R G M COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, KURNOOL DIST., A.P., INDIA

DEPARTMENT OF
ELECTRICAL AND ELECTRONICS ENGINEERING (EEE)

(ESTD-1995)

B.TECH SYLLABUS 2019

Applicable for students admitted into
B.Tech (Regular) from 2019-20
B.Tech (Lateral Entry Scheme) from 2020-21
REGULATIONS, Course Structure & Detailed Syllabus

(Affiliated to J.N.T.U.A, Anantapuramu)

Head of Department
Electrical & Electronics Engineering
RGM College of Engineering & Tech.
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R G M COLLEGE OF ENGINEERING AND TECHNOLOGY
AUTONOMOUS
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABI
B.Tech. (Regular) from 2019-20 and B.Tech. (Lateral Entry Scheme) from 2020-21

For pursuing four year Bachelor Degree Program (under graduate) of study in Engineering (B.Tech.), Two year Master (post graduate) Degree of study in Engineering (M.Tech.), Two year Master (post graduate) degree of study in Business Administration (MBA), Three-year Master (post graduate) Degree of study in Computer Applications (MCA) offered by Rajeev Gandhi Memorial College of Engineering and Technology, Nandyal -518501 under Autonomous status and herein referred to as RGMCET (Autonomous).

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2019-20 onwards. Any reference to "Institute" or "College" in these rules and regulations shall stand for Rajeev Gandhi Memorial College of Engineering and Technology (Autonomous).

All the rules and regulations, specified hereafter shall be read as a whole for the purpose of interpretation. As and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, the Principal, Rajeev Gandhi Memorial College of Engineering and Technology shall be the Chairman, Academic Council.

The candidate seeking admission into the first year of study of four year B.Tech degree Program should have:

i) Passed either Intermediate Public Examination (IPE) conducted by the Board of Intermediate Education, Andhra Pradesh with Mathematics, Physics and Chemistry as optional subjects (or any equivalent examination certified by Board of Intermediate Education) or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or any equivalent examination certified by State Board of Technical Education) for admission.

ii) Secured a rank in the EAMCET examination conducted by AP State Council for Higher Education (APSCHE) for allotment of a seat by the Convener, EAMCET, for admission.

Admission Procedure:

As per the norms of A.P. State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made to the first year of Four year B.Tech. Degree program as follows:-

a) As per the norms of Government of Andhra Pradesh, A-Category (based on the rank obtained in EAMCET) seats will be filled by the Convener, EAMCET.

b) As per the norms of Government of Andhra Pradesh, B-Category seats will be filled by the management.

Admission to the Second year of Four year B.Tech. Degree Program in Engineering:

i) Candidates qualified in ECET and admitted by the Convener, ECET, in such cases for admission, when needed permission from the statutory bodies is to be obtained.

ii) 10% of the sanctioned strength in each program of study (of RGMCET) shall be filled by the Convener, ECET as lateral entry.

List of Programs offered

1. B.Tech – Regular & Lateral Entry
2. M.Tech – Regular
3. MBA – Regular
4. MCA – Regular

Academic Regulations for 2019 B. Tech. (Regular)

(Effective for the students admitted into the I year from the Academic Year 2019-2020)

The B.Tech. Degree be conferred by the Jawaharlal Nehru Technological University Anantapur, Anantapuramu, students who are admitted to the program and fulfill all the requirements for the award of the Degree as specified below:

1.0 Award of B.Tech. Degree

1.1 The student will be declared eligible for the award of the B. Tech. degree if he fulfils the following academic regulations:

1.2 Pursued a course of study for not less than prescribed course work duration and not more than double the prescribed course work duration.

1.3 Registered for 160 credits and secured 160 credits with compulsory subjects as listed in Table-1.

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Table 1: Compulsory Subjects

S.No	SUBJECT PARTICULARS
1	All the subjects offered in B.Tech course / MOOCs
2	Mandatory Learning Courses [Environmental Science, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge]
3	All practical subjects
4	All Skill Development Courses/ value added courses
5	Mini projects
6	Comprehensive Viva-Voce
7	Seminar
8	Internship
9	Extra Academic Activities-EAA
10	Life Science
11	Project work Phase-I
12	Project Work Phase-II

2.0 Forfeit of seat

Students, who fail to fulfill all the academic requirements for the award of the degree within **eight academic years** from the year of their admission, shall forfeit their seat in B.Tech. course.

3.0 Courses of study

The following courses of study are offered at present as specializations for the B.Tech. Course: and any other course as approved by the authorities of the University from time to time.

1. **Civil Engineering**
2. **Computer Science and Engineering**
3. **Electrical and Electronics Engineering**
4. **Electronics and Communication Engineering**
5. **Mechanical Engineering**

Table 2: Credits

Subject	Semester			
	Periods/ Week	Credits	Internal Marks (IM)	External Marks (EM)
Theory	2+1*	03	30	70
English Theory	2+1*	02	30	70
Life Science	2	02	30	70
Mandatory Learning Courses	03	00	00	00
Mini project/ Practical	03	1.5	25	50
Drawing	03	03	30	70
Skill Development Courses/Value Added Course	1+2*	0.5**	30	70
Comprehensive Viva (CV)	--	0.5	00	50
Extra Academic Activities	2	00	00	00
Seminar		0.5	50	00
Internship		1.0	00	Certificate from Internship Agency
Project Phase-I		1.0	25	00
Project Phase-II	--	06	25	100

*Tutorial

**[Skill Development / value Added Courses credits will not be considered for the award of division.

However, all these courses have to be cleared through internal evaluation by scoring minimum of 40% marks. The credits obtained in Skill development courses will be taken in to account for the award of degree.]

Note:- Mandatory Learning Courses /EAA will not carry any credits but attendance requirements of 75% should be fulfilled otherwise they have to reregister to fulfill academic requirements.

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4.0 Distribution and Weightage of Marks

4.1 The performance of the student in each semester shall be evaluated subject –wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, mini-project, Comprehensive Viva-Voce (CV) shall be evaluated for 50 marks each and the project work shall be evaluated for 150 marks.

4.2 For theory subjects, the distribution shall be 30 marks for Internal Evaluation (20 marks for internal test and 10 marks for assignment or field work/group task/Online test) and 70 marks for the End-Examination.

4.3 During the semester there shall be 2 tests for theory subjects. In each Internal test there shall be one compulsory (short answers) question and 3 descriptive questions are to be answered. The duration of internal test will be for 2hours. First test to be conducted in 3 units and second test to be conducted in the remaining 3 units of each subject. For awarding of 20 Internal marks the performance of the student in two Internal examinations conducted one in the middle of the semester and the other towards the end of the semester giving a weight age of 0.75 for the better score and 0.25 for the other score will be considered. There shall be two assignments in each subject (problem based/ field work/group task/Online test) for award of 10 marks so that internal component (marks) will be 30 marks (20 marks for internal test+10 marks for assignments / field work/group task).

Table 3: Units for Internal Tests

Semester	
3 Units	First Internal test
3 Units	Second Internal test

4.4 In the case of Skill Development Courses, two Internal examinations shall be conducted one in the middle of the semester and the other at the end of the semester for 30 marks and the marks scored by the student in these exams with a weight age of 0.75 for better score and 0.25 for the other score will be awarded as Internal marks for 30. For the remaining 70 marks an end examination will be conducted along with other theory examinations. However skill development courses/Value added courses, end examination will be evaluated internally.

4.5 No makeup test for internal examination or assignments/group tasks will be conducted in any subject or practical. The student, who is absent for any test shall be deemed to have scored zero marks in that subject.

4.6 Open and Professional Electives will commence from 3rd year Second semester onwards. The open elective offered in 3-2 semester will be based on self-study/MOOCs. All the students have to opt for the MOOCs (Self Study) and should acquire the required credits. If the student fails to opt for MOOCs, (Under unavoidable circumstances) he/she has to write two internal tests besides the end examination conducted by the institute (Elective offered in place of MOOCs by the Dept.) like other subjects. However, he/she has to obtain the certificate from the organization in which he has registered. Any MOOCs course selected by the student should be of more than 45 hours duration /12 weeks course with minimum of 3 credits and also from the reputed organization. Attendance of the student who has opted for MOOCs will be taken from the remaining subjects and labs only in that semester while finalizing the attendance for fulfilling the minimum requirements of attendance for promotion to the next semester. Attendance will not be recorded for MOOCs.

{Massive open online Courses (MOOCs') B.Tech students can avail the facility of earning up to a maximum of 5% credits of their degree requirements through MOOCs. MOOC courses eligible for this purpose are the courses offered by NPTEL/ SWAYAM/EDX/Course by any other reputed organisation approved by the department only. The student shall obtain prior approval of the Head of the Department before registering for MOOC's. MOOC courses can be taken in lieu of Elective courses such as Open Electives & Professional Electives (pertaining to their branch only) and Employability Enhancement Courses. No Core, Lab or Project Course can be dropped in lieu of MOOC. The student shall submit course Title, institute which offered MOOC, Examination system and Credits of the Course, duration of course - After deciding on the MOOC and a course which is approved as its equivalent in the curriculum a student can enrol for it and clear it any time as per his/her convenience and obtain the assessment certificate.

If the assessment certificate is submitted

(i) Before the commencement of the semester in which the equivalent course is offered, the student will be exempted from attending the regular class work and internal assessment exams of the equivalent subject.

(ii) During the semester the student is permitted to withdraw from the remaining part of the course work and internal assessment tests.

(iii) After the semester is over but before the results of that semester are declared the student can request for considering his performance in the MOOC in lieu of its equivalent.

The student shall submit to the HOD the original certificate issued by MOOC authorities along with a photocopy of the same. The original will be returned after verification and verification shall be certified by the Head of the Department on the photocopy which shall be kept in records. An equivalent Grade corresponding to grade/marks awarded by MOOC agency shall be determined by a committee consisting of Principal, Controller of Examinations, Dean Student affairs and HoD concerned. This equivalent Grade shall be shown in the grade sheet and accounted in the SGPA and CGPA calculations.

4.7 Gap Year – Concept of student Entrepreneur in Residence shall be introduced and the outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after I/II/III year to pursue full time entrepreneurship. This period may be extended for another one year (two years in total) and this period would not be counted for the maximum duration for completion of graduation. An evaluation committee shall be constituted to evaluate the proposal submitted by the student and committee shall decide on permitting the student for having the Gap Year. The committee consists of Principal as Chairman and all HODs as members.

4.8 In the open electives offered from III year II Sem onwards Student has to select the subjects among the list of open elective subjects by the other departments (inter - department). Student has to clear the subject as per norms to get the required credits. At least minimum of 40 students should register for any open elective; otherwise that open elective will not be offered.

4.9 Out of the professional electives offered from III Year II Semester onwards again one Professional elective in IV Year I Sem will be a MOOCs (Self Study) and the student has to acquire the required credits to clear the subject as specified in 4.6.

4.10 The institute would like to offer **Honours** and **Minor** as optional feature of the B. Tech program aimed at providing additional learning opportunities for academically motivated and bright students. In order to earn Honours or Minor, student has to earn a minimum of 20 extra credits. For this in addition to the regular subjects, a student has to pursue (Self-study/MOOCs) five additional subjects from 3-1 semester onwards and acquire the required credits. The Minor is indicated by separate CGPA and is reflected in the degree certificate as for example, B.Tech. in ECE with Minor in Artificial Intelligence. Each department shall offer at least one Minor and also Honours. The student has to select the subjects which are not studied in their regular course and student should have cleared all the subjects up to and including 2-1 semester with above 8.5 CGPA (for SC/ST students 8.0 CGPA) to become eligible for registration for Honours/Minor. GPA and CGPA of 8.0 has to be maintained in the subsequent semesters without any backlog subjects in order to keep the Minor/Honours discipline registration active else Minor/Honours registration will be cancelled. The breakup of the credits are 5 subjects which carry 15 credits @3 credits per subject and project work carries 5 credits. The evaluation pattern of subjects and project work will be similar to methods followed in regular course evaluation. No attendance minimum will be considered for Honours/Minor. Not more than two subjects are allowed for registration in any semester for Honours/ Minor. The student is eligible to receive B.Tech with Honours if he acquires the required additional credits in the same discipline in which he is pursuing his B.Tech. degree. If the students acquire the additional credits from other disciplines then he is eligible to receive B.Tech along with Minor degree in the specified area. Minimum strength for offering Minor/Honours in a discipline is considered as One-Fifth (20% of the class) of the class size and Maximum size would size would be Four-Fifth of Class size (i.e 80% of the class).

4.11 Extra - Academic Activity (EAA)

Each of the following activities carries 0 credits and every student is required to register for **two** activities during second year of study (one in each semester) which is mandatory.

a) ***NSS/NCC***
b) ***Games and Sports***
c) ***Yoga/Meditation***
d) ***Extension Activities***
e) ***Literary/ Cultural Activities***

Any other which may be offered in future.

The activities shall be carried out in the allotted hours. The activities will be monitored by the respective faculty in charge, senior faculty member of the department and the Department HOD. Grades will be awarded on the basis of participation, attendance, performance and behavior. Grades shall be entered in the marks statement as GOOD, SATISFACTORY and UNSATISFACTORY and shall not be counted towards CGPA calculation. If any student gets an Unsatisfactory Grade, he/she has to repeat the activity in the immediate subsequent year.

4.12 The student has an option of going for internship in IV year –II Sem in a reputed organization (The finalization of the internship organization will be as per college guidelines (HOD, two Senior faculty members of the department and same will be recommended to the Principal for approval). In case any student opted for intern ship he need not attend the classes however he has to write internal and external examination of subjects when ever conducted in that semester and acquire the required credits. The project work in the final semester may be carried out during the internship and same may be submitted for evaluation. Student has to acquire 01 credit by going for internship (minimum of Two weeks) / carrying out internal project work/ study project report on any industry/ attending work shop in reputed institutions for two weeks. Certificate from the organization has to be submitted to this effect attested by Head of the Department and Internship in charge to the academic section before the commencement of 3-2 semester. Student is expected to carry out the activities mentioned here during the summer break before the commencement of 3-1 semester.

4.13 The medium of instruction for all Course work, Examination, Seminar Presentations, Project Reports and all academic activities shall be English

5.0 Question Paper Pattern

5.1 Each Internal Test question paper shall contain 5 questions, of which the First question is compulsory and three questions are to be answered from the remaining four. Compulsory question carries 5 marks (It contains 5 questions of one marks - no choice in first question). The remaining 3 questions carry 5 marks each. Each question shall have a,b,c.... parts.

5.2 The End Examination question paper will have 7 questions and students have to answer5 questions. However, the first question is compulsory and it consists of 7 short answer questions, each carrying 2 marks. The next 4 questions are to be answered from the remaining 6 questions and each carries 14 marks. Each 14 marks question shall have a, b, c .. parts. Evaluation of answer scripts shall be done by either Internal or External examiners appointed by the Principal. A minimum of 50% of subjects will be evaluated by external examiners.

5.3 For practical subjects, there shall be a continuous evaluation during the semester for 25 internal marks and End Examination carries 50 marks. Of the 25 marks for Internal, 15 marks shall be awarded for day-to-day work, 5 marks to be awarded by conducting an internal laboratory test and 05 marks will be allotted for any creativity/ innovation/ additional learning in lab beyond prescribed set of experiments etc. The End Examination shall be conducted by the teacher concerned and an external Examiner from other institutions.

5.4 For the subject having design and/or drawing, (such as Engineering Graphics, Machine Drawing etc.) and estimation, the distribution shall be 30 marks for Internal evaluation (15marks for day-to-day work and 5 marks for Internal tests and 10 marks for assignments) and 70 marks for End Examination. There shall be two internal tests in a Semester and the better of the two shall be considered for the award of marks for internal tests.

5.5 The Engineering drawing, wherever offered is to be treated as a theory subject. Evaluation method adopted for theory subjects shall be followed here as well.

5.6 There shall be two Mini-Projects, in collaboration with an industry/EPICS (Engineering Projects In Community Services) (wherever is possible) of their specialization, to be taken up during the vacation (data collection, components etc.) after II year II and III Year II Semester examination and implementation/simulation shall be carried out in III year I semester and IV Year I Semester during lab classes. Implementation or fabrication/simulation of mini projects will be treated as laboratory. However, the mini project and its report shall be evaluated in III year I Semester and IV Year I semester. The mini project shall be submitted in the report form and should be presented before the committee, which shall be evaluated for 50 marks. The committee consists of an external Examiner, Head of the Department and the supervisor of mini project. There shall be 25 internal marks for mini project which will be awarded based on the performance and involvement of the student during mini project period.

5.7 There shall be comprehensive Viva-Voce examination at the end of each semester.CV Examination shall be conducted by the committee consisting of Senior faculty (based on the recommendation of HOD), an external Examiner from other institutions and HOD and evaluated for 50 marks.

5.8 The project topic should be approved by Internal Department Committee (IDC). Out of total 150 marks for the project work, 50 marks shall be for Internal Evaluation (25 marks for Phase-I and 25 marks for Phase-II) and 100 marks for the End Semester Examination. The evaluation of project work phase-I shall be conducted at the end of the IV year I semester and Phase-II shall be conducted at the end of the IV year II semester. The project viva voce examination will be conducted by the committee consisting of an external Examiner from other institute, Head of the Department and the supervisor of the project. The Internal evaluation for 50 marks shall be on the basis of two seminars (25 marks for Phase-I and 25 marks for Phase-II) given by each student on the topic of the project. The Internal evaluation of the

project work for 50 marks shall be conducted by the committee consisting of head of the Department or his nominee, senior faculty member and the supervisor of project.

5.9 For all practical/mini project/main project/CV etc. the HOD of the concerned dept. shall submit a panel of 4 external examiners from different institutes and one will be selected by the Chief Superintendent of the Examination for conducting of end examination.

5.10 Revaluation of End Examination Scripts: Revaluation of End Examination scripts is allowed for theory subjects only by paying requisite fee. Procedure for Revaluation: The script will be revaluated by an examiner appointed by the Principal. The maximum of revaluation and regular end examination grade will be awarded for that subject. Student can apply for revaluation in a subject only once.

Table4: Distribution of weightages for examination and evaluation

Sl. No.	Nature of subject	Marks	Type of examination and mode of assessment		Scheme of Examination
1	Theory	70	End Examination. Both internal and external Evaluation(at least a minimum of 50% subjects will be sent for external evaluation)		End Examination in theory subjects will be for 70 marks.
		30	20	Internal Examinations (Internal evaluation)	These 20 marks are awarded to the students based on the performance in two (per semester) Internal examinations with a weightage of 0.75 for better score and 0.25 for the other score.
			10	Assignments/Field work/Group task/Online Test (Objective Type) (Internal evaluation)	Average of two assignments /Field work/group task in a semester each evaluated for 10 marks.
2	Practical	50	End lab examination (External evaluation)		This End Examination in practical subjects will be for a maximum of 50 marks.
		25	15	Internal evaluation	Day-to-day performance in lab experiments and record.
			05	Internal evaluation	Internal lab examination at the end of year/semester
			05	Internal evaluation	05 marks will be allotted for any creativity/ innovation/ additional learning in lab beyond prescribed set of experiments etc.
3	Mini Project	50	End Examination (External evaluation)		This End Examination in mini project will be for a maximum of 50 marks.
		25	Internal evaluation		Day-to-day performance in executing mini project.
4	Comprehensive Viva-Voce(CV)	50	External evaluation		This end viva voce examinations in all the subjects for 50 marks.
5	Project work	100	External evaluation		This end viva voce in project work for 100 marks
		50	Internal evaluation 25 marks for Phase-I 25 Marks for Phase-II		These 50 marks will be based on the performance of the student in the project reviews apart from attendance and regularity(25 marks for Phase-I and 25 marks for Phase-II)
6	Skill Development Courses/ Value Added Course/ Mock interviews and Group Discussion	30	Internal evaluation		These 30 marks are awarded to the students based on the performance of two Internal examinations with a weight age of 0.75 for better score and 0.25 for the other score.
		70	Internal Evaluation		Based on the performance in the end examination.
7	Internship/Internal Project/Study Report/Work shop	00	-		Certificate form Internship Agency
8	Life Science	70	External Evaluation		End Examination in theory subjects will be for 70 marks.
		30	20	Internal Examinations (Internal evaluation)	These 20 marks are awarded to the students based on the performance in two (per semester) Internal examinations with a weightage of 0.75 for better score and 0.25 for the other score.
			10	Assignments/Field work/Group task/Online Test (Objective Type) (Internal evaluation)	Average of two assignments /Field work/group task in a semester each evaluated for 10 marks.
9	EAA	00	Internal evaluation		Based on performance and committee report.
10	Mandatory Learning Courses	00	Internal evaluation		No examinations. Attendance minimum is required

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6.0 Attendance Requirements:

6.1 The student shall be eligible to appear for End examinations of the semester if he acquires a minimum of 75% of attendance in aggregate of all the subjects of that semester.

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

6.3 The student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester. They may seek re-admission for that semester when offered next.

6.4 Shortage of Attendance below 65% in aggregate shall in <u>NO</u> case be condoned.

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

6.6 The stipulated fee shall be payable towards condonation of shortage of attendance.

7.0 Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.6.0.

7.1 The student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical or design or CV or drawing subject or Skill Development Coursesor project if he secures not less than 35% of marks in the End Examination and he has to score minimum of 40% marks from internal and external exam marks put together to clear the subject.

7.2 The student shall be promoted from II to III year only if he fulfils the academic requirement of securing a minimum of 40.5 credits out of 81 credits from all the exams conducted up to and including II year II semester regular examinations irrespective of whether the candidate takes the examination or not.

7.3 The student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing minimum of 61.5 credits out of 123 credits from all the exams conducted up to and including III year II semester regular examinations, whether the candidate takes the examinations or not.

Table 5: Promotion rules

Promotion from	Total credits to register	Minimum credits to obtain for promotion
II yr to III yr	81	40.5
III yr to IV yr	123	61.5

7.4 The student shall register and put up minimum attendance in all 160 credits and earn 160 credits. Grades obtained in 157 credits (excluding the credits obtained in Skill Development Courses/Value added courses) shall be considered for the calculation of CGPA.

7.5 Students who fail to earn 160 credits as indicated in the course structure in Table-1 within eight academic years from the year of their admission shall forfeit their seat in B.Tech. Course and their admission shall stand cancelled.

8.0 Course pattern:

8.1 The entire course of study is of four academic years. Each academic year consists of two semesters

8.2 The student is eligible to appear for the End Examination in a subject, but absent at it or has failed in the End Examination may appear for that subject at the supplementary examination.

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Table: 6: Course pattern

Year	Semester	No. of Subjects		No. of Skill Development Courses	Number of Labs		Total credits	
First Year	First	CE/ME/CSE 05 {CE-I-HSMC LAC-BSC MEC/AC-BSC PEE/EM/BEM-ESC PPS-I-ESC	ECE/EEE 05 {CE-I-HSMC LAC-BSC AP-BSC ED-ESC PPS-I-ESC}	00	CE/ME/CSE EC lab-BSC PPS-I Lab-ESC DEL Lab-HSMC CV-I	ECE/ EEE EP Lab-BSC PPS-I Lab-ESC EW&ITW-LC CV-I	4X3=12 1x2=02 3X1.5=4.5 1x0.5=0.5	19
	Second	05 {CE-II-HSMC OPDEVC-BSC AP/EP-BSC ED-ESC PPS-II-ESC}	05 {CE-II-HSMC OPDEVC-BSC MEC-BSC NA/BEE-ESC PPS-II-ESC}	00	EP lab-BSC PPS-II Lab-ESC EW&ITW-LC CV-II	EC lab-BSC PPS-II Lab-ESC DEL Lab-HSMC CV-II	4X3=12 1x2=02 3X1.5=4.5 1x0.5=0.5	19
Second Year	First	BSC Life Science Four Subjects	BSC Life Science Four Subjects	01	Subjects Life Science Labs CV (Comprehensive Viva)-III SDC/VAC EAA		5X3=15 1x2=2.0 3x1.5=4.5 1X0.5=0.5 1x0.5=0.5 No Credits	22.5
	Second	MC-I/MC-2/MC-3 Five Subjects SDC/VAC	MC-I/MC-2/MC-3 Five Subjects SDC/VAC	01	Subjects Labs CV (Comprehensive Viva)-IV SDC/VAC Mandatory Course-1/2/3 (ECE/CSE&EEE/CE&ME) (Indian Heritage, Culture Tradition) Mandatory Course-3 (Constitution of India) EAA		5X3=15 3X1.5=4.5 1X0.5=0.5 1x0.5=0.5 No Credits No Credits	20.5
Third Year	First	Five Subjects SDC/VAC MC-I/MC-2/MC-3	Five Subjects SDC/VAC MC-I/MC-2/MC-3	01	Subjects(05S) Labs SDC/VAC CV (Comprehensive Viva)-V Mandatory Course-1/2/3 (ECE/CSE&EEE/CE&ME) (Indian Heritage, Culture Tradition)		5X3=15 3X1.5=4.5 1x0.5=0.5 1X0.5=0.5 No Credits	20.5
	Second	03S + OEC1(MOOCs) + PEC1 MC-I/MC-2/MC-3	03S + OEC1(MOOCs) + PEC1 MC-I/MC-2/MC-3	01	Subjects(03S, OEC1, PEC1) Labs Mini Project-1(EPICS) SDC/VAC CV (Comprehensive Viva)-VI Internship Mandatory Course-1/2/3 (ECE/CSE&EEE/CE&ME) (Indian Heritage, Culture Tradition) Mandatory Course-3 (Constitution of India)		5X3=15 2x1.5=3.0 1x1.5=1.5 1X.5=0.5 1X0.5=0.5 1x1.0=1.0 No Credits	21.5
Fourth Year	First	1S+OEC2+OEC3+PEC2+PEC3 (MOOCs)		01	Subjects (01S, OEC2, OEC3, PEC2, PEC3) Labs SDC/VAC CV (Comprehensive Viva)-VII Project Phase 1 Mini project-2 (EPICS)		5X3=15 2X1.5=03 1X0.5=0.5 1X0.5=0.5 1x1.0=1.0 1X1.5=1.5	21.5
	Second	PEC4 + PEC5		01	Subjects (PEC4, PEC5) SDC/VAC CV (Comprehensive Viva)-VIII Seminar Project Phase-2/Internship		2X3=06 1X0.5=0.5 1X0.5=0.5 1x.5=0.5 1X8=08	15.5
							GRAND TOTAL	**160**
MC-1 (Environmental Studies), MC-2 (Indian Heritage, Culture Tradition), MC-3 (Constitution of India)								

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9.0 Transitory Regulations:

Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone this course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered subject to section 2.0 and they continue to be in the academic regulations in which they were readmitted.

10.0 With-holding of results:

If the candidate has any dues not paid to the Institute or if any case of indiscipline of malpractice is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

11.0 Award of Class:

After the 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:

Table 7: Award of Division

Class Awarded	% of marks to be secured	Division/ Class	CGPA	CGPA secured from 157 Credits (Excluding the credits obtained in Skill Development Courses)
First Class with Distinction	70% and above	First class With Distinction	≥ 7.5	
First Class	Below 70% but not less than 60%	First Class	≥ 6.5 and < 7.5	
Second Class	Below 60% but not less than 50%	Second Class	≥ 5.5 and < 6.5	
Pass Class	Below 50% but not less than 40%	Pass	≥ 4 and < 5.5	

12.0 **Grading*:***

After each subject is evaluated for 100 marks, the marks obtained in each subject will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student falls.

Table 8: Conversion into Grades and Grade points assigned

Range in which the % of marks in the subject fall	Grade	Grade point Assigned	Performance
90 to 100	O	10	Out standing
80 to 89.9	A^+	09	Excellent
70 to 79.9	A	08	Very Good
60 to 69.9	B^+	07	Good
50 to 59.9	B	06	Above Average
45 to 49.9	C	05	Average
40 to 44.9	P	04	Pass
<40	F	00	Fail
Ab	AB	00	Fail

12.1 Requirement for clearing any subject: The students have to obtain a minimum of 35% in End Examination and they have to score minimum of 40% marks from Internal and external exam marks put together to clear the subject. Otherwise they will be awarded fail grade.

12.2 F is considered as a fail grade indicating that the student has to reappear for the end supplementary examination in that subject and obtain a non-fail grade for clearing that subject.

12.3 In case of skill development/ value added course / soft skill subjects, as there is no end exam, all 100 marks are for internal assessment only. Student has to score 40% in these courses to complete the subject which will be evaluated internally. Marks obtained in these courses shall not be considered for award of Division.

12.4 To become eligible for the award of degree the student must obtain a minimum CGPA of 4.0

13.0 Supplementary Examinations:

Apart from the regular End Examinations, the institute may also schedule and conduct supplementary examinations for all subjects for the benefit of students with backlogs. Such students writing supplementary examinations as supplementary candidates may have to write more than one examination per day. For eighth semester, special (Advance) supplementary examinations will be conducted in second week following the results publication date of regular examination of eighth semester only.

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14.0 Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA)

The Grade Point Average (GPA) for each semester and Cumulative Grade Point Average (CGPA) up to any semester is calculated as follows:

i) Semester Grade Point Average will be computed as follows:

$$GPA = \frac{\sum_1^n C_j \times GP_j}{\sum_1^n C_j}$$

Where, n is the number of subjects in that semester. C_j is Credits for the subjects. GP_j is the grade point obtained for the subject and the summation is over all the subjects in that semester.

ii) A Cumulative Grade Point Average (CGPA) will be computed for every student at the end of each semester. The CGPA would give the cumulative performance of the student from the first semester up to the end of the semester to which it refers to and is calculated as follows:

$$CGPA = \frac{\sum_1^m GPA_j \times TC_j}{\sum_1^m TC_j}$$

Where 'm' is the number of semester under consideration. TC_j the total number of credits for a j^{th} semester and GPA_j is the Grade Point Average of the j^{th} semester. Both GPA and CGPA will be rounded off to the second digit after decimal and recorded as such.

While computing the GPA / CGPA, the subjects in which the student is awarded zero grade points will also be included.

For any academic/employment purpose the following formulae shall be used for conversion of CGPA to % of marks. % of marks = (CGPA –0.5) x 10.

15.0 Grade Sheet:

A grade sheet (Memorandum) will be issued to each student indicating his performance in all subjects of that semester in the form of grades and also indicating the GPA and CGPA.

16.0 Award of Degree

After having admitted into the program, B.Tech degree shall be conferred on a student who has satisfied the following conditions.

(i) The student joining with Intermediate qualification must have, after admission into the Regular B.Tech programme of the college, pursued a regular course of study for not less than four academic years and not more than eight academic years.

(ii) The student joining under lateral entry scheme with diploma qualification must have, after admission into III Semester B.Tech, pursued a regular course of study for not less than three academic years and not more than six academic years.

(iii) The student must have satisfied the minimum academic requirements in appropriate branch of engineering in each semester of the program, herein after prescribed.

(iv) Students must register for all the courses and earn the credits specified

(v) Students who fail to fulfil all the academic requirements for the award of degree within the specified period from the year of their admission shall forfeit their seat in B.Tech course and their admission stands cancelled.

(vi) The student shall successfully complete non-credit courses like EAA/MC/Internship.

(vii) The student has no dues to the institution, library, hostels etc.

(viii) The student has no disciplinary action pending against him/her.

The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu on recommendations by the Academic council of RGMCET (Autonomous) basing on the eligibility as in clause 6.0 and 7.0.

17.0 Transcripts:

After successful completion of prerequisite credits for the award of degree, a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued if required after the payment of requisite fee and also as per norms in vogue.

18.0 Rules of Discipline:

18.1 Any attempt by any student to influence the teachers, Examiners, faculty and staff of Examination section for undue favours in the exams, and bribing them either for marks or attendance will be treated as malpractice cases and the student can be debarred from the college.

18.2 When the student absents himself, he is treated as to have appeared and obtained zero marks in that subject(s) and grading is done accordingly.

18.3 When the performance of the student in any subject(s) is cancelled as a punishment for indiscipline, he is awarded zero marks in that subject(s).

18.4 When the student's answer book is confiscated for any kind of attempted or suspected malpractice, the decision of the Chief Superintendent is final.

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19.0 Minimum Instruction Days:

The minimum instruction days for each semester shall be 95 clear instruction days excluding the days allotted for tests/examinations and preparation holidays declared if any.

20.0 Amendment of Regulations:

The college may, from time to time, revise, amend or change the regulations, scheme of examinations and syllabi. However the academic regulations of any student will be same throughout the course of study in which the student has been admitted. However students will continue to be in the academic regulations in which they were readmitted.

21.0 Transfers

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

22.0 General:

22.1 The Academic Regulations should be read as a whole for the purpose of any interpretation.

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

22.3 The Institute 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 Institute.

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

Academic Regulations for B.Tech.
(Lateral Entry Scheme)

(Effective for the students getting admitted into II year from the Academic Year 2020-2021 onwards)

1.0 The Students have to acquire a minimum of 122 credits out of 122 from II to IV year of B.Tech. Program (Regular) for the award of the degree.

2.0 Students, who fail to fulfil the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.

3.0 The same attendance regulations are to be adopted as that of B. Tech. (Regular).

4.0 Promotion Rule:

The student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing minimum of 42.5 credits out of 85 credits from all the exams conducted up to and including III year II semester regular examinations, whether the candidate takes the examinations or not.

5.0 Award of Class:

After the 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: The marks obtained in the best 119 credits will be considered for the calculation of percentage and award of class.

Table 1: Award of Division

Class Awarded	% of marks to be secured	Division/ Class	CGPA	CGPA secured from 119 Credits (Excluding the credits obtained in Skill Development Courses)
First Class with Distinction	70% and above	First class With Distinction	≥ 7.5	
First Class	Below 70% but not less than 60%	First Class	$6.5 and < 7.5$	
Second Class	Below 60% but not less than 50%	Second Class	$\geq 5.5 \; and \; < 6.5$	
Pass Class	Below 50% but not less than 40%	Pass	$\geq 4 \; and \; < 5.5$	

6.0 All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

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I B.TECH, I-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
		Lecture/ Theory	Tutorial	Laboratory/ Practical		Internal	External	Total
THEORY								
A0001191	Communicative English - I	1	1	-	2	30	70	100
A0002191	Linear Algebra and Calculus	2	1	-	3	30	70	100
A0004191	Applied Physics	2	1	-	3	30	70	100
A0301191	Engineering Drawing	2	1	-	3	30	70	100
A0501191	Programming for Problem Solving - I	2	1	-	3	30	70	100
PRACTICALS								
A0094191	Engineering Physics Lab	-	-	3	1.5	25	50	75
A0591191	Programming for Problem Solving – I Lab	-	-	3	1.5	25	50	75
A0592191	Engineering Workshop and IT Workshop	-	-	3	1.5	25	50	75
A0093191	Comprehensive Viva - I	-	-	-	0.5	-	50	50
	Contact Periods / Week	9	5	9	19	225	550	775

I B.TECH, II-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
		Lecture/ Theory	Tutorial	Laboratory/Practical		Internal	External	Total
THEORY								
A0006192	Communicative English - II	1	1	-	2	30	70	100
A0007192	Ordinary, Partial Differential Equations and Vector Calculus	2	1	-	3	30	70	100
A0005191	Modern Engineering Chemistry	2	1	-	3	30	70	100
A0202192	Fundamentals of Electrical and Electronics	2	1	-	3	30	70	100
A0502192	Programming for Problem Solving - II	2	1	-	3	30	70	100
PRACTICALS								
A0091191	Engineering Chemistry Lab	-	-	3	1.5	25	50	75
A0593192	Programming for Problem Solving – II Lab	-	-	3	1.5	25	50	75
A0092191	Digital English Language Lab	-	-	3	1.5	25	50	75
A0095192	Comprehensive Viva - II	-	-	-	0.5	-	50	50
	Contact Periods / Week	9	5	9	19	225	550	775

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II B.TECH, I-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
		Lecture/ Theory	Tutorial	Laboratory/ Practical		Internal	External	Total
THEORY								
A0012193	Transformation Techniques and Complex Variables	2	1	-	3	30	70	100
A0302193	Fluid Mechanics & Hydraulic Machinery	2	1	-	3	30	70	100
A0401193	Analog Electronics and Op-Amp Circuits	2	1	-	3	30	70	100
A0205193	Field Theory	2	1	-	3	30	70	100
A0206193	Electrical Circuit Analysis	2	1	-	3	30	70	100
A0013193	Biology for Engineers (Life Sciences)	2	-	-	2	30	70	100
A0011193	Aptitude Arithmetic Reasoning and Comprehension (Skill Development Course)	1	2	-	0.5	30	70	100
PRACTICALS								
A0491193	Electronic Devices & Circuits Lab	-	-	3	1.5	25	50	75
A0391193	Fluid Mechanics & Hydraulic Machinery Lab	-	-	3	1.5	25	50	75
A0292193	Circuit Theory & Simulation Lab	-	-	3	1.5	25	50	75
A0096193	Comprehensive Viva - III	-	-	-	0.5	-	50	50
	Contact Periods / Week	13	7	9	22.5	285	690	975

II B.TECH, II-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
		Lecture/ Theory	Tutorial	Laboratory/ Practical		Internal	External	Total
THEORY								
A0503193	Python Programming	2	1	-	3	30	70	100
A0405194	Digital Electronics	2	1	-	3	30	70	100
A0208194	Generation and Distribution Of Electric Power	2	1	-	3	30	70	100
A0209194	Control Systems	2	1	-	3	30	70	100
A0210194	Electrical Machines-I	2	1	-	3	30	70	100
A0017194	Indian Heritage & Culture (Mandatory Learning Course – I)	2	-	-	-	-	-	-
A0016194	Design Thinking (Skill Development Course)	1	2	-	0.5	30	70	100
PRACTICALS								
A0594193	Python Programming Lab	-	-	3	1.5	25	50	75
A0493194	IC and PDC Lab	-	-	3	1.5	25	50	75
A0294194	Control Systems and Simulation Lab	-	-	3	1.5	25	50	75
A0097194	Comprehensive Viva - III	-	-	-	0.5	-	50	50
	Contact Periods / Week	13	7	9	20.5	255	620	875

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II B.Tech, I-Sem (EEE) L T C
2 1 3

(A0012193) TRANSFORMATION TECHNIQUES AND COMPLEX VARIABLES

For Branches E.E.E & E.C.E

COURSE OBJECTIVES:

- To familiarize the transformation techniques and complex variables.
- To equip the students to solve various application problems in Signals and Systems, Control systems, Network analysis and Digital signal processing etc.,

COURSE OUTCOMES:

After completion of the course the student will be able to:

- Understand the concept of Laplace and Inverse Laplace transformation and solving ODEs using Laplace transformation technique. Analyze applications of Laplace transforms in control system engineering and Signals and system engineering
- Determine the process of expanding periodic functions into Fourier series and non-periodic functions into Fourier transform its use in Electrical circuit analysis and signal processing
- Obtain the knowledge of Z – Transforms and its applications in digital electronics, control systems, signal processing & discrete systems
- To familiarize the complex variables and to analyze the importance of Caychy – Riemann equations in engineering
- Identify Residue theorem to solve many improper integrals and its use in control theory and electro-magnetic engineering.

MAPPING OF COs & POs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	-	-	-	-	-	-	-
CO2	3	2	3	2	3	-	-	-	-	-	-	-
CO3	2	3	2	3	2	-	-	-	-	-	-	-
CO4	3	2	2	3	2	-	-	-	-	-	-	-
CO5	2	3	3	2	3	-	-	-	-	-	-	-

UNIT-1

Laplace transform of standard functions – Inverse Transform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta (Unit Impulse) function – Initial and Final value theorems – Convolution theorem.

Laplace transform of Periodic function. Application of Laplace transforms to solve ODEs of first and second order.

UNIT-2

Fourier Series: Determination of Fourier coefficients – Fourier series in $[C, C + 2\pi]$ – Fourier series of Even and odd functions – Half – range Fourier sine and cosine series expansions – Fourier series expansion in arbitrary intervals.

UNIT-3

Fourier integral theorem (statement only) – Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – Parseval's identity for Fourier transforms.

UNIT-4

Z-transform: Z – transform – Properties – Damping rule – Shifting rules – Initial and final value theorems – Inverse Z – transform – Partial fractions method– Convolution theorem – Solution of difference equations by Z – transforms.

UNIT-5

Complex Variables: Continuity – Differentiability – Analyticity – Cauchy – Riemann equations in Cartesian and polar coordinates. Milne – Thompson method.

Complex Integration: –Line integral – Evaluation along a path by indefinite integration-Cauchy's Integral Theorem – Cauchy's Integral Formula

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UNIT-6

Complex Series: Taylors series and Laurent series - Singular point – Isolated singular point – pole of order m – Removable – Essential singularity. Residue – Evaluation of residue – Cauchy's Residue theorem – Conformal Mapping – Bi – linear transformation.

TEXTBOOKS/REFERENCES:

1) Erwin kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2011.
2) J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004.
3) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.
4) B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.
5) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6) T.K.V. Iyengar, B. Krishna Gandhi and Others,A Text Book of Engineering Mathematics – III, S. Chand & Company.
7) T.K.V. Iyengar, B. Krishna Gandhi and Others, A Text Book of Engineering Mathematics, Vol – 1, S. Chand & Company.
8) T.K.V. Iyengar, B. Krishna Gandhi and Others, A Text Book of Engineering Mathematics, Vol-1,S. Chand&Company

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II B.Tech, I-Sem (EEE)

L	T	C
2	1	3

(A0302193) FLUID MECHANICS & HYDRAULIC MACHINERY

(For branches EEE & Mech)

COURSE OBJECTIVES:

- To give insight knowledge on fluid statics and fluid dynamics.
- To teach different types of fluid flow, and boundary layer phenomena.
- To teach operation and working principles of fluid machinery.

COURSE OUTCOMES:

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

- Apply conservation laws to fluid flow problems in engineering applications
- Compute drag and lift coefficients using the theory of boundary layer flows.
- Analyze and design free surface and pipe flows
- Design the working proportions of hydraulic machines

MAPPING OF Cos & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	3	2	2	-	2	-	-	-	-	-	2	3	-	-	1
CO2	2	1	3	2	-	1	2	1	-		-	1	2	1	-	1
CO3	3	2	3	2	1	-	1	-	-			1	1	-	1	-
CO4	2	1	3	1	1	2	1	-	-	-		1				

UNIT-1

Fluid Statics: Dimensions and units: fluid properties, atmospheric pressure, gauge pressure and vacuum pressure –measurement of pressure- Piezometer, U-tube and differential manometers. Hydrostatic force on a plane area (Horizontal and vertical position), introduction to Buoyancy.

UNIT-2

Fluid Kinematics: Stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform, non-uniform, laminar, turbulent, rotational, and irrotational flows-equation of continuity for one dimensional flow.

Fluid dynamics: Surface and body forces –Bernoulli's equation for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT-3

Closed conduit flow: Laminar and turbulent flow through pipes: Reynolds experiment significance of Reynolds's number, formulae for laminar flow through circular pipes, Turbulent flow-Darcy Weisbach equation, chezy's formula, friction factor - Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line.

Measurement of flow: Pitot tube, venturimeter, and orifice meter (Only derivations).

UNIT-4

Boundary Layer Flow: Introduction, Definitions, Drag force on a flat plate due to Boundary layer, Turbulent Boundary layer on a flat plate, Analysis of Turbulent Boundary layer, Separation of Boundary layer.

UNIT-5

Basics of Hydraulic Machinery: Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency.

UNIT-6

Hydraulic Turbines : Classification of turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies, hydraulic design –draft tube theory-functions and efficiency, Unit and specific quantities, characteristic curves.

Hydraulic Pumps: Working principle of Centrifugal and Reciprocating pump. (No-derivations and No-problems)

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TEXT BOOKS

1) Fluid Mechanics and Hydraulic Machinery MODI and SETH, 14th Edition, Standard Book House, New Delhi 2002.
2) Fluid Mechanics and Hydraulic Machines by R.K. Bansal, Lakshmi Publications, New Delhi, revised ninth edition,2010.
3) Introduction to Fluid Mechanics and Fluid Machines, S.K. Som and G. Biswas, Tata McGraw-Hill, revised second editions,2008.

REFERENCES:

1) Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
2) Fluid Mechanics and Machinery by Jagadeesh lal.
3) Hydraulic Machines by Banga & Sharma, Khanna Publishers.
4) Fluid Mechanics and Hydraulic Machines by R. K. Rajput, Lakshmi Publications.
5) Instrumentation for Engineering Measurements by James W. Dally, William E. Riley, John Wiley & Sons Inc. (Chapter 12 – Fluid Flow Measurements).

WEBSITES:

1) https://nptel.ac.in/courses/112/105/112105269/
2) https://nptel.ac.in/courses/112/105/112105171/
3) https://nptel.ac.in/courses/112/105/112105206/
4) https://nptel.ac.in/courses/112/105/112105183/
5) https://nptel.ac.in/courses/112/106/112106200/

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II B.Tech, I-Sem (EEE)

L	T	C
2	1	3

(A0401193) ANALOG ELECTRONICS AND OP-AMP CIRCUITS

COURSE OBJECTIVES:

- To study the analysis and design of single stage amplifiers at low and high frequencies.
- Study of small signal and large signal amplifiers and their area of applications.
- To understand the concepts of feedback and their applications (Voltage feedback amplifiers and oscillators)

COURSE OUTCOMES:

- To learn the basics of different Amplifiers, wave shaping circuits and multivibrators.
- To analyze the performance of amplifiers and wave shaping circuits.
- To understand working operation of various feedback amplifiers.
- To apply the knowledge of various electronic circuits.
- Design various types of multi vibrator and Time base generator circuits.
- Applications of various electronic amplifiers.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	1	1	1	-	-	-	-	-	-	-	-
CO4	1	2	-	1	-	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	1
CO6	1	3	1	-	-	-	-	-	-	-	-	1

UNIT-1

DIODE CLIPPING AND CLAMPING CIRCUITS: Introduction, Semiconductor Diode as a Switch, Clipping Circuits- Series, Shunt, Two-level Clippers. Clamping Circuits- Practical Clamping Circuit, Design of a Clamping Circuit, Effect of Diode Characteristics on the Clamping Voltage, Clamping Circuit Theorem.

UNIT-2

SINGLE STAGE AMPLIFIERS: Transistor as a Switch, Importance of Biasing, Operating Point, Load line (DC and AC), Types of Biasing: Fixed bias, Collector to Base, Voltage Divider bias, Thermal stability in CE configuration, Transistor as an amplifying device.

Classification of Amplifiers, Small signal equivalent model of BJT, Analysis of single stage transistor amplifier (CE, CB, and CC) using h-parameters- Deriving equations for Input Impedance, Output Impedance, Voltage Gain and Current Gain.

UNIT-3

POWER AMPLIFIERS

Introduction, Classification of Power Amplifiers, Class A Amplifiers (Directly Coupled and Transformer Coupled), Second - Harmonic Distortion, Higher - Order Harmonic Generations, Class B Amplifier (Push Pull), Elimination of Cross over distortion.

UNIT-4

FEEDBACK AMPLIFIERS: Concepts of Feedback, Classification of Feedback Amplifiers, Transfer Gain with Feedback, General Characteristics of Negative-Feedback Amplifiers, Effect of Feedback on Amplifier characteristics, Analysis of a feedback Amplifiers - Voltage – Series, Current-Series, Current-shunt and Voltage – shunt.

OSCILLATORS: Conditions for oscillations, Phase - shift Oscillator, Wien Bridge Oscillator, L-C Oscillators (Hartley and Colpitts).

UNIT-5

OPERATIONAL AMPLIFIER: Basic information of Op-amp, ideal and practical Op-amp, internal circuits, Op-amp characteristics, DC and AC characteristics, modes of operation-inverting, non-inverting, differential, Comparator, Schmitt trigger, Astable and Monostable Multi vibrators

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UNIT-6

SPECIAL PURPOSE INTEGRATED CIRCUITS: Introduction to 555 timer, functional diagram, Monostable and Astable operations, Schmitt Trigger and applications, Functional block diagram, working and applications of Phase Locked Loop(PLL).

TEXT BOOKS:

1) R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits", 6th edition, Pearson Prentice Hall, 2009.
2) David A. Bell, "Solid State Pulse circuits", 1st edition, PHI, 1992.
3) D. Roy Chowdhury, "Linear Integrated Circuits", 2nd edition, New Age International (p) Ltd, 2003.

REFERENCE BOOKS:

1) J. Millman, C. C. Halkias, and Satyabratha Jit, "Electronic Devices and Circuits", 1st edition, Tata McGraw Hill, 1976.
2) J. Millman and H. Taub, "Pulse, Digital and Switching Waveforms", 5th edition, TATA Mc-Graw-Hill, 1984.
3) R.S. Setha, "Applied Electronics", S. Chand and Company Ltd, 2008.
4) https://nptel.ac.in/courses/117/107/117107094/

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AUTONOMOUS
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

II B.Tech, I-Sem (EEE)

L	T	C
2	1	3

(A0205193) FIELD THEORY

COURSE OBJECTIVES:

- The objective of this course is to introduce the concepts of electric field
- To introduce magnetic fields concepts which will be utilized in the development of the theory for power transmission lines and electrical machines?

COURSE OUTCOMES:

- To apply knowledge of basic mathematics and physics for the determination of electric and magnetic quantities.
- Application of electrostatic and magneto static theorems to determine electric field intensity and magnetic field intensity
- To determine the self and mutual inductance of simple practical current carrying systems
- To solve the problems related to electromagnetic field using dealt theorems
- To understand time varying electromagnetic fields as governed by the maxwell's equations
- To analyze the behavior of the conductors using ohms law, inductors using Faraday's law and capacitors using dielectric principles.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	-	-	-	-	2	1	-	2
CO2	3	3	-	2	-	-	-	-	2	1	-	2
CO3	3	3	-	2	-	-	-	-	2	1	-	2
CO4	1	2	-	2	-	-	-	-	2	1	-	2
CO5	2	2	-	2	-	2	-	-	2	1	-	2
CO6	1	3	-	2	-	-	-	-	2	1	-	2

UNIT-1

Electrostatics-I

Coulomb's law and electrical field intensity: Coulomb's law, Field due to different charge distributions.

Electric flux density, Gauss's law and divergence: Concept of electric flux density, Gauss's law and its applications, Maxwell's first eqn. and divergence theorem for electric flux density.

Electrical potential & Dipole: Energy expanded in moving a point charge in electrical field, Line integral, Definition of potential difference and potential, Potential field of a point charge and system of charges, Potential gradient, Electric Dipole, potential and EFI due to an electric dipole, Torque on an Electric dipole in an electric field.

UNIT-2

Electrostatics-II

Conductors, dielectrics and capacitance: Definition of currents and current density, Continuity equation, Behavior of conductors inside an electric field, Dielectric materials, Characteristics, Dielectric polarization, Boundary conditions, Energy density in electrostatic field, Capacitance of a parallel plate capacitor, Coaxial cable and spherical capacitors. Poisson's and Laplace equation, Examples of solution of Laplace and Poisson's equations

UNIT-3

Magneto statics

Biot–savart Law and its applications: Magnetic field intensity – Biot–savart Law -Magnetic field due to straight conductors, circular loop and solenoid current Carrying wire –Magnetic flux density (B) – B in free space, Maxwell's second Equation.

Ampere's circuital law and its applications: Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament, Point form of Ampere's circuital law, Maxwell's third equation, Curl (H)=Jc, Field due to a circular loop, rectangular and square loops.

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UNIT-4

Magnetic forces: Lorentz Law of force ,Force on a moving charge, Force on a differential current element, Force on a straight and a long current carrying conductor in a magnetic field, Force between two straight long and parallel current carrying conductors ,Force and torque on a close circuit.

UNIT-5

Magnetic potential and inductance: Scalar Magnetic potential and its limitations, vector magnetic potential and its properties, vector magnetic potential due to simple configurations, vector Poisson's equations. Self and Mutual inductance, Neuman's formulae, Determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane, energy stored and density in a magnetic field.

UNIT-6

Electro Dynamic Fields: Faraday's laws and its integral and point forms, induced emf – Transformer and motional EMF –Maxwell's equations (differential and integral forms) – Displacement current – Relation between field theory and circuit theory - Modification of Maxwell's equations for time varying fields, Poynting Theorem and poynting vector

TEXT BOOKS:

1) Sadiku, Kulkarni, "Principles of Electromagnetics", 6th Edition, Oxford University Press, 2015.
2) William.H.Hayt, "Engineering Electromagnetics", 8th Edition, Mc Graw Hill, 2012.
3) J.D. Kraus, "Electromagnetics", 5th Edition, Mc Graw Hill Inc, 1999.

REFERENCE BOOKS:

1) Mahmood Nahvi, Joseph Edminister, "Schaums Outline of Theory and Problems of Electromagnetics" 5th edition, McGraw-Hill Education, 2018.
2) K. D. Prasad, "Antenna and Wave Propagation", Galgotia puplication, 2007.
3) K.A. Gangadhar and P.M. Ramanathan, "Electomagnetic Field Theory", 8th Reprint, Khanna Publications, 2015.
4) https://nptel.ac.in/courses/108/106/108106073/

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(A0206193) ELECTRICAL CIRCUIT ANALYSIS

COURSE OBJECTIVES

- To impart strong foundation in Network analysis
- To introduce three phase circuit and analysis
- To give strong foundation in Electrical Circuits

COURSE OUTCOMES

- Analyses & design a circuit with the help of theorems.
- Learn concepts of network graph theory.
- Learn various techniques to find electrical parameters for a given electrical circuit.
- Distinguish between AC Circuits and DC Circuits.
- Find Transient response of series and parallel RL,RC & RLC Circuits.
- Learn concept of network parameters.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	3	-	2	-	-	-	-	-	2
CO2	2	3	2	2	-	3	-	-	-	--	-	2
CO3	3	3	3	2	-	1	-	-	-	-	-	2
CO4	1	2	2	2	-	2	-	-	-	-	-	2
CO5	2	2	3	3	-	2	-	-	-	-	-	2
CO6	1	3	1	2	-	1	-	-	-	-	-	2

UNIT-1 NETWORK THEOREMS

Network theorems: (Without proof): Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Compensation, Millman's, and Tellegen's theorems for dc and ac excitations

UNIT-2 GRAPH THEORY

Network topology - Definitions – Graph – Tree, Basic cutset and Basic Tie set matrices for planar network – Loop and Nodal methods of analysis of Networks with dependent and independent voltage and current sources - Duality & Dual networks.

UNIT-3 THREE PHASE CIRCUITS

Three phase circuits : Phase sequence – Star and delta connection – Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced 3 phase circuits – Application of Millman's theorem to unbalanced circuits - Measurement of 3 phase power, active power and reactive power.

UNIT-4 DC TRANSIENT ANALYSIS

Transient response of RL, RC, RLC circuits (Series and Parallel combinations) for D.C excitation - Initial conditions –Classical method and Laplace transform methods of solutions – Response of RL, RC, RLC for step, ramp, pulse and impulse excitations using Laplace transform methods.

UNIT-5 AC TRANSIENT ANALYSIS

Transient response of RL, RC, RLC circuits (Series and Parallel combinations) for sinusoidal excitations - Initial conditions –Classical method and Laplace transform methods of solutions.

UNIT-6 TWO PORT NETWORKS

Two Port network parameters – Z, Y, (ABCD) Transmission and Hybrid parameters for Resistive Networks and their relations

TEXT BOOKS:

1) Abhijit Chakrabarthi, "Circuit Theory Analysis & Synthesis", Dhanpat Rai & Co. 2008.
2) K. S. Suresh Kumar, "Electric circuits and Network", 1st edition, Pearson education, 2009.
3) William Hayt and Jack E. Kemmerly, "Engineering Circuit Analysis", 8th edition McGraw-Hill Education, 2011.

REFERENCES BOOKS:

1) Mahmood Nahvi and Joseph A. Edminister, "Schaum's Outlines Electric Circuits", 4th edition, Tata McGraw Hill companies, Inc., 2007.
2) Sudhakar and Shymmohan, "Network Analysis", 4th edition, TMH Publications, 2007.
3) M.E Van Valkenberg, "Network Analysis", 3rd edition, Pearson Education, 2006.
4) https://nptel.ac.in/courses/108/104/108104139/

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(A0013193) BIOLOGY FOR ENGINEERS

(Life Sciences)

(For branches CE, EEE, Mech, ECE & CSE)

COURSE OBJECTIVES:

- To familiarize about biological components and their applications
- To train the students on the principles and Mechanisms in Biological Chemistry
- To train the concepts of molecular structures of Biomolecules
- To introduce the basic principles of Cell Structures and Functions
- To apply the concepts in the development of biosensors for mankind.

COURSE OUTCOMES:

At the end of the course, the students will be able to

- Explain concept and function of cell and cell organelles
- Develop knowledge about various physiological processes in biological systems
- Explain about biomolecules, their structure and function and their role in living organisms. How biomolecules are useful in industry.
- Understanding about human physiology
- Identify and describe the functions of the skeletal system

MAPPING OF COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO2	2	-	2	-	-	-	2	-	-	-	-	1	-	-	-
CO3	2	-	2	-	-	-	-	1	-	-	1	1	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO5	2	1	-	-	-	-	-	-	-	-	-	1	-	-	-
Course	1	-	1	-	1	-	-	-	1	-	-	-	-	-	-

UNIT-1

Cell Structure and Function - Cell theory, Ultra structure of eukaryotic cell (Cell wall, Cell membrane, Golgi complex, Endoplasmic Reticulum, Peroxisome, Lysosomes), Semi- autonomous cell Organelles (Mitochondria & Chloroplast) (5 periods)

Learning outcomes:

1) Understand the structure and importance of the cell.
2) Explain the importance of eukaryotic cell.
3) Explain the functions of cell organelles.

UNIT-2

Human Physiology – Nutrition (Functions of micro & macro nutrients and their role), Respiration (Definition, Types, Respiration in humans), Digestion (Process and digestive organs in humans), Excretion (Definition, Urinary system in humans). (6 Periods)

Learning outcomes:

1) Understand the metabolism in living organism.
2) Explain about the importance of human physiological process.
3) Identify the nutritional values in human body.

UNIT-3

Biomolecules - Proteins (Denaturation of proteins), Nucleic acids (Mechanism of Replication & Transcription), Vitamins (Classification & functions of vitamins in bio-systems). (5 Periods)

Learning outcomes:

1) Describe the denaturation of proteins.
2) Illustrate replication of nucleic acids.
3) Identify the importance of Vitamins in human body.

UNIT-4

Biomaterials - Definition of biomaterials, Requirements of biomaterials, Classification of biomaterials, Physical and Mechanical properties of bio-materials, Comparison of properties of some common biomaterials. (5 Periods)

Learning outcomes

1) Understand the role of biomaterials for humans.
2) Understand the properties of biomaterials for organ substitution.

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UNIT-5

Skeletal System-Types of bones, Structure and composition of bone, artificial bone replacements with soft engineering materials. (6 Periods)

Learning outcomes

1) Understand bone structure and composition
2) Able to develop knowledge about bone replacement.

UNIT-6

Applications of Biology- Stem Cells (Sources, Types and its Uses) Cancer Therapy, Basics of bio-sensors and bio-chips for bio-engineering. (5 Periods)

Learning outcomes

1) Understand the role of stem cells in biology.
2) Develop new type of biosensors, biochips etc.

TEXT BOOKS

1) Nelson, D. L. and Cox, M.M. (2008).Lehninger, Principles of Biochemistry, 5th Edition, W.H.Freeman and Company, N.Y., USA.
2) Ross & Wilson, Anatomy and Physiology, Churchill Livigstone publications (2014).

REFERENCE BOOKS

1) Voet, D. and Voet, J.G. (2004). Biochemistry, 3rd Edition, John Wiley & Sons, Inc. USA.
2) Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition, John Wiley & Sons. Inc.
3) De Robertis, E. D. P. and De Robertis R. E. 2009. Cell and Molecular Biology, 8th edition. Lippincott Williams and Wilkins, Philadelphia.
4) Cooper G. M. Hausman R. E. 2009. The Cell: A Molecular Approach. 5th edition. ASM Press and Sunderland, Washington D. C.; Sinnauer Academic Press.
5) L. Hench & E.C. Ethridge, Biomaterials – An Interfacial approach, Academic Press, 1982.

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(A0011193) APTITUDE ARITHMETIC REASONING AND COMPREHENSION

(For branches CE, EEE, Mech, ECE & CSE)

COURSE OBJECTIVES:

- To familiarize the students about the concepts of aptitude, arithmetic and reasoning
- To cope up the students to improve their employable skills

COURSE OUTCOMES:

After completion of the course the student will be able to:

- Understand number system which helps to become well trained for recruitment drives.
- Analyze permutations and combinations concept.
- Obtain the knowledge of coding and decoding concept.
- Understand the topics related to clock and probability.
- Identify the topics related to Venn diagrams, reasoning and Non-verbal reasoning.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	-
CO4	3	2	3	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	-

UNIT-1

Numbers, Number Systems Simple Equations, Ratio, Proportion, Variation Quadratic Equations, Progressions Percentages.

UNIT-2

Profit, Loss, Partnerships Averages, Mixtures & Allegations, Simple Interest, Compound Interest, Time and Work-Pipes, indices, surds, inequalities , Cisterns Time and Distance Geometry and Menstruation.

UNIT-3

Permutations & Combinations and Probability Data Interpretation & Data Sufficiency.

UNIT-4

Number & Letter Series, Analogies, Coding Decoding, Odd Man Out Blood Relations.

UNIT-5

Direction Sense, Symbols and Notations Deductions & Connectives Clocks, Calendars Analytical

UNIT-6

Reasoning (Verbal and Non-Verbal) , Venn Diagrams, Analytical Puzzles and Octal number system.

REFERENCES:

1) R.S.Agarwal. Quantitative Techniques. S.Chand Series.
2) Shankuntala Devi. Techniques of Reasoning. S.Chand Series.
3) https://www.fresherslive.com/online-test/verbal-ability-test/questions-and- answers
4) https://www.fresherslive.com/online-questions/verbal-ability-test/arithmetic-Reasoning

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II B.Tech, I-Sem (EEE) P C
3 1.5

(A0491193) ELECTRONIC DEVICES & CIRCUITS LAB

COURSE OBJECTIVES:

- This Lab provides the students to get an electrical model for various semiconductor devices. Students can find and plot V_I characteristics of all semiconductor devices. Student learns the practical applications of the devices. They can learn and implement the concept of the feedback and frequency response of the small signal amplifier
- Linear and nonlinear wave shaping circuits

COURSE OUTCOMES:

- Students able to learn electrical model for various semiconductor devices.
- Students able to learn electrical model for FET devices.
- Realize simple Rectifier without filters and with filters.
- Analyze and design the RC circuits.
- Design the circuits for generating desired wave shapes (Clippers and Clampers)

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	2	-	-	-	-	-	3	-	-	-
CO2	1	-	3	-	-	-	-	-	3	-	-	-
CO3	2	-	-	-	-	-	-	-	3	-	-	-
CO4	-	2	1	-	-	-	-	-	3	-	-	-
CO5	-	2	-	-	-	-	-	-	3	-	-	-

LIST OF EXPERIMENTS:

1) PN Junction diode characteristics.
2) Zener diode characteristics and Zener as a Regulator.
3) Transistor CB characteristics (Input and Output).
4) Transistor CE characteristics (Input and Output).
5) Rectifier without filters (Full wave &Half wave).
6) Rectifier with filters (Full wave &Half wave).
7) FET characteristics.
8) MOSFET characteristics.
9) SCR characteristics.
10) UJT characteristics.
11) Linear wave shaping
12) Non Linear Wave Shaping – Clippers
13) Non Linear Wave Shaping – Clampers

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3 1.5

(A0391193) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB
(Common to EEE & ME)

COURSE OBJECTIVES:

- This course "Fluid Mechanics and Hydraulic Machines" lab imparts intensive and extensive practical knowledge of the lab so that students can understand the importance of concepts of "Fluid Mechanics and Hydraulic Machines" in the field of engineering. The student should able to develop theoretical / practical capabilities so that they can characterize, transform, use and apply in engineering from the knowledge gained in solving related engineering problem.

COURSE OUTCOMES:

- Calibrate flow measuring devices used in pipes, channels and tanks
- Determine fluid flow properties
- Characterize laminar and turbulent flows
- Determine the performance characteristics of various fluid machines like pumps, turbines etc.
- Establish the specific energy curve
- Determine Energy loss in Hydraulic jump

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	-	-	-	-	-	-	3	1	-	-
CO2	1	3	-	-	-	-	-	-	3	1	-	-
CO3	1	3	-	-	-	-	-	-	3	1	-	-
CO4	2	3	-	-	-	-	-	-	3	1	-	-
CO5	2	3	-	-	3	-	-	-	3	1	2	-
CO6	2	3	-	-	3	-	-	-	3	1	2	-

LIST OF EXPERIMENTS:

1) Verification of Bernoulli's Equation
2) Calibration of Mouthpiece/orifice
3) Calibration of Triangular/Rectangular Notch
4) Calibration of Venturi meter
5) Calibration of Orifice meter
6) Determination of Friction Factor for a given pipe line
7) Impact of Jet on Vanes
8) Performance Test on Pelton Wheel
9) Performance Test on Francis Turbine
10) Performance Test on Kaplan Turbine
11) Performance Test on Single Stage Centrifugal Pump
12) Performance Test on Reciprocating Pump

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3 1.5

(A0292193) CIRCUIT THEORY & SIMULATION LAB

COURSE OBJECTIVES:

- To understand basic concepts of electric circuits.
- To understand the various techniques that can be used to analyze electric circuits.
- To understand basic concepts of MATLAB tool.
- To understand the basic concept of electrical circuits.
- To understand the various techniques that can be used to analyze electric circuits using MATLAB tool.

COURSE OUTCOMES:

- Analyze response of series and parallel resonant circuits.
- Effect of parameter variation on electrical current and voltage.
- Analyze and Verification of network theorems.
- Measurement of three phase power by using two single phase watt meters.
- Evaluate steady state behavior of single port networks for DC and AC excitations.
- Finding of magnetic circuits parameters.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	-	-	-	-	2	2	2	3
CO2	3	2	2	2	-	-	-	-	3	2	2	2
CO3	3	2	3	2	-	-	-	-	2	3	2	3
CO4	3	3	2	2	-	-	-	-	3	2	2	2
CO5	3	2	2	3	-	-	-	-	2	2	3	3
CO6	2	3	3	2	-	-	-	-	3	2	2	3

LIST OF EXPERIMENTS:

1) Experimental verification of Series and Parallel Resonance
2) Experimental verification of Thevenin's and Norton's Theorem
3) Experimental verification of Maximum Power Transfer and Reciprocity Theorem
4) Experimental Verification of Superposition & Millmann's Theorem
5) Experimental verification of Z & Y Parameters
6) Experimental verification of Hybrid & ABCD Parameters
7) Experimental verification of Measurement of Active Power for Star and Delta Connected Balanced & Unbalanced Loads

SIMULATION OF EXPERIMENTS USING MATLAB

1) Verification of Series and Parallel Resonance
2) Verification of Thevenin's and Norton's Theorem
3) Verification of Maximum Power Transfer and Reciprocity Theorem
4) Verification of Superposition & Millmann's Theorem
5) Verification of Hybrid & ABCD Parameters

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(A0503193) PYTHON PROGRAMMING

(For branches CE, Mech, EEE, ECE, CSE)

COURSE OBJECTIVES:

This course will enable students to

- Learn Syntax and Semantics of various Operators used in Python.
- Understand about Various Input, Output and Control flow statements of Python.
- Handle Strings and Files in Python.
- Understand Lists, Tuples in Python.
- Understand Sets, Dictionaries in Python.
- Understand Functions, Modules and Regular Expressions in Python.

COURSE OUTCOMES:

The students should be able to

- Examine Python syntax and semantics and be fluent in the use of various Operators of Python.
- Make use of flow control statements and Input / Output functions of Python.
- Demonstrate proficiency in handling Strings and File Systems.
- Create, run and manipulate Python Programs using core data structures like Lists and Tuples.
- Apply the core data structures like Sets and Dictionaries in Python Programming.
- Demonstrate the use of functions, modules and Regular Expressions in Python.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	1	-	-	-	1	1	1
CO2	2	3	-	-	-	-	-	-	1	-	-	-	1	1	1
CO3	1	-	2	-	-	-	-	-	1	-	-	-	1	1	1
CO4	2	-	2	-	-	-	-	-	1	-	-	-	1	1	1
CO5	2	-	2	-	-	-	-	-	1	-	-	-	1	1	1
CO6	2	-	2	-	-	-	-	-	1	-	-	-	1	1	1

UNIT-1

Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation. Overview on data types: Numbers, Strings, Lists, Set, Tuple and Dictionaries.

Operators in Python: Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Shift Operators, Ternary operator, Membership Operators, Identity Operators, Expressions and order of evaluations. Illustrative examples on all the above operators.

UNIT-2

Input and Output statements: input() function, reading multiple values from the keyboard in a single line, print() function, 'sep' and 'end' attributes, Printing formatted string, replacement operator ({}). Illustrative examples on all the above topics.

Control flow statements: Conditional statements – if, if-else and if-elif-else statements. Iterative statements – for, while. Transfer statements – break, continue and pass. Illustrative examples on all the above topics.

UNIT-3

Strings: Introduction to strings, Defining and Accessing strings, **Operations on string** - String slicing, Mathematical Operators for String, Membership operators on string, Removing spaces from the string, Finding Substrings, Counting substring in the given String, Replacing a string with another string, Splitting of Strings, Joining of Strings, Changing case of a String, Checking starting and ending part of the string, checking type of characters present in a string. Illustrative examples on all the above topics.

Files: Opening files, Text files and lines, Reading files, Searching through a file, Using try, except and open, Writing files, debugging.

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UNIT-4

Lists: Creation of list objects, Accessing and traversing the elements of list. **Important functions of list** – len(), count(), index(), append(), insert(), extend(), remove(), pop(), reverse() and sort(). **Basic Operations on list:** Aliasing and Cloning of List objects, Mathematical Operators for list objects, Comparing list objects, Membership operators on list, Nested Lists, List Comprehensions. Illustrative examples on all the above topics.

Tuples: Creation of Tuple objects, Accessing elements of tuple, Mathematical operators for tuple, Important functions of Tuple – len(),count(),index(), sorted(), min(), max(), cmp().Tuple Packing and Unpacking. Illustrative examples on all the above topics.

UNIT-5

Sets: Creation of set objects, Accessing the elements of set. Important functions of set –add(), update(), copy(), pop(),remove(),discard(),clear(). Basic Operations on set - Mathematical Operators for set objects, Membership operators on list, Set Comprehensions. Illustrative examples on all the above topics.

Dictionaries: Creation of Dictionary objects, Accessing elements of dictionary, Basic operations on Dictionary - Updating the Dictionary, Deleting the elements from Dictionary. Important functions of Dictionary – dict(), len(), clear(), get(), pop(), popitem(), keys(), values(), items(), copy(), setdefault(). Illustrative examples on all the above topics.

UNIT-6

Functions - Defining Functions, Calling Functions, Types of Arguments - Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Recursive functions, Illustrative examples on all the above topics**.**

Modules: Creating modules, **import** statement, from Import statement.

Regular Expressions: Character matching in regular expressions, Extracting data using regular expressions, combining searching and extracting, Escape character.

TEXT BOOKS:

1) Python for Everybody: Exploring Data Using Python 3, 2017 Dr. Charles R. Severance

REFERENCE BOOKS:

1) Think Python, 2 Edition, 2017 Allen Downey, Green Tea Press
2) Core Python Programming, 2016 W.Chun, Pearson.
3) Introduction to Python, 2015 Kenneth A. Lambert, Cengages
4) https://www.w3schools.com/python/python_reference.asp
5) https://www.python.org/doc/

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(A0405194) DIGITAL ELECTRONICS

COURSE OBJECTIVES:

- Understand the different number system, its conversions and binary arithmetic.

COURSE OUTCOMES:

- Convert one number system to other number system, Classifications of BCD codes.
- Simplify the given logical function by using Boolean algebra, k-map and tabular methods.
- Understand the concepts of PLD's (ROM/PROM, PAL & PLA).
- Design and analyze combinational and sequential logic circuits.
- Optimize combinational and sequential logic circuits.
- This course introduces all varieties of linear and digital IC's. It also deals with Timers, PLL's, D-A and A-D converters.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	-	-	-	-	-	-	-	-	-
CO2	-	3	3	-	-	-	-	-	-	-	-	-
CO3	-	2	3	-	-	-	-	-	-	-	-	1
CO4	2	3	2	-	-	-	-	-	-	-	-	1
CO5	2	3		-	-	-	-	-	-	-	-	1
CO6	1	2	2	-	-	-	-	-	-	-	-	1

UNIT-1

NUMBER SYSTEMS, CODES AND BOOLEAN ALGEBRA: Philosophy of number systems – complement representation of Negative numbers, Binary arithmetic, Binary codes, Error Detecting &Error Correcting codes, Hamming codes. Fundamental postulates of Boolean algebra, Basic theorems and properties

UNIT-2

SWITCHING FUNCTIONS AND IT'S MINIMIZATION: Switching functions, Canonical and standard forms, Algebraic simplification Digital Logic Gates, properties of XOR gates, Universal Gates, Multilevel NAND/NOR realizations. K-map method, Prime Implicants, Don't care combinations, Minimal SOP and POS forms.

UNIT-3

COMBINATIONAL LOGIC DESIGN: Half adder, Full adder, Ripple carry adder, Carry look ahead generator, BCD adder, Half substractor, Full substractor, Encoder, Decoder, Multiplexer, De-Multiplexer, MUX realization of Switching functions, Parity bit generator, Code-converters, multiplier.

UNIT-4

PROGRAMMABLE LOGIC DEVICES, THRESHOLD LOGIC: Basic PLD's-ROM, PROM, PLA, PAL Realization of switching function using PLD's.

UNIT-5

SEQUENTIAL CIRCUITS: Classification of sequential circuits, Basic Flip-Flops, Excitation and Characteristic Tables. Steps in Synchronous Sequential circuit design. Design of modulo-N counters, Ring and Johnson counters, Universal shift register, Serial Binary adder, Sequence Detector. FSM-capabilities and Limitations, Mealy and Moore models, Minimization of completely specified Sequential Machines using partition method.

UNIT-6

D-A & A- D CONVERTERS: Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC specifications – Numerical problems.

TEXTBOOKS:

1) Morries Mano, "Digital Design" 4th edition, PHI.
2) Anand Kumar, "Switching Theory and Logic design", 3rd edition, PHI learning Pvt Ltd., 2016.
3) D. Roy Chowdhury, "Linear Integrated Circuits", 2nd edition, New Age International (p) Ltd, 2003.

REFERENCES:

1) Fletcher, "An Engineering Approach to Digital Design", Prentice-Hall, 2007.
2) Charles H. Roth, "Fundamentals of Logic Design", 7th edition, Cengage learning, 2013.
3) John M. Yarbrough, "Digital Logic Applications and Design", West Publishing Company, 1998.
4) Zvi Kohavi, "Switching & Finite Automata theory", 2nd edition, Tata McGraw-Hill, 1978.
5) Floyd, "Digital Fundamentals", 11th Edition, Pearson, 2015.
6) https://nptel.ac.in/courses/108/105/108105132/

R G M COLLEGE OF ENGINEERING AND TECHNOLOGY
AUTONOMOUS
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

II B.Tech, II-Sem (EEE)

L	T	C
2	1	3

(A0208194) GENERATION AND DISTRIBUTION OF ELECTRIC POWER

COURSE OBJECTIVES:

- Power Systems-I is one of the important courses of the electrical discipline.
- This course helps to know different means of Electrical Generation, Distribution of power considering economical aspects.

COURSE OUTCOMES:

- To know the general system that involves how the electrical power is generated at source and consumed at load side.
- To know the concepts and phenomenon of Power Generation by some conventional sources.
- To know the importance and different parts involved in substations.
- To know the several economic aspects involved in generating stations.
- To know the different ways of distribution of electrical power after transmission from generating station.
- Understand different cost involved in generation of electric power and how the tariff is fixed for different types of loads and consumers.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	1	2	-	1	3	3	2	1	-	3
CO2	3	2	1	2	-	3	2	2	3	2	2	3
CO3	-	2	1	2	1	2	2	1	2	2	2	2
CO4	2	2	-	2	2	-	1	2	1	1	2	2
CO5	3	3	2	-	1	-	-	-	2	1	2	2
CO6	3	2	-	1	1	-	-	1	2	2	2	2

UNIT-1

ENERGY GENERATION WITH CONVENTIONAL SOURCES:

Thermal Power Stations (TPS): Line Diagram of TPS, description of various parts like Economizers, Boilers, Super Heaters, Turbines, Condensers, Chimneys, electrostatic precipitator, Cooling Towers, Paths of air, coal, Flue gases.

Hydro Power Stations (HPS): Selection of site, Classification, Layout, description of Main Components.

UNIT-2

NUCLEAR POWER STATION (NPS):

Nuclear Fission, Chain reaction, Nuclear Fuels-Principle of operation of Nuclear reactor-its Parts, Radiation Hazards, Shielding and Safety Precautions-Types of nuclear reactors and brief description of PWR, BWR & FBR.

UNIT-3

SUBSTATIONS:

Classification of Substations - Air insulated substations (AIS)-indoor and outdoor substations. Bus bar arrangements in substations: simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.

Gas insulated Substations (GIS): advantages, different types, single line diagram, bus bar, construction aspects, installation and maintenance of GIS. Comparison of AIS and GIS

UNIT-4

DISTRIBUTION SYSTEM:

Classification and comparison of AC & DC Distribution Systems - Comparison of Underground and over head Distribution System - Voltage drop calculations in DC distribution for following cases – Radial Distributor-fed one end, both ends (equal and unequal voltages), Ring main Distributor, and inter grid-Voltage drop calculations in AC distribution for following cases – p.f. refer to receiving end voltage and w.r.t load voltages.

UNIT-5

ECONOMIC ASPECTS OF POWER GENERATION:

Load Curve, Load duration Curves- Load, demand, Diversity, Capacity, Utilization and plant use factors-numerical problems.

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UNIT-6

TARIFF METHODS:

Cost of generation & their division into fixed, semi fixed & running cost - Desirable characteristics of tariff method – tariff methods – flat rate, block-rate tariff, two part tariff, three part tariff & power factor tariff methods & numerical problems.

TEXT BOOKS:

1) M. L. Soni, P. V. Gupta, U. S. Bhatnagar, A. Chakrabarthy, "A Text Book on Power System Engineering", Dhanpat Rai & Co Pvt. Ltd, 2008.
2) V. K. Mehata and Rohit Mehata, "Principles of power systems", Revised edition, S. Chand, 2005.
3) R.K Rajput, "Power Systems Engineering", 2nd edition revised, Laxmi Publishers, 2006.
4) C. L. Wadwa, "Electrical Power Systems", New Age International (P) Limited, 2009.

REFERENCES BOOKS:

1) M.V Deshpande, "Elements of Power station design", PHI learning Pvt Ltd., 2010.
2) B. R. Gupta, "Power System Analysis and Design", A. H. Wheeler Publishing Company Limited, 1998.
3) S.N Singh, "Electrical Power Generation, Transmission and distribution", 2nd edition, PHI learning Pvt Ltd., 2011.

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II B.Tech, II-Sem (EEE)

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2	1	3

(A0209194) CONTROL SYSTEMS

(Common to ECE & EEE)

COURSE OBJECTIVES:

- Be prepared to apply mathematics, established scientific and engineering knowledge, for the development and implementation of a broad range of electronic systems
- Be knowledgeable about current technologies and be prepared to adapt to technology advances and ensure professional growth through an appreciation for lifelong learning.
- Basic skill in methods of design and analysis across a broad range of electrical and computer engineering areas

COURSE OUTCOMES:

- Analyze electromechanical systems by mathematical modeling.
- Determine Transient and Steady State behavior of systems using standard test signals.
- Analyze linear and non-linear systems for steady state errors, absolute stability and relative stability.
- Determine stability analysis in s-domain using RH criterion and Root Locus Techniques.
- Able to observe stability using the analysis of polar, nyquist and bode plots.
- Using state space analysis state models can be obtained.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	-	-	-	-	2	-	1	2
CO2	3	3	3	2	-	-	-	-	2	-	1	2
CO3	3	3	2	2	-	-	-	-	1	-	2	1
CO4	3	3	2	2	-	-	-	-	2	-	2	2
CO5	3	3	3	2	-	-	-	-	1	-	2	2
CO6	3	3	3	2	-	-	-	-	2	-	1	1

UNIT-1

INTRODUCTION: Concepts of control systems – Open loop and closed loop control systems and their differences, examples – Types of feedback control systems

Mathematical modeling of Electrical & Mechanical(translational & rotational) systems, differential equations-Electrical analogous (F-V,F-I) of mechanical system- use of Laplace transforms in control systems-Transfer function: concepts, features-Transfer functions of above systems

UNIT-2

BLOCK DIAGRAM REDUCTION & SIGNAL FLOW GRAPH REPRESENTATION: Block diagram representation of electrical systems and reduction techniques - Signal flow graphs and reduction using mason's gain formula- Transfer function of DC servomotor, AC servomotor Control system components-DC Servo motor-AC Servo motor

UNIT-3

TIME RESPONSE ANALYSIS: Definition & classification of time response- Standard test signals – Type & order of a system- Transient response of fist order and 2^{nd} order systems for step input- Transient response specifications- Steady state response- Steady sate errors and error constants- Effects of PD, PI & PID controllers.

UNIT-4

STABILITY ANALYSIS IN S-DOMAIN: The concept of stability - Routh stability criterion, special cases, advantages and limitations

Root locus technique: The root locus concept, construction of root loci- Effects of adding poles and zero's to G(s) H(s) on the root loci.

UNIT-5

FREQUENCY RESPONSE ANALYSIS: Introduction – Steady state response to sinusoidal input (frequency response) - Bode diagrams- Phase margin and gain margin- Stability analysis from Bode plots- Determination of transfer function from Bode diagram.

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UNIT-6

POLAR AND NYQUIST PLOTS: Polar plots - Nyquist plots- Stability analysis

TEXT BOOKS:

1) J. Nagarath and M. Gopal, "Control System Engineering", New age international (P) limited, 2006.
2) B.C. Kuo, "Automatic control systems", 9th edition, John Wiley and son's, 2010.
3) Katsuhiko Ogata, "Modern control engineering", PHI, 2010.

REFERENCE BOOKS:

1) M. Gopal, "Control systems: Principles and Design", Tata McGraw-Hill Education Pvt Limited, 2002.
2) S. Palani, "Control Systems Engineering", 2nd edition, Tata McGraw-Hill Education Pvt Limited, 2010.
3) Norman S. Nise, "Control Systems Engineering", John Wiley, 2017.
4) https://nptel.ac.in/courses/107/106/107106081/

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(A0210194) ELECTRICAL MACHINES-I

COURSE OBJECTIVES:

- Electrical machines course is one of the important courses of the electrical discipline.
- In this course different types of DC generators and motors which are widely used in industry are covered and their performance aspects will be studied.

COURSE OUTCOMES:

- Understand the construction and working principle of operation of DC Generator.
- Analyze the effect of armature reaction and the process of commutation in DC generator and its improvement methods.
- Understand the characteristics of DC Generator and its specific applications. Analyze parallel operation of DC Generators.
- Understand the working of DC motor along with its characteristics and applications.
- Apply the theory for controlling the speed of all DC Motors and need of starters
- Test the performance DC motor and DC Generator.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	1	-	-	3
CO2	3	3	1	-	-	-	-	-	1	-	-	1
CO3	2	-	-	1	-	-	-	-	-	-	-	2
CO4	3	1	-	1	-	-	-	-	2	-	-	3
CO5	2	1	-	-	-	-	-	-	2	-	-	2
CO6	3	2	1	-	-	-	-	-	1	-	-	1

UNIT-1

D.C. GENERATORS – CONSTRUCTION & OPERATION: D.C. Generators – Principle of operation – Action of commutator – constructional features – armature windings – lap and wave windings – simplex and multiplex windings – use of laminated armature – E. M.F Equation – Problems

UNIT-2

ARMATURE REACTION IN D.C. GENERATOR: Armature reaction – Cross magnetizing and de-magnetizing AT/pole – compensating winding – commutation – reactance voltage – methods of improving commutation.

UNIT-3

TYPES OF DC GENERATORS &LOAD CHARACTERISTICS: Methods of Excitation – separately excited and self-excited generators – build-up of E.M.F - critical field resistance and critical speed - causes for failure to self-excite and remedial measures.

Load characteristics of shunt, series and compound generators – parallel operation of d.c series generators – use of equalizer bar and cross connection of field windings – load sharing.

UNIT-4

D.C. MOTORS: D.C Motors – Principle of operation – Back E.M.F. - Torque equation – characteristics and application of shunt, series and compound motors – Armature reaction and commutation.

UNIT-5

SPEED CONTROL OF D.C. MOTORS: Speed control of d.c. Motors: Armature voltage and field flux control methods- Ward-Leonard system-Principle of 3 point and 4 point starters – protective devices

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UNIT-6

TESTING OF D.C. MACHINES: Testing of d.c. machines: Losses – Constant & Variable losses – calculation of efficiency – condition for maximum efficiency Methods of Testing – direct, indirect and regenerative testing – brake test – Swinburne's test – Hopkinson's test – Field's test – Retardation test – separation of stray losses in a d.c. motor test.

TEXT BOOKS:

1) P.S. Bimbra, "Electrical Machinery", 7th edition, Khanna Publishers, 2011.
2) I.J. Nagrath & D.P. Kothari, "Electric Machines", 3rd edition, Tata Mc Graw – Hill Publishers, 2004.
3) J. B. Gupta, "Theory & performance of Electrical Machines", S. K. Kataria & Sons, 2009.

REFERENCE BOOKS:

1) E. Fritzgerald, C. Kingsley and S. Umans, "Electric Machinary", 7th edition, Mc Graw-Hill Companies, 2014.
2) A.E. Clayton and Hancock, "Performance and Design of D.C Machines", 3rd edition, BPB. Publishers, 2004.
3) L. Theraja, "A text book of Electrical Machines", Vol-II, S. Chand.
4) P. C. Sen, "Principles of Electric Machines and Power Electronics", 2nd edition, Wiley India Pvt. Limited, 2007.
5) https://nptel.ac.in/courses/108/105/108105017/

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(A0017194) INDIAN HERITAGE AND CULTURE

Mandatory Learning Course_I
(For branches CSE & EEE)

INTRODUCTION:

- Indian Heritage is an ancient facet pertaining to bygone ages. It reflects strong ethical culture and embodiment of nature in life style. It had its deep roots in great Indian epics and Upanishads. It has been transformed and strengthened by many kings and queens. It is received by erudite writers. The glory of Indian Heritage & culture have been ignored or distorted in wake of western culture. The present generation ought to know their indigenous culture and heritage.

COURSE OBJECTIVES:

- To enable the students to have an insight into and understanding of the great heritage and culture of India.
- To sensitize them towards preservation and progression of the same.

COURSE OUTCOMES:

- Equip themselves with knowledge about the heritage and culture of India.
- Apply the ancient wisdom to become successful professionals.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															

UNIT-1

Origin of Indian Culture - Indus valley & Vedic Culture Evolution - Political unification of India under Mauryas and Guptas - Cultural achievements - Cultural conditions under the Sathavahanas - Contribution of Pallavas and Cholas to art and letters.

UNIT-2

Influence of Islam on Indian Culture - The Sufi, Bhakti and Vishnavite Movements - Cultural achievements of Vijayanagara rulers - Contribution of Shershah and Akbar to the evolution of administrative system in India - Cultural Developments under Mughals - Great Indian Monuments.

UNIT-3

Great Indian Epics - Ramayana and Mahabharata - Upanishads - Vedas - Pathanjali - Yoga -Principles of Jainism and Buddhism.

UNIT-4

Indian Literature - Rabindranath Tagore - Arundhathi Roy - RK.Narayan - Sri Sri - Gurajada -Jashuva - Western Impact on India - Introduction of Western Education - End of the Gurukulas educational system.

UNIT-5

Social and Cultural awakening and social reform movements - Raja Rama Mohan Roy - Dayananda Saraswathi -Theosophical Society - Ramakrishna Paramahamsa and Vivekananda - Iswara Chandra Vidyasagar and Kandukuri Veeresalingam - Emancipation of women and struggle against Caste.

UNIT-6

Mahatma Gandhi - Non-violence and Satyagraha - Great leaders of Freedom struggle - Post Independent Era.

TEXT BOOK

1) Madanlal Malpani & Shamsunder Malpani (2016), ***Indian Heritage and Culture,*** New Delhi: Kalyani Publishers.

REFERENCE BOOKS

1) Romila Thapar (2018) , Indian Cultures as Heritage: Contemporary Pasts, India.
2) Anurag Mathur (2017), Indian Culture & Heritage , Create space independent publishing Platform, 2017.
3) P.R.Rao & P. Raghavendra , Indian Heritage and culture, Sterling Publication Pvt. Ltd.
4) Madhukar kumar Bhagat, Indian Heritage and culture, Access Publications.
5) Dhirendra Singh, Indian Heritage and culture , APH Publications.
6) http://www.indiaculture.nic.in/
7) http://www.indiaculture.nic.in/world-heritage

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(A0016194) DESIGN THINKING

(Skill Development Course)

(Common to CE, Mech, EEE, ECE & CSE)

COURSE OBJECTIVES:

- To create awareness of design among students of engineering
- To motivate students to think of design before implementing an engineering project
- To teach a systematic approach to identifying and defining a problem before brainstorming for a solution
- To instil a sense of significance towards applying creativity to product and service design

COURSE OUTCOMES:

Upon completion of this course, the student shall be

- Learn to identify design principles from an engineering perspective
- Cultivate sensitivity towards design aspects in objects made by engineers and non-engineers, which are typically used in daily life
- Understand and create visual design elements to communicate more effectively
- Construct clear problem statements, understand the importance of validation, and design services creatively
- Develop fundamental team skills: working in teams and managing teams, strategizing tasks, and streamlining activities pertaining to a project

STUDENTS' RESPONSIBILITIES:

1) Students will form teams of 3–5 members each, while working collaboratively throughout the semester.
2) Students will present and report the tasks to the class and to the concerned faculty members and design experts, using their oral and written communication skills as well as creativity and team skills.
3) Students must proactively engage in observing the objects and processes which are part of their daily life and society from a design perspective and discuss with peers to learn collaboratively.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	-	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	1	1	2	-	-	-	2	-	-	-	-	-	-	-
CO3	2	2	-	2	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	2	3	2	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MODULE-1

Design Overview and Motivation: History and Context of birth of Design; Design thinking: Introduction and Motivation; Various definitions and interpretations of design, Design Vocabulary; Design in Indian Context; Art and Design: Art in Design, Design beyond Art; Design in Creative Industries

MODULE-2

Design Sensitization for Engineers: Design Engineering vs. Engineering Design, Examples of Engineering Design and Design Engineering in various engineering domains, Examples of design failures leading to bad products and services, Real-world examples of bad design that caused engineering and technological disasters, Domain-specific Engineering Design examples.

MODULE-3

Design Thinking Foundations: The Design Double Diamond: Discover-Define-Develop-Deliver, User-centric design approaches: Importance of user-centricity for design, Empathisation, Empathy Maps, Data collection from users and for users, Data Validation, Responsible Innovation and Ethical Design: Ethics as foundation for design, Concern for environment and sustainability

MODULE-4

Communication Skills for Design, Culture and Art: Communication Media to express an idea: Visuals, Text, Voice and Audio, Infographics General guidelines for a good Presentation: Target audience, slideshow

templates, appropriate visual elements, presentation styles, guidelines, General guidelines for a good Report: Documentation classification, standards, styles, and templates, Modes of communication: Reports and documents, Presentation, poster, graphic, blog or website.

Understanding Art in Design: Need for creativity, Elements of Visual Design, Design Aesthetics: Influences and impressions of Colours, Shapes, Layouts, Patterns, and Fonts as Design Elements.

MODULE-5

Applied Creativity and Design for Services: Methods to brainstorm solutions for user issues; Combining solutions to workable solution concepts; Identifying the user needs in a service-driven economy; Process Flows and Customer Experience considerations for designing and improving services; 5 Why"s; Service Delivery Pathways

MODULE-6

Doing Design: Looking for a problem, Ideation and Rules of Ideation, Framing and stating the problem; Basic considerations of Prototyping/ Model Building, Basics of Testing and Validation, Incorporating feedback

TEXT BOOKS:

1) Daniel Ling, "Complete Design Thinking Guide for Successful Professionals", CreateSpace Independent Publishing, 2015 (ISBN: 978-1514202739)
2) Tim Brown, "Change by Design", Harper Business, 2012 (ISBN: 978-0062337382)

REFERENCES:

1) Jimmy Jain, "Design Thinking for Startups: A Handbook for Readers and Workbook for Practitioners", Notion Press, 2018 (ISBN: 978-1642495034)
2) Beverly Rudkin Ingle, "Design Thinking for Entrepreneurs and Small Businesses: Putting the Power of Design to Work", APress, 2013 (ISBN: 978-1430261810)
3) Donald A. Norman, "The Design of Everyday Things", *MIT Press*, 2013 (ISBN: 978-0262525671)
4) Bruno Munari, "Design As Art", *Penguin UK*, 2009 (ISBN: 978-0141035819)
5) Tom Kelly, Jonathan Littman, "The Art of Innovation", HarperCollins Business, 2002 (ISBN: 978-0007102938)
6) Thomas Lockwood, "Design Thinking: Integrating Innovation, Customer Experience, and Brand Value", *Allworth Press*, 2009 (ISBN: 978-158115

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3 1.5

(A0594194) PYTHON PROGRAMMING LAB
(For branches CE, Mech, EEE, ECE, CSE)

COURSE OBJECTIVES:

- To be able to introduce core programming basics and various Operators of Python programming language.
- To demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries
- To understand about Functions, Modules and Regular Expressions in Python Programming.

COURSE OUTCOMES:

- Student should be able to understand the basic concepts of scripting and the contributions of scripting language.
- Ability to explore python data structures like Lists, Tuples, Sets and dictionaries.
- Ability to create practical and contemporary applications using Functions, Modules and Regular Expressions.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	-	-	-	-	-	1	-	-	-	1	1	1
CO2	3	3	2	-	-	-	-	-	1	-	-	-	1	1	1
CO3	3	1	2	-	-	-	-	-	1	-	-	-	1	1	1

LIST OF EXPERIMENTS

1) Program to demonstrate basic data type in python
2) Program to demonstrate operators in python
3) A cashier has currency notes of denominations 10, 50, and 100.If the amount to be withdrawn is input through the keyboard using input() function in hundreds, find the total number of currency notes of each denomination the cashier will have to give to the withdrawer
4) Program to demonstrate list and tuple in python
5) Write a program in Python, A library charges a fine for every book returned late. For first 5 days the fine is 50 paisa, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a program to accept the number of days the member is late to return the book and display the fine or the appropriate message
6) Write a program to calculate overtime pay of 10 employees. Overtime is paid at the rate of Rs.12.00 per hour for every hour worked above 40 hours. Assume that employee do not work for fractional part of an hour.
7) Two numbers are entered through the keyboard; write a program to find the value of one number raised to the power of another.
8) Write a function that receives marks received by a student in 3 subjects and returns the average and percentage of these marks. Call this function from main() and print the result in main
9) Write a program to read a file and display its contents.
10) Write a program to demonstrate Regular Expressions in python.

TEXT BOOKS:

1) Learning Python, Mark Lutz, Orielly, 3 Edition 2007.
2) Python Programming: A Modern Approach, Vamsi Kurama, Pearson, 2017.

REFERENCE BOOKS:

1) Think Python, 2 Edition, 2017 Allen Downey, Green Tea Press
2) Core Python Programming, 2016 W.Chun, Pearson.
3) Introduction to Python, 2015 Kenneth A. Lambert, Cengages
4) https://www.w3schools.com/python/python_reference.asp
5) https://www.python.org/doc/

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(A0493194) IC AND PDC LAB

COURSE OBJECTIVES:

At the end of the course the student is expected to design

- Astable and mono stable multi vibrators.
- IC 741 OP-AMP applications.

COURSE OUTCOMES:

- Study the working principle of various Multivibrators (Bi-stable, Mono-stable, and Astable Multivibrators).
- Realize simple logic gates using diodes and transistors
- Realize Adder, integrator & differentiator using OP-Amp
- Realize different oscillator circuits and Function generator using IC741.
- Realize different multivibrators using IC555 timer
- Realize 4-bit DAC using OP-Amp.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	2	-	-	-	-	-	3	-	-	-
CO2	1	-	3	-	-	-	-	-	3	-	-	-
CO3	2	-	-	-	-	-	-	-	3	-	-	-
CO4	-	2	1	-	-	-	-	-	3	-	-	-
CO5	-	2	-	-	-	-	-	-	3	-	-	-
CO6	-	2	-	-	-	-	-	-	3	-	-	-

LIST OF EXPERIMENTS:

1) Study of Logic Gates & Some Applications
2) Transistor as a switch
3) Finding of operating point in CE configuration
4) Common Emitter amplifier
5) Common Collector amplifier
6) IC 741 OP AMP Applications –Integrator Circuits
7) IC 741 OP AMP Applications- Differentiator Circuits
8) IC 555 Timer – Monostable Operation Circuits
9) IC 555 Timer – Astable Operation Circuits
10) Function Generator using 741 OP AMP
11) Schmitt Trigger Circuits – Using IC 741 and IC 555
12) 4 bit DAC using 741 OP AMP

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AUTONOMOUS
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II B.Tech, II-Sem (EEE) P C
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(A0294194) CONTROL SYSTEMS & SIMULATION LAB

COURSE OBJECTIVES:

- To help the students understand and practice the modeling, simulation and to implementation of a physical dynamical system by a linear time invariant ordinary differential equation.
- To highlight the electrical modeling of a second order system and analyze the under damped, over damped and critically damped cases.
- To experimentally determine the transfer function of servo motor skills and techniques.

COURSE OUTCOMES:

- Obtain the moment of inertia experimentally and develop the transfer function of the given DC Servo System, (a) Armature controlled and (b) Field controlled cases.
- Study the AC servo motor and its characteristics. Also to set up a closed loop position control system and study the system performance.
- Set up a system for closed loop voltage regulation for a dc shunt generator its characteristics.
- Obtain the characteristics of the synchro systems and set up a synchro link position.
- To understand the behavior and characteristics of BODE PLOT, ROOT LOCUS, NYQUIST PLOT.
- Verification of theoretical concepts through experimentation.

MAPPING OF COs & POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	2	2	-	-	1	1	-	-
CO2	3	3	1	-	2	2	-	-	1	1	-	-
CO3	3	3	2	1	1	1	-	-	1	1	-	-
CO4	2	3	2	1	1	-	-	1	1	1	-	-
CO5	2	2	1	2	1	-	-	1	1	2	-	1
CO6	3	2	1	1	2	-	-	-	2	1	-	-

Note: The minimum of 10 experiments are to be performed from the following, out of which at least two should be software based.

1) Time response of Second order system
2) Characteristics of Synchros
3) Programmable logic controller – Study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control of motor.
4) Speed-torque characteristics of DC servo motor
5) Transfer function of DC motor
6) Effect of P, PD, PI, PID Controller on a second order systems
7) Transfer function of DC generator
8) Temperature controller using PID
9) Characteristics of magnetic amplifiers
10) Characteristics of AC servo motor
11) DC Position Control System

SOFTWARE BASED EXPERIMENTS

1) To plot root locus diagram of an open loop transfer function and determine range of gain ‘k’ for stability.
2) To plot a Bode diagram of an open loop transfer functions and examines the stability of the system.
3) To draw a Nyquist plot of an open loop transfer functions and examines the stability of the closed loop system.
4) To determine response of first order and second order systems for step input and compare theoretical and practical results.