



## **MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

**(Autonomous Institution – UGC, Govt. of India)**

**Sponsored by CMR Educational Society**

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)

Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.

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# **BACHELOR OF TECHNOLOGY DEPARTMENT OF INFORMATION TECHNOLOGY**

## **ACADEMIC REGULATIONS**

**(Batches admitted from the academic year 2017 - 2018)**

*Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.*

## PRELIMINARY DEFINITIONS AND NOMENCLATURES

- "Autonomous Institution /College" means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.
- "Academic Autonomy" means freedom to a College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- "Commission" means University Grants Commission.
- "AICTE" means All India Council for Technical Education.
- "University" the Jawaharlal Nehru Technological University, Hyderabad.
- "College" means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.
- "Program" means:
  - Bachelor of Technology (B.Tech) degree program
  - UG Degree Program: B.Tech
- "Branch" means specialization in a program like B.Tech degree program in Electronics & Communication Engineering, B.Tech degree program in Computer Science and Engineering etc.
- "Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.
- T–Tutorial, P–Practical, D–Drawing, L–Theory, C–Credits

## FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

***“A thought beyond the horizons of success committed for educational excellence”***

**PRINCIPAL**



## **MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY** **(Autonomous Institution – UGC, Govt. of India)**

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### **VISION**

- ❖ To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

### **MISSION**

- ❖ To become a model institution in the fields of Engineering, Technology and Management.
- ❖ To impart holistic education to the students to render them as industry ready engineers.
- ❖ To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

### **QUALITY POLICY**

- ❖ To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- ❖ To provide state of art infrastructure and expertise to impart quality education.
- ❖ To groom the students to become intellectually creative and professionally competitive.
- ❖ To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never ending ladder of SUCCESS year after year.

**For more information: [www.mrcet.ac.in](http://www.mrcet.ac.in)**

### **ACADEMIC REGULATIONS FOR B. TECH. (REGULAR)**

**Applicable for the students of B. Tech. (Regular) from the Academic Year 2017-18 and onwards**

**The college affiliating to JNTUH, Hyderabad offers a 4-year (8 semesters) Bachelor of Technology (B.Tech.) degree programme, under Choice Based Credit System (CBCS) for the following branches of Engineering.**

#### **1.0 Award of B. Tech. Degree**

A student will be declared eligible for the award of B. Tech. Degree if he fulfills the following academic regulations:

1.1 The candidate shall pursue a course of study for not less than four academic years and not more than eight academic years.

1.2 After eight academic years of course of study, the candidate is permitted to write the examinations for two more years.

**1.3 The candidate shall register for 192 credits and secure 192 credits with compulsory subjects as listed in Table-1. However, student will earn minimum of 184 credits for the award of the B.Tech Degree.**

**Table 1: Compulsory Subjects**

<b>S.No</b>	<b>Subject Particulars</b>
1	All practical Subjects
2	Mini Project
3	Technical Seminar
4	Project Work

1.4 In addition to 1.3, the candidate has to register for Mandatory courses (Non-credit course), in which 50% of scoring is required for the award of the degree.

2.0 The students, who fail to fulfill all the academic requirements for the award of the degree within ten academic years from the year of their admission, shall forfeit their seats in B. Tech. course.

#### **3.0 Courses of study**

The following courses of study are offered at present as specializations for the B. Tech. Course:

<b>S.No</b>	<b>Department</b>
01	Aeronautical Engineering
02	Computer Science Engineering
03	Electronics & Communication Engineering
04	Information Technology
05	Mechanical Engineering
06	Electrical and Electronics Engineering

**4.0 Credits**

Particulars	Semester	
	* Periods per week	Credits
Theory	04	04
	03	03
Practical	03	02
Drawing	03	02
	04	04
Mini Project	--	04
Technical Seminar	04	02
Major Project	12	10

**\*Duration of each period is 60 minutes.**

**5.0 Distribution and Weightage of Marks**

5.1 The performance of a student in each semester shall be evaluated subject-wise for a maximum of 100 marks for a theory and 75 marks for a practical subject. In addition, Mini Project, Technical seminar and Major Project work shall be evaluated for 100, 50 and 300 marks, respectively.

5.2 For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

5.3 For theory subjects, during a semester there shall be 2 mid-term examinations. Each mid-term examination consists of a descriptive paper and assignment. The descriptive paper shall be for 24 marks with a total duration of 2 hours. The descriptive paper shall contain 6 full questions out of which, the student has to answer 4 questions, each carrying 6 marks. Six (6) marks are allocated for Assignments (as specified by the subject teacher concerned). The first Assignment should be submitted before the conduct of the first mid-examination, and the second Assignment should be submitted before the conduct of the second mid-examination. While the first mid-term examination shall be conducted from 1 to 2 units of the syllabus, the second mid-term examination shall be conducted from 3 to 5 units. The total marks secured by the student in each mid-term examination are evaluated for 30 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate.

However, if any student is absent/scoring internal marks less than 40% in any subject of a mid-term examination he/she will be given a chance to write the internal exam once again after he/she re-registering for the internal exam in the concerned subject and paying stipulated fees as per the norms.

The end examination will be conducted for 70 marks with 5 questions consisting of two parts each (a) and (b), out of which the student has to answer either (a) or (b), not both and each question carrying 14 marks.

5.4 For practical subjects there shall be a continuous evaluation during a semester for 25 sessional marks and 50 end semester examination marks. Out of the 25 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 10 marks conducted by the laboratory teacher concerned. The end semester examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the clusters of colleges which are decided by the examination branch of the College.

5.5 For the subject having design and/or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and Estimation, the distribution shall be 30 marks for internal evaluation (15 marks for day-to-day work and 15 marks for internal tests) and 70 marks for end semester examination. There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests.

5.6 There shall be a Mini Project to be taken up during the vacation after III year II Semester examination. However, the Mini-Project and its report shall be evaluated along with the Major Project work in IV year II Semester. The Mini Project shall be submitted in a report form and presented before the committee. It shall be evaluated for 100 marks. The committee consists of an External Examiner, Head of the Department, and the Supervisor of the Mini Project and a Senior Faculty member of the department. There shall be no internal marks for Mini Project.

5.7 There shall be a Technical Seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding of the topic, and submit it to the department. It shall be evaluated by the departmental committee consisting of head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for the seminar.

5.8 Out of a total of 300 marks for the Major Project work, 100 marks shall be allotted for Internal Evaluation and 200 marks for the End Semester Examination (Viva Voce). The End Semester Examination of the Major Project work shall be conducted by the same committee as appointed for the mini-project. In addition, the project supervisor shall also be included in the committee. The topics for mini project, seminar and project work shall be different from one another. The evaluation of project work shall be made at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.

5.9 The Laboratory marks and the sessional marks awarded by the College are subject to scrutiny and scaling by the college wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to Academic Council. The Academic Council will arrive at a scaling factor and the marks will be scaled accordingly. The recommendations of the Academic Council are final and binding. The laboratory records and internal test papers shall be preserved in the College as per the Affiliation University rules and produced before the Committees/Academic Council as and when asked for.

## 6.0 Attendance Requirements

6.1 A student is eligible to write the University examinations only if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

6.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee

**6.3 Shortage of Attendance below 65% in aggregate shall not be condoned.**

6.4 A student who is short of attendance in semester may seek re-admission into that semester when offered within 4 weeks from the date of the commencement of class work.

**6.5 Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class and their registration stands cancelled.**

6.6 A stipulated fee as determined by the examination branch shall be payable towards condonation of shortage of attendance.

**6.7 A student will be promoted to the next semester if he/she satisfies the attendance requirement of the present semester, as applicable, including the days of attendance in sports, games, NCC and NSS activities.**

**6.8 The candidate fulfills the attendance requirement in the present semester, he/she shall not be permitted for readmission into the same class.**

## 7. Course Registration:

7.1 Every student has to register for a set of Courses in each Semester, with the total number of their Credits being limited by considering the permissible weekly Contact Hours (typically: 30/Week); For this, an average Course Registration of minimum 20 Credits/Semester (e.g., 6-7 Courses) and a maximum of 28 credits are generally acceptable on recommendation of concerned academic advisor by satisfying the pre-requisite conditions.

7.2 Approval of the Course Registration will be informed by the concerned Head of the Department on the beginning of the semester by taking the number of students registered (minimum **one-third** students per class) and availability of the faculty into consideration.

7.3 Dropping of the Course Registration can be permitted up to two weeks from the commencement of the semester. Thereafter no droppings are permitted.

7.4 Interchanging of Course Registrations are not permitted.

7.5 The Pre-requisite conditions for the additional course(s) registration by the students are based on the slots available in the Time Table, Class rooms and Faculty availability.

## 8.0 Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.6.



8.1 A student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than 35% of marks in the mid examination (rounded to 10 marks out of 30 marks) and also not less than 35% in end semester examination and minimum 40% of marks in the sum total of the mid-term and end semester exams put-together.

8.2 A student shall be promoted from I year to II year upon fulfilling the minimum required attendance.

8.3 A student will be eligible to be promoted from II year to III year, upon fulfilling the academic requirements of 50 % credits up to II year I semester examinations and secures prescribed minimum attendance in II year.

8.4 A student will be eligible to be promoted from III year to IV year, upon fulfilling the academic requirements of 50 % credits up to III year I semester examinations and secures prescribed minimum attendance in III year.

8.5 A student shall register and put up minimum attendance in all 192 credits and shall earn a minimum of 184 credits for the award of B.Tech degree. Further, marks obtained in the 184 credits shall be considered for the calculation of percentage of marks as well as overall CGPA.

8.6 Students who fail to earn 184 credits as indicated in the course structure within ten academic years (8 years of study + 2 years additionally for appearing for exams only) from the year of their admission, shall forfeit their seat in B.Tech course and their admission stands cancelled.

## **9.0 Course pattern**

9.1 The entire course of study is for four academic years. I,II,III and IV years shall be on semester pattern.

9.2 A student, eligible to appear for the end examination in a subject, but absent from it or has failed in the end semester examination, may write the exam in that subject during the period of supplementary exams.

9.3 When a student is detained for lack of credits/shortage of attendance, he/she will not be promoted to the next semester for that particular academic year. However, the academic regulations under which he was first admitted shall continue to be applicable to him.

## **10.0 Grading Procedure**

10.1 Marks will be awarded to indicate the performance of student in each theory subject, laboratory/practicals, seminar, UG mini project and UG major project. Based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken grade together) as specified in item 8 above, a corresponding letter shall be given.

10.2 As a measure of the performance of student, a 10-point absolute grading system using the following letter grades (as per UGC/AICTE guidelines) and corresponding percentage of marks shall be followed.

### 10.3 Letter Grades and Grade Points:

The UGC recommends a 10-point grading system with the following letter grades as given below:

Letter Grade	Points	% of Marks secured in a subject or course (Class Intervals)
O (Outstanding)	10	Greater than or equal to 90
A+(Excellent)	9	80 and less than 90
A(Very Good)	8	70 and less than 80
B+(Good)	7	60 and less than 70
B(Average)	6	50 and less than 60
C(Pass)	5	40 and less than 50
F(Fail)	0	Below 40
Ab (Absent)	0	-

A student obtaining Grade F shall be considered failed and will be required to reappear in the examination

### 10.4 Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

**Credit points (CP) = grade point (GP) x credits .... For a course**

i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

$$\text{SGPA (Si)} = \Sigma(\text{Ci} \times \text{Gi}) / \Sigma \text{Ci}$$

where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$\text{CGPA} = \Sigma(\text{Ci} \times \text{Si}) / \Sigma \text{Ci}$$

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

10.5. A student obtaining 'F' grade in any subject shall be deemed to have 'failed' and is required to reappear as a 'supplementary student' in the semester end examination, as and when offered. In such cases, internal marks in those subjects will remain the same as those obtained earlier.

10.6 A student who has not appeared for examination in any subject '**Ab**' grade will be allocated in that subject, and student shall be considered '**failed**'. Student will be required to reappear as a 'supplementary student' in the semester end examination, as and when offered.

10.7 A letter grade does not indicate any specific percentage of marks secured by the student, but it indicates only the range of percentage of marks.

10.8 A student earns grade point (GP) in each subject/ course, on the basis of the letter grade secured in that subject/ course. The corresponding 'credit points' (CP) are computed by multiplying the grade point with credits for that particular subject/ course.

**Credit points (CP) = grade point (GP) x credits .... For a course**

10.9 The student passes the subject/ course only when **GP  $\geq$  5 ('C' grade or above)**

#### Illustration of calculation of SGPA

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
Course 1	4	A	8	4 x 8 = 32
Course 2	4	O	10	4 x 10 = 40
Course 3	4	C	5	4 x 5 = 20
Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	3	C	5	3 x 5 = 15
	21			152

$$\text{SGPA} = 152/21 = 7.24$$

#### Illustration of calculation of CGPA:

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
I Year I Semester				
Course 1	4	A	8	4 x 8 = 32
Course 2	4	A+	9	4 x 9 = 36
Course 3	4	B	6	4 x 6 = 24
Course 4	3	O	10	3 x 10 = 30
Course 5	3	B+	7	3 x 7 = 21
Course 6	3	A	8	3 x 8 = 24

I Year II Semester				
Course 7	4	B+	7	4 x 7 = 28
Course 8	4	O	10	4 x 10 = 40
Course 9	4	A	8	4 x 8 = 32
Course 10	3	B	6	3 x 6 = 18
Course 11	3	C	5	3 x 5 = 15
Course 12	3	A+	9	3 x 9 = 27
	Total Credits = 42			Total Credits Points = 327

$$\text{CGPA} = 327/42 = 7.79$$

10.10 For merit ranking or comparison purposes or any other listing, **only** the ‘rounded off’ values of the CGPAs will be used.

10.11 For calculations listed in regulations 10.4 to 10.9, performance in failed subjects/ courses (securing **F** grade) will also be taken into account, and the credits of such subjects/courses will also be included in the multiplications and summations. After passing the failed subject(s) newly secured letter grades will be taken into account for calculation of SGPA and CGPA. However, mandatory courses will not be taken into consideration.

### 11.0 Passing standards

11.1 student shall be declared successful or ‘passed’ in a semester, if student secures a GP  $\geq 5$  (‘C’ grade or above) in every subject/course in that semester (i.e. when student gets an SGPA  $\geq 5.00$  at the end of that particular semester); and a student shall be declared successful or ‘passed’ in the entire under graduate programme, only when gets a CGPA  $\geq 5.00$  for the award of the degree as required.

11.2 After the completion of each semester, a grade card or grade sheet (or transcript) shall be issued to all the registered students of that semester, indicating the letter grades and credits earned. It will show the details of the courses registered (course code, title, no. of credits, and grade earned etc.), credits earned, SGPA, and CGPA.

### 12.0 Declaration of results

12.1 Computation of SGPA and CGPA are done using the procedure listed in 10.4 to 10.9.

12.2 For final percentage of formula marks equivalent to the computed final CGPA, the following formula maybe used.

$$\% \text{ of Marks} = (\text{final CGPA} - 0.5) \times 10$$

### 13.0 Award of Degree

In assessing the performance of the students in examinations, the usual approach is to award marks based on the examinations conducted at various stages (sessional, mid-term, end-semester etc.,) in a semester. As per UGC Autonomous guidelines, the following system is implemented in awarding the grades and CGPA under the **Choice Based Credit System (CBCS)**.

13.1 A student who registers for all the specified subjects/ courses as listed in the course structure and secures the required number of 192 credits (with CGPA  $\geq 5.0$ ), within 8 academic years from the date of commencement of the first academic year, shall be declared to have '**qualified**' for the award of the B.Tech. degree in the chosen branch of Engineering as selected at the time of admission.

13.2 A student who qualifies for the award of the degree as listed in 13.1 shall be placed in the following classes.

13.3 Students with final CGPA (at the end of the under graduate programme)  $\geq 8.00$ , and fulfilling the following conditions shall be placed in '**first class with distinction**'.

- i. Should have passed all the subjects/courses within the first 4 academic years (or 8 sequential semesters) from the date of commencement of first year first semester.
- ii. Should have secured a CGPA  $\geq 8.00$ , at the end of each of the 8 sequential semesters, starting from first year first semester onwards.

13.4 Students with final CGPA (at the end of the under graduate programme)  $\geq 6.50$  but  $< 8.00$ , shall be placed in '**first class**'.

13.5 Students with final CGPA (at the end of the under graduate programme)  $\geq 5.50$  but  $< 6.50$ , shall be placed in '**Second class**'.

13.6 All other students who qualify for the award of the degree (as per item 13.1), with final CGPA (at the end of the under graduate programme)  $\geq 5.00$  but  $< 5.50$ , shall be placed in '**pass class**'.

13.7 A student with final CGPA (at the end of the under graduate programme)  $< 5.00$  will not be eligible for the award of the degree.

13.8 Students fulfilling the conditions listed under item 13.3 alone will be eligible for award of '**university rank**' and '**gold medal**'.

### 14.0 Withholding of results

14.1 If the student has not paid the fees to the university/ college at any stage, or has dues pending due to any reason whatsoever, or if any case of indiscipline is pending, the result of the student may be withheld, and student will not be allowed to go into the next higher semester. The award or issue of the degree may also be withheld in such cases.

### 15.0 Transitory regulations.

15.1 A student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the degree programme, may be considered eligible for readmission to the same subjects/ courses (or equivalent subjects/ courses, as the case may be), and same professional electives/ open electives (or from set/category of electives or equivalents

suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the date of commencement of student's first year first semester).

15.2 After the revision of the regulations, the students of the previous batches will be given two chances for passing in their failed subjects, one supplementary and the other regular. If the students cannot clear the subjects in the given two chances, they shall be given equivalent subjects as per the revised regulations which they have to pass in order to obtain the required number of credits.

15.3 In case of transferred students from other Universities, the credits shall be transferred to JNTUH as per the academic regulations and course structure of the MRCET.

## **16 Minimum Instruction Days**

The minimum instruction days for each semester shall be 90days.

### **17.0 General**

17.1 Wherever the words he, him, his, occur in the regulations, they include she, her, hers.

17.2 The academic regulation should be read as a whole for the purpose of any interpretation.

17.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

17.4 The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

17.5 The students seeking transfer to colleges affiliated to JNTUH from various other Universities/Institutions, have to pass the failed subjects which are equivalent to the subjects of prescribed curriculum of the institute, and also pass the subjects of prescribed curriculum of the institute which the candidates have not studied at the earlier Institution on their own without the right to sessional marks. Further, though the students have passed some of the subjects at the earlier institutions, if the same subjects are prescribed in different semesters of prescribed curriculum of the institute, the candidates have to study those subjects in prescribed curriculum of the institute in spite of the fact that those subjects are repeated.

### **18.0 Scope**

18.1 The academic regulations should be read as a whole, for the purpose of any interpretation.

18.2 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic senate is final.

18.3 The college may change or amend the academic regulations, course structure or syllabi at any time, and the changes or amendments made shall be applicable to all students with effect from the date notified by the academic senate of the college.

**Academic Regulations for B.Tech. (Lateral Entry Scheme) w.e.f the AY 2017-18****1. Eligibility for award of B. Tech. Degree (LES)**

The LES students after securing admission shall pursue a course of study for not less than three academic years and not more than six academic years.

2. The student shall register for 144 credits and secure 144 credits with CGPA  $\geq 5$  from II year to IV year B.Tech. programme (LES) for the award of B.Tech. degree. **Out of the 144 credits secured, the student can avail exemption up to 6 credits**, that is, one open elective subject and one professional elective subject or two professional elective subjects resulting in 138 credits for B.Tech programme performance evaluation.

3. The students, who fail to fulfil the requirement for the award of the degree in six academic years from the year of admission, shall forfeit their seat in B.Tech.

4. The attendance requirements of B. Tech. (Regular) shall be applicable to B.Tech. (LES).

**5. Promotion rule**

- 5.1 A student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than 35% of marks in the mid examination (rounded to 10 marks out of 30 marks) and also not less than 35% in end semester examination and minimum 40% of marks in the sum total of the mid-term and end semester exams put together.
- 5.2 A student shall be promoted from II year to III year upon fulfilling the minimum required attendance.
- 5.3 A student will be eligible to be promoted from II year to III year, upon fulfilling the academic requirements of 50 % credits up to II year I semester examinations and secures prescribed minimum attendance in II year.
- 5.4 A student will be eligible to be promoted from III year to IV year, upon fulfilling the academic requirements of 50 % credits up to III year I semester examinations and secures prescribed minimum attendance in III year

- 6. All the other regulations as applicable to B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme)**

**MALPRACTICES RULES****DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS**

S.No	Nature of Malpractices/Improper conduct	Punishment
	<i>If the candidate:</i>	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original



		<p>candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.</p>
4.	<p>Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.</p>	<p>Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</p>
5.	<p>Using objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting</p>	<p>Cancellation of the performance in that subject.</p>

	him to award pass marks.	
6.	Refuses to obey the orders of the Chief Superintendent/Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-incharge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the	Expulsion from the examination

	examination hall.	hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has

		appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

**Malpractices identified by squad or special invigilators**

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions: (if the squad reports that the college is also involved in encouraging malpractices)
  - i. A show cause notice shall be issued to the college.
  - ii. Impose a suitable fine on the college.
  - iii. Shifting the examination centre from the college to another college for a specific period of not less than one year.

\* \* \* \* \*

**PRE-REQUISITES FOR CORE ELECTIVES**

Core Elective Number	Subject Code	Title of the Subject	Pre-Requisite Subject Code	Pre-Requisite Subject Title
1	<b>R17A0515</b>	Advanced computer architecture	<b>R17A0510</b>	Computer organization
	<b>R17A0524</b>	Distributed systems	<b>R17A0513</b>	Operating Systems
	<b>R17A0561</b>	Network programming		
2	<b>R17A0517</b>	Computer Graphics		
	<b>R17A0518</b>	Object Oriented Analysis and Design	<b>R17A0511</b>	Software Engineering
	<b>R17A0523</b>	Introduction to Analytics(Associate Analytics 1 )		
	<b>R17A0522</b>	Information Security Management( security Analyst 1 )		
3	<b>R17A0564</b>	Multimedia rich internet applications	<b>R17A0520</b>	Web Technologies
	<b>R17A0541</b>	Scripting languages		
	<b>R17A0531</b>	Big Data Analytics (Associate Analytics 2 )	<b>R17A0523</b>	Introduction to Analytics(Associate Analytics 1 )
	<b>R17A0530</b>	Information Security Assessments & Audits ( Security Analyst 2 )	<b>R17A0522</b>	Information Security Management( security Analyst 1 )
4	<b>R17A0528</b>	Design Patterns	<b>R17A0518</b>	Object Oriented Analysis and Design
	<b>R17A0565</b>	Information Retrieval Systems	<b>R17A0509</b> <b>R17A0526</b>	Database Management Systems Data Warehousing and Data Mining
	<b>R17A0566</b>	Soft Computing		
5	<b>R17A0543</b>	Software Project Management	<b>R17A0511</b>	Software Engineering
	<b>R17A0535</b>	Semantic Web and social networks	<b>R17A0526</b>	Data Warehousing and Data Mining
	<b>R17A0567</b>	Grid Computing	<b>R17A0510</b>	Computer organization
6	<b>R17A0539</b>	Web Services	<b>R17A0541</b>	Scripting languages
	<b>R17A0570</b>	E-commerce	<b>R17A0526</b>	Data Warehousing and Data Mining
	<b>R17A0571</b>	Middleware Technologies		

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****DEPARTMENT OF INFORMATION TECHNOLOGY****VISION**

To improve quality technical education that provide quality software Engineering with an attitude to adopt every challenging IT needs of local , national and international arena , through teaching interaction with alumni and industry .

**MISSION**

Department of Information Technology is prepared to meet the challenges and is Playing a Leadership role in shaping the education of the 21st century by providing unique educational and research opportunities

**PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)****PEO1: PROFESSIONALISM & CITIZENSHIP**

To create and sustain a community of learning in which students acquire knowledge and learn to apply it professionally with due consideration for ethical, ecological and economic issues.

**PEO2: TECHNICAL ACCOMPLISHMENTS**

To provide knowledge based services to satisfy the needs of society and the industry by providing hands on experience in various technologies in core field.

**PEO3: INVENTION, INNOVATION AND CREATIVITY**

To make the students to design, experiment, analyze, interpret in the core field with the help of other multi disciplinary concepts wherever applicable.

**PEO4: PROFESSIONAL DEVELOPMENT**

To educate the students to disseminate research findings with good soft skills and become a successful entrepreneur.

**PEO5: HUMAN RESOURCE DEVELOPMENT**

To graduate the students in building national capabilities in technology, education and research.

### PROGRAM SPECIFIC OUTCOMES (PSOs)

- **Fundamentals and critical knowledge of the Computer System:-** Able to Understand the working principles of the computer System and its components , Apply the knowledge to build, asses, and analyze the software and hardware aspects of it
- **The comprehensive and Applicative knowledge of Software Development:** Comprehensive skills of Programming Languages, Software process models, methodologies, and able to plan, develop, test, analyze, and manage the software and hardware intensive systems in heterogeneous platforms individually or working in teams.
- **Applications of Computing Domain & Research:** Able to use the professional, managerial, interdisciplinary skill set, and domain specific tools in development processes, identify the research gaps, and provide innovative solutions to them.



## PROGRAM OUTCOMES (POs)

### Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design / development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
12. **Life- long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**COURSE STRUCTURE****I Year B. Tech (IT) – I Semester**

S.NO	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX.MARKS	
						Int	Ext
1	R17A0001	ENGLISH	2		2	30	70
2	R17A0021	MATHEMATICS-I	4	1	4	30	70
3	R17A0011	ENGINEERING PHYSICS-I	2	1	2	30	70
4	R17A0013	ENGINEERING CHEMISTRY	3		3	30	70
5	R17A0501	COMPUTER PROGRAMMING WITH C	3		3	30	70
6	R17A0302	ENGINEERING DRAWING	4	3	4	30	70
7	R17A0581	COMPUTER PROGRAMMING LAB	-	3	2	25	50
8	R17A0083	ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB	-	3	2	25	50
9	R17A0081	ENGLISH LANGUAGE COMMUNICATION SKILLS LAB-1	-	3	2	25	50
		<b>TOTAL</b>	<b>18</b>	<b>14</b>	<b>24</b>	<b>255</b>	<b>570</b>

**I Year B. Tech (IT) – II Semester**

S.NO	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX.MARKS	
						Int	Ext
1	R17A0002	PROFESSIONAL ENGLISH	2		2	30	70
2	R17A0022	MATHEMATICS-II	4	1	4	30	70
3	R17A0012	ENGINEERING PHYSICS-II	2	1	2	30	70
4	R17A0502	OBJECT ORIENTED PROGRAMMING THROUGH C++	3	1	3	30	70
5	R17A0201	ELECTRICAL CIRCUITS	4		4	30	70
6	R17A0014	ENVIRONMENTAL STUDIES	3		3	30	70
7	R17A0582	OBJECT ORIENTED PROGRAMMING THROUGH C++ LAB	-	3	2	25	50
8	R17A0084	IT WORKSHOP/ENGINEERING WORKSHOP	-	3	2	25	50
9	R17A0082	ENGLISH LANGUAGE COMMUNICATION SKILLS LAB-II	-	3	2	25	50
*10	R17A0003	HUMAN VALUES AND SOCIETAL PERSPECTIVES	2	-	-	50	-
		<b>TOTAL</b>	<b>20</b>	<b>12</b>	<b>24</b>	<b>305</b>	<b>570</b>

**\*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

**II Year B. Tech (IT) – I Semester (6 Core Subjects + 2 Labs)**

S.NO	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R17A0503	MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE	3		3	30	70
2	R17A0504	DATA STRUCTURES USING C++	4	1	4	30	70
3	R17A0024	PROBABILITY AND STATISTICS	4		4	30	70
4	R17A0401	ELECTRONIC DEVICES AND CIRCUITS	3	1	3	30	70
5	R17A0510	COMPUTER ORGANIZATION	3	1	3	30	70
6	R17A0461	DIGITAL LOGIC DESIGN	3	1	3	30	70
7	R17A0282	ELECTRICAL AND ELECTRONICS LAB	-	3	2	25	50
8	R17A0583	DATA STRUCTURES USING C++ LAB	-	3	2	25	50
9	R17A0004 OR R17A0005	FOREIGN LANGUAGES : FRENCH FOREIGN LANGUAGES : GERMAN	2			50	
<b>Total</b>			<b>22</b>	<b>10</b>	<b>24</b>	<b>280</b>	<b>520</b>

**II Year B. Tech (IT) – II Semester (5 Core Subjects + 1 Open Elective + 2 Labs)**

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R17A0506	FORMAL LANGUAGE AND AUTOMATA THEORY	3	1	3	30	70
2	R17A0507	JAVA PROGRAMMING	4		4	30	70
3	R17A0508	DESIGN AND ANALYSIS OF ALGORITHMS	3	1	3	30	70
4	R17A0509	DATABASE MANAGEMENT SYSTEMS	4		4	30	70
5	R17A0511	SOFTWARE ENGINEERING	3	1	3	30	70
6		OPEN ELECTIVE *	3	1	3	30	70
7	R17A0584	DATABASE MANAGEMENT SYSTEMS LAB	-	3	2	25	50
8	R17A0585	JAVA PROGRAMMING LAB	-	3	2	25	50
*9	R17A0006	GENDER SENSITIZATION		3		75	
<b>TOTAL</b>			<b>20</b>	<b>13</b>	<b>24</b>	<b>305</b>	<b>550</b>

\*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

**OPEN ELECTIVES**

S.NO.	SUBJECT CODE	SUBJECT
1	R17A0451	DIGITAL ELECTRONICS
2	R17A0251	FUNDAMENTAL OF ELECTRICAL MACHINES
3	R17A0551	DATA BASE SYSTEMS
4	R17A0351	ELEMENTS OF MECHANICAL ENGINEERING
5	R17A0352	GREEN ENERGY SYSTEMS
6	R17A0051	INTELLECTUAL PROPERTY RIGHTS

**III Year B. Tech (IT) – I Semester (4 Core Subjects+1 Core Electives+1 Open Elective+2 Labs)**

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R17A0527	LINUX PROGRAMMING	4		4	30	70
2	R17A0513	OPERATING SYSTEMS	3	1	3	30	70
3	R17A0520	WEB TECHNOLOGIES	4		4	30	70
4	R17A0512	COMPILER DESIGN	3	1	3	30	70
5	R17A0515 R17A0524 R17A0561	CORE ELECTIVE 1 1. ADVANCED COMPUTER ARCHITECTURE 2. DISTRIBUTED SYSTEMS 3. NETWORK PROGRAMMING	3	1	3	30	70
6	*****	OPEN ELECTIVE *	3	1	3	30	70
7	R17A0591	LINUX PROGRAMMING LAB	-	3	2	25	50
8	R17A0593	WEB TECHNOLOGIES LAB	-	3	2	25	50
*9	R17A0007	TECHNICAL COMMUNICATION AND ANALYTICAL SKILLS	2	-	-	50	-
<b>TOTAL</b>			<b>22</b>	<b>10</b>	<b>24</b>	<b>280</b>	<b>520</b>

\*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

**OPEN ELECTIVES \***

S.NO.	SUBJECT CODE	SUBJECT
1	R17A0452	INDUSTRIAL ELECTRONICS
2	R17A0453	COMMUNICATION NETWORKS
3	R17A0552	OBJECT ORIENTED PROGRAMMING THROUGH JAVA
4	R17A1251	MANAGEMENT INFORMATION SYSTEM
5	R17A1252	SOFTWARE PROJECT MANAGEMENT
6	R17A0353	OPERATION RESEARCH

**III Year B. Tech (IT) – II Semester (4 Core Subjects+1 Core Electives+1 Open Elective+2 Labs)**

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R17A0514	COMPUTER NETWORKS	3	1	3	30	70
2	R17A0521	SOFTWARE TESTING METHODOLOGIES	4		4	30	70
3	R17A0526	DATA WAREHOUSING AND DATA MINING	4		4	30	70
4	R17A0529	CLOUD COMPUTING	3	1	3	30	70
5	R17A0517 R17A0518 R17A0523 R17A0522	CORE ELECTIVE 2 1.COMPUTER GRAPHICS 2.OBJECT ORIENTED ANALYSIS AND DESIGN 3. INTRODUCTION TO ANALYTICS (ASSOCIATE ANALYTICS 1 ) 4. INFORMATION SECURITY MANAGEMENT ( SECURITY ANALYST 1 )	3	1	3	30	70
6		OPEN ELECTIVE *	3	1	3	30	70
7	R17A0590	DATA WAREHOUSING AND DATA MINING LAB	-	3	2	25	50
8	R17A0594	CT AND STM LAB	-	3	2	25	50
<b>TOTAL</b>			<b>20</b>	<b>10</b>	<b>24</b>	<b>230</b>	<b>520</b>

\*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

**OPEN ELECTIVES \***

S.NO.	SUBJECT CODE	SUBJECT
1	R17A0454	ROBOTICS ENGINEERING
2	R17A0455	BIOMEDICAL ENGINEERING
3	R17A0553	WEB TECHNOLOGIES
4	R17A0554	GAME PROGRAMMING
5	R17A0354	NANO TECHNOLOGY
6	R17A0052	ENTERPRISE RESOURCE PLANNING

**IV Year B. Tech (IT) – I Semester (4 Core Subjects+2 Core Electives +2 Labs)**

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX. MARKS	
						INT	EXT
1	R17A0562	HUMAN COMPUTER INTERACTION	3	1	3	30	70
2	R17A0573	APPLICATION PROGRAMMING	4		4	30	70
3	R17A0563	MOBILE APPLICATION DEVELOPMENT	4		4	30	70
4	R17A0533	COMPUTER FORENSICS	3	1	3	30	70
5	R17A0564	CORE ELECTIVE 3	3	1	3	30	70
	R17A0541	1. MULTIMEDIA RICH INTERNET APPLICATIONS					
	R17A0531	2. SCRIPTING LANGUAGES					
	R17A0530	3. BIG DATA ANALYTICS (ASSOCIATE ANALYTICS 2 )					
6	R17A0528	CORE ELECTIVE 4	3	1	3	30	70
	R17A0565	1 DESIGN PATTERNS					
	R17A0566	2.INFORMATION RETRIEVAL SYSTEMS					
	R17A0566	3.SOFT COMPUTING					
7	R17A0592	MOBILE APPLICATION DEVELOPMENT LAB	-	3	2	25	50
8	R17A0595	APPLICATION PROGRAMMING LAB	-	3	2	25	50
<b>TOTAL</b>			<b>20</b>	<b>10</b>	<b>24</b>	<b>230</b>	<b>520</b>

**IV Year B. Tech (IT) – II Semester (2 Core Electives)**

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX. MARKS	
						INT	EXT
1	R17A0543	CORE ELECTIVE 5	4		4	30	70
	R17A0535	1. SOFTWARE PROJECT MANAGEMENT					
	R17A0567	2. SEMANTIC WEB AND SOCIAL NETWORKS					
		3.GRID COMPUTING					
2	R17A0539	CORE ELECTIVE 6	4		4	30	70
	R17A0570	1.WEB SERVICES					
	R17A0571	2.E-COMMERCE					
		3.MIDDLEWARE TECHNOLOGIES					
3	R17A0596	MINI PROJECT	-	-	4	-	100
4	R17A0597	TECHNICAL SEMINAR	-	6	2	50	-
5	R17A0598	MAJOR PROJECT	15	-	10	100	200
<b>TOTAL</b>			<b>23</b>	<b>6</b>	<b>24</b>	<b>210</b>	<b>440</b>

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****I Year B. Tech IT-I Sem****L T/P/D C****2 - / - / - 2****(R17A0001) ENGLISH****INTRODUCTION:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking, and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

**OBJECTIVES:**

- To provide amateur engineers with the critical faculties necessary in an academic environment, using the theoretical and practical components of English syllabus.
- To upgrade the capability of analyzing of texts from different periods and genres.
- To improve the language proficiency of the students in English with emphasis on LSRW skills to face complex engineering activities at work place.
- To understand the basics of grammar to speak correct English and communicate effectively both formally and informally.

**SYLLABUS:****Listening Skills:****Objectives**

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions. Students should be given practice in listening to the sounds of the language to be able to recognize them, to distinguish between them to mark stress and recognize and use the right intonation in sentences.
  - Listening for general content
  - Listening to fill up information
  - Intensive listening
  - Listening for specific information

**Speaking Skills:****Objectives**

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: Learning English: A Communicative Approach)
- Just A Minute (JAM) Sessions.

**Reading Skills:****Objectives**

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

**Skimming the text**

- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Scanning the text
- Recognizing coherence/sequencing of sentences

**NOTE:**

The students will be trained in reading skills using the prescribed text for detailed study.

They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

**Writing Skills:****Objectives**

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
  - Writing sentences
  - Use of appropriate vocabulary
  - Paragraph writing
  - Coherence and cohesiveness
  - Narration / description
  - Note Making
  - Formal and informal letter writing
  - Describing graphs using expressions of comparison

**TEXTBOOKS PRESCRIBED:**

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following text and course content, is prescribed for this semester.

Textbook titled "Epitome of Wisdom", published by Maruthi Publications, Hyderabad.

**Unit –I**

Chapter entitled 'Mokshagundam Visvesvaraya' from *Epitome of Wisdom*  
**and**

Listening – Conversations – introducing each other, talking about a course

Speaking – Jam sessions

Reading – The Palm Islands

Writing – Writing Paragraphs

Grammar – Conjunctions and Adverbs  
Vocabulary – Prefixes and Suffixes

**Unit – II**

Chapter entitled “Three Days to See” from *Epitome of Wisdom*  
**and**

Listening – Conversations-planning for an outing  
Speaking – Telephone Etiquettes  
Reading – Physically challenged athletes  
Writing – Memo writing  
Grammar – Modal Auxiliaries  
Vocabulary – Synonyms & antonyms

**Unit – III**

Chapter entitled “The Road Not Taken” from *A Selection of Robert Frost’s Poems (Owl Book)*, by Holt Paperbacks: 2 Revised Edition. 2002.

**and**

Listening – News items  
Speaking – Public speaking  
Reading – ‘If’ poem  
Writing – Letter writing-formal/informal  
Grammar – Knowing with questions (Wh –questions,) Question tags  
Vocabulary – Similes and Metaphors

**Unit – IV**

Chapter entitled “The Last Leaf” from *Epitome of Wisdom*  
**and**

Listening – Speech on environmental conservation  
Speaking – Group discussion  
Reading – Choose how to start your day  
Writing – Writing a narrative  
Grammar – Prepositions  
Vocabulary – Idioms and one-word substitutes

**Unit – V**

5. Chapter entitled “The Convocation Speech” from *Epitome of Wisdom*  
**and**

Listening – Speech on ‘How do you make a teacher great’?  
Speaking – Role plays  
Reading – What is meant by entrepreneurship?  
Writing – Essay writing  
Grammar – Active voice and Passive voice  
Vocabulary – Phrasal verbs

\* Exercises apart from the text book shall also be used for classroom tasks.

**REFERENCES:**

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.



2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson.
6. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.

**OUTCOMES:**

- Acquire and apply the critical thought process effectively on complex engineering activities.
- Utilize the analytical capability to comprehend and design any text effortlessly.
- Imbibe the English proficiency to receive clear instructions, make notes and draft letters vividly.
- Identify the basic grammatical structures and its application accurately to communicate with society at large.

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**(R17A0021) MATHEMATICS – I****Objectives:**

To learn

- Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions if exist and concept of eigen values and eigen vectors of a matrix
- The mean value theorems and to understand the concepts geometrically , functions of several variables and optimization of these functions.
- Methods of solving the differential equations of first and higher order ,Newton's law of cooling, Natural growth and decay, bending of beams etc.
- In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector-valued functions and their applications to line, surface and volume integrals.

**UNIT - I: Matrix Theory**

Introduction to matrices- Rank of a matrix - Finding rank of a matrix by reducing to Echelon and Normal forms-Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix-Cayley - Hamilton Theorem (without proof) – Verification- finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem- Linear dependence and Independence of Vectors- Eigen values and eigen vectors of a matrix-Properties of eigen values and eigen vectors of real and complex matrices-Diagonalization of a matrix.

**UNIT – II: Differential Calculus**

**Mean Value Theorems:** Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value theorems with geometrical interpretations (all theorems without proof)- verification of the Theorems and testing the applicability of these theorems to the given function- Taylor's series - Maclaurin's series.

**Functions of Several Variables:** Jacobian-Functional dependence- Maxima and Minima of functions of two variables without constraints and with constraints - Method of Lagrange multipliers.

**UNIT – III: Ordinary Differential Equations of First Order and Applications**

Introduction to ordinary differential equation - Variable Separable form- Homogeneous-Non homogeneous- Exact-Non Exact-Linear and Bernoulli's equations-Applications of first order differential equations – Newton's Law of cooling- Law of natural growth and decay- Orthogonal trajectories.

**UNIT - IV: Linear Differential Equations of Higher Order and Applications**

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

**UNIT – V: Vector Calculus**

Introduction- Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties - Laplacian operator, Line integral – work done – Surface integrals -Volume integral. Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

**TEXT BOOKS:**

1. "Mathematics – I", special edition-MRCET, McGraw Hill 2017
2. Engineering Mathematics – I by T.K.V Iyenger ,B.Krishna Gandhi and Others ,S Chand Publishers.

**REFERENCES:**

1. Engineering Mathematics by P. Sivaramakrishna Das, Pearson Publishers.
2. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.

**Outcomes:**

- After learning the contents the student is able to write the matrix representation of a set of linear equations and to analyze solutions of system of equations.
- The student will be able to understand the methods of differential calculus to optimize single and multivariable functions.
- The student is able to identify the type of differential equation and uses the right method to solve the differential equations. Also able to apply the theory of differential equations to the real world problems.
- The student will be able to evaluate multiple integrals (line, surface volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.

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**(R17A0011) ENGINEERING PHYSICS – I****OBJECTIVES:**

- The information in optics is required for engineering technology students to understand wave nature of light for applying accurate measurements by means of optical instruments.
- From the study of quantum and statistical aspects dual behavior of electron and solid state physics can be realized by the engineering students.
- The basic information regarding electrons and holes and their functioning in semiconductors is evident to the students. The semiconductor devices provide basic information for the present communication system

**UNIT-I****OPTICS:**

Interference-Coherence-Coherent sources, Constructive and destructive interference. Theory of interference fringes(Expression for band width). Interference in thin films by reflected light, Newton's rings Experiment. Diffraction-Types of diffraction, Difference between interference and diffraction, Fraunhofer's diffraction (Single Slit), Diffraction grating, Polarization, Types of polarization, Double Refraction, Nicol Prism.

**UNIT-II****LASERS:**

Characteristics of lasers, Spontaneous and Stimulated emissions, Einstein's Coefficients, Population inversion, Meta stable state, pumping, lasing action, Construction and working of Ruby Laser, Helium-Neon Laser, Semi conductor lasers, Applications of lasers.

**FIBER OPTICS:**

Construction and Working Principle of an optical fiber, Advantages of optical fibers, Numerical aperture and Acceptance angle, Types of Optical fibers - Mode and Propagation through step and graded index fibers, Optical Fiber Communication System, Attenuation, Applications of optical fibers.

**UNIT-III****PRINCIPLES OF QUANTUM MECHANICS:**

Wave nature and particle nature-de Broglie's Hypothesis, GP Thomson's Experiment, Davisson and Germer's experiment, Matter Waves, Heisenberg's uncertainty principle, physical significance of wave function, Schrodinger time-independent wave equation, Particle in One dimensional infinite potential box.

**UNIT-IV****ELEMENTS OF STATISTICAL MECHANICS & BAND THEORY OF SOLIDS:**

Micro and Macro states, Maxwell Boltzmann, Bose Einstein, Fermi Dirac Statistical distributions (Qualitative), Density of States, Fermi Energy, Introduction to electron theory of metals, Bloch Theorem (Qualitative), Kronig Penny model(Qualitative), EK curve (Brillouin Zone)-Effective mass of electron, Origin of energy bands in solids, Classification of solids-conductors, semi conductors and insulators.

**UNIT-V****SEMICONDUCTOR PHYSICS:**

Types of semi conductors, Carrier concentration and Fermi level of intrinsic and Extrinsic Semiconductors, Hall Effect and applications, Direct and indirect band gap of semiconductors.

**SEMICONDUCTOR DEVICES:**

Formation of PN junction diode, Energy level diagram of PN junction diode. V-I characteristics of PN junction diode- PN junction diode as LED and Solar cell.

**TEXT BOOKS:**

1. Engineering Physics - S Mani Naidu- Pearson Publishers.
2. A Text Book of Engineering Physics- P.G. Kshirsagar, Avadhanulu – S.Chand

**REFERENCES:**

1. Solid State Physics, Kittel- Wiley International.
2. Solid State Physics – AJ DekKer-Macmillan Publishers.
3. Engineering Physics, P.K. Palaniswamy, Scitech Publishers

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**(R17A0013)ENGINEERING CHEMISTRY****Objectives**

- To impart the basic concepts and ideas in chemistry, to develop scientific attitudes and enable the students to correlate the concepts of chemistry with the core programmes.
- Electrochemistry unit give conceptual knowledge about spontaneous processes and how can they be harnessed for producing electrical energy and efficiency of systems. Fuel cells which are the alternate energy sources for generating electrical energy on spot and portable applications.
- Understand various techniques involved in polymerization and application of polymer technology in the area of various engineering fields and manufacturing process of important metallurgical materials.

**UNIT I: Electrochemistry:** Conductance - Specific, Equivalent, Molar conductance and their unit, Applications of Conductance-Conductometric titrations (Acid base and Precipitation titrations); EMF-electrode and electrode potentials; Nernst equation and its applications; Electrochemical cells-Galvanic cell (Daniel cell) and Concentration cell (electrolytic concentration cell); Types of Electrodes-(construction and functioning of Calomel, Quinhydrone and Glass electrodes); determination of  $P^H$  using glass electrode; Potentiometric titrations (Acid Base and Redox titrations); electrochemical series and its applications; Numerical problems on conductance.

**Batteries:** Primary (Lithium cells) and Secondary cells (Lead-Acid cell and Ni-Cd cell); **Fuel cells** - Hydrogen -Oxygen fuel cell and Methanol-Oxygen fuel cell - construction, functioning, advantages and applications.

**Unit II: Corrosion and its Control:** Causes and effects of corrosion; Theories of corrosion – Chemical corrosion (oxidation corrosion) & Electrochemical corrosion (mechanism of evolution of Hydrogen and Absorption of oxygen); Galvanic corrosion; Factors affecting rate of corrosion – Nature of metal (position of metal in galvanic series, overvoltage, relative areas of anodic and cathodic parts, purity of metal and passivity) and Nature of environment (temperature, humidity and pH effect)

**Corrosion control methods:** Cathodic protection (Sacrificial Anodic and Impressed Current Cathodic protection). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), cladding, electroplating (Cu plating) and Electroless plating (Ni plating) – advantages and applications of electroplating/electroless plating.

**UNIT- III: Engineering Materials**

**Polymers:** Classification of Polymers, Types of Polymerization (Chain growth, Step growth & Zeigler Natta) **Plastics:** Thermoplastic & Thermosetting resins, Preparation, properties, engineering applications of PVC, Teflon and Bakelite. **Fibers-** Characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications. **Rubbers**–Natural rubber and its vulcanization; **Elastomers**–Buna-S and Butyl rubber; **Conducting polymers:** Polyacetylene-Mechanism of conduction, doping; applications of conducting polymers; **Bio-degradable Polymers:** preparation and applications of Poly vinylacetate and Poly lactic acid.

**Lubricants:** Characteristics of a good lubricant; Classification with examples; properties of lubricants: viscosity, cloud point, pour point, flash and fire point.

**Refractories:** Classification of refractories with examples, characteristics of a good refractory and applications of refractories.

**Nanomaterials:** Introduction and applications of nanomaterials.

**UNIT IV: Water and its Treatment:**

Hardness of Water: Causes of hardness, types of hardness, units of hardness; determination of hardness of water by EDTA method - numerical problems. Boiler troubles – Scales & Sludges, Priming, Foaming, and Caustic Embrittlement; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and Calgon conditioning); External treatment–Zeolite process and Ion exchange process; **Potable Water**-Its Specifications–Disinfection of water by ozonisation, chlorination (break point chlorination and its significance); Reverse Osmosis.

**UNIT V: Fuels**

**Fuels** – Characteristics of a good fuel, Classification – Solid fuels: Coal – analysis of coal - proximate and ultimate analysis and their significance, Liquid fuels – petroleum and its refining; Cracking – Fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol- Fischer-Tropsch's process: Gaseous fuels - constituents, characteristics and applications of Natural gas, LPG and CNG; Calorific value of fuel – HCV, LCV; Determination of calorific value by Junker's gas calorimeter.

**TEXT BOOKS:**

1. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company 14<sup>th</sup> Edition (2013)
2. Engineering Chemistry by B. Rama Devi, Ch. Venkataramana Reddy and R.P. Mani, CENGAGE learning (2016)

**REFERENCE BOOKS**

1. Engineering Chemistry by M. Thirumala Chary and E. Laxminarayana, Scitech publications (2016).
2. Engineering Chemistry by Bharathi Kumari and Jyotsna Cherukuri, VGS Techno Series (2016).

**OUTCOMES:**

- Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatment plants.
- Understand the operating principles of various types of electrochemical cells, including fuel cells and batteries.
- Analyze and develop a technically sound, economic and sustainable solution to corrosion problems related to engineering service.
- Be able to apply core concepts in Materials Science to solve engineering problems
- To learn about types of fuels and their characteristics, and combustion systems with emphasis on engineering applications.
- Recently modern materials synthesized find applications in industry and creating instruments for solving problems of electronics, telecommunications, health care, agriculture, and technology etc., In order to emphasize the above the topics like composite materials, polymers, conducting polymers and nanomaterials have been incorporated in the curriculum.

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**(R17A0501) COMPUTER PROGRAMMING WITH C****Objectives**

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the students to basic data structures such as lists, stacks and queues.
- To make the student understand simple sorting and searching methods

**UNIT - I**

Introduction to Computing – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development Life Cycle, Algorithm, Flowchart.

Introduction to C – History of C, Features Of C, Structure Of C Program, Character Set, C Tokens- keywords, Identifiers, Constants, Data types, Variables, Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversion, Statements- Selection Statements( Decision Making) – if and switch statements, Repetition statements ( loops)-while, for, do-while statements, other statements related to looping –break, continue, goto.

**UNIT-II**

Functions-Designing Structured Programs, Types of Functions- user defined functions, Standard Functions, Inter function communication, Categories of functions ,Parameter Passing techniques, Scope, Storage classes-auto, register, static, extern, Type qualifiers, Recursion- recursive functions, Preprocessor commands.

**UNIT – III**

**Arrays** – Declaration and Initialization, Arrays with functions , Array Applications, Two dimensional arrays, Multi dimensional arrays.

**Strings** – Declaration and Initialization, String Input / Output functions, Arrays of strings, String manipulation functions.

**UNIT-IV**

**Pointers**- Introduction, Definition and uses of pointers, address operator, Pointer variables, Pointer constants , void pointers, Pointer arithmetic, Pointers to Pointers, Pointers with Arrays, Pointers with Functions, Pointers to functions, Array of pointers, Pointers with Strings. Dynamic Memory Management functions: malloc(), calloc(), realloc() and free()

**UNIT-V**

Structures and Unions - Introduction, Declaration and Initialization, Structure within a structure, Operations on structures, Array of Structures, Pointer to Structures, Structures with Functions, Self referential structures, Typedef, enum, bitfields, Unions.

Files – Concept of a file, Streams, Text files and Binary files, Opening and Closing files, File input / output functions, File Status functions (Error handling), Positioning functions, Command line arguments.

**TEXT BOOKS:**

1. “Computer Programming with C” ,special edition-MRCET, Mc Graw Hill Publishers 2017.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.



**REFERENCE BOOKS:**

1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2. Computer Programming, E.Balagurusamy, First Edition, TMH.
3. C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.
4. Programming in C, *Ashok Kamthane*. Pearson Education India.
5. Let us C ,Yashwanth Kanethkar, 13<sup>th</sup> Edition, BPB Publications.

**Outcomes:**

- Demonstrate the basic knowledge of computer hardware and Software.
- Ability to apply solving and logical skills to programming in C language and also in other languages.

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**(R17A0302) ENGINEERING DRAWING****UNIT – I**

**Introduction To Engineering Drawing:** Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing- Dimensioning – Lettering practice – BIS Conventions.

- a) Polygons – Construction of regular polygons (General Method only)
- b) Conic Sections (General Method only- Eccentricity Method)
- c) Cycloid, Epicycloid and Hypocycloid
- d) Scales-Plain, Diagonal and Vernier

**UNIT – II**

**Orthographic Projection in First Angle only:** Principles of Orthographic Projections – Conventions – First and Third Angle projections (Introduction).

**Projections of Points.** Points in all four quadrants.

**Projections of Lines** – Parallel and inclined to both planes.

**UNIT – III**

**Projections of Planes:** Projection of regular planes, Plane inclined to both reference planes (No conditional problems).

**Projections of Solids:** Projections of regular solids prism and pyramid inclined to both planes (No conditional problems).

**UNIT – IV**

**Isometric Projections:** Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound Solids.

**UNIT – V**

**Transformation of Projections:** Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects

Basic Principles of ACAD – Demo Only.

**TEXT BOOKS:**

- 1. Engineering Drawing, Special Edition-MRCET, Mc Graw Hill Publishers 2017.
- 2. Engineering Drawing, N.D. Bhatt
- 3. Engineering Drawing by K.Venu Gopal& V.Prabu Raja New Age Publications.

**REFERENCES:**

- 1. Engineering drawing – P.J. Shah .S.Chand Publishers.
- 2. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.

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**(R17A0581) COMPUTER PROGRAMMING LAB****Objectives:**

- Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of Functions involving the idea of modularity.
- Concept of Array and pointers dealing with memory management.
- Structures and unions through which derived data types can be formed
- File Handling for permanent storage of data or record.
- Programming using gcc compiler in Linux.

**Week 1:**

- a) Write a C program to find sum and average of three numbers.
- b) Write a C program to find the sum of individual digits of a given positive integer.
- c) Write a C program to generate the first n terms of the Fibonacci sequence.

**Week 2:**

- a) Write a C program to generate prime numbers between 1 to n.
- b) Write a C program to Check whether given number is Armstrong Number or Not.
- c) Write a C program to evaluate algebraic expression  $(ax+b)/(ax-b)$ .

**Week 3:**

- a) Write a C program to check whether given number is perfect number or Not.
- b) Write a C program to check whether given number is strong number or not.

**Week 4:**

- a) Write a C program to find the roots of a quadratic equation.
- b) Write a C program perform arithmetic operations using switch statement.

**Week 5:**

- a) Write a C program to find factorial of a given integer using non-recursive function.
- b) Write a C program to find factorial of a given integer using recursive function.

**Week 6:**

- a) Write C program to find GCD of two integers by using recursive function.
- b) Write C program to find GCD of two integers using non-recursive function.

**Week 7:**

- a) Write a C program to find both the largest and smallest number in a list of integers.
- b) Write a C Program to Sort the Array in an Ascending Order
- c) Write a C Program to find whether given matrix is symmetric or not.

**Week 8:**

Revision of programs

**Week 9:**

- a) Write a C program to perform addition of two matrices.
- b) Write a C program that uses functions to perform Multiplication of Two Matrices.

**Week 10:**

- a) Write a C program to use function to insert a sub-string in to given main string from a given position.

- b) Write a C program that uses functions to delete n Characters from a given position in a given string.

**Week 11:**

- a) Write a C program using user defined functions to determine whether the given string is palindrome or not.
- b) Write a C program that displays the position or index in the main string S where the sub string T begins, or - 1 if S doesn't contain T.

**Week 12:**

- a) Write C program to count the number of lines, words and characters in a given text.
- b) Write a C program to find the length of the string using Pointer.

**Week 13:**

- a) Write a C program to Display array elements using calloc( ) function.
- b) Write a C Program to Calculate Total and Percentage marks of a student using structure.

**Week 14:**

- a) Write a C program that uses functions and structures to perform the following operations:
- i) Reading a complex number                      ii) Writing a complex number
  - iii) Addition of two complex numbers      iv) Multiplication of two complex numbers
- b) Write a C program to display the contents of a file.

**Week 15:**

- a) Write a C program to copy the contents of one file to another.
- b) Write a C program to merge two files into a third file.
- c) Write a C program to reverse the first n characters in a file.

**Week 16:**

Revision Of Programs

**TEXT BOOKS**

- 1.C Programming and Data Structures, P.Padmanabham, Third Edition, BS Publications
- 2.Computer programming in C.V.RAJaraman, PHI Publishers.
- 3.C Programming, E.Balagurusamy, 3<sup>rd</sup> edition, TMH Publishers.
- 4.C Programming, M.V.S.S.N Venkateswarlu and E.V.Prasad,S.Chand Publishers
- 5.Mastering C,K.R.Venugopal and S.R.Prasad, TMH Publishers.

**Outcomes:**

- Acquire knowledge about the basic concept of writing a program.
- Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Learn how to use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Understand the Role of Functions involving the idea of modularity.
- Understand the Concept of Array and pointers dealing with memory management.
- Learn Structures and unions through which derived data types can be formed
- Learn File Handling for permanent storage of data or record.

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- -/3/- 2**(R17A0083) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB****ENGINEERING PHYSICS LAB****(Any EIGHT experiments compulsory)****OBJECTIVES**

- The students are exposed to various experimental skills which is very essential for an Engineering student.
- The experiments are selected from various areas of physics like physical optics, Lasers, Fiber optics, Sound, Mechanics, Electricity & Magnetism and Basic Electronics.
- The students are exposed to various tools like Screw gauge, Vernier calipers, and physics.

**OUTCOMES**

- The student learns the concept of error and its analysis and try formulate new solutions to problems related to engineering physical balance, Spectrometer and Microscope.
- The student develops experimental skills to design new experiments in Engineering that accelerates development of society considering the public health and safety of society.
- Comprehension power of the engineering student increases with exposure to these experiments that helps them to compare the theory and correlate with experiment.

This course on physics lab is designed with 12 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1<sup>st</sup> year.

**LIST OF EXPERIMENTS: (Any Eight experiments compulsory)**

1. Dispersive power of the material of a prism - Spectrometer.
2. Wave length of light –Diffraction grating-using laser.
3. Newton's Rings –Radius of curvature of Plano convex lens.
4. Melde's experiment –Transverse and Longitudinal modes.
5. Time Constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gee's method.
8. Study the characteristics of LED.
9. Evaluation of numerical aperture of given fiber.
10. Energy gap of a material of p-n junction.
11. Rigidity modulus of given wire - Torsional pendulum.
12. Characteristics of a Solar cell.

**ENGINEERING CHEMISTRY LAB****List of Experiments (Any Eight experiments compulsory)****OBJECTIVES**

This course on chemistry lab is designed with 12 experiments in an academic year. It is common to all branches of Engineering in 1<sup>st</sup> B.Tech.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student. At the end of the course the student is expected to

- Provide the students with a solid foundation in chemistry laboratory required to solve engineering problems.
- Practical implementation of fundamental concepts.

**OUTCOMES**

- Students are able to estimate the total hardness and alkalinity present in a sample of water.
- Ability to select lubricants for various purposes.
- Ability to determine the surface tension of a given liquid.
- Ability to prepare advanced polymer materials.
- Ability to know the strength of an acid by conduct metric and potentio metric method.
- Ability to find the  $\text{Fe}^{+2}$ , and  $\text{Mn}^{+2}$  present in unknown substances/ ores using titrimetric and instrumental methods.

**List of Experiments****Titrimetry:**

1. Estimation of hardness of water by EDTA method.
2. Estimation of alkalinity of water.

**Mineral analysis:**

3. Estimation of manganese dioxide in pyrolusite.

**Instrumental Methods:****Colorimetry:**

4. Determination of ferrous iron in cement by colorimetric method

**Conductometry:**

5. Conductometric titration of strong acid vs strong base.
6. Conductometric titration of mixture of acids vs strong base.

**Potentiometry:**

7. Titration of strong acid vs strong base by Potentiometry.
8. Titration of weak acid vs strong base by Potentiometry.

**Preparation:**

9. Preparation of Phenol Formaldehyde Resin(Bakelite)-Demonstration
10. Preparation of Aspirin.

**Physical properties:**

11. Determination of Viscosity of sample oil by Redwood Viscometer.
12. Determination of Surface Tension of a given liquid by Stalagmometer

**TEXT BOOKS:**

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

**REFERENCE BOOKS:**

1. Text Book of engineering chemistry by R. N. Goyal and HarrmendraGoel, Ane Books Private Ltd.,
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

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**(R17A0081) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB – I**

The Language Lab focuses on the production and practice of sounds of the English language and familiarizes the students with its use in everyday situations and contexts.

**Objective:**

- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in their pronunciation, ample speaking opportunities are provided.
- To improve the fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussions and public speaking

**Syllabus:** English Language Communication Skills Lab has two parts:

- Computer Assisted Language Learning (CALL) Lab
- Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab

**UNIT –I**

**CALL Lab:** Introduction to Phonetics –Speech Sounds –Vowels and Consonants Transcriptions

**ICS Lab:** Ice-Breaking activity - JAM session

**UNIT –II**

**CALL Lab:** Pronunciation: Past Tense Markers and Plural Markers, Mispronounced sounds, Silent letters

**ICS Lab:** Situational Dialogues/Role Plays – Informal

**UNIT -III**

**CALL Lab:** Syllable and Syllabification

**ICS Lab:** Situational Dialogues/Role Plays – Formal

**WORKSHEETS FOR LETTER WRITING****ELCS Lab:****1. Computer Assisted Language Learning (CALL) Lab:**

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.

**System Requirement (Hardware component):**

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

- P –IV Processor
- a)Speed –2.8 GHZ
- b)RAM –512 MB Minimum
- c)HardDisk –80 GB
- ii) Headphones of High quality

**2. Interactive Communication Skills (ICS) Lab :**

A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

**DISTRIBUTION AND WEIGHTAGE OF MARKS****English Language Laboratory Practical Examination:**

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the other institution.

**OUTCOMES:**

- Learning with precision through computer-assisted individualized and independent language learning to work independently in engineering set up.
- Improved conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
- Accuracy in pronunciation and restoring Standard English thereby crafting better command in English language so that the students have a cutting edge over others in society.
- Imbibing appropriate use of language in situations to work as an individual and as a leader in diverse teams



**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****I Year B. Tech IT-II SEM**

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**(R17A0002) PROFESSIONAL ENGLISH****INTRODUCTION:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking, and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

**OBJECTIVES:**

- Provide amateur engineers with the critical faculties necessary in an academic environment, using the theoretical and practical components of English syllabus.
- Upgrade the capability of analyzing of texts from different periods and genres.
- Improve the language proficiency of the students in English with emphasis on LSRW skills to face complex engineering activities at work place.
- Understand the basics of grammar to speak correct English and communicate effectively both formally and informally.

**SYLLABUS:****Listening Skills:****Objectives**

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions. Students should be given practice in listening to the sounds of the language to be able to recognize them, to distinguish between them to mark stress and recognize and use the right intonation in sentences.
  - Listening for general content
  - Listening to fill up information
  - Intensive listening
  - Listening for specific information

**Speaking Skills:****Objectives**

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: Learning English: A Communicative Approach)
- Just A Minute (JAM) Sessions.

**Reading Skills:****Objectives**

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

**Skimming the text**

- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Scanning the text
- Recognizing coherence/sequencing of sentences

**NOTE:**

The students will be trained in reading skills using the prescribed text for detailed study.

They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

**Writing Skills:****Objectives**

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
  - Writing sentences
  - Use of appropriate vocabulary
  - Paragraph writing
  - Coherence and cohesiveness
  - Narration / description
  - Note Making
  - Formal and informal letter writing
  - Describing graphs using expressions of comparison

**TEXTBOOKS PRESCRIBED:**

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following text and course content is prescribed.

Text book entitled "Skills Annexe: Functional English for Success", published by Orient Black Swan, Hyderabad.

**UNIT-I**

Chapter entitled "Of parents and children" from "*The essays of Francis Bacon*", paperback-Import, 11 Oct 2008.

**and**

Listening – Listening for the theme and gist

Speaking – Describing situations and objects

Reading – Why pure science in India lags behind? – By P Rajendran

Writing – Note-taking and Note-making

Grammar – Nouns and Articles

Vocabulary – Homonyms, Homographs, Homophones

### **Unit –II**

Chapter entitled “Sachin Tendulkar” from *Skills Annexe -Functional English for Success*,  
**and**

Listening – listening for opinions

Speaking – Project Oral Presentations

Reading – Benefits of physical activity

Writing – Report writing

Grammar – Common Errors

Vocabulary –Technical Vocabulary

### **Unit –III**

Job applications: Cover letter & Curriculum vitae  
**and**

Listening – listening for main and sub-points

Speaking –Giving directions and instructions

Reading – Editorial letters from newspapers

Writing –Formal letter writing

Grammar – Tenses

Vocabulary – Collocations

### **Unit – IV**

Chapter entitled “Human Values and Professional Ethics” from *Skills Annexe -Functional English for Success*  
**and**

Listening – Listening for details

Speaking – Talking about hypothetical situations

Reading – What I Cherish Most

Writing – E-mail writing

Grammar – Types of verbs: Transitive, Intransitive, Ergative, finite and non – finite

Vocabulary – Commonly confused words

### **Unit – V**

Chapter entitled “The fringe benefits of failure and the importance of imagination” a speech by J.K. Rowlings  
**and**

Listening – listening for information

Speaking – Oral Presentations

Reading – The one thing every business executive must understand about social media

Writing –Picture composition

Grammar – Concord

Vocabulary –Commonly misspelt Words

\* Exercises apart from the text book shall also be used for classroom tasks.

**REFERENCES:**

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson.
6. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.

**OUTCOMES:**

- Acquire and apply the critical thought process effectively on complex engineering activities.
- Utilize the analytical capability to comprehend and design any text effortlessly.
- Imbibe the English proficiency to receive clear instructions, make notes and draft letters vividly.
- Identify the basic grammatical structures and its application accurately to communicate with society at large.

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**(R17A0022)MATHEMATICS-II****Objectives**

- The objective of interpolation is to find an unknown function which approximates the given data points and the objective of curve fitting is to find the relation between the variables x and y from given data and such relationships which exactly pass through the data (or) approximately satisfy the data under the condition of sum of least squares of errors.
- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data and also used to find the roots of an equation and to solve differential equations.
- In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very required. Indeed, any periodic and non periodic function can be best analyzed in one way by Fourier series method.
- PDE aims at forming a function with many variables and also their solution methods .Method of separation of variables technique is learnt to solve typical second order PDE.
- Properties of Laplace Transform, Inverse Laplace Transform and Convolution theorem

**UNIT – I: Solution of Algebraic, Transcendental Equations and Interpolation**

**Solution of Algebraic and Transcendental Equations:** Introduction – Graphical interpretation of solution of equations .The Bisection Method – Regula-Falsi Method – The Iteration Method – Newton-Raphson Method.

**Interpolation:** Introduction-Errors in polynomial interpolation-Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols-Differences of a polynomial-Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae – Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

**UNIT – II: Numerical techniques**

**Numerical integration:** Generalized Quadrature-Trapezoidal rule, Simpson's  $1/3^{\text{rd}}$  and  $3/8^{\text{th}}$  Rule.

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

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

**UNIT – III: Fourier series**

Definition of periodic function. Fourier expansion of periodic functions in a given interval of length  $2\pi$ . Determination of Fourier coefficients – Fourier series of even and odd functions – Half-range Fourier sine and cosine expansions-Fourier series in an arbitrary interval .

**UNIT-IV: Partial differential equations**

Introduction -Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and non-linear equations (Charpit's method), Method of separation of variables for second order equations and Applications of PDE to one dimensional (Heat equation).

**UNIT – V Laplace Transforms and Applications**

Definition of Laplace transform- Domain of the function and Kernel for the Laplace transforms- Existence of Laplace transform- Laplace transform of standard functions- first shifting Theorem,- Laplace transform of functions when they are multiplied or divided by "t"- Laplace transforms of derivatives and integrals of functions – Unit step function – second shifting theorem – Dirac's delta function- Periodic function – Inverse Laplace transform by Partial fractions-Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions- Convolution theorem –Solving ordinary differential equations by Laplace transforms.

**TEXT BOOKS:**

1. Mathematics-II, Special edition MRCET, Mc Graw Hill Publishers-2017.
- 2.1. Mathematical Methods by T.K.V Iyenger ,B.Krishna Gandhi and Others ,S Chand.

**REFERENCES:**

1. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
2. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.

**OUTCOMES:**

- From a given discrete data, one will be able to predict the value of the data at an intermediate point and by curve fitting, one can find the most appropriate formula for a guesses relation of the data variables. This method of analysis data helps engineers to understand the system for better interpretation and decision making.
- The student will be able to find a root of a given equation and will be able to find a numerical solution for a given differential equation. Helps in describing the system by an ODE, if possible. Also, suggests to find the solution as a first approximation.
- One will be able to find the expansion of a given function by Fourier series.
- One will be able to find a corresponding Partial Differential Equation for an unknown function with many independent variables and to find their solution.
- The student is able to solve certain differential equations using Laplace Transform. Also able to transform functions on time domain to frequency domain using Laplace transforms

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**(R17A0012) ENGINEERING PHYSICS-II****OBJECTIVES:**

- To understand the basics of bonding in solids, crystal structures and characterization techniques.
- To make the students aware of X-ray diffraction and different techniques of it.
- To understand the behavior of dielectric materials, magnetic materials and nano materials.

**UNIT-I****BONDING IN SOLIDS:**

Types of bonds - Primary, Secondary, Forces between atoms, Expression for cohesive energy between two atoms.

**CRYSTALLOGRAPHY:**

Space lattice, Basis, Unit cell, lattice parameters, Crystal systems, Bravais lattices, Atomic number, coordination number, packing factor of SC,BCC,FCC crystals, Crystal planes and directions - Miller indices. Expression for inter planar distance in cubic crystal, Structure of NaCl and Diamond.

**UNIT- II****X-RAY DIFFRACTION:**

Bragg's law, Experimental techniques -Laue's method, powder method, Applications of x-ray diffraction.

**DEFECTS IN CRYSTALS:**

Classification of crystal defects, Point defects-Vacancies & Interstitials, Concentrations of Schottky and Frenkel defects, Line defects- edge dislocation and screw dislocation, Burger's vector.

**UNIT-III****DIELECTRIC PROPERTIES:**

Electric dipole, Dipole moment, Polarization vector (P), Displacement vector (D), Dielectric constant (K), Electric susceptibility ( $\chi$ ), Types of polarizations-Expression for Electronic and Ionic polarization, Internal fields in dielectrics, Classius Mosotti relation, Piezo electricity and Ferro electricity, Applications of dielectric materials.

**UNIT-IV****MAGNETIC PROPERTIES:**

Magnetic permeability, Field intensity, Magnetic field induction, Magnetization, Magnetic susceptibility, Origin of Magnetic moment - Bhor magneton, Classification of magnetic materials-Dia, Para and Ferro, Ferri and Anti ferro magnetic materials, Explanation of Hysteresis loop on the basis of domain theory of ferromagnetism. Soft and hard magnetic materials.

**SUPER CONDUCTIVITY:**

Super conductivity, Properties of super conductors, Meissner effect, Types –I Type-II super conductors, Applications of super conductors.

**UNIT-V****NANO SCIENCE & NANO TECHNOLOGY:**

Nano scale, Types of Nano materials, Surface to volume ratio and Quantum confinement, Bottom up Fabrication- Sol gel ,Top down Fabrication- Physical Vapour Deposition, Characterisation of Nano particles –TEM and SEM, Applications of Nano materials.

**TEXT BOOKS:**

1. Engineering Physics - S Mani Naidu- Pearson Publishers.
2. A Text Book of Engineering Physics- P.G. Kshirsagar, Avadhanulu – S.Chand

**REFERENCES:**

1. Solid State Physics, Kittel- Wiley International.
2. Solid State Physics – AJ Dekker-Macmillan Publishers.
3. Engineering Physics, P.K. Palaniswamy, Scitech Publishers

**OUTCOMES:**

- The students would be able to learn the fundamental concepts on behavior of crystalline solids.
- The student will be able to think about the applications of dielectric, magnetic and nano materials.
- Finally Engineering physics course helps the student to develop problem solving skills and analytical skills.



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**(R17A0502) OBJECT ORIENTED PROGRAMMING THROUGH C++****Objectives**

- To teach the student the concepts of object oriented and generic programming.
- To differentiate between object oriented programming and procedural programming.
- To design applications using object oriented features
- To teach the student to implement object oriented concepts

**Unit I**

**Concepts of Object Oriented programming:** Object oriented paradigm - differences between Object Oriented Programming and Procedure oriented programming, Basic concepts of Object Oriented Programming , Encapsulation, Inheritance and Polymorphism. Benefits of OOP. Structure of a C++ program, namespace, Data types, identifiers, variables, constants, enum, operators, typecasting, control structures & loops.

**Unit-II****Functions, Classes and Objects:**

Introduction of Classes, Class Definition, Defining a Members, Objects, Access Control, Class Scope, Scope Resolution Operator, Inline functions, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Objects as Function Arguments, Default Arguments, Friend Functions

**Unit-III****Constructors, Destructors, Inheritance:**

Introduction to Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic initialization of Objects, Copy Constructors, Dynamic Constructors, Destructors.

**Inheritance** :Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi-Level Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Constructors in Derived Classes.

**Unit-IV****Pointers, Virtual Functions and Polymorphism:**

Introduction, Memory Management, new Operator and delete Operator, Pointers to Objects, this Pointer, Pointers to Derived Classes, Polymorphism, compile time polymorphism, Run time polymorphism, Virtual Functions, Pure Virtual Functions, Abstract Classes, Virtual Base Classes, Virtual Destructors. Function Overloading, Operator overloading, Rules for Operator overloading, overloading of binary and unary operators .

**Unit-V****Templates and Exception handling:**

Introduction, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters, Member Function Templates.

**Exception handling:**

Basics of Exception Handling, Types of exceptions, Exception Handling Mechanism, Throwing and Catching Mechanism, Rethrowing an Exception, Specifying Exceptions

**TEXT BOOKS:**

1. Object Oriented Programming with C++, special edition MRCET, Tata Mc Graw Hill Publishers-2017.
2. Object Oriented Programming with C++ by Balagurusamy.

**REFERENCES:**

1. C++ Primer, 3<sup>rd</sup> Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3<sup>rd</sup> Edition, B.Stroutstrup, Pearson Educ

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****I Year B.Tech IT -II SEM****L T/P/D C****4 -/-/ 4****(R17A0201)ELECTRICAL CIRCUITS****Objective:**

This course introduces the basic concepts of network and circuit analysis which is the foundation of the Electrical Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes network analysis, single phase AC circuits, network theorems and magnetic circuits.

**Unit –I: Introduction to Electrical Circuits:**

Concept of Network and Circuit, Types of elements, Types of sources, Source transformation. R-L-C Parameters, Voltage–Current relationship for Passive Elements (for different input signals –Square, Ramp, Saw tooth and Triangular), Kirchhoff's Laws.

**Unit –II: Network Analysis:**

Network Reduction Techniques-Resistive networks, Inductive networks and capacitive networks-Series, Parallel, Series-Parallel combinations, Star–to-Delta and Delta-to-Star Transformation. Mesh Analysis and Super mesh, Nodal Analysis and Super node for DC Excitation. Network topology-Definitions, Graph, Tree, Basic Cut set and Basic Tie set Matrices for Planar Networks.

**Unit-III: Single Phase A.C. Circuits:**

Average value, R.M.S. value, form factor and peak factor for different periodic wave forms. J-notation, Complex and Polar forms of representation. Steady State Analysis of series R-L-C circuits. Concept of Reactance, Impedance, Susceptance, Admittance, Phase and Phase difference. Concept of Power Factor, Real, Reactive and Complex power.

**Unit –IV: Network Theorems (D.C.&A.C):**

Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Tellegen's, Substitution, Compensation and Millman's theorems.

**Unit –V: MAGNETIC CIRCUITS:**

Faraday's laws of electromagnetic induction, concept of self and mutual inductance, dot convention, coefficient of coupling, composite magnetic circuit, analysis of series and parallel magnetic circuits.

**TEXT BOOKS:**

1. Electrical Circuits ,Special edition MRCET- Mc Graw Hill Publishers 2017
2. Electric Circuits - A.Chakrabarhty, Dhanpat Rai & Sons.
3. A Text book of Electrical Technology by B.L Theraja and A.K Theraja, S.Chand publications.

**REFERENCE BOOKS:**

1. Network analysis by M.E Van Valkenburg, PHI learning publications.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A Sudhakar ,Shyammohan and S Palli,Mc Graw Hill Companies.
4. Principles of Electrical Engineering by V.K Mehta,RohitMehta,S.Chand publications.

**OUTCOME:**

After going through this course the student gets a thorough knowledge on basics of network and circuit concepts, circuit elements, network analysis, single phase AC circuits, network theorems, magnetic circuits with which he/she can able to apply the above conceptual things to real-world problems and applications

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****I Year B.Tech. IT - II Sem**

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**(R17A0014)ENVIRONMENTAL STUDIES****Objectives:**

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

**UNIT-I:****Introduction:** Definition of Environment and multidisciplinary nature of environmental sciences.**Ecosystems:** Definition, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles (Carbon, Nitrogen, Water cycle) Bioaccumulation and Biomagnification with examples.**UNIT-II:****Natural Resources:** Classification of Resources: water resources: types: surface and ground water and over utilization effects of ground water. Dams: benefits and problems. Forest resources: functions, causes and effects of Deforestation, Energy resources: renewable and non-renewable energy sources, use of alternate energy resources.**UNIT-III:****Biodiversity and Biotic Resources:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation.**UNIT-IV:****Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, Air Pollution:** Primary and secondary pollutants, sources, causes, effects and control measures **Water pollution:** Sources and types of pollution, causes and effects, water treatment methods. **Soil Pollution:** Sources and types, Impacts of modern agriculture. Solid waste management, e-Waste management.**Global Environmental Problems:** Green house effect, Global warming, Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).**UNIT-V:****Environmental Policy, Legislation & EIA:** Environmental Protection act 1986, Air act 1981, Forest conservation act 1980, Biomedical waste management and handling rules, International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.**EIA:** EIA structure, methods of baseline data acquisition. Concepts of Environmental Management Plan (EMP).**Towards Sustainable Future:** Concept, threats and strategies of Sustainable Development, Environmental Education.**TEXT BOOKS:**

1. Environmental Studies by Anubha Kaushik, 4th Edition, New age international Publishers.
2. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
3. Environmental Studies by R. Rajagopalan, Oxford University Press.

**REFERENCE BOOKS:**

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin& Edward A.Keller, Wiley INDIA edition.
4. Principles of Environmental Science by William . P. Cunnningham& Mary Inn Cunnningham Tata McGRAW –Hill Publishing Company Ltd.
5. Environmental Studies by S. Rama Lakshmi & Purnima Smarath Kalyani Publishers.

**Outcomes:**

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of Ecological principles and environmental regulations which in turn helps in sustainable development

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

I Year B.Tech. IT- II Sem

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- / 3 / - 2**(R17A0582)OBJECT ORIENTED PROGRAMMING THROUGH C++ LAB****Objectives:**

- To strengthen problem solving ability by using the characteristics of an object-oriented approach.
- To design applications using object oriented features
- To handle Exceptions in programs.
- To teach the student to implement object oriented concepts

**Week 1:**

Basic C++ Programs

**Week2:**

- Write a C++ program to find the sum of individual digits of a positive integer.
- Write a C++ program to generate the first n terms of the sequence.

**Week 3:**

- Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
- Write a C++ program to find both the largest and smallest number in a list of integers.

**Week 4:**

- Write a C++ program to sort a list of numbers in ascending order.
- Write a Program to illustrate New and Delete Keywords for dynamic memory allocation

**Week 5**

- Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.
- Program to illustrate default constructor, parameterized constructor and copy constructors
- Write a Program to Implement a Class STUDENT having Following Members:

Member	Description
<b>Data members</b>	
Sname	Name of the student
Marks array	Marks of the student
Total	Total marks obtained
Tmax	Total maximum marks
<b>Member functions</b>	
Member	Description
assign()	Assign Initial Values
compute()	to Compute Total, Average
display()	to Display the Data.

**Week 6:**

- Write a Program to Demonstrate the i)Operator Overloading.ii) Function Overloading.
- Write a Program to Demonstrate Friend Function and Friend Class.

**Week 7:**

- Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.
- Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members.

## Week 8:

## Revision laboratory

## Week 9

Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:

- a) Reading a matrix.      b) Addition of matrices. c) Printing a matrix.  
d) Subtraction of matrices. e) Multiplication of matrices

## Week 10

Write C++ programs that illustrate how the following forms of inheritance are supported:

- a)Single inheritance  
b)Multiple inheritance  
c)Multi level inheritance  
d)Hierarchical inheritance

## Week 11

- Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.
- Write a Program to Invoking Derived Class Member Through Base Class Pointer.

## Week 12

- Write a Template Based Program to Sort the Given List of Elements.
- Write a C++ program that uses function templates to find the largest and smallest number in a list of integers and to sort a list of numbers in ascending order.

## Week 13

- Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly.
- Write a Program to Demonstrate the Catching of All Exceptions.

## Week 14

## Revision

**Text Books:**

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

### References:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****I Year B. Tech IT -II Sem****L T/P/D C****- -/3/- 2****(R17A0084) IT WORKSHOP / ENGINEERING WORKSHOP****OBJECTIVES:**

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

**PC HARDWARE****Week 1:**

Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral

**Week 2:**

- i. Every student should individually install MS windows on the personal computer.
- ii. Basic DOS Commands

**Week 3:**

- a) Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals
- b) Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

**INTERNET & WEB BROWSERS****Week 4:**

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers And How to access the websites and email& Search Engines & various threats on the internet and would be asked to configure their computer to be safe on the internet, Antivirus downloads to avoid viruses and/or worms.

**MS OFFICE****Week 5:**

- a) Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10, overview of toolbars, saving files, Using help and resources, rulers, format painter. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.
- b) Using Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.



**ENGINEERING WORKSHOP****1. TRADES FOR EXERCISES:**

**At least two exercises from each trade:**

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring

**2. TRADES FOR DEMONSTRATION & EXPOSURE:**

1. Plumbing
2. Machine Shop
3. Welding
4. Foundry
5. Metal Cutting (Water Plasma)

**TEXT BOOK:**

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****I Year B. Tech IT -II Sem**

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**(R17A0082) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB- II**

The Language Lab focuses on the production and practice of sounds of the English language and familiarizes the students with its use in everyday situations and contexts.

**Objectives:**

- To make students acquire language skills at their own pace with the usage of authentic learning environment through different media, e-materials and language lab.
- To make learners acquire listening and speaking skills in both formal and informal contexts through diverse interactive sessions and computer aided multi-media training.
- To impart nuances of linguistics to help novices to resolve mother tongue interference by ensuring precision in pronunciation to befit Standard English.
- To help develop the students communication skills by familiarizing them with different strategies to suit academic as well as workplace contexts.

**Syllabus:** English Language Communication Skills Lab shall have two parts:

- a. Computer Assisted Language Learning (CALL) Lab
- b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab

**Exercise –IV**

**CALL Lab:** Word Accent – Rules of Stress and Stress shift

**ICS Lab:** Describing Object, Places, Persons, Events and Experiences.

**Exercise –V**

**CALL Lab:** Intonation

**ICS Lab:** Etiquette – Professional and telephone

**Exercise –VI**

**CALL Lab:** Neutralization of Mother Tongue Influence

**ICS Lab:** Oral Presentations (Team or Individual)

**PROJECTS****PROJECTS**

Students have to choose one of the following projects for their External Examinations, and submit before the end of the semester. This project carries 10 marks in the Lab External Examinations.

**1. Conduct interview using interrogative sentences.**

Students should interview any teacher, or HOD, or Principal, record their responses and submit the project with those questions and answers. The questions asked should not be less than ten.

**2. Project on differences between group discussion and debate.**

Students are supposed to do research on the differences between GD and debate and submit a project on it. There should a minimum of ten points with detailed explanation. Students can use pictures as well.

**3. Book Review**

Choose any fiction of your choice and write a book review on the following parameters.

- Characterization, plot, theme, message  
Please note that the review is not the summary of the story. The project should not be less than 250 words.
- 4. Idioms and Phrasal Verbs**  
Collect at least ten idioms and ten phrasal verbs and concoct a story using those expressions. Word limit is 250.
- 5. Project on Kinesics**  
Students are expected to read and research on body language and their implications. You have to make a list of at least ten body movements with pictures and explain them properly.
- 6. UK and US vocabulary**  
Find words that are used differently in UK and US English. Make separate lists for different spellings and different pronunciations. The project can answer one or more of the following questions:
  - Which pronunciation do you think are Indians following?
  - Which one is your choice? Which one do you feel comfortable in speaking?
  - Are we Indians influenced by both UK and US English? How can you prove it?
- 7. Magazine Article Review**  
Pick a magazine article with a social relevance, which has around 2500 words. Write a review of 250 words as a project. Make sure you voice your opinion in the review.
- 8. Career Guidance Project**  
Browse the net and gather information on any professional competitive exam of your choice, like UPSC or GRE. Prepare and present a paper on the scope and relevance of the exam of your choice. The paper should have a minimum of 300-400 words. Students are expected to answer the questions asked by the audience after the paper presentation.
- 9. Mother Tongue Influence**  
Choose a particular paragraph of 250 words and ask five of your friends, from different states, to read that. One has to record their accent and pronunciation to check the difference. Make a list of ten words that each one pronounces differently. Find out the reasons behind the differences in pronunciations.  
Also, mention the correct pronunciation in your project with transcription.
- 10. Correction of Letter Writing: Language, Sentences, Spelling, Tone and Format**  
Teacher will distribute a set of five letters with errors in spelling, tone, grammar and sentence construction. Give the correct form of the letters as the project

**ELCS LAB:****3. Computer Assisted Language Learning (CALL) Lab:**

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.

**System Requirement (Hardware component):**

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

- i) P –IV Processor
- a) Speed –2.8 GHZ
- b) RAM –512 MB Minimum
- c) HardDisk –80 GB
- ii) Headphones of High quality

**4. Interactive Communication Skills (ICS) Lab :**

A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

**REFERENCES:**

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation
2. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill
4. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP
7. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP
8. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication. New Delhi: Foundation
9. Soundararaj, Francis. 2012. Basics of Communication in English. New Delhi: Macmillan
10. Spoken English(CIEFL) in 3 volumes with 6 cassettes, OUP.
11. English Pronouncing Dictionary Daniel Jones Current Edition with CD.
12. A textbook of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)

**DISTRIBUTION AND WEIGHTAGE OF MARKS****English Language Laboratory Practical Examination:**

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the other institution.

**OUTCOMES:**

- Learning with precision through computer-assisted individualized and independent language learning to work independently in engineering set up.
- Improved conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
- Accuracy in pronunciation and restoring Standard English thereby crafting better command in English language so that the students have a cutting edge over others in society.
- Imbibing appropriate use of language in situations to work as an individual and as a leader in diverse teams

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****I Year B. Tech IT -II Sem****L T/P/D C****2 -/-/ -****(R17A0003) HUMAN VALUES AND SOCIETAL PERSPECTIVES****(MANDATORY COURSE)****Objective: This introductory course input is intended**

- To help the students appreciate the essential complementarity between 'VALUES' and 'skills' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective form the basis of value based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

**Unit-I****Course Introduction–Need, Basic Guidelines, Content and Process of Value Education:**

Understanding the need, basic guidelines, content and process for value Education. Animal consciousness vs Human consciousness, Self Exploration -What is it? Its content and process; Continuous Happiness and Prosperity-A look at basic Human Aspirations. Right understanding, Relationship and physical Facilities –the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and prosperity correctly –A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

**Unit-II**

**Understand Harmony in the Human Being –Harmony in Myself:** Understanding human being as a co-existence of the sentient 'I' and the material 'Body', understanding the needs of self ('I') and 'Body'-Sukh and Suvidha. Understanding the body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Swasthya: correct appraisal of physical needs, meaning of prosperity in detail. Programs to ensure Sanyam and Swasthya.

**Unit-III****Understanding Harmony in the Family and Society-Harmony in Human-Human**

**Relationship:** Understanding harmony in the Family –the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti: Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas: Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society –Undivided society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) –from family to world family!

**Unit-IV****Understanding Harmony in the Nature and Existence –Whole existence as Co-existence:**

Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature, Recyclability and Self-regulation in nature. Understanding Existence

as Co-existence (Sah-astiva) of mutually interacting units in all –pervasive space. Holistic perception of harmony at all levels of existence.

#### **Unit-V**

#### **Implications of the above Holistic Understanding of Harmony on Societal Perspectives:**

Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis of Humanistic Education, Humanistic Constitution and Humanistic Universal Order.

#### **TEXT BOOKS**

1. R R Gaur, R Sangal, G P BAgaria, 2009 A Foundation Course in Human Values and Professional Ethics.
2. Prof.KV Subba Raju, 2013, Success secrets for Engineering students , Smart student Publications, 3<sup>rd</sup> Edition.

#### **REFERENCE BOOKS**

1. Ivan Ilich, 1974, Energy & Equity, The Trinity press, Worcester and Harpercollins, USA.
2. E.F. Schumacher, 1973, small is Beautiful: a study of economics as if people mattered, Blond, Briggs, & Britain.
3. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya path Sansathan Amarkantak.
4. Sussan George, 1976, How the other Half Dies, Penguin press Reprin ted 1986, 1991
5. PL Dhar, RR Gaur, 1990 Science and Humanism Commonwealth Publishers.
6. A.N.Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
8. Done Ila H.Meadows, Dennis L. Meadows, Jorgen Randers, Willian A. Behrens III, 1972, Limits to Growth – Club of Rome’s report Universe Books.
9. E.G Seebauer & Robert L. Beery, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajran , S Natrajan & V.S Senthil kuma, Engineering Ethichs (including Human Values), Eastern Economy Edition, prentice Hall of India Ltd.

#### **Relevant CDs, Movies, Documentaries & other Literature:**

1. Value Education website <http://www.uptu.ac.in>
2. Story of stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech IT – I Sem

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### (R17A0503) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

#### Objectives:

- To explain with examples the basic terminology of functions, relations, and sets.
- To perform the operations associated with sets, functions, and relations.
- To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
- To describe the importance and limitations of predicate logic.
- To relate the ideas of mathematical induction to recursion and recursively defined structures.
- To use Graph Theory for solving problems

#### UNIT-I

**Mathematical Logic** : Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers. **Predicates** : Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

#### UNIT-II

**Relations**: Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. **Functions**: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties,

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

#### UNIT-III

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

#### UNIT-IV

**Recurrence Relation** : Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating funds. Characteristics roots solution of In homogeneous Recurrence Relation.

#### UNIT-V

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

#### TEXT BOOKS:

1. Elements of DISCRETE MATHEMATICS- A computer Oriented Approach- C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.
2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, PHI.

**REFERENCE BOOKS:**

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition.TMH.
2. Discrete Mathematical structures Theory and application-Malik & Sen, Cengage.
3. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
4. Logic and Discrete Mathematics, Grass Man & Trembley, Pearson Education.

**Outcomes:**

- Ability to Illustrate by examples the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.
- Ability to Demonstrate in practical applications the use of basic counting principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
- Ability to represent and Apply Graph theory in solving computer science problems.



**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****II Year B.Tech IT – I Sem****L T/P/D C**  
**4 / - / - 4****(R17A0504) DATA STRUCTURES USING C++****OBJECTIVES:**

- To understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose the appropriate data structures for a specified application
- To write programs in C++ to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables, search trees.

**UNIT I:**

Algorithms, performance analysis- time complexity and space complexity,

Searching: Linear and binary search methods.

Sorting: Bubble sort, selection sort, Insertion sort, Quick sort, Merge sort, Heap sort. Time complexities.

**UNIT II:**

basic data structures- The list ADT, Stack ADT, Queue ADT, array and linked list Implementation using template classes in C++. Trees-Basic terminology Binary Tree ADT, array and linked list Implementation, Binary tree traversals, threaded binary tree.

**UNIT III:**

Priority Queues – Definition, ADT, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion, External Sorting- Model for external sorting, Multiway merge, Polyphase merge.

**UNIT IV:**

Dictionaries, linear list representation, skip list representation, operations insertion, deletion and searching, hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing, comparison of hashing and skip lists.

**UNIT V:**

Search Trees:-Binary Search Trees, Definition, ADT, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, B-Trees, B-Tree of order m, height of a B-Tree, insertion, deletion and searching.

Graphs: Basic terminology, representation of graphs, graph search methods DFS, BFS

**TEXT BOOKS:**

1. DATA STRUCTURES USING C++", special edition MRCET, McGraw Hill publications 2017
2. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd

edition, Universities Press Orient Longman Pvt. Ltd.

3. Data structures and Algorithms in C++, Michael T. Goodrich, R. Tamassia and .Mount, Wiley student edition, John Wiley and Sons.

**REFERENCES:**

1. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
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, Fourth edition, W. Savitch, Pearson education.

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****II Year B.Tech IT – I Sem**

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**(R17A0024) PROBABILITY AND STATISTICS****Objectives: To learn**

- Understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be either discrete or continuous type.
- In the discrete case, study of the binomial and the Poisson random variables and the normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables, through joint distributions.
- The types of sampling, Sampling distribution of means, Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
- The mechanism of queuing system, The characteristics of queue, The mean arrival and service rates, The expected queue length, The waiting line, The random processes, The classification of random processes, Markov chain, Classification of states, Stochastic matrix (transition probability matrix), Limiting probabilities, Applications of Markov chains.

**UNIT -I : Random variable and Probability distributions****Random Variables**

Single and multiple Random variables -Discrete and Continuous. Probability distribution function, mass function and density function of probability distribution. mathematical expectation and variance.

Probability distributions: Binomial distribution – properties, mean and variance, Poisson distribution – properties, mean and variance and Normal distribution – properties, mean and variance

**UNIT -II :Correlation and Regression**

Correlation -Coefficient of correlation , Rank correlation, Regression- Regression Coefficients , Lines of Regression.

**UNIT -III : Sampling Distributions and Statistical Inferences**

Sampling: Definitions of population ,sampling ,statistic ,parameter-Types of sampling – Expected values of sample mean and variance,Standard error- Sampling distribution of means and variance

Parameter Estimations : likelihood estimate , interval estimate.

Testing of hypothesis: Null and Alternative hypothesis-Type I and Type II errors, Critical region – confidence interval – Level of significance,One tailed and Two tailed test

Large sample Tests: i) Test of significance of single mean and equality of means of two samples(cases of known and unknown variance whether equal or unequal) ii) Tests of significance difference between sample proportion and population proportion and difference between two sample proportions

**UNIT -IV : Exact Sampling Distributions(Small samples)**

Exact Sampling Distributions(Small samples) Student t- distribution – properties

i)Test of significant difference between sample and population mean

ii)Test of difference between means of two small samples(independent and dependent samples)

F- distribution - properties –test of equality of two population variances

Chi-square distribution -properties –i)Test of goodness of fit

ii)Test of independence of attributes

**UNIT-V : Queuing Theory and Stochastic process****Queuing Theory**

Structure of a queuing system its characteristics-Arrival and service process-Pure Birth and Death process Terminology of queuing system -Queuing model and its types-M/M/1 model of infinite queue (without proofs)and M/M/1 model of finite queue (without proofs).

**Stochastic Process**

Introduction to stochastic process-classification and methods of description of Random process i.e,stationary and non-stationary Average values of single and two or more random process

Markov process, Markov chain, Examples of Markov chains, Stochastic matrix.

**TEXT BOOKS:**

- 1.Probability and Statistics by T.K.V Iyengar& B.Krishna Gandhi S.Ranganatham,MVSSAN Prasad. S Chand Publishers.
- 2.Fundamentals of Mathematical Statistics by SC Gupta and V.K. Kapoor

**REFERENCES :**

- 1 .Higher Engineering Mathematics By Dr.B.S.Grewal, Khanna Publishers
2. Probability and Statistics for Engineers and Scientists by Sheldon M.Ross,Academic Press.

**Outcomes:**

- Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non circuit branches of engineering. Also able to differentiate among many random variables involved in the probability models. It is quite useful for all branches of engineering.
- The student would be able to calculate mean and proportions(small and large samples)and to make important decisions from few samples which are taken out of unmanageably huge populations.It is mainly useful for non-branches of engineering.
- The student would be able to find the expected queue length, the ideal time the traffic intensity and the waiting time. these are very useful tools in many engineering and data management problems in the industry. it is useful for all branches of engineering.
- The student would be able to understand about the random process, markov process and markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and the probabilities in  $n^{\text{th}}$  state. It is quite useful for all branches of engineering.

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****II Year B.Tech IT – I Sem****L T/P/D C****3 1/-/- 3****(R17A0401) ELECTRONIC DEVICES AND CIRCUITS****OBJECTIVES**

This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

- To familiarize the student with the principal of operation, analysis and design of junction diode. BJT and FET transistors and amplifier circuits.
- To understand diode as a rectifier.
- To study basic principal of filter of circuits and various types

**UNIT-I**

P-N Junction diode: Qualitative Theory of P-N Junction, P-N Junction as a diode, diode equation, volt-ampere characteristics temperature dependence of V-I characteristic, ideal versus practical – resistance levels (static and dynamic), transition and diffusion capacitances, diode equivalent circuits, load line analysis, breakdown mechanisms in semiconductor diodes, zener diode characteristics.

Special purpose electronic devices: Principal of operation and Characteristics of Tunnel Diode with the help of energy band diagrams, Varactor Diode, SCR and photo diode

**UNIT-II**

**RECTIFIERS, FILTERS:** P-N Junction as a rectifier, Half wave rectifier, full wave rectifier, Bridge rectifier, Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L-section filter,  $\pi$ -section filter and comparison of various filter circuits, Voltage regulation using zener diode.

**UNIT-III**

**BIPOLAR JUNCTION TRANSISTOR:** The Junction transistor, Transistor current components, Transistor as an amplifier, Transistor construction, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations.  $\alpha$  and  $\beta$  Parameters and the relation between them, BJT Specifications. BJT Hybrid Model, h-parameter representation of a transistor, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of  $A_i$ ,  $A_v$ , and  $R_o$ ,

**UNIT-IV**

**TRANSISTOR BIASING AND STABILISATION:** Operating point, the D.C and A.C Load lines, Need for biasing, criteria for fixing, operating point, BJT biasing, Fixed bias, Collector to base bias, Self bias techniques for stabilization, Stabilization factors, ( $s$ ,  $s^I$ ,  $s^{II}$ ), Bias Compensation using diode and transistor, (Compensation against variation in  $V_{BE}$ ,  $I_{CO}$ ) Thermal run away, Condition for Thermal stability.

**UNIT-V****FIELD EFFECT TRANSISTOR AND FET AMPLIFIER**

JFET (Construction, principal of Operation and Volt –Ampere characteristics). Pinch-off voltage-Small signal model of JFET. FET as Voltage variable resistor, Comparison of BJT and FET. MOSFET (Construction, principal of Operation and symbol), MOSFET characteristics in Enhancement and Depletion modes. **FET Amplifiers:** FET Common source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, FET biasing.

**TEXT BOOKS:**

1. "Electronic Devices And Circuits", special edition-MRCET ,TATA McGraw Hill 2017.
2. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGraw Hill.
3. Electronic Devices and Circuits Theory, Boylestad, Prentice Hall Publications.
4. Electronic Devices and Circuits, S.Salivahanan,N.Suresh kumar, McGraw Hill.
5. Electronic Devices and Circuits,Balbir kumar ,shail b.jain, PHI Privated Limted, Delhi.

**REFERENCE BOOKS:**

1. Electronic Devices and Circuits,K.Lal Kishore B.S Publications
2. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.
3. Electronic Devices and Circuits,A.P Godse, U.A Bakshi , Technical Publications
4. Electronic Devices and Circuits K.S. Srinivasan Anurdha Agencies

**OUTCOMES:**

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

- Understand and Analyse the different types of diodes, operation and its characteristics
- Design and analyse the DC bias circuitry of BJT and FET
- Design biasing circuits using diodes and transistors.
- To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

II Year B.Tech IT –I Sem

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**(R17A0510) COMPUTER ORGANIZATION****OBJECTIVES:**

- To understand basic components of system
- To explore the memory organization
- To explore I/O organization in depth
- Ability to analyze the hardware and software issues related to computers and the interface between the two.

**UNIT I :**

**BASIC STRUCTURE OF COMPUTERS:** Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers. Data Representation. Fixed Point Representation. Floating – Point Representation. Error Detection codes.

**REGISTER TRANSFER LANGUAGE AND MICRO OPERATIONS :** Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

**UNIT-II:****Basic Computer Organization and Design:**

Instruction codes. Computer Registers Computer instructions, Timing and Control, Instruction cycle. Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.

**Micro Programmed Control:** Control memory, Address sequencing, micro program example, design of control unit, micro Programmed control

**UNIT-III:**

**Computer Processing Unit Organization:** General Register Organization ,STACK organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation ,Program Control. CISC and RISC. **Computer Arithmetic:** Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. BCD Adder

**UNIT-IV:**

**Input-Output Organization:** Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt Direct memory Access, Input –Output Processor (IOP)

**Pipeline And Vector Processing:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, Dependencies, Vector Processing.

**UNIT-V:**

**Memory Organization:** Memory Hierarchy, Main Memory –RAM And ROM Chips, Memory Address map, Auxiliary memory-magnetic Disks, Magnetic tapes, Associate Memory,-Hardware Organization, Match Logic, Cache Memory –Associative Mapping , Direct Mapping, Set associative mapping ,Writing in to cache and cache Initialization , Cache Coherence ,Virtual memory-Address Space and memory Space ,Address mapping using pages, Associative memory page table ,page Replacement .

**TEXT BOOKS:**

1. "Computer Organization" special edition-MRCET,TATA McGraw Hill. 2017
2. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
3. Computer Systems Architecture – M.Moris Mano, Illrd Edition, Pearson/PHI

**REFERENCES:**

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals of Computer Organization and Design, - Sivarama Dandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

**OUTCOMES:**

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

- Student will learn the concepts of computer organization for several engineering applications.
- Student will develop the ability and confidence to use the fundamentals of computer organization as a tool in the engineering of digital systems.
- An ability to identify, formulate, and solve hardware and software computer engineering problems using sound computer engineering principles



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**(R17A0461) DIGITAL LOGIC DESIGN****OBJECTIVES**

- To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions
- To introduce the methods for simplifying Boolean expressions
- To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits
- To introduce the concept of memories and programmable logic devices.
- To illustrate the concept of synchronous and asynchronous sequential circuits

**UNIT I**

**Number systems and Boolean algebra: Number systems and base conversion methods complements of numbers, codes – binary codes binary coded decimal code ,unit distance codes error detecting and correcting codes**

**Digital Logic Gates: AND, OR, NOT, NAND, NOR, Exclusive–OR and Exclusive NOR Implementations of Logic Functions using gates, NAND–NOR implementations**

**UNIT II****MINIMIZATION TECHNIQUES AND LOGIC GATES**

**Introduction Minimization Techniques , Minimization Theorem, Karnaugh map method , 3 ,4 and 5 variable maps prime and essential implications don't care map entries using the map for simplifying ,Quine-McCluskey methods,multilevel NAND/NOR realizations.**

**UNIT III****COMBINATIONAL CIRCUITS**

Design procedure – Half adder , Full Adder, Half subtractor, Full subtractor, Parallel binary adder, parallel binary Subtract or, Carry Look Ahead adder, BCD adder, Binary Multiplier, Binary Divider, Multiplexer/Demultiplexer, decoder, encoder, parity checker, parity generators, Code converters, Magnitude Comparator.

**UNIT IV****SEQUENTIAL CIRCUITS**

Introduction ,basic architectural dictions between combinational and sequential circuits Latches, Flip-flops ,SR, JK, D, T, and Master-Slave, Characteristic table and equation , Conversion of one flip flop using other flip flops .

counters : Design of single mode counter, ripple counter ,ring counter, shift registers , ring counter using shift registers

**UNIT V****MEMORY DEVICES**

Classification of memories – ROM : ROM organization, PROM, EPROM,EEPROM, RAM: RAM organization, Write operation, Read operation, Timing wave forms ,Static RAM Cell: Bipolar RAM cell, MOSFET RAM cell, Dynamic RAM cell, Programmable Logic Devices : Programmable Logic Array (PLA) - Programmable Array Logic, Implementation of combinational logic circuits using ROM, PLA, PAL.

**TEXT BOOKS**

1. M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 / Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
2. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, 3rd Edition., Vikas Publishing House Pvt. Ltd, New Delhi, 2006

**REFERENCES**

1. John F.Wakerly, Digital Design, Fourth Edition, Pearson/PHI, 2006
2. John.M Yarbrough, Digital Logic Applications and Design, Thomson Learning, 2002.
3. Charles H.Roth. Fundamentals of Logic Design, Thomson Learning, 2003.
4. Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 6th Edition, TMH, 2003.
5. William H. Gothmann, Digital Electronics, 2nd Edition, PHI, 1982.
6. Thomas L. Floyd, Digital Fundamentals, 8th Edition, Pearson Education Inc, New Delhi, 2003
7. Donald D.Givone, Digital Principles and Design, TMH, 2003.

**OUTCOMES**

- Understand the basic postulates of Boolean algebra and shows the correlation between Boolean expressions
- Learn the methods for simplifying Boolean expressions
- Understand the formal procedures for the analysis and design of combinational circuits and sequential circuits
- Learn the concept of memories and programmable logic devices.
- Understand the concept of synchronous and asynchronous sequential circuits

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**- - / 3 / - 2****(R17A0282)ELECTRICAL AND ELECTRONICS LAB****PART – A**

1. Verification of KVL and KCL.
2. Verification of Superposition and Reciprocity theorems.
3. Verification of Maximum power transfer theorem.
4. Verification of Thevenin's and Norton's theorems.
5. OC and SC tests on single phase transformer.
6. Load test on single phase transformer.

**PART – B**

7. PN Junction diode characteristics.
8. Zener diode characteristics.
9. Half wave rectifier with and without filter.
10. Full wave rectifier with and without filter.
11. Transistor CB characteristics (Input and Output).
12. Transistor CE characteristics (Input and Output).

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**(R17A0583) DATA STRUCTURES USING C++ LAB****Objectives:**

- To make the student learn a object oriented way of solving problems.
- To make the student write ADTS for all data structures.

**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
- C++ compiler and STL Recommended

**Week1:**

Write C++ programs to implement recursive and non recursive i) Linear search ii) Binary search

**Week2:**

Write C++ programs to implement i) Bubble sort ii) Selection sort iii) quick sort iv) insertion sort

**Week3:**

Write C++ programs to implement the following using an array.

- a) Stack ADT b) Queue ADT

**Week4:**

Write C++ programs to implement list ADT to perform following operations

- Insert an element into a list.
- Delete an element from list
- Search for a key element in list
- count number of nodes in list

**Week5:**

Write C++ programs to implement the following using a singly linked list.

- a)Stack ADT b) Queue ADT

**Week6:**

Write C++ programs to implement the deque (double ended queue) ADT using a doubly linked list and an array.

**Week 7:**

Write a C++ program to perform the following operations:

- Insert an element into a binary search tree.
- Delete an element from a binary search tree.
- Search for a key element in a binary search tree.

**Week8:**

Write C++ programs for implementing the following sorting methods:

- a) Merge sort b) Heap sort

**Week9:**

Write C++ programs that use recursive functions to traverse the given

binary tree in

- a) Preorder b) inorder and c) postorder.

**Week10:**

Write a C++ program to perform the following operations

- a) Insertion into a B-tree b) Deletion from a B-tree

**Week11:**

Write a C++ program to perform the following operations

- a) Insertion into an AVL-tree b) Deletion from an AVL-tree

**Week12:**

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

**(Note: Use Class Templates in the above Programs)**

**TEXT BOOKS :**

1. Data Structures and Algorithms in C++, Third Edition, Adam Drozdek, Thomson.
2. Data Structures using C++, D.S. Malik, Thomson

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**(R17A0004) FOREIGN LANGUAGE-FRENCH****INTRODUCTION:**

Au vu de l'importance croissante des langues étrangères comme outil de communication dans certains pays du globe, le français a été identifié comme l'une des langues les plus sollicitées après l'anglais. De ce fait, tout en insistant sur la formation en compétences communicatives, le programme a été élaboré pour développer des aptitudes linguistiques et communicatives des étudiants ingénieurs. Le cours de français, sera centré sur les compétences orales de base.

**OBJECTIVES:**

- To improve the basic speaking skills of the French language.
- To hone the basic sentence constructions in day to day expressions for communication in their work place.

**SYLLABUS****UNITE - I:**

- **Objectif communicatifs (LSRW)**
  - Se présenter / Présenter quelqu'un - Entrer en contact – Saluer – Epeler - poser des questions - comprendre et remplir un formulaire
- **Grammaire**
  - Les formules de politesse
  - L'alphabet
  - Les nombres de 1 à 30
  - Le verbe "être" et "avoir" au présent de l'indicatif
- **Vocabulaire**
  - Les professions
  - Les nationalités

**UNITE - II:**

- **Objectif communicatifs (LSRW)**
  - Parler de sa famille – décrire quelqu'un – exprimer ses goûts et les préférences – écrire et comprendre un message court – compter jusqu'à 100 – exprimer la possession – exprimer la négation
- **Grammaire**
  - Les articles
  - Les verbes en -er- au présent
  - Les noms (genre et nombre)
  - Les adjectifs possessifs
  - Les adjectifs qualificatifs
  - « Qu'est ce que c'est ? » / « Qui est ce ? »/ « c'est... »
  - La négation
- **Vocabulaire**
  - La famille
  - Les vêtements
  - Les couleurs

- Les nombres de 1 à 100
- La salle de classe

**UNITE - III**

- **Objectif communicatifs (LSRW)**

Parler de ses activités quotidiennes – se situer dans le temps – demander et indiquer la date et l’heure – parler des sports et des loisirs – exprimer la fréquence.

- **Grammaire**

- L’expression du temps (l’heure)
- Les verbes en –ir- au présent
- Les verbes faire, aller, prendre, venir,
- Les adverbes
- Les verbes pronominaux

- **Vocabulaire**

- Les jours et les mois de l’année
- La vie quotidienne
- Les sports
- Les loisirs

**UNITE - IV**

- **Objectif communicatifs (LSRW)**

Exprimer la quantité – demander et donner le prix- exprimer la nécessité, la volonté et la capacité – comparer (adjectif) – s’exprimer au restaurant / dans les magasins

- **Grammaire**

- Pouvoir, vouloir, il faut
- Exprimer la capacité / la possibilité
- Exprimer la volonté / le désir
- Le futur proche

- **Vocabulaire**

- La nourriture
- Les repas
- Les fruits et légumes
- Les parties du corps

**UNITE - V**

- **Objectif communicatifs (LSRW)**

Exprimer l’interdiction et l’obligation- décrire un appartement – parler du temps qu’il fait / demander le temps qu’il fait – demander l’opinion – donner son avis – exprimer son accord ou son désaccord

- **Grammaire**

- Les adjectifs démonstratifs
- Les prépositions
- Le verbe ‘devoir’ et ‘falloir’ au présent
- « Il y a » et « Depuis »

- **Vocabulaire**

- Les saisons
- Les vacances
- La ville

- Le logement

**REFERENCE BOOKS:**

1. Apprenons le Français 1& 2, New Saraswati House, 2015|
2. A propos, A1, Langers International, 2010
3. Easy French Step-by-step by Myrna Bell Rochester-
4. Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5. À L'Aventure: An Introduction to French Language and Francophone Cultures By Evelyne Charvier-Berman, Anne C. Cummings.

**OUTCOMES**

- The student will be in a position to speak in French, Which is the second most widely learned foreign language after English, and the ninth most widely spoken language in the world. French is also the only language, alongside English, that is taught in every country in the world.
- The Student will get the ability to speak French is an advantage on the international job market.
- Students with a good level of French are eligible for French government scholarships to enroll in postgraduate courses in France in any discipline and qualify for internationally recognized French degrees.



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**(R17A0005) FOREIGN LANGUAGES: GERMAN****OBJECTIVES:**

1. To familiarize the students with a modern foreign language.
2. To familiarize the students with the sounds of German and their symbols.
3. To familiarize students with German for basic communication and functions in everyday situations.
4. To familiarize students with the basic of writing simple, direct sentences and short compositions.

**SYLLABUS:****UNIT I**

Current trends in German orthography, German grammar and lexical units, discourse models, oral and written.

**UNIT- II**

Communication patterns, prose passages, etc.

**UNIT- III**

Communication skills in everyday situations

**UNIT-IV**

Training in creative writing in German.

**UNIT- V**

Training in creative speaking in German.

**TEXT BOOKS**

1. Lernziel Deutsch

**Reference books:**

2. Themen
3. Tangram
4. Sprachkurs Deutsch
5. Schulz-Griesbach

**Outcomes**

1. Students familiarize with a modern foreign language – German
2. The students with German get acquainted for basic communication in everyday situations.
3. Students will know with the basics of writing simple direct sentences and short compositions.
4. Students get to know the basics of German language to communicate in the work place when they find the necessity.

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**(R15A0506) FORMAL LANGUAGES AND AUTOMATA THEORY****Objectives:**

- ❖ To teach the student to identify different formal language classes and their relationships
- ❖ To teach the student the theoretical foundation for designing compilers.
- ❖ To teach the student to use the ability of applying logical skills.
- ❖ Teach the student to prove or disprove theorems in automata theory using its properties
- ❖ To teach the student the techniques for information processing.
- ❖ Understand the theory behind engineering applications.

**UNIT I:**

**Fundamentals:** Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, FA, transition diagrams and Language recognizers.

**Finite Automata:** Deterministic finite automaton, Non deterministic finite automaton and NFA with  $\epsilon$  transitions - Significance, acceptance of languages. Conversions and Equivalence : Equivalence between NFA with and without  $\epsilon$  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, Conversion 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, 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, Greibach normal 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, interconversion. (**Proofs not required**). Introduction to DCFL and DPDA.

LINEAR BOUNDED AUTOMATA(LBA):LBA,context sensitive grammars ,CS languages

**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:** Chomsky hierarchy of languages, linear bounded automata and context sensitive language, LR(0) grammar, decidability of, problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility, **Definition of P and NP problems, NP complete and NP hard problems.**

**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. & Papadimitiou C.H. Pearson /PHI.
4. Theory of Computer Science and Automata languages and computation -Mishra and Chandrashekar, 2nd edition, PHI.
5. Theory of Computation, By K.V.N. Sunitha and N.Kalyani

**Course Outcomes:**

Student will have the ability to

- ❖ Apply knowledge in designing or enhancing compilers.
- ❖ Design grammars and automata (recognizers) for different language classes.
- ❖ Apply knowledge in developing tools for language processing or text processing.

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**(R15A0507)JAVA PROGRAMMING****Objectives:**

This subject aims to introduce students to the Java programming language. Upon successful completion of this subject, students should be able to create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism; use data types, arrays and other data collections; implement error-handling techniques using exception handling, create and event-driven GUI using Swing components.

**UNIT-I**

**OOP Concepts:-** Data abstraction, encapsulation, inheritance, Benefits of Inheritance, Polymorphism, classes and objects, Procedural and object oriented programming paradigms.

**Java Programming-** History of Java, comments, Data types, Variables, Constants, Scope and Lifetime of variables, Operators, Operator Hierarchy, Expressions, Type conversion and casting, Enumerated types, Control flow- block scope, conditional statements, loops, break and continue statements, simple java stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class.

**UNIT – II**

**Inheritance** – Inheritance hierarchies super and sub classes, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods.

**Polymorphism – dynamic** binding, method overriding, abstract classes and methods.

**Interfaces-** Interfaces Vs Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface.

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

**Packages-** Defining, creating and accessing a package, Understanding CLASSPATH, importing packages.

**UNIT-III**

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

**Multithreading** – Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer pattern, Exploring java.net and java.text.

**UNIT-IV**

**Collection Framework in Java** – Introduction to java collections, Overview of java collection framework, Generics, Commonly used collection classes- Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, Calendar and Properties.

**Files-** Streams- Byte streams, Character streams, Text input/output, Binary input/output, random access file operations, File management using File class.

**Connecting to Database** – JDBC Type 1 to 4 drivers, Connecting to a database, querying a database and processing the results, updating data with JDBC.

**UNIT-V**

**GUI Programming with Java-** The AWT class hierarchy, Introduction to Swing, Swing Vs AWT, Hierarchy for Swing components, Containers – JFrame, JApplet, JDialog, JPanel, Overview of some Swing components – JButton, JLabel, JTextField, JTextArea, simple Swing applications, Layout management – Layout manager types – border, grid and flow

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

**Applets** – Inheritance hierarchy for applets, differences between applets and applications, Life cycle of an applet, Passing parameters to applets, applet security issues.

**TEXT BOOK:**

1. Java Fundamentals – A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

**REFERENCE BOOKS:**

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.

**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).

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**(R15A0508)DESIGN AND ANALYSIS OF ALGORITHMS****Objectives:**

- To analyze performance of algorithms.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
- Prerequisites (Subjects) Data structures, Mathematical foundations of computer science.

**UNIT I:**

**Introduction:** Algorithm, Psuedo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.

**Divide and conquer:** General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

**UNIT II:**

**Searching and Traversal Techniques:** Efficient non - recursive binary tree traversal algorithm, Disjoint set operations, union and find algorithms, Spanning trees, Graph traversals - Breadth first search and Depth first search, AND / OR graphs, game trees, Connected Components, Bi - connected components. Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components.

**UNIT III:**

**Greedy method:** General method, applications - Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

**Dynamic Programming:** General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

**UNIT IV:**

**Backtracking:** General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

**Branch and Bound:** General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

**UNIT V:**

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

**TEXT BOOKS:**

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.
2. Foundations of Algorithm, 4th edition, R. Neapolitan and K. Naimipour, Jones and Bartlett Learning.

3. Design and Analysis of Algorithms, P. H. Dave, H. B. Dave, Pearson Education, 2008.

**REFERENCES:**

1. Computer Algorithms, Introduction to Design and Analysis, 3rd Edition, Sara Baase, Allen, Van, Gelder, Pearson Education.
2. Algorithm Design: Foundations, Analysis and Internet examples, M. T. Goodrich and R. Tomassia, John Wiley and sons.
3. Fundamentals of Sequential and Parallel Algorithm, K. A. Berman and J. L. Paul, Cengage Learning.
4. Introduction to the Design and Analysis of Algorithms, A. Levitin, Pearson Education.
5. Introduction to Algorithms, 3rd Edition, T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, PHI Pvt. Ltd.
6. Design and Analysis of algorithm, Aho, Ullman and Hopcroft, Pearson Education, 2004.

**Outcomes:**

- Be able to analyze algorithms and improve the efficiency of algorithms.
- Apply different designing methods for development of algorithms to realistic problems, such as divide and conquer, greedy and etc. Ability to understand and estimate the performance of algorithm.

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**(R15A0509) DATABASE MANAGEMENT SYSTEMS****Objectives:**

- To Understand the basic concepts and the applications of database systems
- To Master the basics of SQL and construct queries using SQL
- To understand the relational database design principles
- To become familiar with the basic issues of transaction processing and concurrency control
- To become familiar with database storage structures and access techniques

**UNIT I:**

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction – Instances and Schemas – Data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – Database Users and Administrator – Transaction Management – Database Architecture – Storage Manager – the Query Processor.

Introduction to the Relational Model – Structure – Database Schema, Keys – Schema Diagrams.

Database design and ER diagrams – ER Model - Entities, Attributes and Entity sets – Relationships and Relationship sets – ER Design Issues – Concept Design – Conceptual Design with relevant Examples. Relational Query Languages, Relational Operations.

**UNIT II:**

Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple Relational Calculus (TRC) – Domain relational calculus (DRC).

Overview of the SQL Query Language – Basic Structure of SQL Queries, Set Operations, Aggregate Functions – GROUPBY – HAVING, Nested Sub queries, Views, Triggers, Procedures.

**UNIT III:**

Normalization – Introduction, Non loss decomposition and functional dependencies, First, Second, and third normal forms – dependency preservation, Boyce/Codd normal form.

Higher Normal Forms - Introduction, Multi-valued dependencies and Fourth normal form, Join dependencies and Fifth normal form

**UNIT IV:**

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.



**UNIT V:**

Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Check Points - Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- ARIES Algorithm, Remote Backup systems.

File organization – various kinds of indexes - B+ Trees- Query Processing – Relational Query Optimization.

**TEXT BOOKS:**

1. Database System Concepts, Silberschatz, Korth, McGraw hill, Sixth Edition.(All UNITS except III th)
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition.

**REFERENCE BOOKS:**

1. Fundamentals of Database Systems, Elmasri Navathe Pearson Education.
2. An Introduction to Database systems, C.J. Date, A.Kannan, S.Swami Nadhan, Pearson, Eight Edition for UNIT III.

**Outcomes:**

- Demonstrate the basic elements of a relational database management system
- Ability to identify the data models for relevant problems
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data
- Apply normalization for the development of application software's

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**(R15A0511)SOFTWARE ENGINEERING****Objectives:**

- To understanding of software process models such as waterfall and evolutionary models.
- To understanding of software requirements and SRS document.
- To understanding of different software design and architectural styles.
- To understanding of software testing approaches such as unit testing and integration testing.
- To understanding on quality control and how to ensure good quality software through quality assurance.

**UNIT - I:**

**Introduction to Software Engineering:** The evolving role of software, Changing Nature of Software, Software myths.

**A Generic view of process:** Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

**Process models:** The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

**UNIT - II:**

**Software Requirements:** Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

**Requirements engineering process:** Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

**System models:** Context Models, Behavioral models, Data models, Object models, structured methods.

**UNIT - III:**

**Design Engineering:** Design process and Design quality, Design concepts, the design model.

**Creating an architectural design:** Software architecture, Data design, Architectural styles and patterns, Architectural Design.

**Object-Oriented Design:** Objects and object classes, An Object-Oriented design process, Design evolution.

**Performing User interface design:** Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

**UNIT - IV:**

**Testing Strategies:** A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

**Product metrics:** Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

**Metrics for Process and Products:** Software Measurement, Metrics for software quality.

**Risk management:** Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

#### UNIT - V:

**Quality Management:** Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

#### TEXT BOOKS :

1. Software Engineering A practitioner's Approach, Roger S Pressman, 6th edition. McGrawHill International Edition.
2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

#### REFERENCE BOOKS :

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
7. Software Engineering Foundations, Yingux Wang, Auerbach Publications, 2008.
8. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley & Sons Ltd.
9. Software Engineering3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
10. Introduction to Software Engineering, R. J. Leach, CRC Press.

#### Outcomes:

- Ability to identify the minimum requirements for the development of application.
- Ability to develop, maintain, efficient, reliable and cost effective software solutions.
- Ability to critically thinking and evaluate assumptions and arguments.

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**(R15A0584)DATABASE MANAGEMENT SYSTEMS LAB****Objectives:**

Students will have the ability to:

- Keep abreast of current developments to continue their own professional development.
- To engage themselves in lifelong learning of Database management systems theories and technologies, which enables them to pursue higher studies.
- To interact professionally with colleagues or clients located abroad and the ability to overcome challenges that arises from geographic distance, cultural differences, and multiple languages in the context of computing.
- Develop team spirit, effective work habits, and professional attitude in written and oral forms, towards the development of database applications

**A. Practice on SQL Queries to acquire knowledge on RDBMS.****B. Case Study:**

**Objective:** This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, developing and querying a database in the context of example database -Roadway travels". Students are expected to use "Mysql" database.

**Roadway Travels:** "Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

- Reservations and Ticketing
- Cancellations
- **Reservations & Cancellation:**

Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family).

Cancellations are also directly handed at the booking office.

In the process of computerization of Roadway Travels you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above Process involves many steps like 1. Analyzing the problem and identifying the Entities and Relationships, 2. E-R Model, 3. Relational Model 4. Normalization 5. Creating the database 6. Querying. Students are supposed to work on these steps week wise and finally

create a complete "Database System" to Roadway Travels. Examples are given at every experiment for guidance to students.

### Experiment 1: E-R Model

Analyze the problem carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

Example:

#### Entities:

1. B U S
2. Ticket
3. Passenger

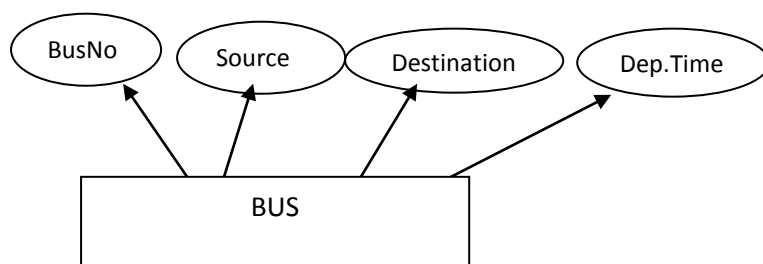
#### Relationships:

1. Reservation
2. Cancellation

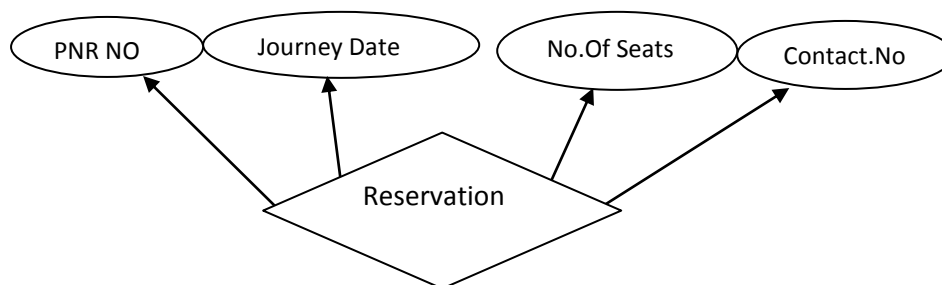
#### PRIMARY KEY ATTRIBUTES:

1. Ticket ID (Ticket Entity)
2. Passport ID (Passenger Entity)
3. Bus\_NO (Bus Entity)

Apart from the above mentioned entities you can identify more. The above mentioned are few.



Ex: Bus Entity



Ex: Reservation relationship

**Note:** *The student is required to submit a document by writing the Entities and Keys to the lab teacher*

### Experiment 2: Concept design with E-R Model

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total/partial). Try to incorporate

Generalization, Aggregation,  
Specialization etc wherever required.

**Note:** The student is required to submit a document by drawing the E-R diagram to the lab teacher.

### Experiment 3: Relational Model

Represent all the entities (Strong, Weak) in tabular fashion.

Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attribute as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multi-valued and Derived) have different way of Representation.

Example: The passenger looks as below .This is an example.

You can add more attributes based on your E-R-Model

This is not normalized table.

Passenger

Name	Age	Sex	Address	Ticket_id	<u>Passport ID</u>
------	-----	-----	---------	-----------	--------------------

Note: The student is required to submit a document by represent relationships in a tabular fashion to the lab teacher.

### Experiment 4: Normalization

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.

For the above table in the First normalization we can remove the multi valued attribute Ticket\_id and place it in another table along with the primary key of passenger.

**First Normal Form: The above table can be divided into two tables as shown below.**

Name	Age	Sex	Address	<u>Passport ID</u>
------	-----	-----	---------	--------------------

--	--	--	--	--

<u>Passport_id</u>	Ticket_id
--------------------	-----------

You can do the second and third normal forms if required. Any how Normalized tables are given at the end.

### Experiment 5: Installation of Mysql and practicing DDL, commands

Installation of MySql. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

Example for creation of a normalized "Passenger" table.

```
CREATE TABLE Passenger (  
  Passport_id INTEGER PRIMARY KEY,  
  Name VARCHAR (50) Not NULL,  
  Age Integer Not NULL,  
  Sex Char,  
  Address VARCHAR (50) Not NULL);
```

Similarly create all other tables.

**Note: Detailed creation of tables is given at the end.**

### Experiment 6: Practicing DML commands

DML commands are used to for managing data within schema objects.

Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for

The records remain

#### Inserting values into "Bus" table:

Insert into Bus values(1234,'hyderabad', 'tirupathi');

Insert into Bus values (2345,'hyderabad' 'Banglore');

Insert into Bus values (23,'hyderabad','Kolkata');

Insert into Bus values (45,'Tirupathi','Banglore');

Insert into Bus values (34,'hyderabad','Chennai');

#### Inserting values into "Passenger" table:

Insert into Passenger values (1, 45,'ramesh', 45,'M', 'abc123');

Insert into Passenger values (2, 78,'geetha', 36,'F','abc124');

Insert into Passenger values (45, 90,' ram', 30,'M','abc12');

Insert into Passenger values (67, 89,' ravi', 50,'M','abc14');

Insert into Passenger values (56, 22,'seetha', 32,'F','abc55');

#### Few more Examples of DML commands:

Select \* from Bus; (selects all the attributes and display)

UPDATE BUS SET Bus No = 1 WHERE BUS NO=2;

### Experiment 7: Querying

In this week you are going to practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

#### Practice the following Queries:

Display unique PNR\_no of all Passengers.

Display all the names of male passengers.

Display the ticket numbers and names of all the passengers.

Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'.

Find the names of passengers whose age is between 30 and 45.

Display all the passengers names beginning with 'A'

Display the sorted list of passengers names

### Experiment 8 and Experiment 9: Querying (continued...)

You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

Write a Query to display the Information present in the Passenger and cancellation tables. Hint: Use UNION Operator.

Display the number of days in a week on which the 9W01 bus is available.

Find number of tickets booked for each PNR\_no using GROUP BY CLAUSE. Hint: Use GROUP BY on PNR\_No.

Find the distinct PNR numbers that are present.

Find the number of tickets booked by a passenger where the number of seats is greater than 1. Hint: Use GROUP BY, WHERE and HAVING CLAUSES.

Find the total number of cancelled seats.

### Experiment 10: Triggers

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

**Eg: CREATE TRIGGER updcheck BEFORE UPDATE ON passenger  
FOR EACH ROW BEGIN**

```
IF NEW.Ticket NO > 60 THEN SET New.Ticket no = Ticket no;
ELSE
SET New.Ticket no = 0;
END IF;
END;
```

### Experiment 11: Procedures

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

**Eg: CREATE PROCEDURE myProc()**

```
BEGIN
SELECT COUNT(Tickets) FROM Ticket WHERE age>=40;
End;
```

### Experiment 12: Cursors

In this week you need to do the following: Declare a cursor that defines a result set.

Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done.

```
CREATE PROCEDURE myProc (in_customer_id INT) B E G I N
DECLARE v_id INT;
DECLARE v_name VARCHAR(30);
DECLARE cl CURSOR FOR SELECT ppno,name FROM Passenger WHERE ppno=in_customer_id;
OPEN cl;
FETCH cl into v_id, v_name;
Close cl;
END;
```

### Tables

#### BUS

Bus No: Varchar: PK (Primary key)

Source: Varchar

Destination: Varchar

DeptTime:Varchar



**Passenger**

PPNO: Varchar(15) : PK

Name: Varchar(15)

Age : int (4)

Sex:Char(10) : Male/Female

Address: VarChar(20)

**Passenger\_Tickets**

PPNO: Varchar(15) : FK Ticket No: Numeric (9)

**Reservation**

PNR\_No: Numeric(9) : PK

Journey\_date : datetime(8)

No\_of\_seats : int (8)

Address: Varchar (50)

Contact\_No: Numeric (9) —&gt; Should not be less than 9 and Should not accept any other character other than Integer

Status: Char (2) : Yes / No

**Cancellation**

PNR\_No:Numeric(9): FK

Journey\_date: datetime (8)

No\_of\_seats : int (8)

Address : Varchar (50)

Contact\_No: Numeric (9) —&gt; Should not be less than 9 and should not accept any other character other than Integer

Status: Char (2) : Yes / No

**Ticket**

Ticket\_No: Numeric(9): PK

Journey\_date : datetime(8)

Age : int (4)

Sex:Char(10) : Male/Female

Source : Varchar

Destination : Varchar

Dep\_time : Varchar

**Reference Books:**

1. Introduction to SQL,Rick F.Vander Lans,Pearson education..
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova,Pearson education.
3. Oracle PL/SQL Programming,Steven Feuerstein,SPD.
4. SQL & PL/SQL for Oracle 10g,B lack Book, Dr.P.S.Deshpande, Dream Tech.
5. Oracle Database 11g PL/SQL Programming,M.Mc Laughlin,TMH.
6. SQL Fundamentals, J.J.Patrick,Pearson Education.

**Course Outcomes:**

Students will be able to demonstrate their skills

- In drawing the ER, EER, and UML Diagrams.
- In analyzing the business requirements and producing a viable model for the implementation of the database.
- In converting the entity-relationship diagrams into relational tables.

- To develop appropriate Databases to a given problem that integrates ethical, social, legal, and economic concerns.

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### (R15A0585)JAVA PROGRAMMING LAB

#### Course Objectives:

- To prepare students to become familiar with the Standard Java technologies of J2SE
- To prepare students to excel in Object Oriented programming and to succeed as a Java Developer through global rigorous education.
- To provide Students with a solid foundation in OOP fundamentals required to solve programming problems and also to learn Advanced Java topics like J2ME, J2EE, JSP, JavaScript
- To train Students with good OOP programming breadth so as to comprehend, analyze, design and create novel products and solutions for the real life problems.
- To inculcate in students professional and ethical attitude, multidisciplinary approach and an ability to relate java programming issues to broader application context.
- To provide student with an academic environment aware of excellence, written ethical codes and guidelines and lifelong learning needed for a successful professional career.

#### Week 1

a) Write a java program that prompts the user for an integer and then printouts all prime numbers up to that integer.

b) Write a java program to multiply two given matrices.

Use Eclipse or Net bean Platform and acquaint with the various menus. Create a test project and a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

#### Week 2

Write a java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, \*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

#### Week 3

a) Develop an applet in java that displays a simple message.

b) Develop an applet in Java that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named “Compute” is clicked.

**Week 4**

Write a java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the result field when the Divide button is clicked. If Num1 and Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were zero, the program would throw an arithmetic Exception. Display the exception in a message dialog box.

**Week 5**

Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.

**Week 6**

Write a java program that connects to a database using JDBC and does add,delete, modify and retrieve operations.

**Week 7**

Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow or green with radio buttons. On selecting a button, an appropriate message with “Stop”, “Ready” or “Go” should appear above the buttons in selected color. Initially there is no message shown.

**Week 8**

Write a java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea() that prints the area of the given shape.

**Week 9**

a) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.  
b) Write a java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired.(Use Adapter classes).

**Week 10**

Write a Java Program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab(\t). It takes a name or phone number as input and prints the corresponding other value from the hash table.(hint: Use hash tables).

**Week 11**

a) Implement the above program with database instead of a text file.  
b) Write program how to handle mouse and keyboard events?

**Week 12**

- a) Write a program to draw the components using Layout Manager?
- b) Write a Java program that takes tab separated data (one record per line) from a text file and inserts them into a database
- c) Write a Java Program that prints the meta-data of a given table.

**TEXT BOOK:**

1. Java Fundamentals – A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.
2. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI

**REFERENCE BOOKS:**

1. Object Oriented programming through Java, P. Radha Krishna, Universities Press.
2. Thinking in Java, Bruce Eckel, PE
3. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.

**Outcomes:**

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

1. Able to analyze the necessity for Object Oriented Programming paradigm and over structured programming and become familiar with the fundamental concepts in OOP.
2. Demonstrate an ability to design and develop java programs, analyze, and interpret object oriented data and report results.
3. Demonstrate an ability to design an object oriented system, AWT components or multithreaded process as per needs and specifications.
4. Demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks like console and windows applications both for standalone and Applets programs.

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**(R15A0006)GENDER SENSITIZATION**

(An Activity-based Course)

**Objectives:**

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

**UNIT-I:****UNDERSTANDING GENDER:**Gender: Why Should We Study It? (*Towards a World of Equals: Unit -1*)Socialization: Making Women, Making Men (*Towards a World of Equals: Unit -2*)

Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

Just Relationships: Being Together as Equals (*Towards a World of Equals: Unit -12*)

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Further Reading: Rosa Parks-The Brave Heart.

**UNIT — II:****GENDER AND BIOLOGY:**Missing Women: Sex Selection and Its Consequences (*Towards a World of Equals: Unit -4*)

Declining Sex Ratio. Demographic Consequences.

Gender Spectrum: Beyond the Binary (*Towards a World of Equals: Unit -10*)

Two or Many? Struggles with Discrimination.

Additional Reading: Our Bodies, Our Health (*Towards a World of Equals: Unit -13*)**UNIT — III:****GENDER AND LABOUR:**Housework: the Invisible Labour (*Towards a World of Equals: Unit -3*)

"My Mother doesn't Work." "Share the Load."

Women's Work: Its Politics and Economics (*Towards a World of Equals: Unit -7*)

Fact and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

#### UNIT – IV:

##### ISSUES OF VIOLENCE:

Sexual Harassment: Say No! (*Towards a World of Equals*: Unit -6)

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "Chupulu".

Domestic Violence: Speaking Out (*Towards a World of Equals*: Unit -8)

Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Further Reading: New Forums for Justice.

Thinking about Sexual Violence (*Towards a World of Equals*: Unit -11)

Blaming the Victim-"I Fought for my Life...." - Further Reading: The Caste Face of Violence.

#### UNIT – V:

##### GENDER STUDIES:

Knowledge: Through the Lens of Gender (*Towards a World of Equals*: Unit -5)

Point of View. Gender and the Structure of Knowledge. Further Reading: Unacknowledged Women Artists of Telangana.

Whose History? Questions for Historians and Others (*Towards a World of Equals*: Unit -9)

Reclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

Essential Reading: All the Units in the Textbook, "*Towards a World of Equals: A Bilingual Textbook on Gender*" written by A.Suneetha, Uma Bhargubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.

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

##### REFERENCE BOOKS:

1. Sen, Amartya. More than One Million Women are Missing." New York Review of Books 37.20 (20 December 1990). Print. 'We Were Making History.... Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.
2. Tripti Lahiri. "By the Numbers: Where Indian Women Work." *Women's Studies Journal* (14 November 2012) Available online at: <http://blogs.wsj.com/India/real-time/2012/11/14/by-the-numbers-where-indian-women-work/>
3. K. Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada <http://harpercollins.co.in/BookDetail.asp?BookCode=3732>
4. Vimala. "Vantillu (The Kitchen)". *Women Writing in India: 600 BC to the Present. Volume II: The 20<sup>th</sup> Century*. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 599-601.
5. Shatrughna, Veena et al. *Women's Work and its Impact on Child Health and Nutrition*, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.
6. Stree Shakti Sanghatana. "*We Were Making History ....' Life Stories of Women in the Telangana People's Struggle*. New Delhi: Kali for Women, 1989.
7. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
8. Jayaprabha, A. "Chupulu (Stares)". *Women Writing in India: 600BC to the Present. Volume II: The 20<sup>th</sup> Century* Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 596-597.
9. Javeed, Shayan and Anupam Manuhaar. Women and Wage Discrimination in India: A Critical Analysis." *International Journal of Humanities and Social Science Invention* 2.4(2013)
10. Gautam, Liela and Gita Ramaswamy. "A 'conversation' between a Daughter and a Mother." *Broadsheet on Contemporary Politics. Special Issue on Sexuality and Harassment: Gender Politics on Campus Today*. Ed. Madhumeeta Sinha and Asma Rasheed. Hyderabad: Anveshi Research Center for Women's Studies, 2014.

11. Abdulali Sohaila. 'I Fought For My Life...and Won.' Available online at: <http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/>
12. Jeganathan Pradeep, Partha Chatterjee (Ed). *"Community, Gender and Violence Subaltern Studies XI"* Permanent Black and Ravi Dayal Publishers, New Delhi, 2000
13. K. Kapadia. *The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India*. London: Zed Books, 2002
14. S. Benhabib. *Situating the Self: Gender, Community, and Postmodernism in Contemporary Ethics*, London: Routledge, 1992
15. Virginia Woolf. *A Room of One's Own*. Oxford: Black Swan. 1992.
16. T. Banuri and M. Mahmood, *Just Development: Beyond Adjustment with a Human Face*, Karachi: Oxford University Press, 1997

**Outcomes:**

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

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**OPEN ELECTIVE - I**  
**(R17A0451) DIGITAL ELECTRONICS**

**OBJECTIVES:**

The main objectives of the course are:

1. To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
2. To introduce the methods for simplifying Boolean expressions.
3. To outline the formal procedures for the analysis and design of combinational and sequential circuits.
4. To introduce the concept of memories and programmable logic devices.
5. To illustrate the concept of synchronous and asynchronous sequential circuits.

**UNIT I****BINARY SYSTEMS AND LOGIC GATES:**

Binary Systems: The Advantage of Binary, Number Systems, The Use of Binary in Digital Systems, AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR and Exclusive-NAND implementations of Logic Functions using gates, NAND-NOR implementations.

**UNIT II****MINIMIZATION TECHNIQUES:**

Minimization Techniques: Boolean postulates and laws-De-Morgan's Theorem-Principle of Duality-Boolean expression-Minimization of Boolean expressions-Minterm-Maxterm-Sum of Products (SOP)-Product of Sums (POS)-Karnaugh map minimization-Don't care conditions-Quine Mc-Cluskey method of minimization.

**UNIT III****COMBINATIONAL CIRCUITS:**

Design Procedure-Half Adder-Full Adder-Half Subtractor-Full Subtractor-Parallel binary adder-Parallel Binary Subtractor-Multiplexer/ Demultiplexer-Decoder-Encoder.



**UNIT IV****SEQUENTIAL CIRCUITS:**

Latches, Flip-flops-SR, JK, D, T and Master-Slave-Characteristic table and equation-Application Table-Edge Triggering-Level Triggering-Realization of one flip-flop using other flip-flops-serial adder/subtractor-Asynchronous Counter-Asynchronous Up/Down Counter, Decade counter-Synchronous Counters-Synchronous Up/Down Counters, Decade Counters

**UNIT V****MEMORY DEVICES:**

Classification of Memories-ROM\_ROM Organization, PROM-EPROM-EEPROM-EAPROM, RAM-RAM Organization-Write operation-Read Operation-Programmable Logic Devices-Programmable Logic Array (PLA), Programmable Array Logic (PAL)-Implementation of combinational logic circuits using ROM, PLA, PAL.

**OUTCOMES**

After the completion of the course, the student will be able to:

1. Analyse different methods used for simplification of Boolean expressions
2. Design and implement Combinational and Sequential circuits.
3. Design and implement Synchronous and Asynchronous Sequential Circuits.

**TEXT BOOK:**

1. M Morris Mano, "Digital Design", 4<sup>th</sup> Edition, Prentice Hall of India Pvt., Ltd., 2008/Pearson Education (Singapore) Pvt., Ltd., New Delhi, 2003.
2. Donald P Leach and Albert Paul Malvino, "Digital Principles and Applications", 6<sup>th</sup> Edition, TMH, 2006.

**REFERENCES:**

1. John F Wakerly. "Digital Design, Fourth Edition, Pearson/PHI, 2008
2. John M Yarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006
3. Charles H Roth, "Fundamentals of Logic Design", 6<sup>th</sup> Edition, Thomson Learning, 2013
4. Thomas L Floyd, "Digital Fundamentals", 10<sup>th</sup> Edition, Pearson Education Inc, 2011.
5. Donald D Givone, "Digital Principles and Design", TMH, 2003.

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**OPEN ELECTIVE - I****(R17A0251) ELEMENTS OF ELECTRICAL ENGINEERING****OBJECTIVES:**

1. To introduce the fundamental concepts of electromechanical energy conversion
2. To familiarize the students with the principle of operation, constructional features and operational characteristics of various types of Motors used in the engineering and consumer Industry

**UNIT – I**

**Electromechanical Energy Conversion:** Electromechanical Energy conversion – forces and torque in magnetic field systems – energy balance – energy and force in a singly excited magnetic field system, determination of magnetic force - co-energy – multi excited magnetic field systems.

**UNIT – II****D.C. Generators & Motors :**

D.C. Generators – Principle of operation – Action of commutator – constructional features – armature windings — simplex and multiplex windings – use of laminated armature – E. M.F Equation

D.C. Motors: Principle of operation – Back E.M.F. - Torque equation – characteristics and application of shunt, series and compound motors – Armature reaction and commutation.

Speed control of DC Motors: Armature voltage and field flux control methods. Ward-Leonard system. – protective devices.

**UNIT – III:****Single Phase Transformers:**

Single phase transformers-principle of operation-constructional details- types-emf equation-equivalent circuit – operation on no load and on load-phasor diagrams –losses- minimization of hysteresis and eddy current losses-efficiency-all day efficiency-regulation-effect of variations of frequency and supply voltage on iron losses.

**UNIT – IV:****Polyphase Induction Motors & Their Speed control**

Polyphase induction motors: construction details of cage and wound rotor machines-production of a rotating magnetic field – principle of operation – rotor emf and rotor frequency – Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation – expressions for maximum torque and starting torque – torque slip characteristic – double cage and deep bar rotors

Speed control: change of frequency; change of poles and methods of consequent poles; cascade connection. injection of an emf into rotor circuit (qualitative treatment only)-induction generator-principle of operation

**UNIT – V:****Single Phase Motors & Special Machines:** Single phase Motors: Single phase induction motor –

Constructional features-Double revolving field theory Equivalent circuit - split-phase motors -

Capacitor start Capacitor run motors. Principles of A.C. Series motor-Universal motor, Stepper motor shaded pole motor, **Reluctance Motors, Brushless DC motors** (Qualitative Treatment only).

**TEXT BOOKS:**

1. Electrical Machines, P.S. Bimbhra, Khanna Publishers.
2. Principles of Electrical Machines, V. K. Mehta, Rohit Mehta, S. Chand Publishing.
3. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers.

**REFERENCE BOOKS:**

1. Electric Machines, Mulukutla S. Sarma, Mukesh K. Pathak, Cengage Learning.
2. Fundamentals of Electric Machines, B. R. Gupta, Vandana Singhal, New Age International Publishers.
3. Electric machinery – A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies, 5th edition.
4. Theory of Alternating Current Machinery- by Langsdorf, Tata McGraw-Hill Companies, 2nd edition

**OUTCOMES:**

At the end of the course the student will

1. Have a clear understanding of the materials used and features in the construction of the electrical machines like transformers, DC and AC motors and special purpose motors.
2. Acquire a basic knowledge on the principle of operation of all these machines
3. Have a basic knowledge on the Torque speed relations and the effect of load torque on their performance.
4. Will have fundamental concept on the speed control of the various types of motors.

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**OPEN ELECTIVE - I**  
**(R17A0551) DATABASE SYSTEMS**

**OBJECTIVES**

1. To understand the basic concepts and the applications of database systems
2. To Master the basics of SQL and construct queries using SQL
3. To understand the relational database design principles
4. To become familiar with the basic issues of transaction processing and concurrency control
5. To become familiar with database storage structures and access techniques

**UNIT I: INTRODUCTION**

**Data- Database:** File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS.DBMS Languages-Database users and DBA.

**UNIT II: DATABASE DESIGN**

**ER Model:** Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints. Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas. ER Diagram Notations- Goals of ER Diagram- Weak Entity Set- Views.

**UNIT III: STRUCTURED QUERY LANGUAGE**

**SQL:** Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join-Nested queries - correlated and uncorrelated- Aggregate Functions-Null values.

**UNIT IV - DEPENDENCIES AND NORMAL FORMS**

**Importance of a good schema design,-** Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's- Closure of a set of FD's,- Minimal covers-Definitions of 1NF,2NF, 3NF and BCNF- Decompositions and desirable properties -

**UNIT V: TRANSACTIONS:**

Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability, Serializability by Locks-Locking Systems with Several Lock Modes-Concurrency Control by Timestamps, validation.

**TEXT BOOK:**

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan," Database System Concepts", McGraw-Hill, 6th Edition , 2010.
2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education.

**REFERENCES:**

1. Raghu Ramakrishnan, Johannes Gehrke, "Database Management System", McGraw Hill., 3rd Edition 2007.
2. Elmasri&Navathe,"Fundamentals of Database System," Addison-Wesley Publishing, 5th Edition, 2008.
3. Date.C.J, "An Introduction to Database", Addison-Wesley Pub Co, 8th Edition, 2006.
4. Peter rob, Carlos Coronel, "Database Systems – Design, Implementation, and Management", 9th Edition, Thomson Learning, 2009.

**OUTCOMES**

1. Demonstrate the basic elements of a relational database management system
2. Ability to identify the data models for relevant problems
3. Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data

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**OPEN ELECTIVE - I****(R17A0351) ELEMENTS OF MECHANICAL ENGINEERING****OBJECTIVES:**

1. To give an insight to students about the behaviour of materials under external forces.
2. The concept of stress, strain, elasticity etc. as applied to various structures under loading are included.
3. The student able to learn about concept of fluids, turbines and engines.

**UNIT - I**

**Stresses and strains:** kinds of – stress-strains, elasticity and plasticity, Hooks law, stress –strain diagrams, modules of elasticity, Poisson's ratio, linear and volumetric strain, relation between E, N, and K, bars of uniform strength, compound bars and temperature stresses.

**Shear force and bending moment:** Types of supports – loads – Shear force and bending moment for cantilever and simply supported beams without overhanging for all types of loads.

**UNIT - II**

**Theory of simple bending:** simple bending formula, Distribution of Flexural and Shear stress in Beam section – Shear stress formula – Shear stress distribution for some standard sections.

**Thin cylindrical shells:** stress in cylindrical shells due to internal pressures, circumferential stress, longitudinal stress, design of thin cylindrical shells, spherical shells, change in dimension of the shell due to internal pressure, change in volume of the shell due to internal pressure

**Thick Cylinders:** Lamé's equation- cylinders subjected to inside and outside pressures Columns and Struts.

**UNIT - III**

**Properties of Fluid :** Stream line , streak line , path line , continuity equation pipes are in series, pipes are in parallel, HGL, TGL , Bernoullis equation .

**Hydraulic pumps and turbines:** working principles and velocity diagrams.

**UNIT - IV**

**Internal combustion engines:** classification of IC engines, basic engine components and nomenclature, working principle of engines, Four strokes and two stroke petrol and diesel engines, comparison of CI and SI engines, comparison of four stroke and two stroke engines, simple problems such as indicated power, brake power, friction power, specific fuel consumption, brake thermal efficiency, indicated thermal efficiency and mechanical efficiency.

**UNIT - V**

**Belts - Ropes and chain:** belt and rope drives, velocity ratio, slip, length of belt , open belt and cross belt drives, ratio of friction tensions, centrifugal tension in a belt, power transmitted by belts and ropes, initial tensions in the belt, simple problems.

**Gear trains:** classification of gears, gear trains velocity ratio, simple, compound –reverted and epicyclic gear trains.

**TEXT BOOKS:**

1. "Strength of Materials and Mechanics of Structures", B.C.Punmia, Standard Publications and distributions, 9 th ed.
2. Thermal Engineering, Ballaney,P.L., Khanna Publishers, 2003 .

3. Theory of Machines , S.S. Rattan , Tata McGraw Hill.
4. Fluid Mechanics and Hydraulic Machinery R.K. Bansal .

**REFERENCE BOOKS:**

1. Thermal Engineering, R.K. Rajput , Laxmi Publications .
2. Theory of Machines, R.S. Khurmi, S. Chand Publications.
3. Fluid Mechanics and Hydraulic Machinery, Modi & Seth.

**OUTCOMES:**

- 1.The student would be exposed to basic mechanical engineering machinery.
- 2.The student learned about mechanical components.
- 3.Student understand about engines and turbines .

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**OPEN ELECTIVE - I**  
**(R17A0352) GREEN ENERGY SYSTEMS**

**OBJECTIVES:**

1. The course aims to highlight the significance of alternative sources of energy.
2. Green energy systems and processes and provides the theory and working principles of probable sources of renewable and green energy systems that are environmental friendly.

**UNIT-I****Introduction:**

**Solar Radiation:** Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion – types of PV cells, I-V characteristics.

**Solar Energy Collection:** Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

**UNIT – II**

**Solar Energy Storage And Applications:** Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

**Wind Energy:** Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

**UNIT – III**

**Bio-Mass:** Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.

**Geothermal Energy:** Resources, types of wells, methods of harnessing the energy, potential in India.

**Ocean Energy:** OTEC, Principles of utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

**UNIT – IV**

**Energy Efficient Systems: (A) Electrical Systems:** Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation and air conditioning), demand site management.

**(B) Mechanical Systems:** Fuel cells- principle, thermodynamic aspects, selection of fuels & working of various types of fuel cells, Environmental friendly and Energy efficient compressors and pumps.

**UNIT-V**

**Energy Efficient Processes:** Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.



**Green Buildings:** Definition, features and benefits. Sustainable site selection and planning of buildings for maximum comfort. Environmental friendly building materials like bamboo, timber, rammed earth, hollow blocks, lime & lime pozzolana cement, agro materials and industrial waste, Ferro cement and Ferro-concrete, alternate roofing systems, paints to reduce heat gain of the buildings. Energy management.

**TEXT BOOKS:**

1. Sukhatme S.P. and J.K.Nayak, Solar Energy – Principles of Thermal Collection and Storage, TMH.
2. Khan B.H., Non-Conventional Energy Resources, Tata McGraw Hill, New Delhi, 2006.
3. Green Manufacturing Processes and Systems, Edited by J. Paulo Davim, Springer 2013.

**REFERENCES:**

1. Alternative Building Materials and Technologies / K.S Jagadeesh, B.V Venkata Rama Reddy and K.S Nanjunda Ra.
2. Principles of Solar Energy / Frank Krieth & John F Kreider.
3. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
4. Renewable Energy Technologies /Ramesh & Kumar /Narosa
5. Renewable Energy Technologies/ G.D Roy

**OUTCOMES:**

1. The student shall understand the principles and working of solar, wind, biomass, geo-thermal, ocean energies.
2. Green energy systems and appreciate their significance in view of their importance in the current scenario and their potential future applications.

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**OPEN ELECTIVE - I****(R17A0051) INTELLECTUAL PROPERTY RIGHTS****OBJECTIVES:**

1. The objective of this course is to provide the knowledge on International IPR's and to make students efficient to take decisions in Global Corporate.

**Unit-I**

**Introduction:** Intellectual property rights basics, the role and value of IP in international commerce, Issues affecting IP internationally. Agreement on trade related aspects of Intellectual Property Rights. (TRIPS) - Agreement on TRIPS and India.

**Unit-II**

**Parties to IP Rights:** Owner, customer, authorized user, licensee, attorney, protection of the weak and strong, finalizing ownership and use rights.

**Unit-III**

**Ensuring the value of IP:** Ensuring the value of IP at creation stage, after creation stage, precise contractual protection of IP rights. Key issues related to IP internationally. IP rights in international forums. Fundamentals in Country legal systems, generalities. Validity of IP rights locally: specifics.

**Unit-IV**

**Managing IP Rights:** Acquiring IP Rights: letters of instruction, joint collaboration agreement, work made for hire agreement - Protecting IP Rights: non disclosure agreement, cease and desist letter, settlement memorandum. Transferring IP Rights: assignment contract, license agreement, deed of assignment or license agreement, addendum to unrecorded assignment or license.

**Unit-V**

**Remedies** and IPR Evaluation - GATT - WTO - Role of WTO in solving IPR issues.

**REFERENCES:**

- A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2<sup>nd</sup> Edition.
- Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.
- Intellectual Property Rights: N K Acharya: ISBN: 9381849309
- Intellectual Property Rights: C B Raju : ISBN-8183870341
- Intellectual Property : Examples and Explanation – Stephen M McJohn, 2/e, ISBN-13: 978-0735556652
- Intellectual Property Rights in the Global Economy – Keith E Maskus, PIIE, ISBN paper 0-88132-282-2

**OUTCOMES**

1. It allows students how to prepare and protect the Inventions , start up ideas and rights of patents and copy rights etc.,
2. This subject brings awareness to the students the basic legal aspects at present following at Global level.