SafeaZaky, *Computer Organization*. McGraw Hill, 5th Ed.
3. Andrew S. Tanenbaum,*Structured Computer Organization*. PHI/Pearson, 4th Ed.
4. SivaraamaDandamudi, *Fundamentals or Computer Organization and Design.* Springer Int. Edition.

Course Outcomes:

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

- Learn the basic structure and operation of a digital computer.
- Learn the organization of Control Unit, Arithmetic and Logical Unit, Memory Unit and I/O Unit.
- Understand data representations and implement algorithms for Computer arithmetic's.
- Learn Register Transfer Language and Micro Operations.
- Learn Micro Programmed and Hardwired Control Unit.
- Able to understand the concepts of parallel processing, Pipelining, and Multiprocessor systems.

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II Year B. Tech. II Semester

(5G142) DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSE and IT)

Course Objective:

- To know the importance of the complexity of a given algorithm.
- To study various algorithmic design techniques.
- To utilize data structures and/or algorithmic design techniques in solving new problems.
- To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete.
- To study some techniques for solving hard problems

Unit I

INTRODUCTION: Algorithm, Pseudo Code for algorithms, performance analysis-Space complexity, Time Complexity, Asymptotic Notation-Big Oh Notation, Omega Notation, Theta notation and Little Oh notation, Amortized complexity, Sets-Disjoint set operations, Union and Find algorithms.

Unit II

DIVIDE AND CONQUER: General Method, applications- Binary Search, Quick sort, Merge Sort, Strassen's Matrix multiplication.

GREEDY METHOD: General Method, applications-Job sequencing with dead-lines, knapsack problem, Minimum-cost Spanning trees, Single source shortest path.

Unit III

DYNAMIC PROGRAMMING: General Method, applications- Matrix Chain multiplication, Optimal Binary search trees, 0/1 Knapsack, All pairs shortest path, The Travelling person problem, Reliability design.

Unit IV

BACKTRACKING: General Method, applications- 8- queen problem, sum of subsets, graph coloring, Hamiltonian cycles.

BRANCH AND BOUND: General Method, applications Travelling Sales Person(*), and 0/1 knapsack problem-LC Branch and Bound Solution, FIFO Branch and Bound solution.

Unit V

NP-HARD AND NP-COMPLETE PROBLEMS: Basic Concepts, nondeterministic algorithms, the classes-NP-Hard and NP Complete, Cook's Theorem

Text Books:

1. Ellis Horowitz, SartajSahni and Rajasekharam, Fundamentals of Computer Algorithms. Galgotia publications Pvt. Ltd.
2. ParagHimanshu Dave, HimanshuBhalchandra Dave, Design and Analysis Algorithms. Pearson.
3. M.T. Goodrich and R.Tomassia,Algorithm Design: Foundations, Analysis and Internet Example.Johnwiley and sons.

Reference Books:

1. R.C.T.Lee,S.S .Tseng,R.C.Chang and T.Tsai, Introduction to Design and analysis of Algorithms,A strategic approach.McGraw Hill.
2. Aho,Ullman and Hopcroft,Design and Analysis of algorithms.Pearson Education.

Course Outcomes:

- Analyze the complexity of the algorithms
- Use techniques divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems.
- Identify and analyze criteria and specifications appropriate to new problems, and choose the Appropriate algorithmic design technique for their solution.
- Able to prove that a certain problem is NP-Complete.

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II Year B. Tech. II Semester

(5G143) FORMAL LANGUAGES AND AUTOMATA THEORY

Course Objective:

- Understand basic properties of formal languages and formal grammars.
- Understand basic properties of deterministic and nondeterministic finite automata
- Understanding the Context free languages and grammars, and also Normalizing CFG.
- Understanding the minimization of deterministic and nondeterministic finite automata and PDA.
- Understand basic properties of Turing machines and computing with Turing machines.
- Know the concepts of tractability and decidability, the concepts of NP-completeness and NP-hard problem.
- Understand the challenges for Theoretical Computer Science and its contribution to other sciences.

Unit I

Introduction: Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non-deterministic finite automaton, Chomsky hierarchy of languages, transition diagrams and Language recognizers.

Finite Automata: NFA with Є transitions - Significance, acceptance of languages. Conversions and Equivalence : Equivalence between NFA with and without Є transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSMs, Finite Automata with output-Moore and Melay machines.

Unit II

Regular Languages: Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets **(proofs not required).**

Unit III

Grammar Formalism: Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar, derivation trees, and sentential forms. Right most and leftmost derivation of strings.

Context Free Grammars: Ambiguity in context free grammars. Minimisation of Context Free Grammars, Chomsky normal form, Greibatchnormal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL **(proofs omitted).**

Unit IV

Push down Automata: Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, inter conversion. **(Proofs not required)**. Introduction to DCFL and DPDA.

Unit V

Turing Machine: Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required).

Computability Theory: Linear bounded automata and context sensitive language, LR (0) grammar, decidability of, problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility.

Text Books:

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education.
2. Introduction to Theory of Computation - Sipser 2nd edition Thomson

Reference Books:

1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
2. Introduction to languages and the Theory of Computation, John C Martin, TMH
3. "Elements of Theory of Computation", Lewis H.P. &Papadimition C.H. Pearson /PHI.
4. Theory of Computer Science and Automata languages and computation -Mishra and Chandrashekaran, 2nd edition, PHI.
5. Theory of Computation, By K.V.N. Sunitha and N.Kalyani

Course Outcomes:

- Students would be able to explain basic concepts in formal language theory, grammars, automata theory, computability theory, and complexity theory
- The student will be able to demonstrate abstract models of computing, including deterministic (DFA), non-deterministic (NFA), Push Down Automata(PDA) and Turing (TM) machine models and their power to recognize the languages
- The student will be able to explain the application of machine models and descriptors to compiler theory and parsing.
- Students will be able to relate practical problems to languages, automata, computability, and complexity
- Students will be able to apply mathematical and formal techniques for solving problems in computer science.
- Students will be able to explain the relationship among language classes and grammars with the help of Chomsky Hierarchy.

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II Year B. Tech. II Semester

(5G144) OBJECT ORIENTED PROGRAMMING
(Common to CSE and IT)

Course Objective:

- Student will understand and apply the concepts of OOP's using java and create console based applications.
- Student will understand and apply the concepts of AWT, SWINGS to develop window based applications.
- Student will understand and apply the networking concepts to develop client/server environment applications.

Unit I

OBJECT ORIENTED THINKING: History of Java, Java Buzzwords, Overview of Java, Data Types, Variables, Type Conversion and Casting, Arrays, Operators, Review of Control Statements, Simple Java Program,

CLASSES AND OBJECTS: Introduction to Classes, Objects, Methods, Constructors, Access Control, this Keyword, Garbage Collection, Finalize() Method, Overloading of Methods and Constructors, Parameter Passing, Recursion, String Handling.

Unit II

INHERITANCE: Inheritance Basics, Using Super, Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Using final with Inheritance, Object Class.

PACKAGES AND INTERFACES: Defining a Package, Finding Packages and CLASSPATH, Importing Packages. Defining an Interface, Implementing Interface, Applying Interface, Variables in Interfaces, Interfaces can be Extended, Differences Between Classes and Interfaces.

Unit III

EXCEPTION HANDLING: Exception Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java's Built in Exceptions, Creating Own Exception Sub Classes, Benefits of Exception Handling.

MULTITHREADING: Java Thread Model, The Main Thread, Thread Life Cycle, Creating Multiple Threads, Using isAlive() and join(), Suspending, Resuming and Stopping Threads, Differences Between Multithreading and Multitasking.

Unit IV

COLLECTION FRAMEWORK: Collection Overview, Collection Interfaces: The Collection Interface, the List Interface, The Set Interface, The SortedSet Interface and Collection Classes: Array List Class, Linked List Class, Accessing a Collection via an Iterator, StringTokenizer.

AWT: AWTClasses, Window Fundamentals, AWT Controls, Layout Managers.

APPLETS: Applet Basics, Life Cycle of an Applet, Types of Applets, Creating Applets, Passing Parameters to Applets, Differences Between Applets and Applications.

Unit V

EVENT HANDLING: Delegation Event Model: Events, Event Sources, Event Listeners, Event Classes, Event Listener Interfaces, Handling Mouse Events and Keyboard Events, Adapter Classes, Inner Classes.

SWING: Introduction, Limitations of AWT, MVC Architecture, Components, Containers, JApplet, JFrame, JComponent, Icons, Labels, Text Fields, Buttons: JButton Class, Check Boxes Class, Radio Buttons, Combo Boxes.

NETWORKING: Networking Basics, Java and the Net, InetAddress, TCP/IP Client Sockets, URL Connection, TCP/IP Server Sockets, Datagrams, Simple Client Server Program using TCP/IP Sockets and UDP Datagrams.

Text Book:

Herbert Schildt.Java. The complete reference, TMH. 7th Edition.

Reference Books:

1. J.Nino and F.A. Hosch, An Introduction to programming and OO design using Java, John Wiley&sons.
2. Y. Daniel Liang, Introduction to Java programming, Pearson Education. 6th Edition
3. R.A. Johnson- Thomson, An introduction to Java programming and object oriented application development,
4. Cay.S.Horstmann and Gary,Cornell, Core Java 2, Vol. 1, Fundamentals, Pearson Education. 7thEdition,
5. Cay.S.Horstmann and GaryCornell Core Java 2, Vol 2, Advanced Features, Pearson Education. 7th Edition,
6. P. Radha Krishna, Object Oriented Programming through Java,University Press.

Course Outcomes:

- Ability to Understand fundamentals of object-oriented programming features like Encapsulation, Inheritance and Polymorphism through Java Programming Language.
- Ability to apply reusability concepts like Inheritance and create user defined packages using java.
- Ability to acquire knowledge on multithreading and exception handling
- Able to Create windows based applications using AWT and swings in java.
- Ability to acquire in depth knowledge on network programming in Java.

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II Year B. Tech. II Semester

(5G441) DATABASE MANAGEMENT SYSTEMS
(Common to CSE and IT)

Course Objectives:

- To understand the role and uses of DBMS in an organization.
- To understand fundamental concepts of Database Management Systems like database design, database languages, and database-system implementation.
- To construct simple and moderately advanced database queries using Structured Query Language (SQL).
- Understand and successfully apply logical database design principles, including E-R diagrams and database normalization techniques.
- To provide detailed knowledge of transaction, concurrency and recovery strategies of DBMS.

Unit I

INTRODUCTION: Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Data Storage and Querying, Transaction Management, Data Base Architecture, Database Users and Administrators, History of Database Systems.

Unit II

DATABASE DESIGN: Database Design and ER Diagrams, Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design with the ER Model, Case study: The Internet Shop.

THE RELATIONAL MODEL: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Data Base Design: ER to Relational.

Unit III

SQL AND PL/SQL: Introduction to SQL, Data Definition Commands, Data Manipulation Commands, Select Queries, Virtual Tables: Creating View, Altering View, Updating View, Destroying View, Relational Set Operators, SQL Join Operators, Sub Queries and Correlated Queries, Aggregate Functions, Procedural SQL:Stored Procedures, Stored Functions, Triggers, Cursors.

Unit IV

SCHEMA REFINEMENT AND NORMAL FORMS: Introduction to Schema Refinement: Problems Caused by Redundancy, Decompositions, Problems Related to Decomposition, Functional Dependencies, Reasoning about FDs, Normal Forms:1 NF, 2 NF, 3 NF, BCNF, Properties of Decomposition: Lossless Join Decomposition, Dependency Preserving Decomposition, Multivalued Dependencies, 4 NF.

Unit V

OVER VIEW OF TRANSACTIONS MANAGEMENT: ACID Properties: Consistency and Isolation, Atomicity and Durability, Transactions and Schedules, Concurrent Execution of Transactions, Transaction Support in SQL.

OVER VIEW OF STORAGE AND INDEXING: Data On External Storage, File Organizations and Indexing, Index Data Structures.

TREE-STRUCTURED INDEXING: Intuition for Tree Indexes, Indexed Sequential Access Methods(ISAM), B^+ Trees: A Dynamic Index Structure.

Text Books:

1. Silberschatz, Korth,Sudarshan, Database System Concepts. McGraw Hill, 5^{th} Edition.
2. RaghuRamaKrishnan, Johannes Gehrke, Database Management Systems, McGraw Hill,

Third Edition.

3. Peter Rob, A. Ananda Rao, Carlos Coronel, Database Management Systems, CENGAGE Learning.

Reference Books:

1. Elmasri,Navate, Fundamentals of Database Systems. Pearson Education.
2. C.J.Date, Introduction to Database Systems. Pearson Education.

Course Outcomes:

- Able to master the basic concepts and understand the applications of database systems.
- Able to construct an Entity-Relationship (E-R) model from specifications and to perform the transformation of the conceptual model into corresponding logical data structures.
- Able to understand the basic database storage structures and access techniques.
- Able to construct database schemas in structure query languages.
- Able to eliminate redundancies in a database schema using normalization.
- Able to understand transaction management concepts in databases and the need of concurrency control.

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II Year B. Tech. II Semester

(5G146) JAVA LAB
(Common to CSE and IT)

Course Objectives:

- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Be aware of the important topics and principles of software development.
- Have the ability to write a computer program to solve specified problems.
- Be able to use the Java SDK environment to create, debug and run simple Java programs

Recommended Systems/Software Requirements:

- Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space
- JDK Kit. Recommended

Week1:

a) Write a Java program to display Fibonacci series between 1 to n.
b) Write a Java program to perform the arithmetic operations using switch case statement.
c) Write a Java program to calculate sum of 5 subjects and find percentage.

Week 2:

a) Write a Java program to display all strong numbers between 1 to n.
b) Write a Java program to find multiplication of two matrices.
c) Write a Java program to convert temperature from Centigrade to Fahrenheit and Fahrenheit to Centigrade.

Week 3:

a) Write a Java program to implement the access control.
b) Write a Java program to implement the constructor overloading.
c) Write a Java program to implement the method overloading.

Week 4:

a) Write a Java program to find the factorial of a given number using recursion.
b) Write a Java program to find whether the given string is palindrome or not.
c) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.

Week 5:

a) Write a Java program to implement the method overriding.
b) Write a Java program to implement the multilevel inheritance.
c) Write a Java program to implement dynamic method dispatch.

Week 6:

a) Write a java program for abstract class implementation.

Note: - class Shape that contains an empty method named numberOfSides(). Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides() that shows the number of sides in the given geometrical figures.

b) Write a Java program to implement the package concept.
c) Write a Java program to implement the multiple inheritance using interface.

Week 7:

a) Write a Java program to implement the exception handling mechanism.

b) Write a Java program to implement the nested try statement.

c) Write a Java program to implement the own exception class.

Week 8:

a) Write a Java program for multi-thread implementation.

Note: First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.

b) Write a Java program to implement producer consumer problem using inter-thread communication mechanism.

c) Write a Java program to use the isAlive() and join() methods.

Week 9:

a) Write a Java program to display the sum of all the integers of given line of integers using StringTokenizer class.

b) Write a Java program to implement stack ADT.

Week 10:

a) Write a Java program to converts infix expression into postfix form

b) Write a Java program to evaluate the postfix expression.

Week 11:

a) Write a Java program to build a simple calculator using grid layout manager.

Note: -Use buttons for digits and for operators (i.e. +, -, *, /, %) add a text field to display the result.

b) Write a Java program that creates a user interface to perform integer division operation.

Note: -The user enters two numbers in the two text fields (i.e. Num1 and Num2). The division of Num1 and Num2 is displayed in the result text field when the Division button is clicked. If Num1 or Num2 are not an integer, the program would throw a Number Format Exception and if Num2 is zero, then the program would throw an Arithmetic Exception and display the exception in a message dialog box.

Week 12:

a) Write a Java applet program for displaying a message in the applet window.

b) Write a Java applet program to compute the factorial of given integer.

Note: - Applet receives an integer in one text field, and computes its factorial value and returns the result in another text field, when the button named "Compute" is clicked.

c) Write a Java applet program to draw lines, rectangles, squares, circles and ovals.

Week 13:

a) Write a Java program for handling keyboard events.

b) Write a Java program for handling mouse events.

c) Write a Java program to implement the inner classes.

Week 14:

a) Write a Java swing program that simulates a traffic light.

Note: - The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on and only one light can be on at a time, No light is on when the program starts.

b) Write a Java program to implement a simple client/server communication using client and server sockets.

Note: - The client sends data to a server. The server receives the data and uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. **Example:** The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle.

TEXT BOOKS:

1. H.M.Dietel and P.J.Dietel, Java How to Program 6th Edition, Pearson Education/PHI
2. Y.DanielLiang,Introduction to Java programming, Pearson Education, 6th Edition.
3. Cay Horstmann,Big Java, 2nd edition, Wiley Student Edition, Wiley India Private Limited.

Course Outcomes:

- An understanding of the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements;
- A competence to design, write, compile, test and execute straightforward programs using a high level language;
- An appreciation of the principles of object oriented programming;
- An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
- Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
- Demonstrate the ability to use simple data structures like arrays in a Java program.
- Be able to make use of members of classes found in the Java API (such as the Math class).
- Demonstrate the ability to employ various types of selection constructs in a Java program. Be able to employ a hierarchy of Java classes to provide a solution to a given set of requirements.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)

II Year B. Tech. II Semester

(5G443) DATA BASE MANAGEMENT SYSTEMS LAB
(Common to CSE and IT)

Course Objectives

- To develop conceptual understanding of database management system.
- To understand how a real world problem can be mapped to schemas.
- To develop understanding of different applications and constructs of SQL PL/SQL.

Week1:

Draw **Relational Databases** and **ER Diagrams** for the following applications.

a) Student Information System

Student(Student No, Student Name, Address, Mobile No, Email ID, Institute Name, Branch Name, Fee, Mark1, Mark2, Mark3, Mark4, Mark5,TotalMarks,Percentage,Grade)

b) Employee Information System

Employee (Employee ID, Employee Name, Address, Mobile No, Email ID, Organization Name, Employee Designation, Basic Salary, DA, HRA, Gross Salary, Deductions, Net Salary)

c) Customer Information System

Customer (Customer ID, Customer Name, Address, Mobile No, Email ID, Shop Name, Product Code, Product Name, Quantity, Cost per Unit, Total Bill, Discount, Net Bill)

Week 2:

Write SQL queries to **CREATE TABLES** for various databases using **DDL** commands (**i.e.** CREATE, DESCRIBE, ALTER, DELETE, DROP).

Week 3:

Write SQL queries to **MANIPULATE TABLES** for various databases using **DML** commands (**i.e.** INSERT, SELECT, UPDATE, DELETE, TRUNCATE).

Week 4:

Write SQL queries to create **VIEWS** for various databases (**i.e.** CREATE VIEW, UPDATE VIEW, ALTER VIEW, DELETE VIEW).

Week 5:

Write SQL queries to perform **RELATIONAL SET OPERATIONS** (**i.e.** UNION, UNION ALL, INTERSECT, MINUS, CROSS JOIN, NATURAL JOIN).

Week 6:

Write SQL queries to perform **SPECIAL OPERATIONS** (**i.e.** ISNULL, BETWEEN, LIKE, IN, EXISTS)

Week 7:

Write SQL queries to perform **JOIN OPERATIONS** (**i.e.** CONDITIONAL JOIN, EQUIJOIN, LEFT OUTER JOIN, RIGHT OUTER JOIN, FULL OUTER JOIN)

Week 8:

Write SQL queries to perform **AGGREGATE OPERATIONS** (**i.e.** SUM, COUNT, AVG, MIN, MAX).

Week 9:

Write SQL queries to perform **ORACLE BUILT-IN FUNCTIONS (i.e.** DATE,TIME).

Week 10:

Write **PL/SQL** programs for

a) Calculating the factorial of given number.
b) Finding the given number is Prime Number or not.
c) Displaying the Fibonacci series up to an integer.

Week 11: Write PL/SQL program to implement **StoredProcedure**on table.

Week 12: Write PL/SQL program to implement **Stored Function**on table.

Week 13: Write PL/SQL program to implement **Trigger** on table.

Week 14: Write PL/SQL program to implement **Cursor** on table.

Text Books:

1. RaghuramaKrishnan,JohannesGehrke, *Data base Management Systems.*TataMcGrawHill.
2. Peter Rob,AnandaRao and Carlos Corone,*Database Management Systems.* Cengage Learning.
3. Rick F.VanderLans, *Introduction to SQL*.Pearson Education.
4. B.RosenZweig and E.Silvestrova,*Oracle PL/SQL*. Pearson Education.
5. Steven Feuerstein.*Oracle PL/SQL Programming.*
6. Dr. P. S. Deshpande, *SQL & PL/SQL for Oracle 10g*. Black Book, DreamTech.
7. J. J. Patrick, *SQL fundamentals*. Pearson Education.

Course Outcomes:

- After undergoing this laboratory module, the participant should be able to:
- Able to crate database with different types of integrity constraints and us the SQL commands such as DDL,DML,DCL,TCL to access data from database objects.
- Able to use database security and authorization in order to access database for the different kinds of the user.
- Able to Programming PL/SQL including stored procedures, stored functions, cursors, packages.