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
AERONAUTICAL ENGINEERING

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

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

S.No	Subject Particulars
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:

S.No	Department
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

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

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.

$$CGPA = \Sigma(Ci \times Si) / \Sigma Ci$$

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

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

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.

% of Marks = (final CGPA – 0.5) x 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 ≥ 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) ≥ 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 ≥ 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) ≥ 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) ≥ 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) ≥ 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 ≥ 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
	If the candidate:	
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 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.
4.	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.	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.
5.	Using objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.

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 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. 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	R17A0327	Composite Materials	R17A2102	Aircraft materials and Production Technology
	R17A2118	Air transportation Systems	R17A2101	Introduction to Aerospace Engineering
2	R17A0367	Experimental Stress Analysis	R17A0301 R17A0363 R17A2104	Engineering Mechanics Mechanics of Solids Aerospace vehicle structures - I
	R17A2117	Wind Tunnel techniques	R17A2101	Introduction to Aerospace Engineering
	R17A0365	Mechanisms and Mechanical Design	R17A0301	Engineering Mechanics
3	R17A2119	Space Mechanics	R17A2106 R17A2110	Aircraft Performance Aircraft Stability and Control
	R17A2123	Aircraft Maintenance Engineering	R17A2115	Aircraft Systems
	R17A2124	Flight Scheduling Operations	R17A0022	Mathematics-II
4	R17A2125	Civil Aviation Rules and Regulations	-	-
	R17A0331	CAD/CAM	R17A2102	Aircraft materials and Production Technology
	R17A2126	Hypersonic Aerodynamics	R17A2108	High Speed Aerodynamics
5	R17A2127	Analysis of composite structures	R17A0363 R17A2104 R17A2109	Mechanics of Solids Aerospace vehicle structures – I Aerospace Vehicle Structures -II
	R17A2128	Helicopter Engineering	R17A2103	Aerodynamics
	R17A2129	Advanced Computational Aerodynamics	R17A2119	Computational Aerodynamics
6	R17A0323	Heat Transfer	R17A0364	Thermodynamics
	R17A2130	Aeroelasticity	R17A2103 R17A2109	Aerodynamics Aerospace Vehicle Structures -II
	R17A0370	Fatigue and Fracture Mechanics	R17A0368	Mechanical Vibrations & Structural Dynamics

DEPARTMENT OF AERONAUTICAL ENGINEERING

VISION

Department of Aeronautical Engineering aims to be indispensable source in Aeronautical Engineering which has a zeal to provide the value driven platform for the students to acquire knowledge and empower themselves to shoulder higher responsibility in building a strong nation.

MISSION

a) The primary mission of the department is to promote engineering education and research.

(b) To strive consistently to provide quality education, keeping in pace with time and technology.

(c) Department passions to integrate the intellectual, spiritual, ethical and social development of the students for shaping them into dynamic engineers.

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 OBJECTIVES (PSOs)

To mould students to become a professional with all necessary skills, personality and sound knowledge in basic and advance technological areas.

1. To promote understanding of concepts and develop ability in design manufacture and maintenance of aircraft, aerospace vehicles and associated equipment and develop application capability of the concepts sciences to engineering design and processes.
2. Understanding the current scenario in the field of aeronautics and acquire ability to apply knowledge of engineering, science and mathematics to design and conduct experiments in the field of Aeronautical Engineering.
3. To develop leadership skills in our students necessary to shape the social, intellectual, business and technical worlds.

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.

DEPARTMENT OF AERONAUTICAL ENGINEERING

COURSE STRUCTURE

I Year B. Tech (ANE) – 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	R17A0014	ENVIRONMENTAL STUDIES	3		3	30	70
5	R17A0501	COMPUTER PROGRAMMING WITH C	3		3	30	70
6	R17A0301	ENGINEERING MECHANICS	4	1	4	30	70
7	R17A0581	COMPUTER PROGRAMMING LAB	-	3	2	25	50
8	R17A0084	IT WORKSHOP /ENGINEERING WORKSHOP	-	3	2	25	50
9	R17A0081	ENGLISH LANGUAGE COMMUNICATION SKILLS LAB-I	-	3	2	25	50
*10	R17A0003	*HUMAN VALUES AND SOCIETAL PERSPECTIVES	2	-	-	50	-
		TOTAL	**20**	**12**	**24**	**305**	**570**

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

I Year B. Tech (ANE) – 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	R17A0013	ENGINEERING CHEMISTRY	3		3	30	70
5	R17A0502	OBJECT ORIENTED PROGRAMMING THROUGH C++	3	1	3	30	70
6	R17A0302	ENGINEERING DRAWING	4	-3-	4	30	70
7	R17A0582	OBJECT ORIENTED PROGRAMMING THROUGH C++ LAB	-	3	2	25	50
8	R17A0083	ENGINEERING PHYSICS/ENGINEERING CHEMISTRY LAB	-	3	2	25	50
9	R17A0082	ENGLISH LANGUAGE COMMUNICATION SKILLS LAB-II	-	3	2	25	50
		TOTAL	**18**	**15**	**24**	**255**	**570**

II Year B. Tech (AE) – I Semester (6 Core Subjects + 2 Labs+1 Mandatory Course)

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R17A0362	Mechanics Of Fluids	4	1	4	30	70
2	R17A0363	Mechanics Of Solids	3	1	3	30	70
3	R17A0364	Thermodynamics	4	-	4	30	70
4	R17A2101	Introduction to Aerospace Engineering	3	-	3	30	70
5	R17A2103	Aircraft Materials & Production Technology	3	1	3	30	70
6	R17A0206	Electrical and Electronics Engineering	3	1	3	30	70
7	R17A0384	MoS and MoF Lab	-	3	2	25	50
8	R17A0282	Electrical and Electronics Engineering lab	-	3	2	25	50
*9	R17A0006	Gender Sensitization*	3	-	-	50	-
Total			**23**	**10**	**24**	**280**	**520**

***Mandatory course: Non-credit course, 40% of scoring in Gender Sensitization is required for the award of the degree**

II Year B. Tech (AE) – II Semester (5 Core Subjects + 1 Open Elective + 2 Labs+1 mandatory course)

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R17A2104	Aerodynamics	3	1	3	30	70
2	R17A2105	Aerospace Vehicle Structures -I	4	1	4	30	70
3	R17A2106	Air Breathing propulsion	3	1	3	30	70
4	R17A2107	Aircraft Performance	4	1	4	30	70
5	R17A0061	Managerial Economics and Financial Analysis	3	1	3	30	70
6		Open Elective – I	3	-	3	30	70
7	R17A2181	Aircraft Materials & Production Lab	-	3	2	25	50
8	R17A2182	AED with CAD LAB	-	3	2	25	50
*9	R17A0004 R17A0005	Foreign Language : French Foreign Language : German	2	-	-	50	-
Total			**22**	**11**	**24**	**280**	**520**

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

OPEN ELECTIVE – I

R17A0451	Digital Electronics
R17A0251	Fundamentals of Electrical Machines
R17A0551	Database Systems
R17A0351	Elements of Mechanical Engineering
R17A0352	Green Energy systems
R17A0051	Intellectual Property Rights

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

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R17A2108	Advanced Propulsion systems	4	1	4	30	70
2	R17A2109	High Speed Aerodynamics	4	1	4	30	70
3	R17A2110	Aerospace Vehicle Structures -II	3	1	3	30	70
4	R17A2111	Aircraft Stability And Control	3	1	3	30	70
5	R17A0327 R17A2118 R17A0367	**Core Elective – I** Composite Materials Air Transportation Systems Experimental Stress Analysis	3	1	3	30	70
6		**Open Elective – II**	3	-	3	30	70
7	R17A2183	Aerodynamics and Propulsion Lab	-	3	2	25	50
8	R17A2184	Aerospace Structures Lab	-	3	2	25	50
Total			**20**	**11**	**24**	**230**	**550**

OPEN ELECTIVE – II

R17A0452	Industrial Electronics
R17A0454	Communication Networks
R17A0552	Object Oriented Programming through JAVA
R17A1251	Software Project Management
R17A1252	Management Information Systems
R17A0353	Operations Research

III Year B. Tech (AE) – II Semester (4 Core Subjects+1 Core Elective+1 Open Elective+2 Labs+1 Mandatory course)

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R17A2113	Finite Element Analysis	4	1	4	30	70
2	R17A2114	Control Theory for Aircraft	4	1	4	30	70
3	R17A2115	Flight Vehicle Design	3	1	3	30	70
4	R17A2116	Aircraft Systems	3	1	3	30	70
5	R17A2117 R17A0365 R17A2119	**Core Elective – II** Wind Tunnel techniques Mechanisms and Mechanical Design Space Mechanics	3	1	3	30	70
6		**Open Elective – III**	3	-	3	30	70
*7	R17A0007	Technical Communication And Soft Skills	2	-	-	50	-
8	R17A2185	Flight Vehicle Design and Instrumentation Lab	-	3	2	25	50
9	R17A2186	Programming Language For Mathematical Models	-	3	2	25	50
Total			**22**	**11**	**24**	**280**	**520**

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

OPEN ELECTIVE – III

R17A0454	Robotics Engineering	R17A0453	Web Technologies
R17A0455	Bio Medical Engineering	R17A0354	Nano Technology
R17A0554	Game Programming	R17A0052	Enterprise Resource Planning

IV Year B. Tech (AE) – 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	R17A2120	Computational Aerodynamics	4	1	4	30	70
2	R17A2121	Airframe Structural Design	3	1	3	30	70
3	R17A0368	Mechanical Vibrations & Structural Dynamics	4	1	4	30	70
4	R17A2122	Avionics	3	1	3	30	70
5	R17A2123 R17A2124 R17A2125	**Core Elective – III** Aircraft Maintenance Engineering Flight Scheduling Operations Civil Aviation Rules and Regulations	3	1	3	30	70
6	R17A0331 R17A2126 R17A2127	**Core Elective – IV** CAD/CAM Hypersonic Aerodynamics Analysis of composite structures	3	1	3	30	70
7	R17A2187	Computational Aerodynamics Lab	-	3	2	25	50
8	R17A2188	Computational Structures Lab	-	3	2	25	50
TOTAL			**20**	**12**	**24**	**230**	**520**

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

S.No.	Subject Code	SUBJECT	L	T/P/D	C	Max. Marks	
						Int	Ext
1	R17A2128 R17A2129 R17A0323	**Core Elective - V** Helicopter Engineering Advanced Computational Aerodynamics Heat Transfer	3	1	3	30	70
2	R17A2130 R17A0370 R17A2131	**Core Elective – VI** Aeroelasticity Fatigue and Fracture Mechanics Airline and Airport Management	3	1	3	30	70
3	R17A2189	Mini Project	-	-	4	-	100
4	R17A2190	Technical Seminar	-	6	2	50	-
5	R17A2191	Major Project	15	-	12	100	200
TOTAL			**21**	**8**	**24**	**210**	**440**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B. Tech ANE-I Sem **L T/P/D C**
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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.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. Tech ANE-I Sem	L	T/P/D	C
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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 Theorms: 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} , sinax, cosax, 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, SpecialEdition - MRCET, Mc Graw Hill Publishers - 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.
- Fromthe study of quantum and statistical aspects dual behavior of electron and solid state physics can be realized by the engineering students.
- Thebasic 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.

SEMICONDUCTORDEVICES:

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 Phyiscs- 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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	3	-/-/-	3

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 act1986, 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.

SUGGESTED 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

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	3	-/-/-	3

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 - **I**ntroduction, 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, 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, 13th 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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R17A0301 - ENGINEERING MECHANICS

Unit – I

Introduction to Engineering Mechanics – Basic Concepts. **Resultants of Force System:** Parallelogram law –Forces and components- Resultant of coplanar Concurrent Forces – Components of forces in Space – Moment of Force - principle of moments – Coplanar Applications – Couples - Resultant of any Force System.

Unit – II

Equilibrium of Force Systems: Free Body Diagrams, Equations of Equilibrium - Equilibrium of planar Systems -Equilibrium of Spatial Systems.

FRICTION: Introduction – Theory of Friction – Angle of friction - Laws of Friction – Static and Dynamic Frictions –Motion of Bodies: Wedge, Screw, Screw-jack, and Differential Screw-jack.

Unit – III

Centroids and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (frombasic principles) – Centroids of Composite Figures - Theorem of Pappus – Center of gravity of bodies and centroids of volumes.

Unit – IV

Moments of Inertia: Definition – Polar Moment of Inertia –Radius of gyration - Transfer formula for moment ofinertia - Moments of Inertia for Composite areas - Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia: Moment of Inertia of Masses- Transfer Formula for Mass Moments of Inertia - massmoment of inertia of composite bodies.

Unit – V

Kinematics of a Particle: Motion of a particle – Rectilinear motion – motion curves – Rectangular componentsof curvilinear motion– Kinematics of Rigid Body - Types of rigid body motion -Angular motion - Fixed Axis Rotation

Kinetics of particles: Translation -Analysis as a Particle and Analysis as a Rigid Body in Translation – Equations ofplane motion - Angular motion - Fixed Axis Rotation – Rolling Bodies.

TEXT BOOKS:

1. Engineering Mechanics/ S. Timoshenko and D.H. Young, Mc Graw Hill Book Company.
2. Engineering Mechanics - Statics and Dynamics by Vijaya Kumar Reddy K , Suresh Kumar J.BS Publications

REFERENCES:

1. Engineering Mechanics / S.S. Bhavikati & K.G. Rajasekharappa
2. A text of Engineering Mechanics / YVD Rao / K. Govinda Rajulu/ M. Manzoor Hussain, Academic Publishing Company
3. Engg. Mechanics / M.V. Seshagiri Rao & D Rama Durgaiah/ Universities Press
4. Engineering Mechanics, Umesh Regl / Tayal.
5. Engineering Mechanics / KL Kumar / Tata McGraw Hill.
6. Engineering Mechanics / Irving Shames / Prentice Hall

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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 programperformarithmeticoperations 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, 3rd 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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R17A0084 - IT WORKSHOP LAB / 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

1. 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

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R17A0081 - ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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:

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

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:

   i) 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 o leader in diverse teams

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R17A0003 - HUMAN VALUES AND SOCIETAL PERSPECTIVES

(MANDATORY COURSE)

Objective:

- 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 does, 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, 3rd Edition.

REFERENCE BOOKS

1. Ivan llich, 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 lla H.Meadows, Dennis L. Meadows, Jorgen Randers, Willian A. Behrens lll, 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

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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 $1/3^{rd}$ and $3/8^{th}$ 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 2π.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.

PRESCRIBED TEXT BOOKS:

1. Mathematics-II, Special Edition - MRCET,TATA Mc Graw HILL-2017 Publishers.
2. 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 (χ), 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 Phyiscs- 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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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–Disinfectation 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 14th 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).

Course 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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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 Handing Mechanism, Throwing and Catching Mechanism, Rethrowing an Exception, Specifying Exceptions

Text Books:

1. Object Oriented Programming, Special Edition - MRCET, Tata Mc Graw Hill PUBLISHERS-2017
2. Object Oriented Programming with C++ by Balagurusamy

References:

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

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R17A0302 - ENGINEERING DRAWING

UNIT – I

Introduction To Engineering Drawing: Principles of Engineering Drawing/Graphics – Various DrawingInstruments – 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 oforthographic 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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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:

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

Week 3:

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

Week 4:

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

Week 5

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

Member	Description
Data members	
Sname	Name of the student
Marks array	Marks of the student
Total	Total marks obtained
Tmax	Total maximum marks

Member functions	
Member	Description
assign()	Assign Initial Values
compute()	to Compute Total, Average
display()	to Display the Data.

Week 6:

a) Write a Program to Demonstrate the i)Operator Overloading.ii) Function Overloading.

b) Write a Program to Demonstrate Friend Function and Friend Class.

Week 7:

a) Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.

b) 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

a.)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.

b) Write a Program to Invoking Derived Class Member Through Base Class Pointer.

Week 12

a) Write a Template Based Program to Sort the Given List of Elements.

b) 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

a) Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly.
b) 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.

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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 1st 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 1st 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

- At the end of the course
- 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 conductometric and potentiometric method.
- Ability to find the $Fe^{+2,}$ and 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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R17A0082 - ENGLISH LANGULAGE COMMUNICATION SKILS 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 2ndEdition 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 DictionaryDaniel Jones Current Edition with CD.
12. A textbook of English Phonetics for Indian Studentsby 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 o leader in diverse teams

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II Year B. Tech, ANE-I Sem

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R17A0362 - MECHANICS OF FLUIDS

Objectives:

- The student will gain insight into a number of potentially useful phenomena involving movement of fluids.
- He/she will learn to do elementary calculations for engineering application of fluid motion.
- This course also prepares the student for more advanced courses such as Aerodynamics- I & -II.

UNIT I

Fluid Properties: Density, specific weight, specific gravity, surface tension & capillarity, Newton's law of viscosity, incompressible & compressible fluid, numerical problems. Hydrostatic forces on submerged bodies: Pressure at a point, Pascal's law, pressure variation with temperature and height, Center of pressure on vertical, inclined and curved surfaces. Manometers- simple and differential manometers, inverted manometers, micro manometers, Pressure gauges and numerical problems. Buoyancy- Archimedes's Principle, Metacenter, Meta centric height calculations.

UNIT II

Fluid Kinematics: Stream line, path line, streak line, stream surface, stream tube, classification of flows: steady, unsteady, uniform, non uniform, laminar, turbulent flows. One dimensional approximation, examples of real 1-D flows, two dimensional approximation, 2-D flow in wind tunnel, continuity equations for 1-D and 2-D flows both compressible and incompressible, stream function for two dimensional incompressible flows. Vorticity, irrotational flow, Velocity potential function. Introduction to vortex flows.

UNIT III

Fluid Dynamics: Surface & body forces, substantive derivative, local derivative and convective derivative, momentum equation, Euler equation, Bernoulli's equation. Phenomenological basis of Navier-Stokes equation.

Flow measurements: pressure, velocity and mass flow rate, viscosity, Pitot-static tube, venturi meter and orifice meter, viscometers.

Flow of through pipes: major and minor losses.

UNIT IV

Boundary Layer: Introductory concepts of boundary layer, Large Reynolds number flows and Prandtl's boundary layer hypothesis, Qualitative description of Boundary layer thickness and velocity profile on a flat plate and forces due to laminar and turbulent boundary layer. Separation of boundary layer. Methods of preventing separation of boundary layer.

UNIT V

Dimensional and Model Analysis and Forces on submerged bodies:

Statement of Buckingham's π-theorem, Similarity parameters: Dimensionless numbers, Types of similarities, Similarity laws, Model testing and Classification of models. Forces exerted by a flowing fluid on a stationary body, Expressions for drag and lift.

Text Books:

1. Engineering Fluid mechanics – K.L . Kumar, S.Chand & Co.
2. Introduction to Fluid Mechanics and Fluid machines – S.K. Som and G. Biswas
3. Fluid Mechanics and Hydraulic Machines – RK Bansal, Laxmi Publications

Reference Books:

1. Fluid Mechanics – Frank M and White, Mc-Grawhill.
2. Fluid Mechanics- Fox and Mc Donald
3. Fluid Mechanics – E. Rathakrishnan

Outcomes:

- Students can define the governing equations of fluid flow problems.
- It makes the student ready to understand about aerodynamics.
- Students can able to create models for experimental analysis.

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R17A0363 - MECHANICS OF SOLIDS

Objectives:

- To introduce behavior of structural components under various loading conditions.
- To impart the knowledge of Shear force and Bending moment diagrams.

UNIT – I

Simple Stresses & Strains : Elasticity and plasticity – Types of stresses & strains–Hooke's law– stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio & volumetric strain – Elastic module & the relationship between them – Bars of varying section – compositebars – Temperature stresses. Strain energy – Resilience – Gradual, sudden, impact and shock loadings.

UNIT – II

Shear Force And Bending Moment : Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l., uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

Flexural Stresses : Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I,T,Angle and Channel sections – Design of simple beam sections. Shear Stresses: Derivation of formula – Shear stress distribution across various beams sections like rectangular, circular, triangular, I, T angle sections.

UNIT-IV

Principal Stresses and Strains: Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions. Theories of Failure: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

UNIT – V

Torsion of Circular Shafts : Theory of pure torsion – Derivation of Torsion equations : T/J = q/r = Nθ/L – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders– Thin
spherical shells.

Text Books:

1. Strength of materials – R.S. Kurmi and Gupta.
2. Solid Mechanics, by Popov
3. Strength of Materials – Ryder. G.H.; Macmillan Long Man Pub.
4. Strength of Materials – W.A. Nash, TMH

Reference Books:

1. Strength of Materials -By Jindal, Umesh Publications.
2. Analysis of structures by Vazirani and Ratwani.
3. Mechanics of Structures Vol –I by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. Ltd.
4. Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.
5. Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.
6. Fundamentals of Solid Mechancis by M.L.Gambhir, PHI Learning Pvt. Ltd
7. Strength of Materials by R.K Rajput, S.Chand & Company Ltd.

Outcomes:

Solve the problems related to the structural components under various loading conditions.

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R17A0364 - THERMODYNAMICS

Objectives:

- Learn about concepts and laws used in thermodynamics.
- Students acquire knowledge of various cycles.
- Students gain information about the working principle of different engines.

UNIT - I

Introduction: Basic Concepts: System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic view points, Concepts of Continuum, Thermodynamic Equilibrium, State, Property, Process, Exact & Inexact Differentials, Cycle - Reversibility - Quasi - static Process, Irreversible Process, Causes of Irreversibility - Energy in State and in Transition, Types, Displacement & Other forms of Work, Heat, Point and Path functions, Zeroth Law of Thermodynamics - Concept of Temperature - Principles of Thermometry - Reference Points - Const. Volume gas Thermometer - Scales of Temperature, Ideal Gas Scale - Joule's Experiments - First law of Thermodynamics – applied to a process and system, Corollaries , Steady Flow Energy Equation.

UNIT - II

Limitations of the First Law - Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature, Clausius Inequality, Entropy, Principle of Entropy Increase - Energy Equation, Availability and Irreversibility - Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations - Elementary Treatment of the Third Law of Thermodynamics.

UNIT - III

Perfect Gas Laws - Equation of State, specific and Universal Gas constants - various Non-flow processes, properties, end states, Heat and Work Transfer, changes in Internal Energy - Throttling and Free Expansion Processes - Flow processes. Perfect Gas Model, derivations - Vader Waals Equation of State - Compressibility charts - variable specific Heats - Gas Tables - Phase Transformations - Triple point at critical state properties during change of phase, Dryness Fraction - Clausius - Clapeyron Equation Property tables. Mollier charts - Various Thermodynamic processes and energy Transfer - Steam Calorimetry.

UNIT - IV

Mixtures of perfect Gases - Mole Fraction, Mass friction Gravimetric and volumetric Analysis - Dalton's law of partial pressure, Avogadro's Laws of additive volumes - Mole fraction, Volume fraction and partial pressure, Equivalent Gas const. and Molecular Internal Energy. Enthalpy, specific heats. Heats and Entropy of Mixture of perfect Gases and Vapour, Atmospheric air - Psychrometric Properties and Psychrometric chart.

UNIT - V

Thermodynamic Cycles: Power cycles: Otto, Diesel, Dual Combustion cycles, Sterling Cycle, Atkinson Cycle, Lenoir Cycle - Description and representation on P-V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis - comparison of Cycles. Application of Brayton cycles in aviation.

Refrigeration Cycles: Bell-Coleman cycle - Vapour compression cycle performance Evaluation.

Text Books:

1. Engineering Thermodynamics, Special Edition - MRCET, McGrawHill Publishers-2017
2. Engineering Thermodynamics / PK Nag / TMH, 5th Edition
3. Engineering Thermodynamics / E Rathakrishnan / PHI / Second Edition / 2013

Reference Books:

1. Engineering Thermodynamics / DP Mishra / Cengage Learning / Second impression 2012
2. Thermodynamics - An Engineering Approach - Yunus Cengel & Boles / TMH
3. Thermodynamics - J.P. Holman / McGrawHill
4. Engineering thermodynamics - Jones & Dugan
5. Engineering Thermodynamics / P. Chattopadhyay / Oxford higher Education / Revised First Edition
6. Thermodynamics & Heat Engines - Yadav - Central Book Dept. Allahabad

Outcomes:

- Basic concepts can be applied by the students
- Students can correlate cycles applicable for engines.
- Students should be able to analyze the relationship between various processes and working mechanisms of the engines.

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R17A2101 - INTRODUCTION TO AEROSPACE ENGINEERING

Objective:

1. Insight overview of various important areas in Aeronautical Engineering
2. Students will acquire the knowledge of the Evolution of Aerospace industry.
3. To provide an exposure of various forces and performance aspects important for flight.

UNIT - I

History of Flight - The Aerospace Environment

Evolution of flight, usage of balloons, dirigibles, Heavier than air aircraft, various advances in techniques for commercial transportation. Helicopters, missiles, Conquest of space and exploring solar system and beyond, Earth's atmosphere, standard atmosphere, the temperature extremes of space, laws of gravitation low earth orbit, microgravity, benefits of micro gravity. The near earth Radiative environment, magnetosphere, Environmental impact on spacecraft. Meteoroids, micrometeoroids, space debris and the planetary environments.

UNIT - II

Aerodynamics and Performance

Airfoil- nomenclature and types, Aerodynamic forces on a wings and bodies, Generation of lift, Sources of drag, Force and moment coefficients, centre of pressure. Rotary wing aircraft concepts – Forces while hovering, Propeller Theory.

Performance requirements of a civil and military aircrafts. Control surfaces,

UNIT - III

Propulsion- Aircrafts, Rockets and Missiles: Thrust for flight, Reciprocating engines-2 stroke/4 stroke; Jet engine and types, Rocket engines - Description, Principles of operation. Types of orbits and maneuvers, Types of Missiles, simililarities and differences with launch vehicle, controls for missiles, Airframe components of missiles

Evolution of Space Missions: Space missions, Mission objectives, Case studies, Human space flight missions - goals, historical background, The Soviet and US missions, The Mercury, Gemini, Apollo (manned flight to the moon), Skylab, Apollo-Soyuz, Space Shuttle, International Space Station, extravehicular activity, Life support systems. History and evolution of ISRO, Missions carried in ISRO.

UNIT – IV

Structures: History of airplane construction, Loads on aircraft, Lift production/augmentation devices, Low speed/ high speed airfoils, Monocoque and semi-monocoque structures, Load bearing structural components, use of composites in aircraft and aerospace vehicles.

UNIT - V

Experimental Aerodynamics: Requirement and importance of Wind tunnel, Shock Tubes, Shock Tunnel – types and principle of operation,

Measurement Techniques: Sensors and instrumentation- Pitot static tube, Cockpit layout of modern civil aircraft, Basic principles of Gyro, accelerometers.

TEXT BOOKS:

1. Anderson, J.D., Introduction to Flight, fifth edition, Tata McGraw-Hill, 2007, ISBN: 0-07-006082-4.
2. Kermode, Flight Without Formulae, fifth edition, Pearson Education, 2004, *ISBN*-10: 0273403605; *ISBN*-13: 978-0273403609

REFERENCES:

1. Bamard, R. H. and Philpot, D.R., Aircraft Flight, third edition, Pearson, 2004, ISBN: 81-297-0783-7.

Outcome:

1. Students acquire knowledge with Aerospace Engineering to take up study in detail through subsequent courses.
2. Students acquire fundamental concepts of all aspects of flight.
3. Students acquire the knowledge of the important design aspects of aerospace vehicles.

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R17A2103 - AIRCRAFT MATERIALS AND PRODUCTION TECHNOLOGY

OBJECTIVES :

On completion of the course, the student will have knowledge about the selection of aircraft materials and process involved during production.

UNIT-I INTRODUCTION:

Classification of aircraft materials, properties of flight vehicle materials and their significant, factors affecting the selection of material for different parts of airplanes, Process associated to conventional materials.

UNIT-II METALS AND ALLOYS:

Aluminum and its alloys, high strength and high corrosion alloys. Titanium and its alloys: applications, machining, forming,welding and heat treatment; Classification of steels alloys, effect of alloying elements, magnesium alloys and their properties, heat treatment processes, maraging steels: properties and applications.

UNIT-III HIGH STRENGTH AND HEAT RESISTANT ALLOYS:

Classification of heat resistant materials, iron, nickel and cobalt based alloys, refractory materials, ceramics, properties of inconel, monal, nimonic and super alloys; application of heat resistant alloy in aircrafts. Heat treatment of steel and its alloys. Case hardening, initial stresses and stress alleviation procedures, corrosion prevention and protective treatments.

UNIT-IV COMPOSITE MATERIALS:

Classification, characteristics of composite materials, volume fraction, laminated composites, particulate composites and fibrous composites. Types of reinforcements, their shape and size, production and properties of fiber reinforced plastics. Application of Composite materials.

UNIT-V AIRCRAFT MANUFACTURING PROCESSES:

Profiling, hydro forming, spar milling, spark erosion and powered metal parts, integral machining, contour etching, high energy rate forming and manufacturing of honeycomb structures and general methods of construction of aircraft engine parts.

Text Books:

1. G. F. Titterton, Aircraft Materials and Processes, 5/e, Sterling Book House,1998.
2. F. C. Campbell, Manufacturing Technology for Aerospace Structural Materials,1/e, Elsevier Publications, 2006.
3. Agarwal, B.D., and Broutman, L.J., "Analysis and Performance of Fibre Composites," John Wiley and sons. Inc., New York, 1995.
4. L. Gupta, Advanced Composite Materials, 2/e, Himalayan Books, 2006.

Reference Books:

1. R. H. Avner, Introduction to Physical Metallurgy, 2/e, Tata McGraw Hill,
2. W. D. Callister, D. G. Rethwisch, An Introduction on Material Science and Engineering, John Wiley, 2010.
2. Autar K Kaw, 'Mechanics of Composite Materials', CRC Press, 1997.
2. Lubin, G., "Handbook on Advanced Plastics and Fibre Glass", Von Nostrand Reinhold Co., New York, 1989.
4. Allen Baker, "Composite Materials for Aircraft Structures", AIAA Series, II Edition, 1999.

Outcomes:

- The Students can able to understand factors involved with the selection of aircraft materials and their production techniques.
- The student can correlate the various methods of manufacturing employed for different materials.

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R17A0206 - ELECTRICAL AND ELECTRONICS ENGINEERING

Objectives:

- This course introduces the concepts of electrical DC and AC circuits, basic law's of electricity, instruments to measure the electrical quantities
- Different methods to solve the electrical networks, construction operational features of energy conversion devices i.e. DC and AC machines, transformers.
- It also emphasis on basics of electronics, semiconductor devices and their characteristics and operational features.

UNIT-I:

Electrical Circuits: Basic definitions, Types of elements, Ohm's Law, Resistive networks, Kirchhoff's Laws, Inductive networks, Capacitive networks, Series, Parallel circuits and Star-delta and delta-star transformations.

Instruments: Basic Principle of indicating instruments, Permanent magnet moving coil and moving iron instruments.

UNIT-II:

DC Machines: Principle of operation and operation of DC Generator, EMF equation, Types, Losses and efficiency, Magnetization and load characteristics of DC generators. DC Motors-Types, Characteristics, Losses and efficiency, Swinburne's Test, 3-Pont starter, Speed control of DC shunt motor-Flux and armature voltage control methods.

UNIT-III:

Transformers: Principle of operation of single phase transformers, EMF equation, Equivalent circuit, Losses, OC and SC tests, Efficiency and regulation.

AC Machines: Principle of operation of alternators, Regulation by synchronous impedance method .Principle of operation of induction motor, slip – torque characteristics, Applications.

UNIT–IV:

Diodes: P-n junction diode, symbol, V-I Characteristics, Diode applications, and Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems).

Transistors: PNP and NPN Junction transistor, Transistor as an amplifier, SCR characteristics and applications.

UNIT-V: Cathode Ray Oscilloscope: Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, Electrostatic and magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

EEE: Text Books

1. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudiptanath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
3. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.

EEE: Reference Books:

1. Basic Electrical Engineering, S.N. Singh, PHI.
2. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI.
4. Basic Electrical Engineering by D.P.Kothari, I.J. Nagrath, McGraw-Hill.

ECE: Text Books

1. Electronic Devices and Circuits, S.Salivahanan, N.Suresh Kumar, A.Vallavaraj,Tata McGraw- Hill companies.
2. Electronic Devices and Circuits, K. Lal Kishore, BS Publications.

ECE: Reference Books:

1. Millman's Electronic Devices and Circuits,J. Millman, C.C.Halkias, and Satyabrata Jit, Tata McGraw-Hill companies.
2. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky,PEI/PHI.
3. Introduction to Electronic Devices and Circuits, Rober T. Paynter,PE.
4. Integrated Electronics, J. Millman and Christos C. Halkias, Tata McGraw-Hill companies.
5. Electronic Devices and Circuits, Anil K. Maini, Varsha Agarwal,Wiley India Pvt. Ltd.

Outcomes:

After going through this course the student gets a thorough knowledge on basic electrical circuits, parameters, electromechanical energy conversion, construction and operational characteristics of DC and AC machines, the constructional features and operation of measuring instruments like voltmeter, ammeter, wattmeter etc., different semiconductor devices, operation of diodes and transistors, their voltage-current characteristics, realization of various electronic circuits with the various semiconductor devices ,and cathode ray oscilloscope, With which he/she can able to apply the above conceptual things to real-world electrical, electronics problems and applications.

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R17A0384 - MECHANICS OF SOLIDS AND MECHANICS OF FLUIDS LAB

Objectives:

- To supplement the theoretical knowledge gained in Mechanics of Solids with practical testing for determining the strength of materials under externally applied loads.
- This would enable the student to have a clear understanding of the design for strength and stiffness**.**
- Upon Completion of this subject, the students can able to have hands on experience in flow measurements using different devices

(A) MECHANICS OF SOLIDS LAB:

1. Direct tension test
2. Torsion test
3. Hardness test

a) Brinells hardness test

b) Rockwell hardness test

4. Test on springs
5. Compression test on cube
6. Impact test
7. Punch shear test

(B) MECHANICS OF FLUIDS LAB

8. Calibration of Venturimeter
9. Calibration of orifice meter
10. Calibration of Triangular notch
11. Verification of Bernoulli's apparatus.
12. Pipe friction.
13. Determination of co-efficient of loss of head in a sudden retraction (Mouth Piece Apparatus)

Note: Any 10 experiments can be conducted minimum five from each section.

Equipment needed

MOS – lab

1. UTM – 20 / 40 Tons with load Vs Elongation graphical attachment and provision for Bending and sheering along with accessories and end grips
2. Deflection test rig (Fabricated hardware + precession dial gauge)
3. Torsion testing Machine
4. Hardness testing Machine (Brinnel and Rockwell)
5. Impact Testing Machine
6. Spring testing Machine.

MOF – lab

1 Venturimeter test rig

2.Test rig for Flow over notch

3.Pipe friction apparatus

4.Bernoulli's apparatus

5.test rig for Orifice meter

6. Mouthpiece apparatus.

Outcomes:

- Ability to characteristic materials
- Ability to use the measurement equipments for flow measurement

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R17A0282 - ELECTRICAL AND ELECTRONICS ENGINEERING LAB

SECTION-A: ELECTRICAL ENGINEERING

1. Magnetization characteristics of D.C. shunt generator.
2. Speed control of DC shunt motor.
3. Swinburne's test on DC shunt machine.
4. Brake test on DC shunt motor.
5. OC and SC tests on Single-phase transformer.
6. Brake test on 3-phase induction motor.
7. Regulation of an alternator by synchronous impedance method.

SECTION-B: ELECTRONICS ENGINEERING

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

Note: Any 10 experiments can be conducted.

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	L	T/P/D	C
II Year B. Tech, ANE-I Sem	**3**	**-/-/-**	**-**

R17A0006 - GENDER SENSITIZATION

(An Activity – based Course)

Objectives of the Course:

- 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.

Learning 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 labor 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.

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 and 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
GNNDER AND LABOUR:
Housework: the Invisible Labor(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 – "! Fought for my Life ……" – Further Reading. The Caste Face of Violence.

Unit – V
GENDERS 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 Telangana History.

Essential Reading: All the Units in the Text books, "Towards a World of Equals: A Bilingual Textbook on Gender" Written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.
Note: Since it is Innterdisciplinary Course, reasource Persons can be drawn from the fields of English Literature of Sociology or Political Science or any other qualified faculty who has expertise in this field.

Reference Books:

1. Sen, Amartya. "More than Once 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 India 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-works/>
3. K. Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada http://harpercollints.co.in/BookDetail.asp?Book Code=3732
4. Vimala "Vantilu (The Kitchen)". Omen Writing in India: 600BC to the Present, Volume II The 20th Century. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 599-601.
5. Shatrughna, Veena et al. Women`s Work and its Impact on Child Health and Nutrition, Hyderabad, National Institute of Nutrition, India Council of Medcial Research 1993.

6. Stress Shakti Sanghatana. “We Were Making History….’Life Stories of Women in the Telangana People`s Struggle. New Delhi:Kali of 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 20th Century Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 596-597.
9. Javeed, Shayam and Anupam Manuhaar. “Women and Wage Discrimination in India: A Critical Analysis”. International Journal of Humanilities and Social Science Invention 2, 4(2013).
10. Gautam, Liela and Gita Ramaswamy. “A ‘Conversation’ between a Daughter and Mother”. Broadsheel on Contemporany Politics. Special Issue on Sexuality and Harassment: Gender Politics on Campus Today. Ed.Madhumeeta Sinha and Asma Rasheed. Hydrabad: Anveshi research Center for Women`s Studies, 2014.
11. Abdulali Sohaila. “ I Fought For My Life…and Won.” Abailable 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 Block 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 Oxford: Black Swan. 1992.
16. T. Banuri and M. Mahmood, Just Development: Beyond Adjustment with a Human Face, Karachi: Oxford University Press, 1997.

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II Year B. Tech, ANE-II Sem

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R17A2104 - AERODYNAMICS

Objectives:

- To introduce the concepts of mass, momentum and energy conservation relating to aerodynamics.
- To make the student understand the concept of vorticity, irrotationality, theory of airfoils and wing sections.
- To introduce the basics of viscous flow.

UNIT - I

Basics of Aerodynamics:Review of Fluid Mechanics, Developments in aerodynamics, Fundamental aerodynamics variables, Nomenclature of Airfoil - Aerodynamic forces and moments and coefficients, Pressure distribution on an airfoil, Types of drag, Estimation of lift, Drag and pitching moment coefficient from the pressure distribution. Governing equations - Continuity, momentum and Energy equations in differential form.

UNIT - II

Inviscid Incompressible Flows: Angular Velocity, Vorticity and circulation, Kelvin Theorem and irrotational flow velocity potential, Stream function, Laplace equation, boundary condition at infinity and wall, Elementary flows and their combinations, Magnus effect, D'Alembert's Paradox, Kutta - Joukowsky theorem, kutta condition. Kelvin's circulation theorem & starting vortex, concept of small perturbation & thin airfoil theory - linearization of the boundary condition, resolution of thin airfoil problem into lifting & nonlifting cases, their solutions by method of singularity distribution, the aerodynamic center.

UNIT - III

Viscous Flow and Boundary Layer: Role of viscosity in fluid flow. Boundary layer growth along a flat plate and nearly flat surface, displacement thickness and patching of inviscid external flow to viscous boundary layer flow, laminar boundary layer, transition and turbulent boundary layer, factors influencing boundary layer separation - adverse pressure gradient and sharp bending / turning of surface. Real (viscous) flow and importance of skin friction drag airfoils. Blasius solution for the flat plate problem. Definition of momentum thickness & derivation of Von karman's momentum equation.

UNIT - IV

Inviscid Flow over Wings & Panel Methods: Vortex filament statement of Helmholtz's vortex theorems, Biot - Savart Law, starting, bound & trailing vortices of wings, Prandtl's Lifting line theorem - downwash and induced drag, Elliptic loading & wings of elliptic platforms, expression for induced drag, minimum induced drag for Elliptic platform. Source and vortex panel methods for airfoils.

UNIT - V

Applied Aerodynamics: Drag reduction & lift augmentation - Sweep, winglets, Flaps, slats and vortex generators. Airfoil design for high $C_{l\ max}$, Multiple lifting surfaces, Circulation control, Streamwise vorticity, Secondary flows, Vortex lift strakes.

Text books:

1. Aerodynamics for Engineers, fourth edition, Bertin, J.J., Pearson Education, 2012, ISBN: 81-297-0486-2.
2. Fundamentals of Aerodynamics, Anderson, Jr., J.D., International edition, McGraw Hill, 2001, ISBN: 0-07-118146-6.
3. Kuethe, A.M., and Chow, C., Foundations of Aerodynamics, 5th Edn, Wiley, 1998, ISBN: 0-471-12919-4.
4. Karamcheti, Krishnamurthy, Idea fluid Aerodynamics.

Reference Books:

1. Kuchemann, D., The Aerodynamic Design of Aircraft, Pergamon, 1978.
2. Shevell, R.S., Fundamentals of Flight, Indian reprint, Pearson Education, 2004, ISBN: 81-297-0514-1.
3. McCormick, B.W., Aerodynamics, Aeronautics & Flight Mechanics second edition John Wiley, 1995, ISBN: 0-471-575062.

Outcomes:

- An ability to apply thin airfoil theory to predict aerodynamic characteristics of air foil
- Application of Elementary flows to develop real problems.
- Development of devices to enhance aerodynamic characteristics of aircraft components.

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

R17A2105 - AEROSPACE VEHICLE STRUCTURES - I

Objectives:

- To impart basic understanding aircraft structure
- To provide the students an understanding on the linear static analysis of determinate and
  indeterminate aircraft structural components.
- To provide the design process using different failure theories.

UNIT – I

INTRODUCTION TO AIRCRAFT STRUCTURE:

Structural components of Aircraft, Monocoque, semi-monocoque and geodesic construction, typical wing and fuselage structure.

STATICALLY DETERMINATE & INDETERMINATE STRUCTURES

Plane truss analysis – method of joints – method of sections – method of shear – 3-D trusses –principle of super position, clapeyron's 3 moment equation and moment distribution method for indeterminate beams.

UNIT II ENERGY METHODS

Strain Energy in axial, bending, torsion and shear loadings. Castigliano's theorems and theirapplications. Energy theorems – dummy load & unit load methods – energy methods applied tostatically determinate and indeterminate beams, frames, rings & trusses.

UNIT III BEAMS AND COLUMNS

Deflection of beams-Euler's column curve – inelastic buckling – effect of initial curvature – the Southwell plot – columns with eccentricity – use of energy methods – theory of beam columns – beam columns with different end conditions – stresses in beam columns.

UNIT IV FAILURE THEORIES

Ductile and brittle materials – maximum principal stress theory - maximum principal strain theory -maximum shear stress theory - distortion energy theory – octahedral shear stress theory.

UNIT V INDUCED STRESSES

Thermal stresses – impact loading – Fatigue – Creep - Stress Relaxation

Text Books:

1. Megson THG, "Aircraft Structure for Engineering students", Edward Arnold Publication.
2. Timoshenko and Gere, "Mechanics of Materials", Tata McGraw Hill, 1993

Reference Books:

1. David J. Peery "Aircraft Structures" McGraw Hill Book Company.
2. Argyris J.H. and Kelsey S.Energy theorems and structural analysis, Butterworths Scientific Publications 1960.
3. Donaldson, B.K. "Analysis of Aircraft Structures - AnIntroduction" McGraw Hill.
4. David H. Allen, and Walter E. Haiseler "Introduction to Aeronautical Structure Analysis", Jhon Wiley & Son, 1985.

Outcomes:

- The student will be able to analyze basic aircraft structure.
- Analyzing determinant and indeterminant structures.
- Application of Energy principles

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R17A2106 - AIR BREATHING PROPULSION

Objective:

- Students can focus on various propulsion systems available in aerospace industry and also understand the future scenario.
- Understand the performance aspects at the design point and off design operations.
- To provide an exposure with reference to numerical calculations and design limitations.

UNIT I

FUNDAMENTALS OF PROPULSION

Types of aerospace propulsion, working principles, advantages, disadvantages, applications – reciprocating engines, propellers, jet engine, turboprop, turbofan, turbo-shaft, ramjet, scramjet, pulsejet. Engine components- performance requirements, thermodynamic processes- change of state- representation by T-sand p-v diagrams - pressure ratios, temperature ratios. Energy transfer, losses- entropy generation- mechanisms. Performance- polytropic, stage and component efficiencies, burning efficiency

Station numbering in engine, thrust generation, momentum equations, equation of thrust for installed and uninstalled cases, factors affecting thrust, Role of propulsion in aircraft performance.

UNIT II ANATOMY OF JET ENGINE-I

INLETS: Locations, Types of inlets, operating principle, functions, geometry, operating conditions, flow field, capture area, sizing, flow distortion, drag, and diffuser losses and methods of mitigation, performance.
NOZZLE: Exhaust nozzles- primary nozzle, fan nozzle- governing equations of flow- choking, engine back pressure control, nozzle-area ratio, thrust reversal, vectoring mechanisms. Afterburner functions and its components, design requirements and parameters. Performance gross thrust coefficient, discharge, coefficient, velocity coefficient, angularity coefficient, performance maps, Numericals on nozzles.

UNIT III ANATOMY OF JET ENGINE-II

COMPRESSOR & TURBINE: types, construction, stage, cascade, blade geometry, velocity triangles, Euler equation, types of flow analysis, diffusion factor, stage loading, Variable stator, limits on compressor performance, typical blade profiles, Numericals on turbo machinery, Axial flow turbines-, similarities and differences with compressors, Velocity diagram analysis, no exit swirl condition, flow losses, causes tangential stresses, repeating stages, Computation of stage parameters for ideal and real turbine of given cascade, blade geometry and initial flow conditions and turbine speed- procedure. Typical turbine blade profiles, turbine performance maps, Thermal limits of blades, cooling, materials, construction, methods of production, Limits on stage pressure ratio of turbines- multistage, multi-spooled turbines. design parameters.

UNIT IV ANATOMY OF JET ENGINE-III

BURNER: Burners- types, components- function, schematic diagram, airflow distribution, cooling- types, cooling effectiveness, performance parameters, combustion efficiency, overall total pressure loss, exit temperature profile, ignition relight envelope- effect of combustor design, Fuel injection, atomisation, vaporisation, recirculation- flame stabilisation, flame holders. Afterburners, function, components, bypass duct, total pressure losses, Mixing process- pressure losses, fuels- composition, specifications of commonly used fuels.

UNIT V:

DESIGN OF GAS TURBINE ENGINE

Aircraft Mission Analysis, Engine Selection- Performance and Parametric Analysis, Sizing the Engine, Major Considerations in Engine Component Design - Rotating Turbo-machinery, Combustion Systems, Inlets and Exhaust Nozzles

SYSTEM MATCHING AND ANALYSIS

Matching of Gas Turbine Components, Cycle Analysis of one and two spool engines, Gas Generator, Component Modeling, Solution of Matching Problem, Dynamic or Transient behavior, Matching of Engine and Aircraft, Use of Matching and Cycle analysis in Second stage design

Text Books:

1. Mattingly, J.D., Elements of Gas Turbine Propulsion, McGraw-Hill, 1996, ISBN0-07-912196-9.
2. Flack, R.D., Fundamentals of Jet Propulsion with applications, Cambridge University Press, 2005, ISBN0-521-81983-0.

References:

1. Cohen, Henry, Rogers, G. F. C., Saravanamuttoo, H.H., Gas Turbine Theory, Longman Pub Group, ISBN 10: 0582236320 ISBN 13: 9780582236325.
2. V. Ganesan, Gas Turbines, Tata McGraw-Hill, 1999, ISBN, 0070681929.

Outcomes:

- Students attain knowledge of all propulsion systems in use and under developed.
- Students will be able to configure the engine required for specific need.
- Students understand design requirements of engine and aircraft.

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R17A2107 - AIRCRAFT PERFORMANCE

Objectives:

- To equip the students with fundamental understanding of aircraft performance in various flight regimes.
- To familiarize the concepts and parameters affecting flight performance.
- To understand the performance of rockets and missiles.

UNIT – I

Introduction to Aircraft Performance- the Force Systems of The Aircraft: The role and design mission of an aircraft. Specification of the performance requirements and mission profile. Importance of performance analysis, estimation, measurement, operational safety and economy. The Standard Atmosphere. Off-standard and design atmosphere. Measurement of air data. Air data computers. Equations of motion for performance - the aircraft force system. Lift, drag, side force. Total airplane drag- estimation, drag reduction methods. The propulsive forces - the thrust production engines, power producing engines, variation of thrust, propulsive power and specific fuel consumption with altitude and flight speed.

UNIT - II

Cruise Performance: Maximum and minimum speeds in level flight. Range and endurance with thrust production, and power producing engines. Cruise techniques - constant angle of attack, constant Match number; constant altitude, methods- comparision of performance. The effect of alternative fuel flow laws, weight, altitude and temperature on cruise performance. Cruise performance with mixed power-plants.

UNIT - III

Climb, Descent and Manoeuvre Performance: Climb and descent techniques, safety considerations, performance analysis- maximum climb gradient, climb rate. Energy height and specific excess power, optimal climbs - minimum time, minimum fuel climbs. Measurement of climb performance. Descent performance in aircraft operations. Effect of wind on climb and descent perfomance. Accelerated motion of aircraft - equations of motion- the manoeuvre envelope. Longitudinal manoeuvres- the pull-up, push over manoeuvres. Lateral manoeuvres- turn performance- turn rates, turn radius-limiting factors. Manouvre boundaries, Manoeuvre performance of military aircraft, transport aircraft.

UNIT - IV

Take-off And Landing- Safety Requirements - Flight Planning: Estimation of take-off distances. The effect on the take-off distance wrt weight, wind, runway conditions, ground effect. Take off safety factors ,The estimation of landing distances, the discontinued landing ,baulked landing air safety procedures and requirements on performance The effect on the landing distance, of weight, wind, runway conditions, ground effect. Fuel planning, fuel requirement, trip fuel, reserve and tankering.

UNIT - V

Performance of Rockets And Missiles: Principal design features of rockets and missiles. Types, Applications, Staging, Launch and Climb. Performance in boost glide, boost sustain, long range cruise and long -range ballistic trajectories.

Text Books:

1. Eshelby, M.E., Aircraft Performance; Theory and Practice, AIAA Education Series, AIAA, 2000, ISBN: 1-56347-398-4.
2. Brandt, S.A, et. al., Introduction to Aeronautics: A Design Perspective, Second Edition, AIAA Education Series, AIAA, 2004, ISBN: 1-56347-701-7.
3. Missile Configuration Design, Chin SS, Mc Graw Hill, New York, 1961.

Reference Books:

1. Dole, C.E., Flight Theory and Aerodynamics: a Practical Guide for Operational Safety, Wiley Interscience, 1981, ISBN: 0-471-09152-9.
2. Anderson, J.D. Jr., Aircraft Performance and Design, International edition, McGraw Hill, 1999, ISBN: 0-07-001971-1.
3. McCormick, B.W, Aerodynamics, Aeronautics and Flight Mechanics, second edition, John Wiley, 1995, ISBN: 0-471-57506-2.
4. Shevel, R.S., Fundamentals of Flight, second edition, Pearson Education, 1989, ISBN: 81-297-0514-1.
5. Raymer, D.P., Aircraft Design: A Conceptual Approach, third edition, AIAA Education Series, AIAA, 1999, ISBN: 1-56347-281-0.
6. Yechout, T.R. et al., Introduction to Aircraft Flight Mechanics, AIAA Eduction Series , AIAA, 2003, ISBN: 1-56347-577-4.

Outcomes:

- To make preliminary performance estimation.
- To assess various aircraft parameters and their effect of performance.
- The student will have a clear understanding of the fundamental concept leading to aircraft performance.

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II Year B. Tech, ANE-II Sem

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4	1/-/-	3

R17A0061 - MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

OBJECTIVES:

- To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations that are needed for sound economic decision making.
- The main purpose is to provide inputs on an overall analysis of an individual firm namely: demand and supply, production function, cost analysis, markets etc.
- To understand and analyse the financial formats of the organisation for smooth running of the business.

Unit-I

Introduction to Managerial Economics: Definition, Nature and scope of Managerial economics, Micro and Macroeconomic concepts.

Demand Analysis: Demand Determinants, Law of Demand and exceptions. Elasticity Of Demand: Definition, Types, Measurement and Significance of elasticity of Demand. Demand Forecasting, Factors governing demand Forecasting, methods of demand Forecasting.

Unit-II

Production & Cost Analysis: Production Function- Isocost and Isoquants MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit-III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Objectives and Policies of Pricing- Methods of Pricing.

Business: Features of different forms of Business Organisation, Changing Business Environment in Post-liberalization scenario.

Unit-IV

Introduction to Capital and Financial Accounting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance – Trading forecast, Capital Budget, Cash Budget.

Accounting Definition, Concepts and Conventions (GAAP); Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

Unit-V

Investment Decision: Features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems). Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios.

TEXTBOOKS:

- Varsheney & Maheswari, Managerial Economics, Sultan Chand, 2009.
- S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age International Publishers, Hyderabad 2013
- M. Kasi Reddy & Sarawathi, Managerial Economics and Financial Analysis, PHI, New Delhi, 2010.

REFERENCES:

- S.N.Maheswari & S. K. Maheswari, Financial Accounting, Vikas, 2012.
- D.N. Dwivedi, Managerial Economics, Vikas, 2012.
- Justin Paul, Leena, Sebastian, Managerial Economics, Cengage, 2012
- A,R.Aryasri: Managerial Economics and Financial Analysis, McGraw-Hill, 2011.

OUTCOMES:

Students should be able to understand the basic economic principles, forecast demand and supply and should be able to estimate cost and understand market structure, pricing practices and able to interpret the financial results of the organisation.

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-	-/3/-	2

II Year B. Tech, ANE-II Sem

R17A2181 - AIRCRAFT MATERIALS AND PRODUCTION TECHNOLOGY LAB

Objectives:

Basic Exercises in Lathe, Shaper, Milling, Slotting, CNC and Grinding machines welding equipment comprising Microscopes polishing disc grinders as under.

PRODUCTION LAB

1. Plain Turning, Facing, Knurling, Taper turning, Thread Cutting.
2. Drilling, boring, counter boring, counter sinking.
3. Simple exercises on shaping
4. Simple exercises in Planing
5. Plain Milling
6. Gear Milling
7. Sheet metal joining by Soldering.
8. Simple exercises on CNC machines and Programme generation.
9. Simple exercises in Gas.
10. Simple exercises in Arc Welding.
11. Aircraft wood gluing practice
12. Study of properties of sandwich structures

Note: Any 10 experiments can be conducted.

Equipment needed: Lathe, Shaper, Milling, Slotting, EDM, CNC and Grinding machines welding equipment and metallurgy equipment comprising Microscopes polishing disc grinders.

Reference Books:

1. "Aircraft production techniques" Keshu S.C, Ganapathy K.K., Interline Publishing House, Banglore- 1993.
2. "Manfacturing Engineering and Technology" by Kalpakajam - Addison Wesley.

Outcomes:

- Student will have hands on experience on various production techniques.

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-	-/3/-	2

II Year B. Tech, ANE-II Sem

R17A2182 - AED with CAD LAB

Objectives:

- To develop skill to use software to create 2D and 3D models.

PART - A

Machine Drawing Conventions: Need for drawing conventions – introduction to IS conventions - Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, airfoil.

Drawing of Machine Elements I: Selection of Views, additional views for the following machine elements and parts with every drawing proportion:

a) Popular forms of Screw threads, bolts, nuts, set screws.

b) Keys, cotter joints and knuckle joint.

c) Riveted joints for plates

d) Welded joints and welding symbols.

Introduction to simple Air Craft components.

a) Different types of trusses used in wings fuselage including ribs, stringers, skin, brackets

b) Different elements of fuselage structures, bulk head, and rings (frame) longerons

c) Landing gear basic elements, structural brackets, wheel, shock absorber and Hydraulic cylinder

PART – B

LIST OF AUTO CAD EXPERIMENT:

1. INTRODUCTION to CAD
2. AutoCAD – BASICS
   - 2.1 Starting with AutoCAD
   - 2.2 Layout and sketching
   - 2.3 Drawing environment
   - 2.4 Elements of drawing
   - 2.4.1 Draw commands
   - 2.5 3D functions
3. 2D – FIGURES for practice USING AutoCAD
4. ISOMETRIC DRAWING for practice USING AutoCAD
5. 3-D SOLID FIGURES USING ACAD
6. INTRODUCTION TO CREO 3.0
   - 6.1 Learning Different Operations like Threading, Sweep, Sweptblend.
   - 6.2 Modeling
   - 6.3 Assembling

Equipment needed: Computers and **Software:** Autocad 2013 and CREO – 3.0

Text Books:

1. Machine Drawing by K. L. Narayana, P. Kannaiah, K. Venkata Reddy New Age International
2. Raymer, D.P., Aircraft Design: A Conceptual Approach, third edition, AIAA Education Series, AIAA, 1999, ISBN: 1-56347-281-0.
3. Engineering graphics with Auto CAD- R.B.Choudary/Anuradha Publishes

Outcomes:

- Ability to use the software packers for drafting and modeling
- Ability to create 2D and 3D models of Engineering Components

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R17A0004 - FOREIGN LANGUAGE: FRENCH
(Mandatory Course)

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)**

Parlerde sa famille – décrire quelqu'un – exprimer ses gouts 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 volonte / 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.Ã L'Aventure: An Introduction to French Language and Francophone Cultures By 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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II Year B. Tech, ANE-I Sem

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2	-/-/-	-

R17A0005 - FOREIGN LANGUAGES: GERMAN

(Mandatory Course)

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

Lernziel Deutsch

Reference books:

1) Themen
2) Tangram
3) Sprachkurs Deutsch
4) 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.

OPEN ELECTIVE - I

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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 suing 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”, 4th 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”, 6th 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”, 6th Edition, Thomson Learning, 2013
4. Thomas L Floyd, “Digital Fundamentals”, 10th Edition, Pearson Education Inc, 2011.
5. Donald D Givone, “Digital Principles and Design”, TMH, 2003.

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II Year B.Tech ANE-II Sem

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3	-/-/-	3

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. Bimbra, 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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II Year B.Tech ANE-II Sem

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3	-/-/-	3

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: Lame'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 titled 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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3	-/-/-	3

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 – 2nd 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.