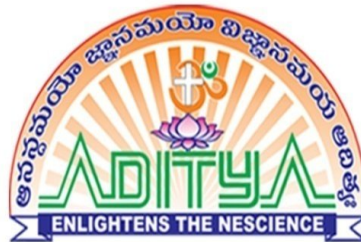


ACADEMIC REGULATIONS, PROGRAMME STRUCTURE AND SYLLABUS

AGRICULTURAL
ENGINEERING

For

B. Tech FOUR YEAR DEGREE PROGRAMME
(Applicable for the batches admitted from 2017-18)



ADITYA ENGINEERING COLLEGE

An Autonomous Institution

Approved by AICTE, Affiliated to JNTUK & Accredited by NBA, NAAC with 'A' Grade
Recognized by UGC under the sections 2(f) and 12(B) of UGC act 1956
Aditya Nagar, ADB Road, SURAMPALEM - 533 437

ABOUT ADITYA ENGINEERING COLLEGE

ADITYA ENGINEERING COLLEGE (AEC) was established in 2001 at Surampalem, Kakinada, Andhra Pradesh in 125 Acres of pollution free and lush green landscaped surroundings by the visionaries of Aditya Academy who are in the glorious service field of education since last 33 years.

AEC believe in the holistic development of society at large and are researching its efforts in multi-disciplinary activities. We shoulder the responsibility of shaping the Intellect, Character and Physique of every student, because we believe that these students would be the architects to develop a humanized and harmonious society, and the nation as a whole.

Our vision is to impart education, in a conducive ambience, as comprehensive as possible, with the support of all the modern technologies and produce graduates and post graduates in engineering with the ability and passion to work wisely, creatively, and effectively for the betterment of our society. It is our endeavor to develop a system of Education which can harness students' capabilities and the muscles of the mind thoroughly trained to enable it to manifest the great feats of intellectualism which it is capable of.

SALIENT FEATURES:

- An Autonomous Institution.
- Accredited by NAAC with “A” Grade in 2015 and NBA in 2008.
- Recognized by UGC under sections 2(f) & 12(B).
- Affiliated to JNTUK, Kakinada.
- Recognized by Scientific and Industrial Research Organizations (SIROs) of Department of Scientific and Industrial Research, Ministry of Science and Technology, Govt. of India.
- Rated as “GOLD” Category institute by AICTE-CII Survey of Industry – Linked Technical Institutes 2016.
- Bagged Grade “A” (top grade) by the Govt. of A.P.
- Dept. of Science and Technology under Technology Development Board has sanctioned Incubation Centre and only one College in the state received this financial Assistance.

- Best Rankings & Ratings given to Aditya by reputed Magazines & journals in their surveys :
 - Grade AAA by careers 360.
 - One of the best 20 Engineering colleges in India by The Sunday Indian.
 - South India IV rank by Digital Mailers.
 - South India VI rank by Silicon India.
 - India 13th Rank out of top 25th Engineering Colleges by 4Ps.
 - Asia's Top 100 colleges by WCRC Leaders.
 - Higher Education Review 35th Rank in India.
 - South India's 68th Rank, India's 99th Rank by the Week magazine.
 - 8th Rank in providing high quality infrastructure out of 10 engineering Colleges in India by The Week magazine and more
- The college has students from 17 states across India & 13 foreign countries.
- 150+ foreign students.
- Honored with Best Placement Award by Chief Minister of Andhra Pradesh.
- Only one college in AP received Best Performance Award from Tech Mahindra for its outstanding achievement in campus placements.
- Remarkable achievement of campus placements in CMM Level 5 Companies
- Students received Gold Medals at University level.
- Offering most job potential engineering courses of Petroleum Engineering, Mining Engineering, and Agricultural Engineering in addition to the regular courses of Mechanical, Civil, and EEE, ECE, CSE and IT at UG, PG and Diploma Levels.
- Skill Development Centre with the collaboration of Govt. of A.P. (APSSDC)
- Siemens Centre of Excellence Campus.
- PMKVY Skill Development Centre Campus.
- South India's first Microsoft Ed-vantage Platinum Campus.
- Campus of Microsoft innovation centre.
- Adobe's Centre of Excellence Campus.
- Campus of CISCO Networking Academy.
- MOU with 4 Foreign Universities.
- MOU with Educational Consultants India Ltd., (EdCil).
- On campus Nationalized Bank with 8 ATMs facility.
- On campus hostels with world class infrastructure facilities & 50+ resident staff.
- Own transportation facility to pickup and drop the students and staff covering all the villages in the District with more than 60 buses.

ACADEMIC REGULATIONS (AR17)

Applicable for the students admitted from the academic year 2017-18 onwards

1. 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 If he pursued a Programme of study in not less than four and not more than eight academic years.

1.2 The student shall register for 180 credits and secure all the 180 credits.

2. PROGRAMMES OF STUDY

The following programmes of study are offered at present as specializations for the B. Tech. programme with English as medium of Instruction.

S. No	Branch	Programme code
01	Civil Engineering	01
02	Electrical and Electronics Engineering	02
03	Mechanical Engineering	03
04	Electronics and Communication Engineering	04
05	Computer Science and Engineering	05
06	Information Technology	12
07	Mining Engineering	26
08	Petroleum Technology	27
09	Agricultural Engineering	35

3. DISTRIBUTION AND WEIGHTAGE OF MARKS

3.1 The performance of a student in each semester shall be evaluated course - wise with a maximum of 100 marks for both Theory and Practical courses. The Industry-Oriented (Internship) Minor Project shall be evaluated for 50 marks, Major Project work for 200 marks, Audit courses for 50 marks and Employability Skills course for 50 marks.

3.2 For theory courses, the distribution shall be 40 marks for Sessional evaluation and 60 marks for the End - Examinations. There shall be 2 Sessional examinations during the semester. The Sessional marks shall be awarded by giving a weightage of 80% for best of the two Sessional examinations and 20% for the other Sessional examination. The I

Sessional examination (Descriptive, Objective and Assignment) is conducted for first 2 ½ units of syllabus and II Sessional examination for the remaining 2 ½ units for each course in a semester. The weightage of Sessional marks for 40 consists of Descriptive - 24, Objective -10 (Conducted at College level with 20 Multiple choice questions with a weightage of ½ mark each) and Assignment - 06 (Theory, Design, Analysis, Simulation, Algorithms, Drawing, Quiz, Term paper, Tutorial, Surprise test, Seminar, Case study, Lab activity, Minor Project, etc. as the case may be and for Physics-Virtual lab, for Mathematics - MATLAB). For Assignment, the nature of test will be intimated by the concerned faculty member at the beginning of the semester. The descriptive examination is conducted for 90 minutes and the objective examination is for 20 minutes. Each descriptive examination question paper shall contain 3 questions of equal marks and all questions need to be answered. The Objective examination is conducted for 10 marks and descriptive examination is conducted for 24 marks are to be added to the assignment of 06 marks for finalizing Sessional marks of 40. The End examination is conducted for 60 marks in duration of 180 minutes, which contains ten questions, two questions are from each unit and each question may have sub questions. The student has to write one question from each unit, each question carries 12 marks.

- 3.3 For practical courses, there shall be continuous evaluation during the semester for 40 Sessional marks and 60 End examination marks. The Sessional 40 marks shall be awarded as, day-to-day work-15 marks, observation and Record-10 marks and laboratory Exam -15 marks. The End examination shall be conducted by the concerned teacher and external examiner appointed by the Principal.
- 3.4 For design and / or drawing, (such as Engineering Drawing, Machine Drawing) and estimation courses, the distribution shall be 40 marks for Sessional evaluation (20 marks for day - to - day work, and 20 marks for Sessional examination) and 60 marks for End examination. There shall be two Sessional examinations in a Semester. The Sessional marks shall be awarded by giving a weightage of 80% for the best of two Sessional examinations and 20% for the other Sessional examination.

- 3.5 For audit courses, during a semester there shall be one examination for 50 marks for a duration of 180 minutes in which a student should get minimum 40% of the marks for satisfactory, otherwise the student is considered as not satisfactory. The examination is conducted by covering the topics of all units, which contains five 10 marks questions with internal choice from each unit and each question may have sub questions. If a student failed to get satisfactory marks or is absent for examination, he has to write the exam in that course when conducted next.
- 3.6 For Employability Skills as audit course, during a semester there shall be one examination for 50 marks. The duration of examination is 100 minutes. The examination shall be conducted in objective type (Multiple choice questions with weightage of $\frac{1}{2}$ mark each), in which a student should get minimum 40% of the marks for satisfactory; otherwise the student is considered as not satisfactory. If a student failed to get satisfactory marks or is absent for examination, he has to write the exam in that course when conducted next.
- 3.7 For Employability Skills as credit course, the exam is conducted for 50 marks in which 20 marks are conducted for Sessional examination and 30 marks for End examination. For Sessional marks, during the semester there shall be two Sessional examinations. The duration of Sessional examination is 40 minutes and for End examination is 60 minutes. Both the Sessional and End examinations are conducted in objective type (Multiple choice questions with weightage of $\frac{1}{2}$ mark each). The Sessional marks shall be awarded by giving 80% weightage for the best of two Sessional examinations and 20% weightage for other Sessional examination.
- 3.8 For Industry-Oriented (Internship) Minor Project, the students have to do a project in collaboration with an industry of their specialization, during the vacation after VI Semester End examination. However, the minor project and its report shall be evaluated in VII Semester. The Minor Project shall be submitted in report form and should be presented before the committee, which shall be evaluated for Sessional marks of 50. The committee consists of Head of the Department, Supervisor of the minor project and a senior faculty member of the department. There shall be no

external evaluation.

- 3.9 For Major Project, 200 marks are awarded out of which 80 marks shall be for Sessional Evaluation and 120 marks for the End Examination. The Sessional Evaluation shall be on the basis of two seminars given by each student on the topic of his major project and evaluated by an internal committee that consists of Head of the Department, Supervisor of the major project and one senior faculty of the department. The End Examination (Viva-Voce) shall be conducted by the committee that consists of an External Examiner (appointed by Principal from the panel of three members given by HOD), Head of the Department and Supervisor of the major project.

4. ATTENDANCE REQUIREMENTS

- 4.1 A student shall be eligible to write the End examinations if he acquires a minimum of 75% of attendance in aggregate of all the courses.
- 4.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) on a medical grounds in a semester may be granted by the College Academic Committee and a student can be condoned for a maximum of three times only.
- 4.3 Shortage of Attendance below 65% in aggregate shall not be condoned.
- 4.4 Students whose shortage of attendance is not condoned in any semester are not eligible to write their End examinations of that semester.
- 4.5 A fee of Rs. 500/- shall be payable towards condonation for shortage of attendance.
- 4.6 A student will be promoted to the next semester if he satisfies the attendance requirement of the present semester.
- 4.7 If any student fulfills the attendance requirement in the present semester, he shall not be eligible for re-admission into the same semester.
- 4.8 A student who is shortage of attendance in a semester may seek re-admission into that semester when offered within 2 weeks from the date of the commencement of class work.

5. MINIMUM ACADEMIC REQUIREMENTS

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.4.

- 5.1 A student is deemed to have passed a course and earns the credits allotted to that course by securing not less than 35% of marks in the End examination, and minimum 40% of marks of the total marks (sum of Sessional marks and End examination marks).
- 5.2 A student will be promoted from IV semester to V semester, if he fulfills the academic requirement of 50% of the credits up to IV semester from all the examinations, whether or not the student takes the examinations.
- 5.3 A student shall be promoted from VI semester to VII semester if he fulfills the academic requirements of 50% of the credits up to VI semester from all the examinations, whether or not the students takes the examinations.
- 5.4 All the credit courses shall be considered for calculation of SGPA and CGPA.

6. PROGRAMME PATTERN

- 6.1 The entire programme of study is for four academic years and all the years are in semester pattern.
- 6.2 A student is eligible to appear for the End examination in a course, but absent from it or has failed in the End examination, may write the exam in that course when conducted next.
- 6.3 When a student is detained for lack of credits / shortage of attendance, he may be re-admitted into the same semester in which he has been detained. However, the academic regulations under which he was first admitted shall continue to be applicable to him.

7. AWARD OF DEGREE AND CLASS

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. degree, he shall be placed in one of the following four classes:

Class Awarded	CGPA to be secured	From the CGPA Secured from 180 Credits
First Class with Distinction	≥ 7.75 with no course failures	
First Class	≥ 6.75 with course failures	
Second Class	≥ 5.75 to < 6.75	
Pass Class	≥ 4.75 to < 5.75	

7.1 Cumulative Grade Point Average (CGPA)

The following procedure is to be adopted to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

Range of Marks(%)	Letter Grade	Level	Grade Point
≥ 90	O	Outstanding	10
≥ 80 to < 90	A+	Excellent	9
≥ 70 to < 80	A	Very Good	8
≥ 60 to < 70	B+	Good	7
≥ 50 to < 60	B	Fair	6
≥ 40 to < 50	P	Satisfactory	5
< 40	F	Fail	0
	-	Absent	0

1. COMPUTATION OF SGPA

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

$$SGPA (S_i) = \frac{\sum (C_i \cdot G_i)}{\sum (C_i)}$$

Where C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course.

2. COMPUTATION OF CGPA

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

$$CGPA = \frac{\sum (C_i \cdot S_i)}{\sum (C_i)}$$

Where S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester.

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

iii. Equivalent Percentage = $(\text{CGPA} - 0.75) \times 10$

8. MINIMUM INSTRUCTION DAYS

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

9. TRANSFER

9.1 Aditya Engineering College (AEC) proposes to practice JNTUK / State government guidelines for transfer.

9.2 There shall be no branch transfers after the completion of the admission process.

10. WITHHOLDING OF RESULTS

If the student not paid any dues to the college or involved in indiscipline activities, his result will be withheld.

11. TRANSITORY REGULATIONS

11.1 Discontinued or detained students are eligible for readmission as and when next offered.

11.2 The readmitted students will be governed by the regulations under which the student has been admitted.

11.3 a) In case of transferred students from other Universities / colleges, the credits shall be transferred to AEC as per the academic regulations and course structure of the AEC.

b) The students seeking transfer to AEC from various other universities/institutions have to obtain the credits of any equivalent courses as prescribed by college. In addition the transferred students have to pass the failed courses at the earlier institute.

12. GENERAL

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

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

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

- 12.4 The college may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

ACADEMIC REGULATIONS (AR17) LATERAL ENTRY

Applicable for the students admitted into III semester from the Academic Year 2018-19 onwards

1. 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 If he pursues a course of study in not less than three academic years and not more than six academic years.
- 1.2 The student shall register for 133 credits and secure all the 133 credits. All the credit courses shall be considered for calculation of SGPA and CGPA.

2. PROMOTION RULE

- 2.1 A student shall be promoted from VI semester to VII semester if he fulfills the academic requirements of 50% of the credits up to VI semester from all the examinations, whether or not the student takes the examinations.

3. AWARD OF CLASS

After a student has satisfied the requirement prescribed for the completion of the program and is eligible for the award of B. Tech. degree, he shall be placed in one of the following four classes:

Class Awarded	CGPA to be secured	From the CGPA Secured from 133 Credits
First Class with Distinction	≥ 7.75 with no course failures	
First Class	≥ 6.75 with course failures	
Second Class	≥ 5.75 to < 6.75	
Pass Class	≥ 4.75 to < 5.75	

4. **All the other regulations applicable to B. Tech Programme remain the same for B. Tech Lateral Entry also.**

MALPRACTICES RULES

Disciplinary Action for /Improper Conduct in Examinations

The Chief controller of examinations shall refer the cases of malpractices in Sessional and End Examination to an Enquiry Committee constituted by him / her. The Committee will submit a report on the malpractice allegedly committed by the student to the Chief Controller of Examinations. The Chief Controller of Examinations along with the members of the Committee is authorized to impose a suitable punishment, if the student is found guilty as per the following guidelines.

	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 course 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 course of the examination)	Expulsion from the examination hall and cancellation of the performance in that course 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 examination hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that course 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 course of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that Semester.
3	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining

		examinations of the courses of that Semester
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 the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that Semester. The candidate is also debarred for two consecutive semesters from class work and all End examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5	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 the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that Semester. The candidate is also debarred for two consecutive semesters from class work and all End examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
6	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that Semester. The candidate is also debarred and forfeits of seat.
7	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 courses of the examination (including practical and project work) already appeared and shall not be allowed to appear for examinations of the remaining courses 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 impostor is an outsider, he will be handed over to the police and a case is registered against him.
8	Refuses to obey the orders of the Chief controller of examinations / Observer / 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-in charge, 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 or 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 course and all other courses the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that semester. 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.
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 course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred and forfeits the seat.






10	Uses 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 course.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that course and all other courses the candidate has appeared including practical examinations and project work of that End examination.
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Chief controller of examinations for further action to award suitable punishment.	

Ragging

Prohibition of ragging in educational institutions Act 26 of 1997

Salient Features

- ⇒ Ragging within or outside any educational institution is prohibited.
- ⇒ Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student

	Imprisonment Upto		Fine Upto
Teasing, Embarrassing and Humiliation	 6 Months	+	Rs. 1,000/-
Assaulting or Using Criminal force or Criminal intimidation	 1 Year	+	Rs. 2,000/-
Wrongfully restraining or confining or causing hurt	 2 Years	+	Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	 5 Years	+	Rs. 10,000/-
Causing death or abetting suicide	 10 Years	+	Rs. 50,000/-

In Case of Emergency CALL TOLL FREE NO. : 1800 - 425 - 1288

LET US MAKE ADITYA A RAGGING FREE CAMPUS

Ragging

**ABSOLUTELY
NO TO RAGGING**

1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the College.
4. Outsiders are prohibited from entering the College and Hostel without permission.
5. Girl students must be in their hostel rooms by 7.00 p.m.
6. All the students must carry their Identity Cards and show them when demanded
7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.

In Case of Emergency CALL TOLL FREE NO. : 1800 - 425 - 1288

LET US MAKE ADITYA A RAGGING FREE CAMPUS

VISION & MISSION OF THE COLLEGE

VISION

To induce higher planes of learning by imparting technical education with International standards, Applied research, Creative ability and Value based instruction to emerge as a premier institute.

MISSION

Achieving academic excellence by providing globally acceptable technical education by forecasting technology through

- Innovative research & development
- Industry institute interaction
- Empowered manpower

VISION & MISSION OF THE DEPARTMENT

VISION

To make the Agricultural Engineering education known for its contribution to agriculture and allied fields in making agriculture more sustainable and profitable.

MISSION

- M1: Implementation of new technologies for the farmers on sustainable food production through precision agriculture and mechanized food processing.
- M2: Educating the students to integrate knowledge of agricultural engineering fundamentals and design of systems involved in food production, processing, storage, handling, distribution and use of food.
- M3: Developing the good atmosphere/foundation between the students and faculty to perform and lead engineering projects and make significant contributions for the benefit farming community.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**Graduates of the Program will**

PEO 1	Develop diverse capability to work with tractor industries, seed processing industries, irrigation companies and also to run self entrepreneurship like dairy farming and custom hiring centers.
PEO 2	Support higher studies in IITs, NITs, Central agricultural universities, State agricultural universities, Foreign universities, Reputed educational institutions in India and abroad.
PEO 3	Be capable of addressing issues of ethics, safety, professionalism, cultural diversity, globalization, environmental impact, and social and economic impact in Agricultural Engineering.

PROGRAM OUTCOMES (POs)**After successful completion of the program, the graduates will be able to**

PO 1	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO 2	Identify, formulate, research literature and analyze complex engineering problems, reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO 3	Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO 5	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations.
PO 6	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
PO 7	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of, and need for sustainable development.
PO 8	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PO 9	Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
PO 10	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.

PO 11	Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments.
PO 12	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.

PROGRAM SPECIFIC OUTCOMES

After successful completion of the program, the graduates will be able to

PSO 1	Utilize adequate knowledge in different disciplines of agricultural engineering to gain better employment opportunities in various industries of agricultural engineering.
PSO 2	Develop innovative solution which includes the abilities to think creatively, formulate problem statement, synthesize information, evaluate and implement solution for the field oriented problems in Agricultural Engineering.
PSO 3	Analyze basic knowledge, scientific and technological topics conducive to continues learning and the adaptability to new situations and changing environments.

Mission of the department – PEOs mapping

PEO's Statements	M1	M2	M3
PEO 1: Develop diverse capability to work with tractor industries, seed processing industries, irrigation companies and also to run self entrepreneurship like dairy farming and custom hiring centers.	3	3	2
PEO 2: Support higher studies in IITs, NITs, Central agricultural universities, State agricultural universities, Foreign universities, Reputed educational institutions in India and abroad.	3	3	3
PEO 3: Be capable of addressing issues of ethics, safety, professionalism, cultural diversity, globalization, environmental impact, and social and economic impact in Agricultural Engineering.	2	3	3

PROGRAMME STRUCTURE

I SEMESTER

Course Code	Name of the Course	Category	Periods/Week			Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	
171HS1T01	English - I	HSS	3	1	---	3
171BS1T01	Mathematics - I	BS	3	1	2	3
171HS1T02	Environmental Studies	HSS	2	1	---	2
171BS1T03	Engineering Chemistry	BS	3	1	---	3
171ES1T02	Engineering Mechanics	ES	3	1	---	3
171ES1T01	Computer Programming	ES	3	1	---	3
171HS1L01	English Communication Skills Lab - I	HSS	---	---	3	2
171BS1L01	Engineering Chemistry Lab	BS	---	---	3	2
171ES1L01	Computer Programming Lab	ES	---	---	3	2
TOTAL			17	6	11	23

II SEMESTER

Course Code	Name of the Course	Category	Periods/Week			Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	
171HS2T03	English - II	HSS	3	1	---	3
171BS2T06	Mathematics - III	BS	3	1	2	3
171BS2T02	Mathematics - II	BS	3	1	---	3
171BS2T07	Engineering Physics	BS	3	1	---	3
171ES2T03	Engineering Drawing	ES	3	1	---	3
171ES2T08	Theory of Machines	ES	3	1	---	3
171HS2L02	English Communication Skills Lab - II	HSS	---	---	3	2
171BS2L02	Engineering Physics Lab	BS	---	---	3	2
171ES2L02	Engineering Workshop & IT Workshop	ES	---	---	3	2
TOTAL			18	6	11	24

BS: Basic Sciences; HSS: Humanities and Social Sciences; ES: Engineering Sciences; PC: Professional Core; PE: Professional Elective; OE: Open Elective; SS: Self Study Course; PR: Project.

III SEMESTER

Course Code	Name of the Course	Category	Periods/Week			Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	
171AG3T01	Principles of Soil Science & Agronomy	PC	3	1	---	3
171AG3T02	Renewable Energy Sources	PC	3	1	---	3
171AG3T03	Ground Water Hydrology , Wells & Pumps	PC	3	1	---	3
171ES3T19	Properties & Strength of Materials	ES	3	1	---	3
171ES3T20	Electrical & Electronics Engineering	ES	3	1	---	3
171ES3T21	Surveying & Levelling	ES	3	1	---	3
171AG3L01	Soil Science & Agronomy Field Lab	PC	---	---	3	2
171ES3L11	Surveying & Levelling Lab	ES	---	---	3	2
171HS3A10	Employability Skills - I	HSS	---	---	2	---
171HS3A09	Professional Ethics & Human Values	HSS	2	---	---	---
TOTAL			20	6	8	22

IV SEMESTER

Course Code	Name of the Course	Category	Periods/Week			Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	
171AG4T04	Thermodynamics & Refrigeration Systems	PC	3	1	---	3
171AG4T05	Heat and Mass Transfer	PC	3	1	---	3
171ES4T25	Fluid Mechanics & Open Channel Hydraulics	ES	3	1	---	3
171AG4T06	Soil Mechanics	PC	3	1	---	3
171AG4T07	Surface Water Hydrology	PC	3	1	---	3
171AG4T08	Engineering Properties of Biological Materials & Food Quality	PC	3	1	---	3
171ES4L14	Fluid Mechanics & Open Channel Hydraulics Lab	ES	---	---	3	2
171ES4L15	Machine Drawing & Computer Graphics Lab	ES	---	---	3	2
171HS4A11	Employability Skills - II	HSS	---	---	2	---
171HS4A08	IPR & Patents	HSS	2	---	---	---
TOTAL			20	6	8	22

V SEMESTER

Course Code	Name of the Course	Category	Periods/Week			Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	
171AG5T09	Theory of Structures	PC	3	1	---	3
171AG5T10	Irrigation & Drainage Engineering	PC	3	1	---	3
171AG5T11	Agricultural Process Engineering	PC	3	1	---	3
171AG5T12	Agricultural Extension Techniques & Business Management	PC	3	1	---	3
171AG5T13	Farm Power & Tractor Systems	PC	3	1	---	3
---	Professional Elective - I	PE	3	1	---	3
171AG5L02	Agricultural Process Engineering Lab	PC	---	---	3	2
171AG5L03	Field Operation & Maintenance of Tractors Lab - I	PC	---	---	3	2
171HS5T06	Employability Skills - III	HSS	---	---	2	1
171AG5S01	MOOCs - I	SS	---	---	---	---
TOTAL			18	6	8	23

VI SEMESTER

Course Code	Name of the Course	Category	Periods/Week			Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	
171AG6T14	Soil & Water Conservation Engineering	PC	3	1	---	3
171AG6T15	Farm Machinery & Equipment - I	PC	3	1	---	3
171AG6T16	Design of Soil, Water Conservation & Farm Structures	PC	3	1	---	3
171AG6T17	Post Harvest Engineering for Horticulture Produce	PC	3	1	---	3
---	Professional Elective - II	PE	3	1	---	3
---	Professional Elective - III	PE	3	1	---	3
171AG6L04	Farm Machinery Lab - I	PC	---	---	3	2
171AG6L05	Soil & Water Engineering Lab	PC	---	---	3	2
171HS6T07	Employability Skills - IV	HSS	---	---	2	1
171AG6S02	MOOCs - II	SS	---	---	---	---
TOTAL			18	6	8	23

MOOCs – Massive Open Online Courses

VII SEMESTER

Course Code	Name of the Course	Category	Periods/Week			Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	
171AG7T18	Micro Irrigation Engineering	PC	3	1	---	3
171AG7T19	Farm Machinery & Equipment - II	PC	3	1	---	3
171AG7T20	Dairy & Food Engineering	PC	3	1	---	3
171ES7T26	Mechanical Measurements & Instrumentation	ES	3	1	---	3
---	Professional Elective - IV	PE	3	1	---	3
---	Professional Elective - V	PE	3	1	---	3
171AG7L06	Farm Machinery Lab - II	PC	---	---	3	2
171AG7L07	Dairy & Food Engineering Lab	PC	---	---	3	2
171AG7P01	Industry Oriented (Internship) Minor Project	PR	---	---	---	1
TOTAL			18	6	6	23

VIII SEMESTER

Course Code	Name of the Course	Category	Periods/Week			Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	
---	Professional Elective - VI	PE	3	1	---	3
---	Open Elective	OE	3	1	---	3
171AG8P02	Major Project	PR	---	---	---	14
TOTAL			6	2	0	20

Professional Elective – I (V Semester)

S.No	Course Code	Name of the Course
1	171AG5E01	Agro Industries & Bi-Product Utilization
2	171HS5T04	Managerial Economics & Financial Analysis
3	171AG5E02	Rural Water Supply, Sanitation & Environmental Engineering

Professional Elective – II (VI Semester)

S.No	Course Code	Name of the Course
1	171AG6E03	GIS & Remote Sensing
2	171AG6E04	Human Engineering & Safety
3	171AG6E05	Production Technology of Agricultural Machinery

Professional Elective – III (VI Semester)

S.No	Course Code	Name of the Course
1	171AG6E06	Green House / Poly House Technology
2	171AG6E07	Optimization, Operations Research & Systems Engineering
3	171AG6E08	Industrial Engineering & Management

Professional Elective – IV (VII Semester)

S.No	Course Code	Name of the Course
1	171AG7E09	Seed Processing & Storage Engineering
2	171AG7E10	Food Processing Plant Design & Layout
3	171AG7E11	Food Packing Technology

Professional Elective – V (VII Semester)

S.No	Course Code	Name of the Course
1	171AG7E12	Aqua Cultural Engineering
2	171AG7E13	Soil Dynamics in Tillage & Traction
3	171AG7E14	Computational Fluid Dynamics

Professional Elective – VI (VIII Semester)

S.No	Course Code	Name of the Course
1	171AG8E15	Hydraulic Devices & Control
2	171AG8E16	Watershed Management
3	171AG8E17	Design of Agricultural Machinery

Open Elective (VIII Semester)

S.No	Course Code	Name of the Course
1	171EE8E20	Digital Control systems
2	171AG8O01	Industrial Pollution Control Engineering
3	171AG8O02	Mechatronics
4	171AG8O03	Water Resources Systems Planning & Management
5	171CS8O05	Operations Research
6	171AG8O04	Image Processing Techniques

ENGLISH – I
(Common to all branches)

I Semester	L	T	P	C
Course Code: 171HS1T01	3	1	0	3

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the students of Engineering.

As far as the detailed textbooks are concerned, the focus should be on the skills of listening, speaking, reading and writing. The non-detailed textbooks are meant for extensive reading for pleasure and profit.

Thus the stress in the syllabus is primarily on the development of communicative skills and fostering of ideas.

Course Objectives:

- COB 1: To improve the language proficiency of the students in English with emphasis on LSRW skills.
- COB 2: To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
- COB 3: To develop the communication skills of the students in both formal and informal situations.
- COB 4: To appraise the learner how Gandhi spent a period of three years in London as a student.
- COB 5: To make the learners rediscover India as a land of knowledge.
- COB 6: To discuss how scientific point of view seeks to arrive at the truth without being biased by emotion.
- COB 7: To inform the learner that all men are in peril.
- COB 8: To inspire the learners by inventions and contributions of great achievers.

LISTENING SKILLS:**Objectives:**

1. To enable the students to appreciate the role of listening skill and improve their pronunciation.
2. To enable the students to comprehend the speech of people belonging to different backgrounds and regions.
3. To enable the students to listen for general content, to fill up information and for specific information.

SPEAKING SKILLS:**Objectives:**

1. To make the students aware of the importance of speaking for their personal and professional communication.
2. To enable the students to express themselves fluently and accurately in social and professional success.
3. To help the students describe objects, situations and people.
4. To make the students participate in group activities like role-plays, discussions and debates.
5. To make the students participate in just a minute talks.

READING SKILLS:**Objectives:**

1. To enable the students to comprehend a text through silent reading.
2. To enable the students to guess the meanings of words, messages and inferences of texts in given contexts.
3. To enable the students to skim and scan a text.
4. To enable the students to identify the topic sentence.
5. To enable the students to identify discourse features.
6. To enable the students to make intensive and extensive reading.

WRITING SKILLS:**Objectives:**

1. To make the students understand that writing is an exact formal skills.
2. To enable the students to write sentences, paragraphs, e-mails and essays.
3. To make the students identify and use appropriate vocabulary.
4. To enable the students to narrate and describe.
5. To enable the students to write coherently and cohesively.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Summarize how Gandhi grew in introspection.
- CO 2: Explain the conditions to achieve a higher quality of life, strength and sovereignty of a developed nation.
- CO 3: Identify the scientific attitude to solve many problems which we find difficult to tackle.
- CO 4: Identify that all men can come together and avert the peril.
- CO 5: Interpret humorous texts and use of words for irony.
- CO 6: Explain the characteristic traits of renowned scientists who contributed enormously to the scientific advancement of India.
- CO 7: Demonstrate writing and basic concepts of grammar skills.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO2 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO3 (K3)	-	-	-	-	-	-	-	-	-	2	-	-
CO4 (K3)	-	-	-	-	-	-	-	-	-	2	-	-
CO5 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO6 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO7 (K2)	-	-	-	-	-	-	-	-	-	3	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K2)	-	-	-
CO2 (K2)	-	-	1
CO3 (K3)	-	-	2
CO4 (K3)	-	-	-
CO5 (K2)	-	-	-
CO6 (K2)	-	-	-
CO7 (K2)	-	-	-

Methodology:

1. The class is to be learner-centred where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

Recommended Topics:**UNIT-I:**

1. IN LONDON: M.K.GANDHI (Detailed)
2. G.D. NAIDU (Non-Detail)

UNIT-II:

1. THE KNOWLEDGE SOCIETY- APJ ABDUL KALAM (Detailed)
2. G.R. GOPINATH (Non-Detail)

UNIT-III:

1. THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE (Detailed)
2. J.C. BOSE (Non-Detail)

UNIT-IV:

1. MAN’S PERIL-BERTRAND RUSSELL (Detailed)
2. HOMI JEHangIR BHABHA (Non-Detail)

UNIT-V:

1. LUCK—MARK TWAIN (Detailed)
2. A SHADOW (Non-Detail)

Textbooks:

Detailed Text Book: ‘English Essentials’ by Ravindra Publications.

Non Detailed Text Book: ‘Modern Trail Blazers’ by Orient Black Swan Pvt. Ltd. Publishers.

Web Links:

1. https://en.wikipedia.org/wiki/Gopalswamy_Doraiswamy_Naidu
2. <https://englishforundergraduates.wordpress.com/2016/09/25/the-knowledge-society-from-ignited-minds-a-p-j-abdul-kalam/>
3. <http://btechenglish.blogspot.in/2014/01/the-scientific-point-of-view-j-b-s.html>
4. <https://www.famousscientists.org/jagadish-chandra-bose/>
5. <https://www.thebetterindia.com/37339/homi-jehangir-bhabha/>

MATHEMATICS-I
(Common to all branches)

I Semester	L	T	P	C
Course Code: 171BS1T01	3	1	2	3

Course Objectives:

- COB 1: To equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- COB 2: To help the students acquire a necessary base to develop analytical and design skills.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Associate linear differential equations of first order to various physical problems involving differential equations of first order
- CO 2: Solve linear differential equations of higher order.
- CO 3: Solve linear systems of equations using the concept of rank, Gauss elimination, Gauss seidal method.
- CO 4: Find the eigen values and eigen vectors.
- CO 5: Associate the concepts of Partial Differentiation to maxima and minima of functions of several variables and to Partial differential equations.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	2	1	-	-	-	-	-	-	-	-	-	-
CO2 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO3 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO4 (K2)	2	1	-	-	-	-	-	-	-	-	-	-
CO5 (K2)	2	1	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K2)	-	-	-
CO2 (K3)	-	3	-
CO3 (K3)	-	3	-
CO4 (K2)	-	-	-
CO5 (K2)	-	-	-

UNIT I:**Differential equations of first order and first degree:**

Linear differential equations - Bernoulli differential equation - Exact differential equations - Equations reducible to exact (Type-1, Type-2, Type-3, Type-4)

Applications:

Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories.

UNIT II:**Linear differential equations of higher order:**

Linear differential equations of higher order with constant coefficients with RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} V(x)$, $xV(x)$ - Method of Variation of parameters, Method of undetermined coefficients.

*(MATLAB Exercise: Introduction to MATLAB commands and Solution of Initial Value Problems using the command 'dsolve')

Applications:

Electric circuits, simple harmonic motion.

UNIT III:**Linear systems of equations:**

Rank of a matrix - Echelon form-Normal form – Solution of linear systems – Gauss elimination method - Gauss Seidal method.

Applications:

Finding the current in electrical circuits.

UNIT IV:**Eigen values - Eigen vectors and Quadratic forms:**

Eigen values - Eigen vectors– Properties of eigen values (without proof) – Cayley - Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley - Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form using orthogonal transformation– Nature of the quadratic form.

*(MATLAB Exercise: All Basic Operations on matrices are to be implemented using MATLAB including computation of rank, computation of eigen values and eigen vectors)

UNIT V:**Partial differentiation and Partial differential equations**

Homogeneous function-Euler's theorem-Total derivative-Chain rule-Taylor's and Maclaurin's series expansion of functions of two variables– Functional dependence-Jacobian.

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation, nonlinear (standard types) equations.

Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints).

*(MATLAB Exercise: To Plot graphs of various single and multivariable functions using MATLAB and analyze their maxima and minima graphically).

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. Dr.T.K.V. Iyengar, Engineering Mathematics, S. Chand publications

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India
2. D.G.Zill, MICHAEL R CULTER, Advanced Engineering Mathematics Third Edition Norosa Publications 2009.
3. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
4. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
5. Glyn James, Advanced modern engineering mathematics, Pearson education.
6. MATLAB by Rudra Pratap, Getting started with MATLAB, Oxford Publication.

Web Links:

1. <https://en.wikipedia.org/wiki/Portal:Mathematics>
2. <http://mathworld.wolfram.com>
3. <https://www.khanacademy.org>
4. <http://nptel.ac.in/courses/122104017>

ENVIRONMENTAL STUDIES
(Common to CE, EEE, ME, Min.E, PT & Ag.E)

I Semester	L	T	P	C
Course Code: 171HS1T02	3	1	0	2

Course Objectives:

- COB 1: To define the various ecosystems and its diversity.
- COB 2: To summarize the overall natural resources.
- COB 3: To classify environmental impacts of developmental activities.
- COB 4: To discuss social issues, environmental legislation and global treaties.
- COB 5: To educate environmental management systems.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Identify the need for protecting the producers and consumers in various ecosystems and their role in the food web.
- CO 2: Outline the natural resources and their importance for the sustenance of the life.
- CO 3: List out the biodiversity of India, threats and its conservation methods.
- CO 4: Illustrate various attributes of the pollution, impacts and measures to control the pollution along with waste management practices.
- CO 5: Describe social issues both rural and urban environment to combat the challenges.
- CO 6: Summarize the legislations of India in environmental protection.
- CO 7: Classify environmental assessment and the stages involved in EIA.
- CO 8: Transform existing campus into self sustaining green campus with environment friendly aspects of – Energy, Water and Wastewater reuse, Plantation, Rainwater Harvesting and Parking Curriculum.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K1)	1	-	-	-	-	1	2	1	-	-	-	-
CO2 (K2)	1	-	-	-	-	1	2	1	-	-	-	-
CO3 (K1)	1	-	-	-	-	1	2	1	-	-	-	-
CO4 (K2)	1	-	-	1	-	1	2	1	-	-	-	-
CO5 (K2)	1	-	-	-	-	1	2	1	-	3	-	-
CO6 (K2)	1	-	-	-	-	1	2	1	-	-	-	-
CO7 (K4)	1	-	-	-	-	1	2	1	-	-	1	-
CO8 (K2)	2	1	2	1	-	2	3	2	3	3	2	2

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K4)	PSO 3 (K3)
CO1 (K1)	-	-	-
CO2 (K2)	-	-	2
CO3 (K1)	-	-	-
CO4 (K2)	2	-	-
CO5 (K2)	-	-	-
CO6 (K2)	-	-	-
CO7 (K4)	-	-	-
CO8 (K2)	2	1	2

UNIT – I:**Ecosystems:**

Scope of environmental studies, Structure- Producers, consumers and decomposers
 Function – Food chain, Food web, Tropic structure and Energy flow in the ecosystem
 Ecological pyramids, nutrient recycling, primary and secondary production, ecosystem regulation. Ecological succession Terrestrial ecosystem and aquatic ecosystem - Introduction, types, characteristic features.

UNIT – II:**Natural Resources:**

Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people

Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources

Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity

Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources vs oil and natural gas extraction.

Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT – III:**Biodiversity and its conservation:**

Definition: genetic, species and ecosystem diversity classification Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity.

UNIT – IV:**Environmental Pollution:**

Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style.

Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.

UNIT – V:

Social Issues and the Environment

Urban problems related to energy -Water conservation, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns. Global challenges

Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act-Issues involved in enforcement of environmental legislation. - Public awareness and Environmental management.

Text Books:

1. Environmental Studies, K.V. S. G. Murali Krishna, VGS Publishers, Vijayawada
2. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
3. Environmental Studies, P.N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

Reference Books:

1. Text Book of Environmental Studies, Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi.
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi.
4. “Perspectives in Environment Studies” Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014.

Web Links:

1. https://www.youtube.com/watch?v=7G3eXI_DPn8
2. www.nptel.ac.in/courses/122102006/
3. www.nptel.ac.in/courses/120108002/
4. https://www.youtube.com/watch?v=4AuwG2G_ERU
5. www.nptelvideos.in/2012/12/fundamentals-of-environmental-pollution.html
6. www.nptel.ac.in/courses/120108004/

ENGINEERING CHEMISTRY
(Common to CE, ME, Min.E, PT & Ag.E)

I Semester	L	T	P	C
Course Code: 171BS1T03	3	1	0	3

Course Objectives

- COB 1: To impart knowledge about polymers and plastic materials that are used in household appliances, aerospace and automotive industries.
- COB 2: To nurture students about fuels as energy source used in industries like thermal power plant, steel industry, fertilizer industry etc., and automobiles.
- COB 3: To impart knowledge about working of primary, secondary cells. Theories of corrosion and its control methods.
- COB 4: To impart knowledge on advance materials like Nano, Super Conductors also Semi Conductors and Liquid Crystals.
- COB 5: To educate students about the importance of water in industries and household purposes.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Explain polymeric materials their uses and moulding techniques of plastics.
- CO 2: Classify solid, liquid and gaseous fuels.
- CO 3: Explain about batteries, corrosion and their control methods.
- CO 4: Explain Nano materials, Super Conductors, Semi Conductors and Liquid Crystals.
- CO 5: Summarize water purification techniques and boiler troubles.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	2	-	-	-	-	-	-	-	-	-	-	-
CO2 (K2)	2	-	-	-	-	-	-	-	-	-	-	-
CO3 (K2)	2	-	-	-	-	-	-	-	-	-	-	-
CO4 (K2)	2	-	-	-	-	-	-	-	-	-	-	-
CO5 (K2)	2	-	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K2)	-	-	-
CO2 (K2)	-	2	-
CO3 (K2)	-	-	-
CO4 (K2)	-	-	-
CO5 (K2)	2	-	-

UNIT- I:**High Polymers and Plastics:**

Polymerization: Introduction- Mechanism of polymerization - Stereo regular polymers -Physical and mechanical properties – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (compression moulding, injection moulding, extrusion moulding and transfer moulding techniques) - Preparation, properties and applications of polyethene, PVC, Bakelite and polycarbonates. Elastomers – Natural rubber-compounding and vulcanization – Synthetic rubbers: Buna S, Buna N, Thiokol – Applications of elastomers. Biodegradable polymers.

UNIT - II:**Fuel Technology:**

Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Coal — Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents – Power alcohol – Bio-diesel – Gaseous fuels – Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus.

UNIT - III:**Electrochemical Cells and Corrosion:**

Galvanic cells - Reversible and irreversible cells – Single electrode potential- Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Li cells - Zinc – air cells.
Corrosion:- Definition – Theories of Corrosion (electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Cathodic protection - Protective coatings: – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).

UNIT - IV:**Chemistry of Advanced Materials:**

Nano materials:-Introduction – Sol-gel method - Carbon nano tubes and fullerenes: Types, preparation, properties and applications.
Super conductors:-Type –I, Type II – Characteristics and applications
Semi conductors: - Preparation of semiconductors, working of diodes and transistors.
Green synthesis:-Principles
Liquid crystals:-Introduction – Types – Applications
Fuel cells: - Introduction - cell representation, H₂-O₂fuel cell: Design and working, advantages and Limitations. Types of fuel cells: methanol-oxygen fuel cells.

UNIT - V:**Water Technology**

Hard water:- Reasons for hardness – units of hardness - determination of hardness and alkalinity - Water for steam generation - Boiler troubles – Priming and Foaming, Scale formation, Boiler corrosion, Caustic embrittlement - Internal treatments -

Softening of Hard water : Lime – Soda process, Zeolite process and numerical problems based on these processes and Ion Exchange process - Water for drinking purposes- Purification – Sterilization and disinfection : Chlorination, Break point chlorination and other methods – Reverse Osmosis and Electro Dialysis.

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co.
2. A Text books of Applied Chemistry by Dr. Bharathi kumari Yalamananchili, VGS publications
3. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:

1. Engineering Chemistry by PrasanthRath, Cengage Learning, 2015 edition.
2. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
3. Applied Chemistry by H.D. Gesser, Springer Publishers
4. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM.

Web Links:

1. <http://www.nptelvideos.in/2012/11/chemistry-of-materials>
2. <http://www.nptelvideos.com/lecture.php?id=2946>
3. <http://www.nptelvideos.com/lecture.php?id=2922>
4. <http://www.nptelvideos.com/lecture.php?id=2954>

ENGINEERING MECHANICS
(Common to CE, EEE, ME, Min.E, PT & Ag.E)

I Semester	L	T	P	C
Course Code: 17IES1T02	3	1	0	3

Course Objectives:

- COB 1: To impart knowledge on the concept of forces and its resolution in different planes, resultant of force system, forces acting on a body, their free body diagrams using graphical methods and to know the concept of friction.
- COB 2: To make the students calculate the centre of gravity and moment of inertia.
- COB 3: To educate the students about kinematics, kinetics, work - energy and impulse - momentum principles.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Determine the resultant force and moment for a given force system.
- CO 2: Explain the concept of friction.
- CO 3: Calculate the forces in planar and spatial systems.
- CO 4: Locate centroid of composite areas and centre of gravity of composite bodies.
- CO 5: Calculate the moment of inertia of composite areas and rigid bodies.
- CO 6: Apply the concepts of kinematics, kinetics, work - energy and impulse - momentum methods to particle motion.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	2	1	-	-	-	-	-	-	-	-	-
CO2 (K2)	2	1	1	-	-	-	-	-	-	-	-	-
CO3 (K3)	3	2	1	-	-	-	-	-	-	-	-	-
CO4 (K1)	1	1	1	-	-	-	-	-	-	-	-	-
CO5 (K3)	3	2	1	-	-	-	-	-	-	-	-	-
CO6 (K3)	3	2	1	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K3)	-	3	2
CO2 (K2)	-	3	2
CO3 (K3)	-	3	2
CO4 (K1)	-	-	-
CO5 (K3)	-	3	2
CO6 (K3)	3	3	2

UNIT- I:

Introduction to Engineering Mechanics – Basic Concepts.

Systems of Forces: Coplanar Concurrent Forces & Non Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.

Friction: Introduction, limiting friction and impending motion, Coulomb's laws of dry friction, coefficient of friction, cone of friction.

UNIT- II:

Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, and Spatial Systems for concurrent forces. Lami's Theorem, Converse of the law of Triangle of forces, Converse of the law of polygon of forces condition of equilibrium.

UNIT- III:

Centroid: Centroid of simple figures (from basic principles) – Centroid of composite figures.

Centre of Gravity: Centre of gravity of simple body (from basic principles), Centre of gravity of composite bodies, Pappus theorems.

UNIT- IV:

Area Moment of Inertia: Definition – Polar Moment of Inertia, Transfer Theorem, Moment of Inertia of composite figures.

Mass Moment of Inertia: Moment of Inertia of masses, Transfer formula for Mass Moment of Inertia, Mass Moment of inertia of composite bodies.

UNIT – V:

Kinematics: Basics of linear motion.

Kinetics: Particle and Rigid body in translation – Central force motion – Equations of plane motion – Fixed axis rotation.

Work – Energy Method: Equations for translation, Work-Energy Applications to particle motion, Connected system-Fixed axis rotation and plane motion. Impulse momentum method.

Text Books:

1. Engineering Mechanics statics and dynamics - A.K.Tayal, Umesh Publications.
2. Engineering Mechanics statics and dynamics - A Nelson, Mc Graw Hill publications.

Reference Books:

1. Engineering Mechanics statics and dynamics – R.C.Hibbeler, 11th Edn – Pearson Publ.
2. Engineering Mechanics, statics and dynamics – I.H.Shames, – Pearson Publ.
3. Mechanics for Engineers, statics - F.P.Beer & E.R.Johnston – 5th Ed. Mc Graw Hill Publ.
4. Mechanics for Engineers, dynamics - F.P.Beer & E.R.Johnston –5th Ed. Mc Graw Hill Publ.

Web Links:

1. <http://www.nptelvideos.in/2012/12/engineering-mechanics-drgsaravana-kumar.html>
2. <http://freevideolectures.com/Course/2264/Engineering-Mechanics>
3. <http://freevideolectures.com/Course/2690/Applied-Mechanics>
4. <https://cosmolearning.org/courses/engineering-mechanics/video-lectures/>

COMPUTER PROGRAMMING (Common to all branches)

I Semester

L T P C

Course Code: 171ES1T01

3 1 0 3

Course Objectives:

- COB 1: To impart adequate knowledge on the need of programming languages and problem solving techniques.
- COB 2: To develop programming skills using the fundamentals and basics of C language.
- COB 3: To enable effective usage of Control Structures, arrays, Strings, functions, structures and union.
- COB 4: To impart the knowledge of pointers and to understand the principles of dynamic memory allocation.
- COB 5: To illustrate the file concepts and its operations.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Illustrate the basic concepts of Computers.
- CO 2: Solve mathematical and scientific problems using fundamentals of C.
- CO 3: Use Control Structures and Arrays in solving complex problems.
- CO 4: Develop modular programs to solve problems using control structures, Arrays and strings.
- CO 5: Demonstrate the pointers concept for allocating and deallocating memory dynamically.
- CO 6: Solve real world problems using the concept of structures and unions.
- CO 7: Develop real time applications using file operations.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	2	1	-	-	1	-	-	-	-	-	-	-
CO2 (K3)	3	2	1	1	3	-	-	-	-	-	-	-
CO3 (K3)	3	2	1	1	3	-	-	-	-	-	-	-
CO4 (K3)	3	2	1	1	3	-	-	-	-	-	-	-
CO5 (K2)	2	1	-	-	2	-	-	-	-	-	-	-
CO6 (K4)	3	3	2	2	3	-	-	-	-	-	-	-
CO7 (K3)	3	2	1	1	3	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K2)	-	-	-
CO2 (K3)	-	3	-
CO3 (K3)	-	3	-
CO4 (K3)	-	-	-
CO5 (K2)	-	-	-
CO6 (K4)	-	-	-
CO7 (K3)	-	3	-

UNIT-I:**Computer History, Hardware, Software, Programming Languages and Algorithms:**

Fundamental concepts of Computer, Programming Languages - Machine Language, Assembly Language, Low-level and High-level Languages, Basics of Hardware and Software, Algorithms, Flowchart, pseudo code, The Software Development Process.

Introduction to C Programming:

Introduction, Structure of a C Program, Identifiers, main() function, printf() function, Indentation, Comments, Keywords, Data Types, Variables, Constants and Declarations, Input/Output Statements, Operators, Type Conversion.

UNIT -II:**Control Flow, Relational Expressions & Arrays:**

Selection: if, if-else, nested if with examples, Multi-way selection: switch, else-if with examples. Repetition: Basic Loop Structures: for, while and do-while loops, counter controlled and condition controlled loops, nested loops, goto, continue and break.

Arrays: Introduction, Operations on Arrays, 2D Arrays, Arrays as Function Arguments, Multi Dimensional Arrays.

UNIT-III:**Functions:**

Basics of Functions: Declaration, Definition and call, Categories of Functions, passing parameters to Functions, Variable Scope, Storage Classes, Recursive Functions, Recursion and its Types.

Strings:

String Fundamentals, String Processing with and without Library Functions.

UNIT-IV:**Pointers:**

Concept of a Pointer, Declaring and Initializing Pointer Variables, Pointer Expressions and Address Arithmetic, Null Pointers, Generic Pointers, Pointers as Function arguments, Pointer to Pointer, Pointers and Arrays, Pointers and Strings, Dynamic Memory Allocation Functions, Dangling Pointer, Command line Arguments.

UNIT-V:**Structures:**

Introduction to Structures, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, derived data type, bit-fields.

Data Files:

Introduction to Files, Using Files in C, Reading and Writing with Text Files, Error Handling during File Operations, Random File Access.

Text Books:

- 1 Computer Programming, Reema Thareja, OXFORD.
- 2 ANSI C Programming, Gary J. Bronson, Cengage Learning.
- 3 Programming in C A-Practical Approach by Ajay Mittal.

Reference Books:

- 1 C Programming – A Problem Solving Approach, Forouzan, Gilberg, Cengage.
- 2 The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.
- 3 Programming in C, Ashok Kamthane.

Web Links:

1. <http://www.c4learn.com/>
2. <http://www.geeksforgeeks.org/c/>
3. <http://nptel.ac.in/courses/122104019/>
4. <http://www.learn-c.org/>
5. <https://www.tutorialspoint.com/cprogramming/>

ENGLISH COMMUNICATION SKILLS LAB- I
(Common to all branches)

I Semester	L	T	P	C
Course Code: 17IHS1L01	0	0	3	2

Course Objectives:

- COB 1: To facilitate computer-aided multi-media instruction enabling individualized and independent language learning.
- COB 2: To sensitize the students to the nuances of English speech sounds, word accent and intonation.
- COB 3: To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking.
- COB 4: To improve the fluency in spoken English and neutralize mother tongue influence.
- COB 5: To train students to use language appropriately.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Demonstrate nuances of language through audio-visual experience and Group activities.
- CO 2: Identify accent for intelligibility.
- CO 3: Demonstrate in conversation, jams and public speaking.
- CO 4: Make use of the concepts to communicate confidently and competently in English Language in all spheres.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	-	-	-	-	2	-	-	-	-	3	-	-
CO2 (K3)	-	-	-	-	3	-	-	-	-	2	-	-
CO3 (K2)	-	-	-	-	2	-	-	-	-	3	-	-
CO4 (K3)	-	-	-	-	3	-	-	-	-	2	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K2)	-	-	-
CO2 (K3)	-	-	-
CO3 (K2)	2	-	1
CO4 (K3)	-	-	-

PRACTICE 1:

- A. Greeting, Introducing and taking leave
- B. Pure Vowels

PRACTICE 2:

- A. Giving Information and Asking for Information
- B. Diphthongs

PRACTICE 3:

- A. Inviting, Accepting and Declining Invitations
- B. Consonants

PRACTICE 4:

- A. Commands, Instructions and Requests
- B. Accent and Rhythm

PRACTICE 5:

- A. Suggestions and Opinions
- B. Intonation

Reference Books:

1. Strengthen your Communication Skills by Dr.M.Hari Prasad, Dr.Salivendra J.Raju and Dr.G.Suvarna Lakshmi, Maruthi Publications.
2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. A Handbook of English for Professionals by Prof Eliah, B.S Publications.
4. Effective Technical Communication by M. Ashraf Rizvi, Tata Mcraw – Hill Publishing Company.
5. Word power made handy, Dr. Shalini verma, S. Chand Company.
6. Let us hear them speak, Jayashree Mohanraj, Sage texts.

ENGINEERING CHEMISTRY LAB
(Common to CE, ME, Min.E, PT & Ag.E)

I Semester	L	T	P	C
Course Code: 171BS1L01	0	0	3	2

Course Objectives:

- COB 1: To demonstrate volumetric, conductometric, potentiometric titrations and P^H determination.
- COB 2: To educate students about the preparation of thermosetting plastic such as Bakelite and alternative fuel such as Bio-diesel.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Demonstrate Acid – Base Redox & Complexometric titrations by volumetric analysis.
- CO 2: Demonstrate Acid – Base titrations by instrumental analysis.
- CO 3: Prepare polymer like Bakelite.
- CO 4: Prepare alternative fuel like Bio-Diesel.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	-	-	-	3	-	-	-	-	-	-	-
CO2 (K3)	3	-	-	-	3	-	-	-	-	-	-	-
CO3 (K3)	3	-	-	-	3	-	-	-	-	-	-	-
CO4 (K3)	3	-	-	-	3	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K3)	-	-	-
CO2 (K3)	-	-	-
CO3 (K3)	-	-	2
CO4 (K3)	-	-	2

Exercise 1:

Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.

Exercise 2:

Trial experiment - Determination of HCl using standard Na₂CO₃ solution.

Exercise 3:

Preparation of Phenol - Formaldehyde resin (Bakelite).

Exercise 4:

Determination of KMnO_4 using standard Oxalic acid solution.

Exercise 5:

Determination of ferrous iron using standard $\text{K}_2\text{Cr}_2\text{O}_7$ solution.

Exercise 6:

Preparation of Bio-Diesel.

Exercise 7:

Determination of temporary and permanent hardness of water using standard EDTA solution.

Exercise 8:

Determination of Copper using standard EDTA solution.

Exercise 9:

Determination of Iron by a Colorimetric method using thiocyanate as reagent.

Exercise 10:

Determination of pH of the given sample solution using pH meter.

Exercise 11:

Conduct metric titration between strong acid and strong base.

Exercise 12:

Conduct metric titration between strong acid and weak base.

Exercise 13:

Potentiometric titration between strong acid and strong base.

Exercise 14:

Potentiometric titration between strong acid and weak base.

Exercise 15:

Determination of Zinc using standard EDTA solution.

Exercise 16:

Determination of Vitamin – C.

Reference Books:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr.Jyotsna Cherukuris (2012) Laboratory Manual of engineering chemistry - II, VGS Techno Series.
3. Chemistry Practical Manual, Lorven Publications K. Mukkanti (2009). Practical Engineering Chemistry, B.S.Publication.

COMPUTER PROGRAMMING LAB
(Common to all branches)

I Semester	L	T	P	C
Course Code: 171ES1L01	0	0	3	2

Course Objectives:

- COB 1: To impart knowledge on various Editors.
- COB 2: To nurture the students on various operators and control structures in C.
- COB 3: To demonstrate the modular programming approach for solving problems.
- COB 4: To make the students understand, the concepts of array and structures.
- COB 5: To explain the file concepts for solving various problems.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Implement basic programs in C.
- CO 2: Use Conditional and Iterative statements to solve real time scenarios in C.
- CO 3: Implement the concept of Arrays and Modularity.
- CO 4: Apply the Dynamic Memory Allocation functions using pointers.
- CO 5: Develop programs using structures, and Files.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	2	1	1	3	3	-	-	-	-	-	-
CO2 (K3)	3	2	1	1	3	3	-	-	-	-	-	-
CO3 (K3)	3	2	1	1	3	3	-	-	-	-	-	-
CO4 (K3)	3	2	1	1	3	3	-	-	-	-	-	-
CO5 (K3)	3	2	1	1	3	3	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K3)	-	3	-
CO2 (K3)	-	3	2
CO3 (K3)	-	-	2
CO4 (K3)	-	3	-
CO5 (K3)	-	3	-

Exercise – 1:**Introduction to C Programming**

- 1.1) Introduction about Editors –Turbo, vi, Emacs
- 1.2) C Program to Perform Addition, Subtraction, Multiplication and Division of two numbers from Command line
- 1.3) Write a C Program to Calculate area of a Triangle using Heron's formula.

Exercise – 2:**Basic Math**

- 2.1) Write a C Program to Find Whether the Given Year is a Leap Year or not.
- 2.2) Write a C Program to convert Celsius to Fahrenheit and vice versa.
- 2.3) Write a C Program to find largest of three numbers using ternary operator.

Exercise – 3:**Control Flow - I**

- 3.1) Write a C program to find the roots of a Quadratic Equation.
- 3.2) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch...case.
- 3.3) Scenario - 1 ATM PIN GENERATION:

Aditya purchased a credit card. He has to generate a PIN number to access the ATM and Net banking for which OTP was sent to his registered mobile number. Using this OTP number he has to generate ATM PIN number. After generating PIN number, he can use it for further transactions. Maximum login he can make is 3 times.

Sample Input:

OTP: 6732

If valid

Enter PIN: 8858

Confirm your PIN: 8858

Sample output:

valid/Invalid

PIN generated successfully.

Note: OTP is hard coded.

- 3.4) Scenario - 2 RESET PASSWORD:

Sindhuja was using Syndicate Bank's Online Account. She wanted to pay her bills through Online. But she forget her password. Now she has to reset the password. For resetting the password, she has to select reset option from the Menu.

NOTE: using switch case.

Sample input:

1. Fast withdrawal

2. Mini Statement.

3. Balance Enquiry

4. Reset Password

Enter your choice: 4

Sample Output: Reset password: New password: ***** Confirm password: *****

Exercise –4:**Control Flow - II**

- 4.1) Write a C Program to Find Whether the Given Number is
 - i) Prime Number
 - ii) Armstrong Number
- 4.2) Write a C program to print Floyd Triangle
- 4.3) Write a C Program to print Pascal Triangle

Exercise – 5:**Control Flow – III**

- 5.1) Write a C program to find the sum of individual digits of a positive integer.
 5.2) Write a C program to check whether given number is palindrome or not.
 5.3) Write a C program to read two numbers, x and n, and then compute the sum of the geometric progression $1+x+x^2+x^3+\dots+x^n$.

5.4) Scenario - 3 Student Attendance report Generation:

Some of the school staff had failed to maintain the attendance of the students, causing lack of essential records related to students attendance that should be submitted in a parents meet. The school management has decided to automate the process in order to maintain the attendance of every student effectively. You are asked to write a program to the above scenario and display whether the student is allowed to write the Exam or not.

percentage<65	detained
>=65 and <75	should pay condonation to appear for Exams
>=75	allowed for Exams

Sample Input:

Enter no of students: 5

Enter Students Details:

Rno:1	Name: Kalyan	attendance(%):67	Should pay condonation to appear for Exams
Rno:2	Name: laxman	attendance(%):56	
Rno:3	Name: Yamini	attendance(%):79	
Rno:4	Name: Aryan	attendance(%):60	
Rno:5	Name: Raghav	attendance(%):88	

Sample Output:

Rno	Name	Attendance (%)	Remarks
1	Kalyan	67	should pay condonation to appear for Exams
2	Laxman	56	detained
3	Yamini	79	allowed for Exams
4	Aryan	60	detained
5	Raghav	88	allowed for Exams

Exercise 6:**Arrays**

Demonstration of arrays

- 6.1) Linear Search.
 6.2) Bubble Sort.
 6.3) Operations on Matrix.
 6.4) Scenario – 4 Celebrity of the Week:

Red FM has launched a program called Celebrity of the week in their channel. Listeners are given a toll free number where they can listen to list of celebrities. Listeners can choose their favourite celebrity from the list and vote for him/her. The votes are validated from Monday to Saturday. The one with highest votes is called as

"Celebrity of the Week" and his/her songs are played in the program, which is aired on Sundays. Now write a program to find the celebrity of the week.

Sample Input:

1. Nagachaithanya
 2. Nithin
 3. Prabhas
 4. Ram
 5. Thamanna
 6. Samantha
 7. Regina
 8. Sruthihasan
- Enter no of listeners: 10
 Enter your favourite: 3
 Enter your favourite: 8
 Enter your favourite: 4
 Enter your favourite: 3
 Enter your favourite: 4
 Enter your favourite: 2
 Enter your favourite: 7
 Enter your favourite: 3
 Enter your favourite: 1
 Enter your favourite: 5

Sample Output:

"Celebrity of the Week" is PRABHAS

Exercise – 7:

Functions

7.1) Write a C Program to demonstrate parameter passing in Functions and returning values.

7.2) Write a C Program to find Fibonacci, Factorial of a number with Recursion and without Recursion.

7.3) Scenario – 5 SELF DRIVE RENTAL

Sadiq and his friends are going to Banglore. But they don't have a vehicle in Banglore. For that they go to rental cars to take car for rent. You have find out what is total amount of car's rent. The car's rentals and rules are as follows.

- i) Minimum booking is 4.
- ii) There are 3 types of cars
 - A) SWIFT
 - B) SCORPIO
 - C) INNOVA
- iii) There are 3 categories in cars rental

- A) LTTE
- B) CLASS
- C) XL

FOR SWIFT,

- In LTTE 5 kms are free for one hour and Rs.70 per one hour, if they exceed 5kmph, then Rs.12 per km.
- In CLASS, 10 kms are free for one hour and Rs.90 per one hour, if they exceed 10kmph, then Rs.12 per km.

- In XL, 15 kms are free for one hour and Rs.110 per one hour, if they exceed 15kmph, then Rs.12 per km.

FOR SCORPIO,

- In LTTE, 5 kms are free for one hour and Rs.90 per one hour, if they exceed 5kmph, then Rs.15 per km.
- In CLASS, 10 kms are free for one hour and Rs.110 per one hour, if they exceed 10kmph, then Rs.15 per km.
- In XL, 15 kms are free for one hour and Rs.130 per one hour, if they exceed 15kmph, then Rs.15 per km.

FOR INNOVA

- In LTTE, 5 kms are free for one hour and Rs.110 per one hour, if they exceed 5kmph, then Rs.18 per km.
- In CLASS, 10 kms are free for one hour and Rs.130 per one hour, if they exceed 10kmph, then Rs.18 per km.
- In XL, 15 kms are free for one hour and Rs.150 per one hour, if they exceed 15kmph, then Rs.18 per km.

SAMPLE INPUT:

ENTER NO.OF DAYS AND HOURS FOR CAR: 01 02 (I.E 1 DAY 2 HOURS = 26 HOURS)

1. SWIFT
 2. SCORPIO
 3. INNOVA
 SELECT A CAR: 2
 1. LTTE
 2. CLASS
 3. XL
 SELECT RENTAL TYPE: 2
 TOTAL KMS COVERED: 300

SAMPLE OUTPUT:

TOTAL HOURS:	26
CAR NAME:	SCORPIO
RENTAL TYPE:	CLASS
AMOUNT:	2860
EXCEED AMOUNT (40KM *15):	600
GRAND TOTAL:	3460

Exercise – 8:

Strings

8.1) Implementation of string manipulation operations with library function.

- copy
- concatenate
- length
- compare

8.2) Implementation of string manipulation operations without library function.

- copy

- ii) concatenate
- iii) length
- iv) compare

8.3) Verify whether the given string is a palindrome or not

8.4) Scenario – 6 Word with Obesity:

Jeeth is a fun loving and active boy. He likes to play with words and numbers. One day Jeeth and his friends attended a seminar, which was conducted in his school. The Seminar was about "Causes of obesity in children and its effects". Jeeth and his friend Ram are not interested in listening to the seminar, so he thought of giving a puzzle to Ram. Jeeth gave some words to Ram and wanted him to find the word with Obesity. Ram was confused and asking your help. Write a program to find the weights of the words and display the word with highest weight (word with obesity).

Sample Input:

Enter no of words: 3

Enter 3 words: apple banana carrot

Sample Output:

Word with Obesity is carrot

Exercise – 9:

Arrays and Pointers

9.1) Write a C Program to Access Elements of an Array Using Pointer

9.2) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 10:

Dynamic Memory Allocations

10.1) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.

10.2) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function. Understand the difference between the above two programs

Exercises – 11:

Structures

11.1) Write a C Program to Store Information of a book Using Structure

11.2) Write a C Program to Store Information Using Structures with Dynamically Memory Allocation

11.3) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

11.4) Scenario – 7 Library Management

Shilpa student of PGEC got the Library Card. She wants to lend the books from the Library. The college gave two cards to each and every student. The students can lend only two books at a time and it has to be returned back after 15 days. If the books are not returned late fee will be collected for no. of days the books were returned after the due date. Late fee per day is Rs.50/-

Sample Input.

Enter the name of student, Roll No. Branch, Section, Year, DOL, DOR,

Sample output

No. of days returned after the due date = 5

Late fee per day = Rs. 50

Fine paid by the student is $5 * 50 = 250$.

Exercise -12:

Files

12.1) Write a C program to open a file and to print the contents of the file on screen.

12.2) Write a C program to copy content of one file to another file.

12.3) Write a C program to merge two files and store content in another file.

12.4) Scenario – 8 Student Information System Using Files:

Lakshya International school was recently established and having large no of admissions. The school management wanted the Student information to be computerized and wanted to maintain in a simple and in effective manner. You are asked to develop Student Information System using Files to perform the following tasks

1. Add New Student
2. Update Existing Student
3. Delete Existing Student
4. Retrieve A Particular/All Students

Sample Input:

Choose the task you want to perform:

1. Add
2. Update
3. Delete
4. Retrieve

Your choice: 1

Enter student details:

Name: Akhil

Age: 5

Class: 1

Sample Output:

Student details added

Reference Books:

1. Let Us C by Yashwanth Kanetkar.
2. Programming in C A-Practical Approach by Ajay Mittal.
3. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.

Web Links:

1. <https://www.hackerrank.com/>
2. <https://www.codechef.com/>
3. <https://www.topcoder.com/>
4. <https://code-cracker.github.io/>

ENGLISH – II
(Common to all branches)

II Semester	L	T	P	C
Course Code: 171HS2T03	3	1	0	3

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the students of Engineering.

As far as the detailed Textbooks are concerned, the focus should be on the skills of listening, speaking, reading and writing. The non-detailed Textbooks are meant for extensive reading for pleasure and profit.

Thus the stress in the syllabus is primarily on the development of communicative skills and fostering of ideas.

Course Objectives:

- COB 1: To improve the language proficiency of the students in English with emphasis on LSRW skills.
- COB 2: To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
- COB 3: To develop the communication skills of the students in both formal and informal situations.
- COB 4: To make the learner understand how modern life has been shaped by Technology.
- COB 5: To make the students understand the importance of work.

LISTENING SKILLS:**Objectives:**

- 1 To enable the students to appreciate the role of listening skill and improve their pronunciation.
- 2 To enable the students to comprehend the speech of people belonging to different backgrounds and regions.
- 3 To enable the students to listen for general content, to fill up information and for specific information.

SPEAKING SKILLS:**Objectives:**

- 1 To make the students aware of the importance of speaking for their personal and professional communication.
- 2 To enable the students to express themselves fluently and accurately in social and professional success.

- 3 To help the students describe objects, situations and people.
- 4 To make the students participate in group activities like role-plays, discussions and debates.
- 5 To make the students participate in Just a Minute talks.

READING SKILLS:

Objectives:

- 1 To enable the students to comprehend a text through silent reading.
- 2 To enable the students to guess the meanings of words, messages and inferences of texts in given contexts.
- 3 To enable the students to skim and scan a text.
- 4 To enable the students to identify the topic sentence.
- 5 To enable the students to identify discourse features.
- 6 To enable the students to make intensive and extensive reading.

WRITING SKILLS:

Objectives:

- 1 To make the students understand that writing is an exact formal skills.
- 2 To enable the students to write sentences and paragraphs.
- 3 To make the students identify and use appropriate vocabulary.
- 4 To enable the students capable of note-making.
- 5 To make the students to write formal and informal letters.
- 6 To enable the students to write CV
- 7 To enable the students to write technical reports.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Compare the difference between modern technology and people's technology.
- CO 2: Identify the causes for climate change.
- CO 3: Explain the applications of modern technologies.
- CO 4: Infer that spiritual help is the true bias of all activities in life.
- CO 5: Identify professional work habits, necessary for effective collaboration and cooperation.
- CO 6: Rephrase coherent writing in political, social and religious background.
- CO 7: Demonstrate writing and basic concepts of grammar skills.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO2 (K3)	-	-	-	-	-	-	-	-	-	2	-	-
CO3 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO4 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO5 (K3)	-	-	-	-	-	-	-	-	-	2	-	-
CO6 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO7 (K2)	-	-	-	-	-	-	-	-	-	3	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K2)	-	-	1
CO2 (K3)	-	-	2
CO3 (K2)	-	-	1
CO4 (K2)	-	-	-
CO5 (K3)	-	-	-
CO6 (K2)	-	-	-
CO7 (K2)	-	-	-

Methodology:

- 1 The class is to be learner-centred where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
- 2 Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
- 3 The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
- 4 The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
- 5 The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

Recommended Topics:

UNIT-I:

1. TECHNOLOGY WITH A HUMAN FACE (Detailed)
2. AN IDEAL FAMILY (Non-Detailed)

UNIT-II:

1. CLIMATE CHANGE AND HUMAN STRATEGY (Detailed)
2. WAR (Non-Detailed)

UNIT-III:

1. EMERGING TECHNOLOGIES (Detailed)
2. THE VERGER (Non-Detailed)

UNIT-IV:

1. THE SECRET OF WORK (Detailed)
2. THE SCARECROW (Non-Detailed)

UNIT-V:

1. WORK BRINGS SOLACE (Detailed)
2. A VILLAGE LOST TO THE NATION (Non-Detailed)

Prescribed Text Books:

Detailed Text Book: ‘Sure Outcomes’ by Orient Black Swan Pvt. Ltd. Publishers.

Non Detailed Text Book: Panorama- A course on Reading by Oxford University Press Pvt. Ltd. Publishers.

Web Links:

1. http://www.cooperative-individualism.org/schumacher-e-f_technology-with-a-human-face-1973.htm
2. <http://www.sinden.org/verger.html>
3. <http://btechenglish.blogspot.in/2015/05/work-brings-solace-sure-out-comes-b.html>
4. http://www.ramakrishnavivekananda.info/vivekananda/volume_1/karma-yoga/secret_of_work.htm
5. https://en.wikipedia.org/wiki/Solar_power_in_Spain

MATHEMATICS-III
(Common to all branches)

II Semester	L	T	P	C
Course Code: 171BS2T06	3	1	2	3

Course Objectives:

- COB 1: To equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- COB 2: To help the students acquire a necessary base to develop analytical and design skills.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Compute Laplace transform of various functions.
- CO 2: Apply Laplace transform to solve initial value problems.
- CO 3: Discuss about beta and gamma function, double integral over a region and triple integral over a volume.
- CO 4: Find the gradient of a scalar function, divergence and curl of a vector function.
- CO 5: Apply line, surface and volume integrals to find work done by a force, flux.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO2 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO3 (K2)	2	1	-	-	-	-	-	-	-	-	-	-
CO4 (K2)	2	1	-	-	-	-	-	-	-	-	-	-
CO5 (K3)	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K3)	-	3	-
CO2 (K3)	-	3	-
CO3 (K2)	-	-	-
CO4 (K2)	-	-	-
CO5 (K3)	-	3	-

UNIT - I:**Laplace transforms:**

Laplace transforms of standard functions-First Shifting theorem, Change of scale, Multiplication with t, Division by t - Transforms of derivatives and integrals – Unit step function –Dirac’s delta function, Periodic functions.

UNIT- II:**Inverse Laplace transforms:**

Inverse Laplace transforms – Convolution theorem (with out proof), Second shifting theorem.

*(MATLAB Exercise: Computing Laplace transform of $f(t)$ using symbolic toolbox, Solving initial value problems using ‘dsolve’)

Applications:

Evaluating improper integrals, solving initial value problems using Laplace transforms.

UNIT - III:**Multiple integrals and Beta, Gamma functions:**

Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration, Beta and Gamma functions- Properties - Relation between Beta and Gamma functions-

Applications:

Finding Areas and Volumes.

UNIT - IV:**Vector Differentiation:**

Gradient - Directional Derivatives – Divergence - Curl - Laplacian Operator - Vector identities.

Applications:

Equation of continuity, potential surfaces

UNIT - V:**Vector Integration:**

Line integral – Work done - Surface and volume integrals, Green’s Theorem, Stokes Theorem and Gauss Divergence theorem (without proof) and related problems.

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. Dr. T K V Iyengar, Engineering Mathematics, S. Chand Publications.

Reference Books:

1. George B. Thomas, D, Weir and J. Hass. Thomas Calculus, 12th edition, 2010 Pearson Education
2. Greenberg, Advanced Engineering Mathematics, 2nd edition, Pearson Education.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.
4. W. Jordan and T. Smith, Mathematical Techniques, Oxford University Press.

Web Links:

1. <https://en.wikipedia.org/wiki/Portal:Mathematics>
2. <http://mathworld.wolfram.com>
3. <https://www.khanacademy.org>
4. <http://nptel.ac.in/courses/122104017>

MATHEMATICS-II
(Common to CE, EEE, ME, Min.E, PT & Ag.E)

II Semester	L	T	P	C
Course Code: 171BS2T02	3	1	0	3

Course Objectives:

- COB 1: To equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- COB 2: To help the students acquire a necessary base to develop analytical and design skills.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Apply various numerical methods to find roots of equations and interpolating polynomials.
- CO 2: Apply numerical methods to initial value problems and problems involving integration.
- CO 3: Find the Fourier series of a given function and study the convergence of the series.
- CO 4: Find the Fourier transforms for given functions.
- CO 5: Apply method of separation of variables to solve one dimensional heat equation and wave equation and two dimensional laplace equations.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO2 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO3 (K2)	2	1	-	-	-	-	-	-	-	-	-	-
CO4 (K2)	2	1	-	-	-	-	-	-	-	-	-	-
CO5 (K3)	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K3)	-	3	2
CO2 (K3)	-	3	2
CO3 (K2)	-	-	-
CO4 (K2)	2	-	1
CO5 (K3)	-	3	-

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

Introduction- Bisection method – Method of false position – Iteration method – Newton - Raphson method.

Errors in polynomial interpolation – Finite differences- Forward differences- Backward differences – Central differences – Relation between operators - Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unequal intervals - Lagrange's interpolation formula.

UNIT II:**Numerical Integration and solution of Ordinary Differential equations:**

Trapezoidal rule- Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rule-Solution of ordinary differential equations by Taylor's series-Picard's method of successive approximations-Euler's method, Modified Euler's method – Runge - Kutta method (fourth order).

UNIT III:**Fourier Series:**

Fourier series of periodic function - Dirichlet's conditions for Fourier expansion - Functions having points of discontinuities-Change of interval – Even and odd functions – Half-range series.

UNIT IV:**Fourier Transforms:**

Fourier integral theorem (without proof) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT V:**Applications of Partial Differential Equations:**

Classification of Higher order P.D.E - Method of separation of Variables- Solution of One dimensional Wave equation, Heat equation and two-dimensional Laplace equation.

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. V. Ravindranath and P. Vijayalakshmi, Mathematical Methods, Himalaya Publishing House.

Reference Books:

1. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.
3. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.
4. Higher engineering mathematics by John Bird, 5th edition Elsevier Limited, 2006.
5. Advance engineering mathematics by SRK Iyengar, Alpha Sciences International Publication.

Web Links:

1. <https://en.wikipedia.org/wiki/Portal:Mathematics>
2. <http://mathworld.wolfram.com>
3. <https://www.khanacademy.org>
4. <http://nptel.ac.in/courses/122104017>

ENGINEERING PHYSICS
(Common to CE, ME, Min.E, PT & Ag.E)

II Semester	L	T	P	C
Course Code: 171BS2T07	3	1	0	3

Course Objectives:

- COB 1: To equip the students with basic knowledge of physics in the areas of optics and lasers.
- COB 2: To impart the basic knowledge of sound and material science.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Make use of the basic concepts of interference and relate to the principle of interferometer.
- CO 2: Relate the basic concepts of diffraction to illustrate the principle of optical instruments like Telescope & microscope.
- CO 3: Explain the basic concepts of polarization, principle of polarimeter and the method of producing high intensity light beams.
- CO 4: Explain the basic concepts of sound waves, ultrasonics, crystal structure and X-ray diffraction Techniques.
- CO 5: Classify different types of solids, to use the appropriate solid as per its magnetic and dielectric properties.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	-	-	-	-	-	-	-	-	-	-	-
CO2 (K2)	2	-	-	-	-	-	-	-	-	-	-	-
CO3 (K2)	2	-	-	-	-	-	-	-	-	-	-	-
CO4 (K2)	2	-	-	-	-	-	-	-	-	-	-	-
CO5 (K2)	2	-	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K3)	-	-	-
CO2 (K2)	-	2	-
CO3 (K2)	-	-	-
CO4 (K2)	-	-	1
CO5 (K2)	-	2	1

UNIT-I:**INTERFERENCE:**

Principle of Superposition – Coherence – Interference in thin films (reflection geometry)– Newton’s rings – construction and basic principle of Interferometer.

UNIT-II:**DIFFRACTION:**

Fraunhofer diffraction at single slit - Cases of double slit, N-slits, & circular aperture, Grating equation – Rayleigh criterion of resolving power-Resolving power of a grating, Telescope and Microscopes.

UNIT-III:**POLARIZATION:**

Types of Polarization-production - Nicol Prism -Quarter wave plate and Half Wave plate-working principle of polarimeter (Sacharimeter)

LASERS:

Characteristics– Stimulated emission – Einstein’s Transition Probabilities-Pumping schemes - Ruby laser – Helium Neon laser-CO₂ Laser-Applications

UNIT-IV:**ACOUSTICS:**

Reverberation time - Sabine’s formula – Acoustics of concert-hall.

ULTRASONICS:

Production - Ultrasonic transducers- Non-Destructive Testing-Applications.

CRYSTALLOGRAPHY & X-RAY DIFFRACTION:

Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cell- packing fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg’s law-Bragg’s x-ray spectrometer.

UNIT-V:**MAGNETISM:**

Classification based on Field, Temperature and order/disorder –atomic origin – Ferromagnetism- Hysteresis- applications of magnetic materials (Para & Ferro).

DIELECTRICS:

Electric Polarization – Dielectric in DC fields – Internal field – Clausius Mossoti Equation –Dielectric loss- Ferroelectric Hysteresis and applications.

Text Books:

- 1 Engineering Physics – by M. N. Avadhanulu and T.V.S. Arun Murthy, S. Chand & Company Ltd.,
- 2 Physics for Engineers by M. R. Srinivasan, New Age international publishers (2009).
- 3 Engineering Physics by D. K. Bhattacharya and Poonam Tandon, Oxford press (2015).

Reference books:

- 1 Applied Physics by P. K. Palanisamy, Scitech publications (2014).
- 2 ‘Solid State Physics’ by A. J. Dekker, Mc Millan Publishers (2011).

Web Links:

1. <http://nptel.ac.in/courses/122107035/11>
2. <http://nptel.ac.in/courses/115102023/>
3. <https://phet.colorado.edu/en/simulations/category/physics>
4. <http://physicsgecg.blogspot.in/p/reading-materials.html>
5. <https://sites.google.com/site/physicsbysureshsaganti/home>

ENGINEERING DRAWING
(Common to CE, EEE, ME, Min.E, PT & Ag.E)

II Semester	L	T	P	C
Course Code: 171ES2T03	3	0	3	3

Course Objectives:

- COB 1: To impart the knowledge for drawing various types of polygons, conic sections and scales.
- COB 2: To improve the visualization skills of the students for representing the 3D objects in 2D planes.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Sketch the polygons, conics and scales by using the principles of drawing.
- CO 2: Draw Orthographic projections of points and lines.
- CO 3: Draw Orthographic projections of planes in various positions.
- CO 4: Draw Orthographic projections of solids in various positions.
- CO 5: Construct isometric scale and isometric projections.
- CO 6: Convert isometric view in to orthographic views.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	2	1	-	-	-	-	-	-	-	-	-
CO2 (K3)	3	2	1	-	-	-	-	-	-	-	-	-
CO3 (K3)	3	2	1	-	-	-	-	-	-	-	-	-
CO4 (K3)	3	2	1	-	-	-	-	-	-	-	-	-
CO5 (K3)	3	2	1	-	3	-	-	-	-	3	-	-
CO6 (K3)	3	2	1	-	3	-	-	-	-	3	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K3)	3	3	2
CO2 (K3)	-	3	-
CO3 (K3)	-	3	-
CO4 (K3)	-	-	-
CO5 (K3)	3	3	2
CO6 (K3)	3	3	2

UNIT-I**Introduction to Engineering Drawing:**

Lettering, Dimensioning, Types of lines.

Geometrical Constructions:

Construction of regular polygons by general method and inscribing circle method.
Special methods for pentagon and hexagon.

Conic Sections:

Ellipse, Parabola and Hyperbola by general method (eccentricity method) and special methods.

Scales:

Plain Scale, Diagonal Scale and Vernier Scales.

UNIT-II**Orthographic Projections:**

Introduction to orthographic projections, Projections of Points, Projections of Lines.

UNIT-III**Projections of Planes:**

Regular planes perpendicular/parallel to one reference plane and inclined to other reference plane; inclined to both the reference planes.

UNIT-IV**Projections of Solids:**

Prisms, Pyramids, Cones and Cylinders with the axis parallel to both the reference planes and axis inclined to one of the reference planes.

UNIT-V**Isometric Projections**

Isometric Scale, Isometric Projections, Conversion of Isometric views into Orthographic projections.

Text Books:

1. Engineering Drawing by N.D.Bhatt, Charotar Publishers.
2. Engineering Drawing by K.L.Narayana and P. Kannaiah. Scitech Publishers.

Reference Books:

1. Engineering Drawing by K. Venugopal, New Age Publications.
2. Engineering Drawing by M. B. Shah & B.C. Rana., Pearson's Publishers.
3. Engineering Drawing by B. Agrawal & C.M. Agrawal, Tata Mcgraw Hill Publishers.

Web Links:

1. <http://nptel.ac.in/courses/112103019>
2. <http://freevideolectures.com/Course/3420/Engineering-Drawing>
3. <http://engineeringdrawing.org>
4. <http://inoxwap.com/video/category/engineering-drawing-for-first-year-engineering.html>

THEORY OF MACHINES
(Only Ag.E)

II Semester	L	T	P	C
Course Code: 171ES2T08	3	1	0	3

Course Objectives:

- COB 1: To impart the knowledge on the role of kinematics of machinery, the mechanisms and machines.
- COB 2: To make the students calculate the parameters of mechanical power transmission systems.
- COB 3: To educate the students about the knowledge in analytical and graphical methods for calculating balancing of rotary and reciprocating masses.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Determine the velocity and acceleration for different mechanisms by graphical and analytical methods.
- CO 2: Compute the parameters of mechanical components for power transmission.
- CO 3: Determine the parameters of gears and gear trains.
- CO 4: Determine the parameters for various types of governors.
- CO 5: Calculate the balancing forces of rotating and reciprocating masses.
- CO 6: Calculate the weight and moment of inertia of fly wheels.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	2	1	-	-	-	-	-	-	-	-	-
CO2 (K3)	3	2	1	-	-	-	-	-	-	-	-	-
CO3 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO4 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO5 (K3)	3	2	1	1	-	-	-	-	-	-	-	-
CO6 (K3)	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K3)	3	2	2
CO2 (K3)	3	3	3
CO3 (K3)	2	-	1
CO4 (K3)	2	-	1
CO5 (K3)	-	3	2
CO6 (K3)	2	-	1

UNIT – I:

Introduction, Elements, links, pairs, kinematics pairs chains and mechanisms. Classification of pairs and mechanisms. Lower and higher pairs. Four bar chain, slider crank chain and their inversions. Determination of velocity and acceleration using graphical (relative velocity and acceleration) method.

UNIT – II:

Belt drives, types of drives. Belt materials, Length of belt, Power transmission, Velocity ratio Effect of centrifugal tension Creep and slip on power transmission. Chain drives. Types of friction, laws of dry friction, Rolling friction, Anti-friction bearings.

UNIT – III:

Types of gears. Law of gearing, velocity of sliding between two teeth in mesh. Involute and cycloidal profile for gear teeth. Spur gear, nomenclature, interference and undercutting. Introduction to helical, spiral, bevel and worm gear. Simple, compound, reverted, and epicyclic trains. Determining velocity ratio by tabular method.

Unit – IV:

Types of governors. constructional details and analysis of Watt/Centrifugal governors – spread of governors. Effect of friction, Sensitiveness, stability, hunting, isochronisms, power and effort of a governor.

Unit – V:

Static and dynamic balancing. Balancing of rotating masses in one and different planes. Partial primary balancing of reciprocating masses. Weight of flywheel, flywheel applications.

Text Books:

1. Rattan. S.S. Theory of Machines. Tata Mc Graw Hill Publishing Company Limited. New Delhi.
2. Lal. J.S., Theory of machines. Metropolitan Publishers., New Delhi.

Reference Books:

1. Erdman.A.G and Sandor G.N. Mechanism Design:Analysis Synthesis (Vol. 1 and 2).Prentice Hall of India, New Delhi.
2. Rao, J.S. Theory of Machines through solved problems. New Age International publishers,New Delhi.
3. Balleney, P.L. Theory of Machines. ,Khanna Publishers, New Delhi.
4. Theory of Machines, Thomas Bevan 1984, CBS Publishers.

Web Links:

1. <http://nptel.ac.in/courses/112104121/16>
2. <http://nptel.ac.in/courses/112105219/>
3. https://www.tutorialspoint.com/theory_of_machines/gear_and_gear_trains.asp
4. <http://nptel.ac.in/courses/112104114/17>
5. <http://nptel.ac.in/courses/112101096/download/lecture-3.pdf>

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

II Semester	L	T	P	C
Course Code: 171HS2L02	0	0	3	2

Course Objectives:

- COB 1: To facilitate computer-aided multi-media instruction enabling individualized and independent language learning.
- COB 2: To improve the fluency in spoken English and neutralize mother tongue Influence.
- COB 3: To train students to use language appropriately

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Illustrate interpersonal skills using language confidently and effectively for personal and profession growth.
- CO 2: Make use of effective delivery strategies to select, compile, and synthesize information for an oral presentation.
- CO 3: Demonstrate in mock interviews, mock group discussion and public speaking.
- CO 4: Identify communicative competency to respond to others in different situations.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	-	-	-	-	2	-	-	-	-	3	-	-
CO2 (K3)	-	-	-	-	3	-	-	-	-	2	-	-
CO3 (K2)	-	-	-	-	2	-	-	-	-	3	-	-
CO4 (K3)	-	-	-	-	3	-	-	-	-	2	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K2)	-	-	-
CO2 (K3)	-	-	-
CO3 (K2)	2	-	1
CO4 (K3)	-	-	-

PRACTICE 1:
Body Language

PRACTICE 2:
Dialogues

PRACTICE 3:
Presentation Skills

PRACTICE 4:
Group Discussion

PRACTICE 5:
Interviews and Telephonic Interviews.

PRACTICE 6:
Debates

Reference Books:

1. Strengthen your Communication Skills by Dr.M.Hari Prasad, Dr.Salivendra J.Raju and Dr.G.Suvarna Lakshmi, Maruthi Publications.
2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. A Handbook of English for Professionals by Prof Eliah, B.S Publications.
4. Effective Technical Communication by M. Ashraf Rizvi, Tata Mcraw – Hill Publishing Company.
5. Cornerstone, Developing soft skills, Pearson Education.

ENGINEERING PHYSICS LAB
(Common to CE, ME, Min.E, PT & Ag.E)

II Semester	L	T	P	C
Course Code: 171BS2L02	0	0	3	2

Course Objectives:

- COB 1: To make the students gain practical knowledge to co- relate with the theoretical studies.
- COB 2: To impart skills in measurements.
- COB 3: To plan the experimental procedure and to record and process the results.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Use spectrometer, polarimeter, travelling microscope for making measurements.
- CO 2: Determine energy gap of a semiconductor, draw characteristic curves to estimate thermal coefficient of a thermistor, zener diode.
- CO 3: Determine the rigidity and determine frequency of an unknown electric vibrator.
- CO 4: Determine wavelength of unknown source, the width of narrow slits, spacing Between close rulings using lasers and appreciate the accuracy in measurements.
- CO 5: Verify magnetic field along the axis of a circular coil.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	-	-	-	3	-	-	-	-	-	-	-
CO2 (K2)	2	-	-	-	2	-	-	-	-	-	-	-
CO3 (K3)	3	-	-	-	3	-	-	-	-	-	-	-
CO4 (K3)	3	-	-	-	3	-	-	-	-	-	-	-
CO5 (K3)	3	-	-	-	3	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K3)	-	3	2
CO2 (K2)	2	-	1
CO3 (K3)	-	3	2
CO4 (K3)	3	3	2
CO5 (K3)	-	3	2

LIST OF EXPERIMENTS:**(Any 10 of the following listed experiments)**

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration-Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of vibrations in stretched strings – Sonometer.
8. Determination of velocity of sound – Volume Resonator.
9. L- C- R Series Resonance Circuit.
10. Study of I/V Characteristics of Semiconductor diode.
11. I/V characteristics of Zener diode.
12. Characteristics of Thermistor – Temperature Coefficients.
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
14. Energy Band gap of a Semiconductor p - n junction.
15. Hall Effect in semiconductors.
16. Time constant of CR circuit.
17. Determination of wavelength of laser source using diffraction grating.
18. Determination of Young's modulus by method of single cantilever oscillations.
19. Determination of lattice constant – lattice dimensions kit.
20. Determination of Planck's constant using photocell.
21. Determination of surface tension of liquid by capillary rise method.
22. Polarimeter – Determination of specific rotation of sugar solution.
23. Single Slit – Determination of Slit width using laser or Determination of Wavelength of laser.

Reference Books:

1. Engineering Physics Lab Manual by Dr.C.V.Madhusudhana Rao, V.Vasanth Kumar, Scitech Publications.
2. Laboratory Manual Cum Record for Engineering Physics I & II by Dr.Y.Aparna, Dr.K.Venkateswara Rao, VGS Technoseries.

ENGINEERING WORKSHOP & IT WORKSHOP
(Common to all branches)

II Semester	L	T	P	C
Course Code: 171ES2L02	0	0	3	2

ENGINEERING WORKSHOP**Course Objectives:**

- COB 1: To impart hands-on practice on basic engineering trades and skills.
- COB 2: To nurture the students to be able to build various joints used in different trades used for various domestic and Industrial applications.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Construct the various wooden joints.
- CO 2: Prepare the various fitting joints.
- CO 3: Experiment with different shapes by black smithy.
- CO 4: Develop components for making the various sheet metal models.
- CO 5: Experiment with the various house wiring connections.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	2	1	-	1	-	-	-	-	-	-	-
CO2 (K3)	3	2	1	-	1	-	-	-	-	-	-	-
CO3 (K3)	3	2	1	-	1	-	-	-	-	-	-	-
CO4 (K3)	3	2	1	-	1	-	-	-	-	-	-	-
CO5 (K3)	3	2	1	-	1	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K3)	3	-	2
CO2 (K3)	-	3	-
CO3 (K3)	-	-	2
CO4 (K3)	3	-	2
CO5 (K3)	3	-	2

Trade:**Carpentry:**

1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint

Fitting:

1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

Black Smithy:

1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt

House Wiring:

1. Parallel / Series Connection of three bulbs
2. Stair Case wiring
3. Florescent Lamp Fitting
4. Measurement of Earth Resistance

Tin Smithy:

1. Taper Tray
2. Square Box without lid
3. Open Scoop
4. Funnel

Reference Books:

1. Engineering Workshop Dr. A. B. Srinivasa Rao, AMIGO Books.
2. Manual on Workshop practice by Dr. P.Kannaiah & Dr. K.L.Narayana, Scitech publications.

IT WORKSHOP**Course Objectives:**

- COB 1: To nurture the students to identify the basic components of a computer.
- COB 2: To demonstrate the process of assembling and disassembling of computer parts.
- COB 3: To explain the installation of operating systems.
- COB 4: To make the students develop applications like spread sheet, documents, presentation using the software like MS office, LATEX.
- COB 5: To illustrate the usage of internet.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Identify various components and its functions.
- CO 2: Apply the knowledge of computer peripherals in assembling, disassembling and troubleshooting of personal computer.
- CO 3: Experiment with installation of operating system and make the computer ready to use.
- CO 4: Prepare word documents, excel sheets and power point presentation.
- CO 5: Develop LaTeX documents to handling equations and images effectively.
- CO 6: Make use of internet to enhance their technical skills.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K1)	1	-	-	-	1	1	-	-	-	-	-	-
CO2 (K3)	3	2	1	1	3	3	-	-	-	-	-	-
CO3 (K3)	3	-	-	-	1	1	-	-	-	-	-	-
CO4 (K3)	3	2	1	1	3	3	-	-	-	-	-	-
CO5 (K3)	3	2	1	1	3	3	-	-	-	-	-	-
CO6 (K3)	3	2	1	1	3	3	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K1)	1	-	-
CO2 (K3)	-	3	2
CO3 (K3)	-	-	-
CO4 (K3)	3	3	2
CO5 (K3)	3	3	2
CO6 (K3)	3	3	2

Exercise 1: Identification of peripherals of a computer

Block diagram of the CPU along with the configuration of the each peripheral and its functions.

Exercise 2: System Assembling and Disassembling

Disassembling the components of a PC and assemble them back to working condition.

Exercise 3: Installation of softwares

Installation of operating Systems: Windows, Linux along with necessary Device Drivers, Installation of application softwares and Tools.

Exercise 4: Troubleshooting (Demonstration)

Hardware Troubleshooting: Identification of a problem and fixing a defective PC
Software Troubleshooting: Identification of a problem and fixing the PC for any software issues.

Exercise 5: Network Configuration and Internet

Configuring TCP/IP, proxy and firewall settings, Internet and World Wide Web- Search Engines, Types of search engines, netiquette, cyber hygiene.

Exercise 6: MS-Office / Open Office

- a. Word - Formatting, Page Borders, Reviewing, Equations, symbols.
- b. Spread Sheet - organize data, usage of formula, graphs and charts.
- c. Power point - features of power point, guidelines for preparing an effective Presentation.
- d. Access- creation of database, validate data.

Exercise 7: LaTeX

LaTeX - basic formatting, handling equations and images.

Reference Books:

1. Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance, K.L. James, Eastern Economy Edition.
2. Microsoft Office 2007: Introductory Concepts and Techniques, Windows XP Edition by Gary B. Shelly, Misty E. Vermaat and Thomas J. Cashman (2007, Paperback).
3. LATEX- User's Guide and Reference manual, Leslie Lamport, Pearson, LPE, 2/e.
4. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008.
5. The Complete Computer upgrade and repair book, 3/e, Cheryl A Schmidt, Dream tech.
6. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dream tech.
7. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

Web Links:

1. <https://assemblyourpc.net>
2. <https://lifehacker.com>
3. <http://www.teachmsoffice.com>
4. <https://www.latex-tutorial.com/tutorials>
