USHA RAMA
COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

(Approved by A.I.C.T.E & Permanently Affiliated to JNTU, Kakinada)
Accredited by NAAC with "A" Grade
on NH 16, Telaprolu, Krishna Dist – 521109

UR19 CBCS REGULATIONS FRESHERS HAND BOOK

Electrical and Electronics Engineering

(Applicable for the batches admitted from the Academic Year 2019-20)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

UR19 CBCS REGULATIONS

CONTENTS

1. PREAMBLE

Usha Rama College of Engineering and Technology (URCET) aims at achieving academic excellence by implementing new initiatives in teaching-learning and evaluation processes. Based on the directions of the University Grants Commission (UGC), New Delhi, All India Council for Technical Education (AICTE), New Delhi and Jawaharlal Nehru Technological University (JNTUK) Kakinada, URCET introduced the Credit Based Semester System (CBSS) in under-graduate programmes offered from the academic year 2019 – 20. Keeping in view of the standardization of the higher education system in India, URCET is going to implement Choice Based Credit System (CBCS).

2. ADMISSION CRITERIA

The eligibility criteria for admission into engineering programmes offered at URCET shall be as prescribed by the Government of Andhra Pradesh. The criteria are given below:

- The candidate shall be an Indian National / NRI.
- The candidate should have completed 18 years of age as on 31st December of the academic year for which the admissions are being conducted.
- The candidate should have passed the qualifying examination (10+2) or equivalent as on the date of admission recognized by BIE, Andhra Pradesh State.
- Seats in each programme in the Institute are classified into three categories i.e., Category – A, Category – B
- Category – Lateral Entry seats as per the GOs.

2.1 Category – A Seats

These seats shall be filled through counseling by convener as per the rank secured by a candidate in the Common Entrance Test (EAMCET) conducted by the Government of Andhra Pradesh and as per other admission criteria laid down in the GOs.

2.2 Category – B Seats

These seats shall be filled by the Institute as per the GOs issued by the Government of Andhra Pradesh from time to time.

2.3 Category – Lateral Entry seats

Direct Admission to Second Year: (Lateral Entry Scheme)

A candidate shall be admitted into the third semester (II year I semester) based on the rank secured by the candidate in the Engineering Common Entrance Test [ECET (For Diploma Holders)] by the Government of Andhra Pradesh and as per other admission criteria laid down in the GOs.

3. UNDER-GRADUATE DEGREE PROGRAMMES OFFERED

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

Table 1: Under graduate degree programs offered

S.No	Branch
1	Civil Engineering (CE)
2	Electrical and Electronics Engineering (EEE)
3	Mechanical Engineering (ME)
4	Electronics and Communication Engineering (ECE)
5	Computer Science and Engineering (CSE)
6	Information Technology (IT)

4. AWARD OF B.TECH DEGREE

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

1. A student shall be declared eligible for the award of the B. Tech Degree, if he pursues a course of study in not less than four and not more than eight academic years

2. The candidate shall register for 160 credits and secure all the 160 credits.
   NOTE: 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. programme.

3. In case of Lateral Entry students, the candidate shall register for 120 credits and secure all the 120 credits.
   NOTE: Students, who fail to fulfill all the academic requirements for the award of the degree within six academic years from the year of their admission, shall forfeit their seat in B.Tech. programme.

5. DURATION OF THE ACADEMIC PROGRAMMES

Under CBCS, it is possible for an outstanding student to qualify for the award of degree in a shorter time than that of the duration specified for the concerned programme. However, the B.Tech. degree shall be issued at the end of normal duration of the programme.

Normal Duration:

The duration of the B.Tech. degree programme shall be four (4) years.
The duration of the B.Tech Lateral Entry Scheme (LES) degree programme shall be three (3) years.

Maximum Duration:

The maximum period in which a student can complete a full time B.Tech. degree programme shall be twice the normal duration of the programme, i.e., eight years (16 semesters) for B.Tech. degree and six years (12 semesters) for B.Tech. lateral entry scheme degree (For Diploma Holders).

The maximum period for a programme shall also be dictated by the fact that a student has to demonstrate the prescribed minimum academic

performance by registering for the prescribed minimum number of credits in every semester, for continuing in the programme. This period can be equal to or lesser than the maximum period.

6. B.TECH. PROGRAMME COURSE STRUCTURE

6.1 Medium of Instruction And Examination
The medium of instruction shall be English for all the courses including their content delivery and examinations, seminars, presentations and project evaluation as prescribed in the programme curriculum.

6.2 Scheme of Instruction And Examination:
The scheme of instruction and examination of all B. Tech programs are given separately.

6.3 Minimum Instruction Days
Each semester shall consist of 16 weeks of academic work excluding examination and evaluation. The minimum instruction days for each semester shall be 90 working days.

7. COURSES AND CREDIT STRUCTURE

Table 2: Course Code and Definitions

Course Code	Definitions
L	Lecture
T	Tutorial
P	Practical
BSC	Basic Science Courses
ESC	Engineering Science Courses
HMC	Humanities and social sciences including Management Courses
PCC	Professinal Core Courses
PEC	Professinal Elective Courses
OEC	Open Elective Courses
LC	Laboratory Courses
MC	Mandatory Courses
PROJ	Project

Table 3: Description of Courses

Broad Course Classification	Course Category	Description of Courses
Foundation Courses	Basic Science courses	Includes mathematics, physics, chemistry and biology courses
	Engineering Science courses	Includes fundamental engineering courses
	Humanities and Social Science courses including Management courses	Includes courses related to humanities, social sciences and management
Core courses	Professional Core courses	Includes core courses related to the parent discipline/department/branch of Engineering
	Project Work	B.Tech. project stage-I and stage-II
	Mini- project	Internship/Industry oriented mini-project
Elective courses	Professional Elective courses	Includes elective courses related to the parent discipline/department/ branch of Engineering
	Open Elective courses	Elective courses which include inter – disciplinary courses or courses in an area outside the parent discipline/department /branch of Engineering
Mandatory courses		Mandatory non-credit courses

Table 4: Category of Courses, their Codes and Distribution of Credits

Type of Courses		Course Category	Code	Range of Credits
Compulsory Courses	Foundation courses	Engineering Science courses	ESC	14-20
		Basic Science courses	BSC	17-25
		Humanities & Social Science Incl. Management	HM	09-16
	Core courses	Professional Core courses	PC	70-75
	Project	Project	PROJ	12-13
Elective Courses		Professional Elective	PE	15-20
		Open Elective	OE	09-12
Mandatory Courses		Mandatory courses MC		Non- Credit
Total Credits				160

Engineering Exploration Project

Engineering Exploration Project is offered to the First year students of all engineering disciplines. The motivation of including this project is to make the students practice creative problem solving method - Design Thinking which fosters collaboration and solve problems in human-centered ways. It enables the students to exercise and identify design opportunities through various phases with the help of hands-on activities. Obtaining a best solution for an identified problem involves a non-linear, iterative process which seeks to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test. The students are encouraged to explore real-world problems and expected to take charge of their own learning, work together in teams towards the problem.

The evaluation of the Engineering Exploration Project involves in writing their observations in Activity Cards at the end of each task given in syllabus and submitting a final report along with working prototype.

8. CHOICE BASED CREDIT SYSTEM

Flexibility is extended to the fast learning students to take the courses of higher semesters in advance as per their convenience to concentrate on their placement activity/ project work etc., during the seventh/eighth semesters.

8.1 CBCS Course Registration policy

Fast learning students can register for additional courses from higher semesters by satisfying the pre-requisite course(s) to a maximum of 6 credits in each of the semesters from 3rd semester onwards along with the regular semester courses as prescribed. There is no minimum limit on the credits for taking additional courses.

8.2 Eligibility for choosing CBCS flexibility

Regular Students (4 Year duration), entering the nth semester must pass all the subjects in single attempt as on date and with CGPA ≥ 7.75 up to (n-2)th semester, are only eligible to opt for this flexibility.

Lateral entry students (3 year duration) with 70% Marks in their Diploma are eligible to opt for this flexibility during 3rd and 4th Semesters. Those students entering into V/ VI /VII semester with no backlog courses as on date and with CGPA ≥ 7.75 up to (n-2)th semester, are only eligible to opt for this flexibility

- List of additional courses offered in the even & odd semesters, registration dates will be notified by the respective departments well in advance.
- Withdrawal from the respective course by the student may be permitted within 10 days after the commencement of the course.
- Choice of opting this flexibility is purely optional to the students.
- Minimum number of students required to register for an additional course shall be twenty (20). In case the registered strength for the additional course is less than twenty (20), the course may be

offered on the recommendation of the Head of the Department and subsequent approval of the Principal.

9. EXAMINATIONS AND SCHEME OF EVALUATION

9.1 Description of Evaluation

9.1.1 Internal Evaluation

The performance of the student in each course is evaluated by the faculty/course coordinator all through the semester with mid-term examinations, assignments, Online quiz, project reviews, viva voce, laboratory assessment and other means covering the entire syllabus of the course.

9.1.2 Semester End Evaluation (SEE)

Semester End Examination (SEE) shall be conducted by the Controller of Examinations (COE) by inviting Question Papers from the External Examiners. Question papers may be moderated for the coverage of syllabus, pattern of questions by an examiner appointed by the COE. The appointed examiner shall prepare a detailed answer key and scheme of valuation and submit it to the COE. Laboratory SEE shall be conducted involving internal and external examiners. The controller of examinations must use the panel of examiners for question paper setting/evaluation approved by concerned BOS. At present, Question paper setting and evaluation shall be external (IIT/NIT/Central University/State University/Reputed Autonomous Colleges).

9.2 CONTINUOUS INTERNAL EVALUATION

9.2.1 Theory Courses

Each course is evaluated for 30 marks. For theory subjects, during a semester, there shall be two mid-term examinations. Each mid-term exam consists of one objective paper, one descriptive paper and one assignment. The midterm marks shall be awarded giving a weightage of 75% in the midterm examination in which the student scores more marks and 25% for the midterm examination in which the student scores less marks.

   (a)   Two assignment tests each for 5 marks will be conducted for 60 minutes duration. Question bank with minimum six comprehensive questions from the concerned UNIT of the syllabus will be given at least a week in advance before the commencement of Assignment Test.

   (b)   Two descriptive type mid-term examinations each for 15 Marks will be conducted for 90 minutes duration.

   (c)   Two Online Quizzes (Objective type mid-term exam) for 10 marks will be conducted for 20 minutes duration.

   (d)   For the subject having design and/or drawing (such as Engineering Graphics & Drafting, Machine Drawing) and

Estimation, there is no online quiz. The distribution of internal marks shall be as given below.

Day to day performance – 15M

Midterm exam – 15M

(e) Mandatory Courses (Non Credit): Each course is evaluated for 100 marks.

Two examinations (Midterm-1(Descriptive) & Midterm-2(Descriptive) for 50 Marks each will be conducted for 90 minutes duration. Sum of the marks obtained in both examinations will be considered for 100 marks.

9.2.2 Lab Courses

For Laboratory courses there shall be continuous internal evaluation during the semester for 20 marks (Day to day work 10M + Record 5M + Internal laboratory test 5M) and semester end evaluation for 30 marks.

9.2.3 Engineering Exploration Project / Engineering Project for Community Services /Mini Project

For Engineering Exploration Project /Engineering Project for Community services / Mini Project, there shall be Internal evaluation during the semester for 20 marks and semester end evaluation for 30 marks.

9.2.4 Project: 80 Marks

Project work shall be carried out in two stages. The Project stage 1 during the VII semester and Project stage 2 during the VIII semester. Project stage 1 shall be evaluated for 50 marks and Project stage 2 shall be evaluated for 150 marks.

For Project stage 1, there shall be an internal evaluation during the VII semester for 20 marks and semester end evaluation for 30 marks. The internal evaluation for project stage 1 shall be on the basis of project reviews conducted by the Project Review Committee (PRC). The PRC consists of HOD, Project coordinator, two senior faculty members of the department and project guide. Students have to submit a report containing introduction to the project work, literature survey and problem definition for the project stage 1 at the end of VII semester.

For Project stage 2, there shall be an internal evaluation during the VIII semester for 60 marks and semester end evaluation for 90 marks. The internal evaluation for Project stage 2 shall be on the basis of project reviews conducted by the Project Review Committee (PRC). Students have to submit a report containing the project work carried out during Project stage 1 and Project stage 2 putting together at the end of VIII semester.

9.3 SEMESTER END EXAMINATIONS

9.3.1 Theory Courses (70M)

The Semester End Examination shall be conducted for 3 hours duration at the end of the semester. The question paper shall be given in the prescribed pattern. Each course shall consist of 5 units of syllabus. The

questions shall be framed in line with the Course Outcomes defined and Blooms Taxonomy levels.

9.3.2 Laboratory Courses

The semester end examination for laboratory courses shall be conducted for three hour duration at the end of semester for 30 marks. Each Semester-end Laboratory Examination shall be conducted by an External Examiner along with an Internal Examiner. The average of the marks awarded by Internal and External Examiners shall be taken into consideration in case of difference of opinion.

9.3.3 Engineering Exploration Project/ Engineering Project For Community Services/Mini Project: 30 Marks

The distribution of semester end examination marks for Engineering Exploration Project / Engineering Project for Community services and Mini Project is given below

> Report – 20 Marks
> Presentation and Viva Voce – 10 Marks

The semester end examination shall be conducted and evaluated by the Committee nominated by the Head of the Department.

9.3.4 Project: 120 Marks

The semester end examination for project stage 1 shall be held for 30 marks and project stage 2 shall be for 90 marks (Evaluation, Presentation and Viva Voce) by a committee consisting of an external examiner, Head of the Department and Project coordinator. The evaluation of project stage 1 shall be conducted at the end of VII semester and project stage 2 at the end of VIII semester. The average of marks awarded by the committee members shall be taken in to consideration. The semester end examination for both project stages shall be completed before the commencement of semester end theory examinations.

9.3.5 Self-Learning Courses:

(Prescribed from the existing open courseware)

Students who have qualified in the examination conducted by the MOOCs providers are exempted from appearing in the internal and semester end evaluations conducted by the institution in that category.

In case a student fails to complete the MOOCs course offered by MOOCs providers, he/she may be allowed to register again for the same with any of the providers from the list approved by the department.

For the courses under this category, those students who have not registered under MOOCs platform and are able to learn by themselves shall appear for internal evaluation for 20 marks and semester end examination for 30 marks in the VIII semester

The distribution of marks for internal evaluation is given below

> Home assignment - 5M
> Assignment test - 5M
> Midterm Examination – 10M

9.3.6 Industry Interaction / Internships: 100M

Students have to register for an Internship in collaboration with an Industry of their specialization during summer.

The candidate shall submit the comprehensive report to the department. The report will be evaluated for 100 marks by the Review Committee consisting of Head of the department, Program Coordinator and Industry Institute Interaction Coordinator.

9.3.7 Induction Program:

Induction program is mandatory for all the first year B.Tech students and shall be conducted as per Semester – 0 course structure.

9.4 MINIMUM ACADEMIC REQUIREMENTS

In addition to the attendance requirements mentioned in these regulations for the award of B.Tech Degree, a student must satisfy the minimum academic requirements as given below:

A student shall be deemed to have satisfied the minimum academic requirements and earn the credits for each theory or practical or design or drawing course in B.Tech programme, if he secures

9.4.1 A minimum of 35% marks for each theory course in the semester end examinations and a minimum of 40% marks for each theory course considering both IE and SEE taken together.

9.4.2 A minimum of 50% marks for internship, industry oriented mini-project and project.

9.4.3 A student shall be treated as failed, if he does not submit a report on internship, industry oriented mini-project, project or does not make a presentation of the same before the evaluation committee as per the schedule, or secures less than 50% marks in evaluation.

9.4.4 In case of a student not meeting any of the above points, student may re-appear for each of the evaluation of internship, industry oriented mini-project, project, design sensitization, design thinking courses, as scheduled by the evaluation committee until he/she meets the requirement.

9.4.5 A student shall register for all the courses covering 160 credits as specified and listed in the course structure of the B.Tech programme, fulfills all the attendance and academic requirements for 160 credits, 'earn all 160 credits' by securing SGPA ≥5.0 (in each semester) and CGPA (at the end of each successive semester) ≥5.0 to successfully complete the under- graduate programme.

9.4.6 If a student fails to secure a pass grade in a particular course, he shall register and reappear for the supplementary examination in that course. It is mandatory that he should continue to register and reappear for the examination till he secures a pass grade.

9.4.7 A student eligible to appear in SEE of any course, but remains absent from it or gets failed (failing to secure 'D' grade or above) may reappear for that course in the supplementary SEE as and when conducted. In such cases, IE assessed earlier for that course shall be carried over, and added to the marks to be obtained in the supplementary SEE examination for evaluating the performance in that course.

9.4.8 A student detained in a semester due to shortage of attendance, may be re-admitted into the same semester in the next academic year for fulfillment of the academic requirements.

9.4.9 Academic regulations applicable to the semester in which re-admission is sought shall be applicable to the re-admitted student. However, no grade allotments or SGPA/ CGPA calculations shall be done for the entire semester in which the student has been detained.

9.4.10 A student detained due to lack of credits, shall be promoted to the next year only after acquiring the required academic credits. Academic regulations applicable to the semester in which re-admission is sought shall be applicable to the re-admitted student.

9.4.11 The student shall be qualified in two certificate courses not less than 40 hours duration each during his course of study. Out of the two certificate courses, atleast one certificate course shall be pursued through MOOCs platform like SWAYAM-NPTEL online courses, Coursera online courses, BEC certification courses etc.

9.4.12 Students who fail to earn 160 credits(LEs 120 Credits) as indicated in the course structure within eight academic years(LEs 6) counting from the year of their admission shall forfeit their seat in B.Tech programme and their admission stands cancelled.

9.5 REVALUATION AND PERSONAL VERIFICATION

9.5.1 Internal Evaluation
The Internal Evaluation scripts shall be shown to the students before finalizing the marks.

9.5.2 Semester End Evaluation
1. As per the notification issued by the Controller of Examinations, the students can submit the application form along with the requisite fee receipt for revaluation of his/her answer script(s) of theory course(s), if he/she is not satisfied with marks obtained.
2. The Controller of Examinations shall arrange for re-evaluation of those answer script(s).
3. A new examiner, other than the first examiner, shall re-evaluate the answer script(s).
4. Best out of the two will be taken into consideration.

9.5.3 Personal verification

On payment of special fee, the Semester End Examination answer scripts shall be shown to the candidate in front of the Controller of Examinations.

9.6 PERFORMANCE AND GRADING SYSTEM

Marks Range (% of marks)	Letter Grade	Level	Grade Points
≥ 90	O	Outstanding	10.00
≥80 to <90	S	Excellent	9.00
≥70 to <80	A	Very Good	8.00
≥60 to <70	B	Good	7.00
≥50 to <60	C	Fair	6.00
≥40 to <50	D	Satisfactory	5.00
<40	F	Fail	0
	AB	Absent	0

9.7 COMPUTATION OF SGPA AND CGPA
Computation of SGPA

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

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

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

Where C_i is the number of credits of the ith course and G_i is the grade point scored by the student in the ith course.

Computation of CGPA

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

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

Where S_i is the SGPA of the ith semester and C_i is the total number of credits in that semester.

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

Equivalent Percentage = (CGPA – 0.75) x 10

9.8 Award of Class

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

Class Awarded	CGPA to be secured	
First Class with Distinction	≥7.75 with no subject failures	From the CGPA secured from 160 Credits (120 credits incase of LEs)
First Class	≥ 6.75 with subject failures	
Second Class	≥ 5.75 to < 6.75	
Pass Class	≥ 4.75 to < 5.75	

9.9 WITH HOLDING RESULTS

If the student has any dues, to the institute or if any case of indiscipline is pending against him, the result of the student will be withheld. His degree will be withheld in such cases.

9.10 MALPRACTICES:

Institution implements JNTUK guide lines for malpractices and improper conduct in examinations.

Disciplinary Action for Malpractices/Improper Conduct in Examinations

S.No	Nature of Malpractices/Improper conduct	Punishment
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.

2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the Controller of Examinations.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all semester end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all semester end examinations. The continuation of

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

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

		semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Principal for further action to award suitable punishment.	

10. ATTENDANCE REQUIREMENTS AND DETENTION POLICY

Student has to maintain a minimum of 50% in each subject and 75% of attendance in aggregate to be eligible for appearing the Semester End Examinations. Students who do not meet this requirement shall be detained in that semester.

However, the following are the special cases where the lack of attendance can be condoned.

(i) Shortage of attendance up to 10% on medical grounds in which case the student must submit the medical certificate from any recognized medical practitioner on the day of reporting back to the class work after recovery from ill health.

(ii) Up to a maximum of 10% if the student represents the university/state/country in any extra /co-curricular activities.

Shortage of attendance below 65 % shall in no case be condoned.

- A stipulated fee shall be payable towards condonation of shortage of attendance.
- Students, who do not meet the minimum required attendance in a semester, shall be detained in that semester and their registration for that semester shall stand cancelled. They shall not be promoted to the next semester.
- Students detained in a semester shall seek re-admission into that semester as and when offered.
- Academic regulations applicable to the semester in which re-admission is sought shall be applicable to the re-admitted student. In case if there are any professional electives and/or open electives, the same may also be re- registered if offered. However, if those electives are not offered in the later semesters, then alternate electives may be chosen from the same set of elective courses offered under that category.
- A student fulfilling the attendance requirement in the present semester shall not be eligible for re-admission into the same class.

11. ELIGIBILITY CRITERIA FOR SEMESTER END EXAMINATIONS

i) Minimum required attendance 75%
ii) No dues

12. PROMOTION RULES

Apart from the minimum required attendance conditions as specified in these regulations, the credit conditions to be fulfilled by a student for

getting promoted from the current semester to the next semester are given in the Table.

Table: Promotion Rules

S. No.	Promotion	Conditions to be fulfilled
1.	Third semester (II year I semester) to fourth semester (II year I semester)	Regular course of study of third semester (II year I semester).
2	Fourth semester (II year II semester) to fifth semester (III year I semester)	Regular course of study of fourth semester (II year II semester). Must have secured atleast 40% of the total credits up to fourth semester (II year II semester) of the respective programme from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Sixth semester (III year II semester) to seventh semester (IV year I semester)	Regular course of study of sixth semester (III year II semester). Must have secured atleast 50% of the total credits up to sixth semester (III year II semester) of the respective programme from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.

13. DISCIPLINE

Students shall conduct themselves within and outside the premises of the Institute in a manner befitting the students of our Institution.

13.1 Ragging:

As per the order of Honorable Supreme Court of India, ragging in any form is considered as criminal offence and is banned. Any form of ragging will be severely dealt with the institute implements anti ragging regulations of UGC.

URCET - ANTI RAGGING REGULATIONS
According to UGC Anti Ragging Regulations 2009
UGC REGULATIONS ON CURBING THE MENACE OF RAGGING IN
HIGHER EDUCATIONAL INSTITUTIONS, 2009

In exercise of the powers conferred by clause (g) of Sub-Section (1) of Section 26 of the University Grants Commission Act, 1956, the University Grants Commission, hereby, makes the following Regulations, namely

Title, commencement and applicability:-
1. These regulations shall be called the "UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009".
2. They shall come into force with immediate effect.
3. They shall apply to all the Universities established or incorporated by or under a Central Act, a Provincial Act or a State Act, to all Institutions deemed to be University under Section 3 of UGC Act, 1956, to all other higher Educational Institutions, Including the departments, constituent units and all the premises (academic, residential, sports, canteen, etc.) of such Universities, deemed University and other Higher Educational Institutions, whether located within the campus or outside, and to all means of transportation of students whether public or private.

Objective:

To root out raging in all its forms from Universities, Colleges and other educational institutions in the country by prohibiting it by law, preventing its occurrence by following the provision of these regulations and punishing those who indulge in ragging as provided for in these regulations and the appropriate law in force.

"Ragging" means the following:

Any conduct whether by words spoken or written or by an act which has the effect of teasing, treating or handling with rudeness any other student, indulging in rowdy or undisciplined activities which causes or is likely to cause annoyance, hardship or psychological harm or to raise rear or apprehension thereof in a fresher or a junior student or asking the students to do any act or perform something which such student will not in the ordinary course and which has the effect of causing or generating a sense of shame or embarrassment so as to adversely affect the physique or psyche of a fresher or a junior student.

Punishable ingredients or Ragging:
- Abetment to ragging;
- Criminal conspiracy to ragging;
- Unlawful assembly and rioting while ragging;
- Public nuisance created during ragging;
- Violation of decency and morals through ragging;
- Injury to body, causing hurt or grievous hurt;

- Wrongful restraint;
- Wrongful confinement;
- Use of criminal force;
- Assault as well as sexual offences or unnatural offences;
- Extortion;
- Criminal trespass;
- Offences against property;
- Criminal intimidation;
- Attempts to commit any or all of the above mentioned offences against the victim(s);
- Physical or psychological humiliation;
- All other offences following from the definition of "Ragging".

Punishments:
At the institution level:
Depending upon the nature and gravity of the offence as established by the Anti-Ragging Committee of the institution, the possible punishments for those found guilty of ragging at the institution level shall be any one or any combination of the following:
- Suspension from attending classes and academic privileges.
- Withholding/Withdrawing scholarship/fellowship and other benefits.
- Debarring from appearing in any test/examination or other evaluation process.
- Withholding results.
- Debarring from representing the institution in any regional, National or International meet, tournament, Youth festival, etc.
- Suspension/ Expulsion from the hostel.
- Cancellation of Admission.
- Rustication from the Institution for period ranging from 1 to 4 semesters.
- Expulsion from the Institution and consequent debarring from admission to any other institution for specified period.
- Fine ranging between Rupees 25,000/- and Rupees 1 Lakh.

Collective punishment: when the persons committing or abetting the crime of ragging are not identified, the institution shall resort to collective punishment.

13.2 Eve Teasing
   i) Definition: "Eve teasing" means any indecent conduct or act by a man which causes or likely to cause intimidation, fear, shame or embarrassment to a woman, including abusing or causing hurt or nuisance to or assault, use of force on a woman.
   ii) Eve teasing at any place is prohibited.
   iii) Whoever commits or participates in or abets Eve teasing in or within the precincts of the institute shall be punished.

14. LATERAL ENTRY SCHEME ACADEMIC REGULATIONS

UR 19 CBCS regulations are applicable for lateral entry students admitted into 2nd year B.Tech from the Academic Year 2020-2021. All the regulations applicable to B.Tech 4-year degree course (Regular) will hold good for B.Tech Lateral Entry Scheme unless otherwise mentioned.

15. TRANSITORY REGULATIONS

1. Discontinued or detained candidates are eligible for readmission as and when next offered.
2. The readmitted students will be governed by the current regulations under which the candidate has been readmitted.
3. Transfer from other universities is permitted with the approval of Academic Council/APSHEC. Equivalent subjects and credits will be calculated with the approval of Board of Studies (BOS) chairman.

16. GENERAL

1. Wherever the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
2. The academic regulation should be read as a whole for the purpose of any interpretation.
3. In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.
4. 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.

17. AMENDMENTS TO REGULATIONS

The Academic council of Usha Rama College of Engineering and Technology (Autonomous) reserves the right to revise, amend or change the regulations, scheme of examinations and/or syllabi or any other matter pertained suitable to the needs of the students, society, industry without any notice.

Course Structure
Electrical and Electronics Engineering
(Applicable for batches admitted from 2019-2020)

S. No	Course Category	Course Code	Course Title	L	T	P	Contact Hrs./wk	C
I SEMESTER								
1	HMC	UR19HM101	Communicative English	2	0	0	2	2
2	BSC	UR19BSC101	Linear Algebra & Calculus	3	1	0	4	4
3	BSC	UR19BSC108	Applied Physics	3	0	0	3	3
4	ESC	UR19ESC108	Engineering Graphics & Drafting	1	0	3	4	2.5
5	ESC	UR19ESC109	Fundamental of Computer Science	3	0	0	3	3
6	HMC	UR19HML101	Communicative English Lab	0	0	2	2	1
7	BSC	UR19BSCL102	Applied Physics Lab	0	0	3	3	1.5
8	ESC	UR19ESCL101	Engineering Workshop and IT Workshop	0	0	3	3	1.5
MANDATORY COURSE								
9	MC	UR19MC102	Applied Physics-Virtual Lab*	0	0	0	2	0
Total				12	1	11	26	18.5

*Internal evaluation

S. No	Course Category	Course Code	Course Title	L	T	P	Contact Hrs./wk	C
II SEMESTER								
1	HMC	UR19HM202	Professional English	2	0	0	2	2
2	BSC	UR19BSC205	Differential Equations & Vector Calculus	3	0	0	3	3
3	BSC	UR19BSC203	Numerical Methods and Transforms	3	0	0	3	3
4	BSC	UR19BSC210	Applied Chemistry	3	0	0	3	3
5	ESC	UR19ESC202	Electrical Circuit Analysis-I	3	0	0	3	3
6	ESC	UR19ESC210	Problem Solving & Programming Using C	3	0	0	3	3
7	HMC	UR19HML202	Professional English Lab	0	0	3	3	1.5
8	BSC	UR19BSCL203	Engineering and Applied Chemistry Lab	0	0	3	3	1.5
9	ESC	UR19ESCL202	Problem Solving & Programming Using C Lab	0	0	3	3	1.5
MANDATORY COURSES								
10	MC	UR19MC200	Engineering Exploration Project*	0	0	0	1	0
11	MC	UR19MC203	Constitution of India	0	0	0	2	0
Total				17	0	9	29	21.5

*Internal evaluation

III SEMESTER								
S. No	Course Category	Course Code	Course Title	L	T	P	Contact Hrs./wk	C
1	PCC	UR19PCEE301	Electrical Machines-I	3	1	0	4	4
2	PCC	UR19PCEE302	Electrical Circuit Analysis-II	3	0	0	3	3
3	PCC	UR19PCEE303	Electromagnetic Field	2	1	0	3	3
4	PCC	UR19PCEE304	Electronic Devices and Circuits	3	0	0	3	3
5	PCC	UR19PCEE305	Thermal and Hydro Prime Movers	2	0	0	2	2
6	HMC	UR19HM301	Managerial Economics and Financial Analysis	3	0	0	3	3
7	PCC	UR19PCEEL301	Electrical Circuit and Pspice Lab	0	0	3	3	1.5
8	PCC	UR19PCEEL302	Thermal and Hydro Lab	0	0	3	3	1.5
MANDATORY COURSE								
9	MC	UR19MC301	Environmental Studies	0	0	0	2	0
Total				16	2	6	26	21
Employability Skills- I*							2	0
*Internal evaluation								

IV SEMESTER								
S. No	Course Category	Course Code	Course Title	L	T	P	Contact Hrs./wk	C
1	PCC	UR19PCEE401	Electrical Machines-II	3	1	0	4	4
2	PCC	UR19PCEE402	Power Systems-I	3	0	0	3	3
3	PCC	UR19PCEE403	Control Systems	2	1	0	3	3
4	PCC	UR19PCEE404	Switching Theory and Logic Design	3	0	0	3	3
5	PCC	UR19PCEE405	Electrical Measurements	3	0	0	3	3
6	PCC	UR19PCEEL401	Electrical Machines-I Lab	0	0	3	3	1.5
7	PCC	UR19PCEEL402	Electronic Devices and Circuits Lab	0	0	3	3	1.5
MANDATORY COURSE								
1	PROJ	UR19PROJEE401	Mini Project	0	0	0	2	0
Total				14	2	6	26	19
Self Learning *(Technical Certificate)							1	0
*Internal evaluation								

			V SEMESTER					
S. No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./wk**	**C**
1	PCC	UR19PCEE501	Linear and Digital IC Applications	3	0	0	3	3
2	PCC	UR19PCEE502	Power Systems-II	3	0	0	3	3
3	PCC	UR19PCEE503	Power Electronics	3	0	0	3	3
4	PCC	UR19PCEE505	Signals and Systems	3	0	0	3	3
			Professional Elective – I					
5	PEC	UR19PEEE501	Industrial Drives and Application	3	0	0	3	3
		UR19PEEE502	Smart Grid					
		UR19PEEE503	Renewable Energy sources					
6	PCC	UR19PCEEL501	Electrical Machines-II Lab	0	0	3	3	1.5
7	PCC	UR19PCEEL502	Electrical Measurements Lab	0	0	3	3	1.5
8	PCC	UR19PCEEL503	Control Systems Lab	0	0	3	3	1.5
			MANDATORY COURSE					
9	MC	UR19MCL501	Virtual Electrical Machines Lab*	0	0	0	2	0
			Total	15	0	9	26	19.5
Employability Skills- II*							2	0
Self Learning *(Technical Certificate)							2	0
*Internal evaluation								

			VI SEMESTER					
S. No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./wk**	**C**
1	PCC	UR19PCEE601	Power Systems Analysis	3	0	0	3	3
2	HMC	UR19HM 601	Management Science	3	0	0	3	3
3	PCC	UR19PCEE603	Electrical Drives	3	0	0	3	3
4	PCC	UR19PCEE504	Microprocessors and Microcontrollers	3	0	0	3	3
			Professional Elective – II					
5	PEC	UR19PEEE601	Design of Electrical Apparatus	3	0	0	3	3
		UR19PEEE602	Electric Machine design					
		UR19PEEE603	Electrical Materials					
6	OEC	---	**Open Elective-I**	3	0	0	3	3
7	PCC	UR19PCEEL601	Power Electronics Lab	0	0	3	3	1.5
8	PCC	UR19PCEEL602	Microprocessors and Microcontrollers Lab	0	0	3	3	1.5
			MANDATORY COURSES					
9	MC	UR19MC601	Essence of Indian Traditional Knowledge	0	0	0	2	0
10	MC	UR19MCL602	Virtual Power Lab*	0	0	0	2	0
12	PROJ	UR19PROJEE603	Mini Project	0	0	0	2	0
			Total	18	0	6	30	21
*Internal evaluation								

			VII SEMESTER					
S. No	Course Category	Course Code	Course Title	L	T	P	Contact Hrs./wk	C
1	PCC	UR19PCEE701	Switch Gear and Protection	3	0	0	3	3
2	PCC	UR19PCEE702	Utilization of Electrical Energy	3	0	0	3	3
			Professional Elective – III					
3	PEC	UR19PEEE701	Digital Control Systems	3	0	0	3	3
		UR19PEEE702	Electrical and Electronics Instrumentation					
		UR19PEEE703	Electrical Distribution System					
			Professional Elective – IV					
4	PEC	UR19PEEE704	Advanced Control Systems	3	0	0	3	3
		UR19PEEE705	Special Electrical Machines					
		UR19PEEE706	HVDC & EHV AC Transmission System					
5	OEC	---	**Open Elective – II**	3	0	0	3	3
7	PCC	UR19PCEEL701	Power Systems Lab	0	0	3	3	1.5
8	PCC	UR19PCEEL702	Electrical Simulation Lab	0	0	3	3	1.5
10	PROJ	UR19PROJEE711	Internship	0	0	0	0	2
11	PROJ	UR19PROJEE701	Project Stage-I	0	0	3	0	1.5
		Total		15	0	9	21	21.5

			VIII SEMESTER					
S. No	Course Category	Course Code	Course Title	L	T	P	Contact Hrs./wk	C
1	PCC	UR19PCEE801	Power System Operation and Control	3	0	0	3	3
			Professional Elective – V					
2	PEC	UR19PEEE801	FACTS	3	0	0	3	3
		UR19PEEE802	Power System Deregulation					
		UR19PEEE803	High Voltage Engineering					
3	OEC	---	**Open Elective – III**	3	0	0	3	3
4	PROJ	UR19PROJEE801	Project Stage-II	0	0	18	18	9
		Total		9	0	18	27	18

Total Credits = 18.5+21.5+21+19+19.5+21+21.5+18=160

List of Open Electives

Open Electives offered by the Dept. of CE

S.No.	Course Code	Open Elective-I
1.	UR19OECE 601	Introduction To GIS
2.	UR19OECE 602	Environmental Pollution Control
	Course Code	**Open Elective-II**
3.	UR19OECE701	Metro Systems and Engineering
4.	UR19OECE702	Natural Disaster Mitigation and Management
	Course Code	**Open Elective-III**
5.	UR19OECE801	Sanitary and Public Health Engineering
6.	UR19OECE802	Environmental and Industrial Hygiene

Open Electives offered by the Dept. of EEE

S.No.	Course Code	Open Elective-I
1.	UR19OEEE601	Neural Networks and Fuzzy Logic
2.	UR19OEEE602	Linear Control Systems
3.	UR19OEEE603	Electrical Safety Management
	Course Code	**Open Elective – II**
4.	UR19OEEE701	Programmable Logic Controllers
5.	UR19OEEE702	Energy Audit and Conservation Management
6.	UR19OEEE703	Electrical Technology
	Course Code	**Open Elective – III**
7.	UR19OEEE801	Non Conventional Energy Sources
8.	UR19OEEE802	Industrial Electrical Operation
9.	UR19OEEE803	Hybrid Electric Vehicles

Open Electives offered by the Dept. of ME

S.No.	Course Code	Open Elective-I
1.	UR19OEME601	Nano Technology
2.	UR19OEME602	Robotics
3.	UR19OEME603	Power Plant Engineering
	Course Code	**Open Elective-II**
4.	UR19OEME701	Operations Research
5.	UR19OEME702	Industrial Engineering & Quality control
6.	UR19OEME703	Advanced materials
	Course Code	**Open Elective-III**
7.	UR19OEME801	Optimization Techniques
8.	UR19OEME802	Green Engineering systems
9.	UR19OEME803	Mechatronics

Open Electives offered by the Dept. of ECE

S.No.	Course Code	Open Elective-I
1	UR19OEEC601	Consumer Electronics
2	UR19OEEC602	Digital Electronics
	Course Code	**Open Elective-II**
3	UR19OEEC701	Embedded Systems
4	UR19OEEC702	Internet of Things (IoT)
	Course Code	**Open Elective-III**
5	UR19OEEC801	Microcontrollers
6	UR19OEEC802	Principles of Electronic Communications

Open Electives offered by the Dept. of CSE

S.No.	Course Code	Open Elective-I
1.	UR19OECS601	Java Programming
2.	UR19OECS602	Data Base Management Systems
3.	UR19OECS603	C++ Programming
	Course Code	**Open Elective-II**
4.	UR19OECS701	Distributed Computing
5.	UR19OECS702	Deep Learning
6.	UR19OECS703	AI and ML for Robotics
	Course Code	**Open Elective-III**
7.	UR19OECS801	AI Tools & Techniques
8.	UR19OECS802	Information Security
9.	UR19OECS803	Big Data

Open Electives offered by the Dept. of IT

S.No.	Course Code	Open Elective-I
1.	UR19OEIT101	Data Structures
2.	UR19OEIT102	Computer Graphics
3.	UR19OEIT103	Data Science
	Course Code	**Open Elective – II**
4.	UR19OEIT201	Operating Systems
5.	UR19OEIT202	Python Programming
6.	UR19OEIT203	Web Technologies
	Course Code	**Open Elective – III**
7.	UR19OEIT301	Information Security
8.	UR19OEIT302	Mobile Application Development
9.	UR19OEIT303	Block Chain Technologies

I Year - I Semester　　　　　　Course Code : UR19HM101　　　　L　T　P　C

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　2　0　0　2

　　　　　　　　　　Internal: 30 Marks　　　　External: 70 Marks

COMMUNICATIVE ENGLISH
(Common to all branches)

Course Objectives:

- Recall and improve the language proficiency of the students in English
- Paraphrase and interpret the ideas and thoughts in a dynamic way
- Prioritize the importance of practical learning of English
- Distinguish the various levels of Listening, Speaking, Reading and writing skills
- Construct statements in writing and speaking in professional manner

UNIT – I
Poem: "Life" by Sarojini Naidu
Grammar: Articles
Vocabulary: Prefixes and Suffixes
Writing: Paragraph Writing
Life-Skills: Attitude

UNIT – II
Essay: A Drawer full of Happiness
Grammar: Prepositions
Vocabulary: Homonyms, Homophones, Homographs
Writing: Letter of Request and Apology
Life-Skills: Self- Management

UNIT – III
Short Story: "Half a Rupee Worth" by R.K. Narayan
Grammar: Tenses
Vocabulary: Idiomatic Expressions; Phrasal Verbs
Writing: Letter of Complaint and Appreciation
Life-Skills: Body Language

UNIT – IV
Text: Stephen Hawking – Positivity 'Benchmark'
Grammar: Question Tags, Conjunctions
Vocabulary: One - Word Substitutes, Collocations
Writing: Dialogue and Speech Writing
Life-Skills: Being Assertive

UNIT – V
Poem: Once Upon a Time by Gabriel Okara
Grammar: Degrees of Comparison
Vocabulary: Technical Abbreviations
Writing: E-mail Writing, Preparation of Resume and Letter of application
Life-Skills: Goal Setting, Working in a Team

TEXT BOOK:
'InfoTech English' – Maruti Publications

REFERENCE BOOKS:
Raymond Murphy, "Murphy's Essential English Grammar" with CD, Cambridge University Press
Practical English Usage, Michael Swan, OUP, 1995

NPTEL ONLINE COURSE:
'Enhancing Soft skills & Personality Development

Course Outcomes:
CO1: Apply critical-thinking to develop writing skills
CO2: Understand and evaluate different kinds of prose tests.
CO3: Describe distinct literary characteristics of poems.
CO4: Analyze the major and minor details of a biography.
CO5: Develop grammar and vocabulary skills
CO6: Evaluate the effectiveness in improving life-skills.

*****

I Year - I Semester Course Code : UR19BSC101   L   T   P   C
                                                       3   1   0   4

Internal: 30 Marks   External: 70 Marks

LINEAR ALGEBRA & CALCULUS
(Common to all branches)

Course Objectives:
- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

UNIT – I
Matrices: Solving system of homogeneous and non-homogeneous linear equations by Gauss elimination method. Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem.

UNIT – II
Sequences and Series: Convergence and divergence, Ratio test - Comparison test -Cauchy's root test-. Fourier series, Euler's formulae, conditions for Fourier expansion, Even and Odd functions.

UNIT – III
Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (single variable & without proofs).

UNIT – IV
Multivariable calculus: Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT – V
Multiple Integrals: Double integrals, change of order of integration, double integration in polar coordinates. Evaluation of triple integrals, change of variables.

TEXT BOOK:
1. Higher Engineering Mathematics, B.S.Grewal, Khanna Publishers

Course Outcomes:
CO1: Develop the use of matrix algebra techniques that is needed by engineers for practical Applications
CO2: Find or compute the Fourier series of Fourier series periodic signals.
CO3: Utilize mean value theorems to real life problems.
CO4: Translate the given function as series of Taylor's and Maclaurin's with remainders.
CO5: Familiarize with functions of several variables which are useful in optimization.
CO6: Apply Double integration in evaluating areas bounded by regions.

*****

Internal: 30 Marks External: 70 Marks
APPLIED PHYSICS
(EEE & ECE)

Course Objectives:
- Impart Knowledge of Physical Optics phenomena like Interference and Diffraction required to design instruments with higher resolution.
- Understand the physics of Semiconductors and their working mechanism for their utility in sensors.
- Impart the knowledge of materials with characteristic utility in appliances.

UNIT – I

INTERFERENCE: Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry) – Newton's rings.

DIFFRACTION: Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order – resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).

UNIT – II

QUANTUM MECHANICS: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P.Thomson experiment – Heisenberg's Uncertainity Principle –interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.

UNIT – III

FREE ELECTRON THEORY & BAND THEORY OF SOLIDS : Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi-Dirac distribution function - expression for Fermi energy -Density of states.
Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m^* Vs K diagram - concept of hole.

UNIT – IV

SEMICONDUCTOR PHYSICS: Introduction – Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.

UNIT – V

MAGNETISM & DIELECTRICS: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material.
Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant- types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

TEXT BOOKS:
1."A Text book of Engineering Physics" by M.N.Avadhanulu,P.G.Kshirsagar - S.Chand Publications, 2017.
 2. "Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).
 3. "Engineering Physics" by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.

REFERENCE BOOKS:
1. Applied Physics by P.K. Palanisamy, Scitech publications (2014).
2. Lasers and Non-Linear optics by B.B. Laud, New Age International Publishers (2008).
3. Engineering Physics by M. Arumugam, Anuradha Publication (2014).
4. Physics for Engineers by M.R. Srinasan, New Age international publishers (2009).

Course Outcomes:

CO1: Explain the need of coherent sources and the conditions for sustained interference and
 illustrate the resolving power of various optical instruments.
 CO2: Explain the fundamental concepts of quantum mechanics and analyze the physical significance
 Of wave function.
CO3: Explain the various electron theories and interpret the effects of temperature on Fermi Dirac
 distribution function
CO4: Explain the various energy bands
 CO5: Classify the energy bands of semiconductors and outline the properties of n-type and p-type
 Semiconductors.
CO6: Explain the applications of dielectric and magnetic materials.

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ENGINEERING GRAPHICS & DRAFTING
(CIVIL/EEE/ECE)
PRE-REQUISITES: Mathematics, Physics

COURSE EDUCATIONAL OBJECTIVE
- Engineering drawing being the principle method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

UNIT – I INTRODUCTION TO ENGINEERING DRAWING:

Introduction: Principles of Engineering Graphics and their significance - Drawing Instruments - Geometrical Constructions.

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles.
Curves: Ellipse ,Parabola and Hyperbola by general methods,
Scales: Diagonal scales and Vernier scales

UNIT – II

ORTHOGRAPHIC PROJECTIONS: Principle of orthographic projection-Method of Projections – First and third angle projection methods Projections of Points – Projections of straight lines of different orientations - True lengths and traces.

UNIT – III
PROJECTIONS OF PLANES & SOLIDS: Regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes. Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT – IV
ISOMETRIC VIEWS: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

UNIT – V
COMPUTER AIDED DRAFTING: Introduction – Computer Aided drafting system – Advantages, Applications of AUTOCAD, Drafting software-AUTOCAD-Advantages, Initial setup commands, utility commands, Drawing Aids, Entity Draw commands, Display commands, Edit commands, Lettering & Dimensioning

TEXT BOOKS:
1.N. D. Bhatt, Engineering Drawing, Revised and Enlarged Edition, Charotar publishers,
   2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers
   3. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

REFERENCE BOOKS:
1. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers
2. Engineering Graphics for Degree by K.C. John, PHI Publishers
3. Engineering Graphics by PI Varghese, McGrawHill Publishers

Course Outcomes:

CO1: Represent the geometrical objects considering BIS standards.
CO2: Comprehend the basics of orthographic projections and deduce orthographic projections
of a point and a line at different orientations.
CO3: Visualize geometrical planes of different positions in real life environment
CO4: Draw the projection of various of types of solids.
CO5: Imagine orthographic views of various solid objects at different orientations
CO6: Recognize the significance of isometric drawing to relate 2D environment with 3D environment. Learn basics of CAD.

*****

Course Code : UR19ESC109   L   T   P   C
                                                                              3   0   0   3

Internal: 30 Marks   External: 70 Marks

FUNDAMENTALS OF COMPUTER SCIENCE
(EEE/CSE/IT)

Course Objectives:

To study different types and working of a digital computer.
* To learn different number systems and representation of floating point numbers.
* To understand the need and working of memory and other peripheral devices.
* To be familiar with the internal organization of a computer.
* To study the interconnection of computers and applications of computer.

UNIT – I INTRODUCTION

History of Digital computers, types of computers, block diagram of a digital computers, various parts of a digital computer. Computer programming — Machine language, assembly language and high-level language programming.

UNIT – II
NUMBER SYSTEMS

Binary, Octal, Decimal and Hexadecimal number systems, conversion of numbers from one system to other system, Fixed point and floating-point representation of numbers, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating - point Arithmetic Operations

UNIT – III
MEMORY AND PERIPHERALS

Memories: Need for memory, Types of computer memories — magnetic, Dynamic and static memories, RAM, ROM, EPROM and EEPROM memories, Cache memory, Concept of Virtual memory. Peripheral Devices: Working of Keyboard and Mouse. Types of Printers and it's working. I/O Ports, Addressing I/o devices — programmed I/O, interrupt I/O, DMA.

UNIT – IV
COMPUTER ORGANISATION

Organization of a processor - Registers, ALU and Control unit, Register transfer language, micro operations, Instruction codes, Computer instructions, Instruction formats, Instruction cycle, Memory Reference Instructions, Input — Output instructions, Control memory, Address sequencing, Design of control unit-micro programmed control, hard wired control.

UNIT – V
APPLICATIONS

Various applications of Computers, Networking of Computers, LAN, WAN, MAN, Internet. Internet of Things (IoT) applications to electrical engineering.

TEXT BOOKS:

1.   Computer Fundamentals By PK Sinha, 6th Edition, BPB publications.
2.   Fundamentals of Computers by E. Balagurusamy, McGrawHill edition.
3.   Computer Fundamentals by Anitha Goel, Pearson education

Course Outcomes:

CO1: Understand the functioning and programming of computers.

CO2: Convert numbers from one type of system to other type of system.

CO3: Distinguish between different types of memories and learn the mapping of I/O devices.

CO4: Understand the functioning of peripheral devices and addressing I/o devices.

CO5: Demonstrate the internal organization of digital computer.

CO6: Apply digital computers for storing electrical engineering problems.

*****

Internal: 20 Marks   External: 30 Marks

COMMUNICATIVE ENGLISH LAB
(Common to all branches)

Course Objectives:
To enable the students to learn through practice the communication skills of listening, speaking, reading and writing.

List of Activities

1)   Introducing yourself

2)   Greeting

3)   Thanking and Responding to thanks

4)   Requesting and Responding to requests

5)   Making and Responding to complaints

6)   Apologising and accepting apologies

7)   Consonants : Plosives, Affricates and Nasals

8)   Consonants: Fricatives, Liquids and Glides

9)   Vowels: Pure vowels

10) Vowels: Dipthongs

11) Consonant clusters

12) Word Accent

13) Word Stress

14) Intonation

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Reference Manuals:
'INTERACT: English Lab Manual for Undergraduate Students' Published by Orient Blackswan Pvt Ltd 'Strengthen Your Communication Skills' published by Maruthi Publications

Course Outcomes:

Upon completion of the course, the student will be able to:

CO1   Apply expressions in day to day life
CO2   Build language proficiency by using patterns
CO3   Develop communication skills through various language activities
CO4   Outline of Letters and Sounds
CO5   Identify consonants and vowel sounds in phonetic script
CO6   Understand pronunciation, stress and intonation

*****

APPLIED PHYSICS LAB

Course objectives:
- To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
- To learn the usage of electrical and optical systems for various measurements.
- Apply the analytical techniques and graphical analysis to the experimental data.
- To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

List of Experiments
1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
5. Energy Band gap of a Semiconductor p - n junction.
6. Characteristics of Thermistor – Temperature Coefficients
7. Determination of dielectric constant by charging and discharging method
8. Determination of resistivity of semiconductor by Four probe method.
9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
10. Measurement of magnetic susceptibility by Quincke's method.
11. Dispersive power of diffraction grating.
12. Verification of laws of stretched string – Sonometer.
13. Resolving power of grating.
14. Determination of Hall voltage and Hall coefficients of a given semiconductor using Hall effect.
15. Variation of dielectric constant with temperature.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Text book:
1. A Text book of Practical Physics, Balasubramanian S, Srinivasan M.N, S Chand Publishers, 2017

Course outcomes:
CO1: Handle optical instruments like microscope and spectrometer
CO2: Determine thickness of a hair/paper with the concept of interference
CO3: Estimate the wavelength and resolving power of different colors using diffraction grating
CO4: Demonstrate the elastic response of loaded beams; estimate the frequency of a vibrating system using standing wave pattern.
CO5: Estimate the strength of the magnetic field due to a current carrying coil.
CO6: Estimate the mechanical properties of materials.

*****

Internal: 20 Marks   External: 30 Marks

ENGINEERNG WORK SHOP AND IT WORK SHOP
ENGINEERNG WORK SHOP:

Course Objectives:
- To familiarize with the basics of tools and equipments used in fitting, carpentry, Sheet metal and smithy.
- To familiarize with the production of simple modes in the above trades.

NOTE: At least one exercise to be done from each trade.

Trade: Carpentry:
1. Cross –Lap joint
2. Mortise and Tenon joint
3. T-Lap joint

FITTING:
1. V-fit
2. Square fit
3. Dovetail fit

Black Smithy:
1. S-Hook
2. Round rod to square
3. Round rod to Hexagonal headed bolt
4. Making simple parts like chisel.

House Wiring:
1. Parallel/Series connection of three bulbs
2. Stair Case wiring
3. Florescent lamp fitting
4. Measurement of earth resistance

Tin Smithy:
1. Making rectangular tray
2. Making scoop
3. Making hopper
4. Making funnel

IT WORK SHOP:

Course Objectives:
- IT Workshop is to impart basic computer usage and maintenance skills and to introduce you to a suite of productivity tools that will aid in your day to day activities.
- IT workshop works in a learning-by-doing mode. It concentrates more on hands-on experience for the participants rather theoretical classes.
- It enables the participant to make the best use of Microsoft Office Suite in their day-to-day requirements and make use of it to improve the standards in the educational environment.
- The IT Workshop prepares the participant to have a hands-on experience in maintaining and troubleshooting a PC by themselves.

Task1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your

instructor

Task2: Every student should individually install MS windows on the personal computer.

Task3: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals.

Task 4: Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Task 5: Excel Orientation: The importance of MS office 2007/10 tool Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources. Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text.

Task 6: Basic power point utilities and tools which helpful to create basic power point presentation. Topic covered during this includes PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both Latex and Power point.

Task 7: Introduction to HTML &Basic syntax of html Attributes, elements, lists, and basic programs, Homepage using HTML Consisting of photo, name, address and education details as a table.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Course Outcomes:
Upon completion of the course, the student will be able to

CO1: Identify the peripherals, components of CPU along with the functions of CPU.

CO2: Implement the installation of Windows OS and explain about Hardware Troubleshooting.

CO3: Create HTML Homepage and use MS Office like Word, Excel and Power Point Presentation.

CO4: Apply basic Electrical Engineering knowledge for House-wiring Practice.

CO5: Make different components using Fitting and Carpentry.

CO6: Prepare simple jobs as per specifications using Tinsmithy tools and Blacksmithy Tools.

*****

Internal: 20 Marks   External: 0 Marks

Semester-end: 30 Marks

APPLIED PHYSICS - VIRTUAL LAB

(Any 3 of the following listed 12 experiments)

Course objectives:

- To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
- To learn the usage of electrical and optical systems for various measurements.

LIST OF EXPERIMENTS
1. Hall Effect
2. Crystal Structure
3. Brewster's angle
4. Numerical Aperture of Optical fiber
5. Photoelectric Effect
6. LASER – Beam Divergence and Spot size
7. Michelson's interferometer
8. Black body radiation
9. Flywheel –moment of inertia
10. AC Sonometer
11. Resistivity by four probe method
12. Newton's rings –Refractive index of liquid

URL: www.vlab.co.in

Course outcomes:
CO1: Handle optical instruments like microscope and spectrometer
CO2: Determine thickness of a hair/paper with the concept of interference

*****

Internal: 30 Marks   External: 70 Marks

PROFESSIONAL ENGLISH

(Common to all branches)

Course Objectives:

- Recall and improve the language proficiency of the students inEnglish
- Paraphrase and interpret the ideas and thoughts in a dynamicway
- Prioritize the importance of practical learning ofEnglish
- Distinguish the various levels of Listening, Speaking, Reading and writingskills
- Construct statements in writing and speaking in professionalmanner

UNIT – I

Poem: "Enterprise" by

Nissim Ezekiel **Grammar:**

Types of Sentences

Vocabulary: Synonyms

Writing: Essay Writing

Life-Skills: Values and Ethics

UNIT – II

Text: Like a tree, unbowed:

WangariMaathai**Grammar:** Active Voice

& Passive Voice **Vocabulary:** Antonyms

Writing: Technical Report Writing **Life-Skills:** Time Management

UNIT – III

Text: Stay Hungry – Stay Foolish

Grammar: Common Errors in Articles and Prepositions

Vocabulary: Words Often Confused

Writing: Describing People, Places, Objects, Events

Life-Skills: Motivation

UNIT – IV

Story: The Cop and the Anthem by O. Henry

Grammar: Common Errors in Subject – Verb agreement

Vocabulary: Technical Vocabulary
Writing: Note- Making **Life-Skills:** Rapid Reading

UNIT – V

Short Story: "A Village School Master" by Oliver Gold Smith

Grammar: CommonErrors

Vocabulary: GRE WordList

Writing: Precise Writing / Information Article

Life-Skills: Career Planning

TEXT BOOK:

1. 'InfoTech English' – MarutiPublications

REFERENCE BOOKS:

1. Raymond Murphy, "Murphy's Essential English Grammar" with CD, Cambridge UniversityPress.

2. Practical English Usage, Michael Swan, OUP,1995

3. Remedial English Grammar, F.T. Wood, Macmillan,2007

Course Outcomes:
Upon completion of the course, the students will be able to
CO1: Apply critical thinking to develop writing skills
CO2: Evaluate common errors in grammar
CO3: Describe distinct literary characteristics of poems
CO4: Analyze the characteristics of one-act-plays
CO5: Develop correspondence skills and promotional writing skills
CO6: Evaluate the importance of values and ethics for career planning.

*****

Internal: 30 Marks　　　　External: 70 Marks

DIFFERENTIAL EQUATIONS & VECTOR CALCULUS
(Common to all branches)

Course Objectives:
- To enlighten the learners in the concept of differential equations.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

UNIT – I

Linear Differential Equations of Higher Order: Definitions, complete solution, operator D, rules for finding complimentary function, inverse operator, rules for finding particular integral with RHS of the forms e^{ax}, Sinax, Cosax, x^n, $e^{ax}.V$ and xV. L-C-R Circuit problems.

UNIT – II

First order Partial Differential Equations: Formation of PDE, solutions of Lagrane's linear equation Method of grouping – Method of multipliers, Solution of non-linear PDEs of the forms $f(p,q)=0$, $f(z,p,q)=0$, $f(x,p)=g(y,q)$, $Z=px+qy+f(p,q)$.

UNIT – III

Applications of Partial Differential Equations: Method of Separation of variables-One dimensional Wave equation-Two dimensional Heat equation, Laplaceequation.

UNIT – IV

Vector Differential Calculus: Scalar and vector point functions, Gradient, Directional derivative. Divergence, Curl, Physical interpretation of operators.

UNIT – V

Vector Integral Calculus: Line integral-work done, surface and volume integrals, Green's theorem in the plane (without proof), Stoke's theorem (without proof), Divergence theorem (without proof).

TEXT BOOK:
　　　1. Higher Engineering Mathematics, B. S. Grewal.

REFERENCE BOOKS:
　　　1. Advance Engineering in Mathematics, ErwinKreyszig.
　　　2. Vector calculus, Schaum'sseries.

Course Outcomes:
Upon completion of the course, the students will be able to
CO1: Solve the differential equations related to various engineering fields.
CO2: Identify solution methods for partial differential equations that model physical processes.
CO3: Apply a range of techniques to find solutions of standard PDEs .
CO4: Classify the nature of the partial differential equations.
CO5: Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO6: Estimate the work done against a field and circulation using vector calculus.
*****

Course Code : UR19BSC203 L T P C

3 0 0 3

Internal: 30 Marks   External: 70 Marks

NUMERICAL METHODS&TRANSFORMS
(ECE/EEE)

Course Objectives:
- To elucidate the different numerical methods to solve nonlinear algebraic equations.
- To familiarize the students with numerical methods of solving the non-linear equations.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

UNIT – I
Solution to algebraic equations: Solution of polynomial and transcendental equations: Bisection method, Regula-Falsi method, Iteration method,Newton-Raphson method.

UNIT – II
Interpolation: Finite differences, interpolation using Newton's forward and backward difference formulae, Gauss forward and backward interpolation formulae, Interpolation with unequal intervals, Newton's divided difference and Lagrange's formulae.

UNIT – III
Numerical integration and Solution of ODE: Numerical integration- trapezoidal rule and Simpson's 1/3rd and 3/8 rules. Ordinary differential equations, Taylor's series, Euler and modifiedEuler's methods. Runge-Kutta method of fourth order for solving first orderODE .

UNIT – IV
Laplace Transforms : Laplace transforms of elementary functions, Properties of Laplace Transforms of derivatives and integrals, Multiplication by t, Division by t, Inverse transforms, Method of Partial fractions, Applications of Ordinary differential equations.

UNIT – V
Fourier Transforms: Fourier integral theorem (without proof),Fourier sine and cosine integral, Fourier transforms, Fourier sine and cosine transforms, Properties of Fourier transforms.

TEXT BOOK:
Higher Engineering Mathematics, B.S. Grewal.

REFERENCE BOOKS:
1. Advanced Engineering Mathematics, Erwin kreyszig,
2. Introductory methods of Numerical Analysis by S.S.Sastri

NPTEL ONLINE COURSE:

Course Outcomes:
Upon completion of the course, the students will be able to
CO1: Evaluate approximating the roots of polynomial and transcendental equations by different Algorithms.
CO2: Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal Intervals.

CO3: Apply definite integral of a function by using different numerical methods.
CO4: Solve different algorithms for approximating the solutions of ordinary differential equations to itsanalytical computations.
CO5: Explain the Laplace and Inverse Laplace Transform for different types of functions and
Evaluate ordinary differential equations using Laplace transform technique.
CO6: Apply integral expressions for the forwards and inverse Fourier transform
to a range of non – periodic waveforms .

*****

Internal: 30 Marks   External: 70 Marks
APPLIED CHEMISTRY
(EEE & ECE)

Course Objectives:

- Importance of usage of Plastics in household appliances and composites (FRP) in aerospace automotive industries.
- Select the fuels as a source of energy are a basic need of any industry, particularly industries like thermalpower stations, steel industry, fertilizer industry etc., and hence they are introduced.
- Constructions of galvanic cells as well as some batteries used in instruments are introduced. Understand the mechanism of corrosion which itself is explained by electrochemical theory
- With the increase in demand, a wide variety of materials are coming up; some of them have excellent engineering properties and a few of these materials are introduced.
- Explain the computational chemistry and different applications of analytical instruments.

UNIT – I
HIGH POLYMERS AND PLASTICS

Polymerisation : Introduction- Mechanism of polymerization - Stereo regular polymers – methods of polymerization (emulsion and suspension) -Physical and mechanical properties – Plastics as engineering materials : advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (4techniques)- Preparation, properties and applications of Polyethene, PVC, Bakelite and Teflon Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers : Buna S, Buna N, Thiokol and polyurethanes – Applications of elastomers. Composite materials & Fiber reinforced plastics – Biodegradable polymers – Conducting polymers.

UNIT – II
FUEL TECHNOLOGY

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

UNIT – III
ELECTROCHEMICAL CELLS AND CORROSION
Part-A:
ELECTROCHEMISTRY

Introduction- Galvanic cells - Reversible and irreversible cells – Single electrode potential – Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell –Lead-Acid storage cells-Li cells. Fuel cells: - Hydrogen Oxygen fuel cells – Methanol Oxygen fuel cells.
Part-B
CORROSION

Corrosion:- Definition – Theories of Corrosion (electrochemical and chemical)-Galvanic corrosion,Differential aeration corrosion –Factors which influence the rate of corrosion - Protection from corrosion– Cathodic protection - Protective coatings: – Surface preparation – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).

UNIT – IV
CHEMISTRY OF ADVANCED ENGINEERING MATERIALS
Nano materials:- Introduction–Sol-gel method & chemical reduction method of preparation - Carbon nano tubes-Preparation and Applications;**Solar Energy:**- Introduction, application of solar energy, photovoltaic cell: design, working and its importance **Liquid Crystals** :- Types and applications **Non-Elemental Semiconducting Materials:-**Stoichiometric, Controlled valency&Chalcogen photo/semiconductors, Preparation of Semiconductors(Distillation,Zonerefining,Czochralski crystal pulling,epitaxy,diffusion,ion implantation) **Superconductors** :- Type-I & Type-2, properties &applications.

UNIT – V
COMPUTATIONAL CHEMISTRY AND SPECTROSCOPIC STUDIES
COMPUTATIONAL CHEMISTRY: Introduction,Ab Initio studies.
SPECTROSCOPIC STUDIES: Electromagnetic spectrum-UV(laws of absorption,instrumentation,theory of electronic spectroscopy,Frank-condon principle,chromophores and auxochromes,intensity shifts,applications),X-Ray diffraction method , FT-IR(Instrumentation and IR of some organic compounds,applications)-MRI and CT scan(Procedure & Applications).

TEXT BOOKS:
1.Engineering Chemistry by Jain and Jain; DhanpatRaiPublicating Co.
2. Engineering Chemistry by ShikhaAgarwal; Cambridge University Press, 2015 edition.

REFERENCE BOOKS:
1.Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
2. Engineering Chemistry by PrasanthRath, Cengage Learning, 2015 edition.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Applied Chemistry by H.D. Gesser, Springer Publishers
5. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM.

Course Outcomes:
Upon completion of this course, the students will be able to

CO1: Understand the advantages and limitations of plastic materials.
CO2: Describe the need of fuels as a source of energy.
CO3: Explain the theory of construction of batteries.
CO4: Study some methods of corrosion control and Categorize the reasons for corrosion.
CO5: Generalize the importance of advanced engineering materials like Nanomaterials, Liquid Crystals, Principles of Green chemistry, Refractories and Cementing materials.

CO6: Obtainthe knowledge of computational chemistry and understand the principles of different analytical instruments.

*****

I Year - II Semester   Course Code : UR19ESC202   L   T   P   C
                                                                    3   0   0   3

Internal: 30 Marks   External: 70 Marks

ELECTRICAL CIRCUIT ANALYSIS-I

(EEE)

Course Objectives:

- To study the concepts of passive elements, types of sources and various network reduction techniques.
- To understand the applications of network topology to electrical circuits.
- To study the concept of magnetic coupled circuit.
- To understand the behavior of RLC networks for sinusoidal excitations.
- To study the performance of R-L, R-C and R-L-C circuits with variation of one of the parameters and to understand the concept of resonance.
- To understand the applications of network theorems for analysis of electrical networks.

UNIT – I

Introduction to Electrical Circuits: Passive components and their V-I relations. Sources (dependent and independent) -Kirchoff's laws, Network reduction techniques. source transformation technique, nodal analysis and mesh analysis..

UNIT – II

Network topology: Definitions of Graph and Tree, Basic cutset and tieset matrices for planar networks, Loop and nodal methods of analysis of networks with independent voltage and current sources, Duality and Dual networks.

UNIT – III

Magnetic Circuits: Basic definition of MMF, flux and reluctance. Analogy between electrical and magnetic circuits.Faraday's laws of electromagnetic induction Concept of self and mutual inductance. Dot convention-coefficient of coupling

Single Phase A.C Systems: Periodic waveforms -Concept of phase angle and phase difference – Waveforms and phasor diagrams for lagging, leading networks. Complex and polar forms of representations, steady state analysis of R, L and C circuits. Power Factor and its significance real, reactive power and apparent power, waveform of instantaneous power triangle and complex power.

UNIT – IV

Analysis of AC Networks: Extension of node and mesh analysis to AC networks, Numerical problems on sinusoidal steady state analysis, Series and parallel resonance, selectively band width and Quasi factor.

UNIT – V

Network theorems (DC & AC Excitations): Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman'stheorem .

TEXT BOOK:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley,McGraw Hill Company,6 th edition
2. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd

REFERENCE BOOKS:

1. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, McGraw Hill Education (India)
2. Electric Circuits by David A. Bell, Oxford publications
3. Introductory Circuit Analysis by Robert L Boylestad, Pearson Publications
4. Circuit Theory (Analysis and Synthesis) by A.Chakrabarthi,DhanpatRai&Co.

NPTEL ONLINE COURSE:

Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Design various electrical networks in presence of active and passive elements.

CO2: Express electrical networks with network topology concepts.

CO3: Judge any magnetic circuit with various dot conventions.

CO4: Identify any R, L, C network with sinusoidal excitation.

CO5: Memorize any R, L, network with variation of any one of the parameters i.e R, L, C. and f.

CO6: Identify electrical networks by using principles of network theorems.

*****

I Year - II Semester   Course Code : UR19ESC210   L   T   P   C
                                                                    3   0   0   3

Internal: 30 Marks   External: 70 Marks

Problem Solving and Programming Using C
(CE/EEE/ECE/CSE/IT)

Course Objectives:

- The objectives of this course are to make the student familiar with 'problem solving using computers, development of algorithms, usage of basic flowchart symbols and designing flowcharts.

- The students can also understand programming language basic concepts, reading and displaying the data, earn the programming skills using selection, iterative control structures, functions, arrays, pointers and files. After completion of this course the student is expected to analyze the real life problem and write programs in C language to solve theproblems.

UNIT – IINTRODUCTION

Problem Solving: Problem solving aspects, Problem solving techniques, Computer as a Problem solving tool, Algorithms-definition, features, criteria. Flowchart-definition, basic symbols, sample flowcharts. Top down design, Implementation of program verification, The efficiency of algorithms, Analysis of algorithms, computational complexity of algorithm, order(O) notation, Worst case & Average case Analysis.

UNIT – II

Basics of C programming language: Introduction to C, structure of a C program,.basic data types and sizes, constants, variables, unary, binary and ternary operators, expressions, type conversions, conditional expressions, precedence and order of evaluation, Input and Output statements, Sample Programs.
SELECTION-DECISION MAKING CONDITIONAL CONTROL STRUCTURES: simple-if, if- else, nested if-else, if- else ladder and switch-case.
ITERATIVE: while-loop, do-while loop and for loop control structures, goto, break and continue statements. Sample Programs.

UNIT – III

FUNCTIONS-basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for Fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs :
ARRAYS-concepts, declaration, definition, accessing elements, storing 'elements, 1-D arrays, 2-D arrays and character arrays, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix, Passing 1-D arrays, 2-D arrays to functions, Strings and String Manipulations

UNIT – IV

POINTERS-pointers concepts, initialization of pointer variables, pointers and function

arguments, passing by address-dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and -multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT – V
ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures- declaration, definition and initialization of structures, accessing 'structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, program applications
FILEHANDLING: Concept of a file, text files and binary files, Formatted I/O, File I/O operations

TEXT BOOKS:
1. How to Solve it by Computer, R. G. Dromey, Pearson Education,2019
2. ProgramminginC,AshokNKamthane,AmitAshokKamthane,3rdEdition,PearsonEducation, 2019

Reference Books:
1. The C programming Language by Dennis Richie and BrianKernighan
2. Programming in C, ReemaThareja,OXFORD
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad,Cengage

Course Outcomes:
Upon completion of the course, the students will be able to

CO1: Design efficient algorithm for solving a problem.
CO2: Identify various constructs of C programming language efficiently.
CO3: Apply programs using modular approach such as functions.
CO4: Create programs to perform matrix and mathematical applications.
CO5: Understand dynamic memory management and problems using pointers and solving the problems.
CO6: Developreal life applications using structures and also learn about handling the files for storing the data permanently.

*****

Internal: 20 Marks   External: 30 Marks
PROFESSIONAL ENGLISH LAB
(Common to all branches)

Course Objectives:

To enable the students to learn through practice the communication skills of listening, speaking, reading and writing.

List of activities:

1) Body Language: facial expressions, body posture, gestures

2) Body Language: eye movement, touch and the use of space

3) JAM

4) Extempore

5) Debate: Lincoln-Douglas debate and dos and don'ts

6) Debate: Formal and Informal debate

7) Interview Skills: Formal and Informal Interview

8) Interview Skills: Telephonic interview

9) Group Discussion: Dos and don'ts, general topics

10) Group Discussion: Science and technical topics

11) Presentation: Elimination of stage fear and preparation

12) Presentation on general topics

13) Presentation: using ppt or visual aids.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Reference Manuals:

'INTERACT: English Lab Manual for Undergraduate Students' Published by Orient Blackswan Pvt Ltd 'Strengthen Your Communication Skills' published by Maruthi Publications

Course Outcomes:

Upon Completion of the course, the student will be able to:

CO1   Understand different types of body language
CO2   Develop communication skills through various language activities
CO3   Apply critical thinking to get main ideas for debate
CO4   Develop audacity to face an interview
CO5   Build knowledge for discussing topics effectively
CO6   Analyze a topic by making a presentation

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Internal: 20 Marks   External: 30 Marks

Engineering and Applied Chemistry Lab

Course objectives:
- To gain practical knowledge by applying the experimental methods to correlate with the chemistry theory.
- To learn the usage of electrical systems for various measurements.
- Apply the analytical techniques and graphical analysis to the experimental data.

List of Experiments
1. Introduction to Chemistry laboratory-Molarity,Normality,Primary,Secondary standard solutions, Volumetric titrations, Qualitative analysis, Quantitative analysis etc.
2. Trial experiment-Estimation of HCl by using standard Na_2CO_3 solution.
3. Estimation of Total hardness of water by using standard EDTA solution.
4. Estimation of Zinc using standard EDTA solution.
5. Estimation of Copper using standard EDTA solution.
6. Estimation of P^H of the given sample solution using P^H meter.
7. Conductometric titration between Strong acid and Strong base.
8. Conductometric titration between Strong acid and Weak base.
9. Potentiometric titration between Strong acid and Strong base.
10. Potentiometric titration between Strong acid and Weak base.
11. Estimation of $KMnO_4$ using standard Oxalic acid.
12. Determination of Alkalinity of water.
13. Determination of Viscosity of given sample by Ostwald viscometer.
14. Estimation of Ferric iron using standard $K_2Cr_2O_7$ solution.
15. Estimation of Copper using standard $K_2Cr_2O_7$ solution.
16. Preparation of Bakelite (Demo).

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Course Outcomes:
Upon Completion of the course, the student will be able to
CO1: Utilize different Analytical tools and execute experiments involving estimation of raw materials, finished products and environmental samples etc.
CO2: Utilize modern instruments like Conductometer, pH meter and Potentiometer for the analysis of samples.
CO3: Determine the total hardness present in water for its quality in drinking purpose.
CO4: Estimate the Viscosity of oil and assess its suitability as a lubricant.
CO5: Determine the alkalinity present in water for its quality in drinking purpose.
CO6: Identify the adulteration of lemon juice for Vitamin-C.

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

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                                                                 0   0   3   1.5

Internal: 20 Marks   External: 30 Marks

Problem Solving and Programming using C Lab

Course Objectives:

- Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming.
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of Functions involving the idea of modularity.

Exercise 1
a)   Write a C Program to calculate the area of a triangle.
b)   Write a C program to find the largest of three numbers using ternary operator.
c)   Write a C Program to swap two numbers without using a temporary variable.

Exercise 2
a)   Write a C program to find the 2's complement of a binary number.
b)   Write a C program to find the roots of a quadratic equation.
c)   Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 3
a)   Write a C program to find the sum of individual digits of a positive integer and, also, find 'the reverse of the given number.
b)   Write a C program to generate the first n terms of the Fibonacci sequence.
c)   Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Exercise 4
a)   Write a C Program to print the multiplication table of a given number.
b)   Write a C Program to read a decimal number and find its equivalent binary number.
c)   Write a C Program to check whether the given number is Armstrong number or not.

Exercise 5
a)   Write a C program to interchange the largest and smallest numbers in the given array.
b)   Write a C program to implement a liner search on a given set of values.
c)   Write a C program to implement binary search on a given set of values.

Exercise 6
a)   Write a C program to implement sorting of an array of elements.
b)   Write a C program to input two m x n matrices, check the compatibility and perform 'addition and multiplication of them.

Exercise 7

Write a C program that uses functions to perform the following operations:

i.   To insert a sub-string into given main string at a given position.
ii.   To delete n characters from a given position in a given string.
iii.   To replace a character of string either from beginning or ending or at a specified location.

Exercise 8

Write a C program that uses functions to perform the following operations using Structure:

i) Reading a complex number
ii) Writing a complex number
iii) Addition of two complex numbers
iv) Multiplication of two complex numbers

Exercise 9

Write C Programs for the following string operations without using the built in functions

- to concatenate two strings to append a string to another string
- to compare two strings

Exercise 10

a)   Write C Program to find the number of characters in a given string including and excluding spaces.
b)   Write C Program to copy the contents of one string to another string without using string handling functions.
c)   Write C Program to find whether a given string is palindrome or not.
d)   Write a C program to find both the largest and smallest number of an array of integers using call by value and call by reference.

Exercise 11

Write a C program using recursion for the following:

a)   To display sum of digits of given number
b)   To find the factorial of a given integer
c)   To find the GCD (greatest common divisor) of two given integers.
d)   To find Fibonacci sequence

Exercise 12

a)   Write C Program to reverse a string using pointers
b)   Write a C Program to compare two 2D arrays using pojnters
c)   Write a C program consisting of Pointer based function to exchange value of two integers using passing by address.

Exercise 13

Examples which explores the use of structures, union and other user defined variables.

Exercise 14

a) Write a C program. which copies one file to another.
b) Write a C program to count the number of characters and number of lines in a file.
c) Write a C Program to merge two files into a third file. The names of the files must be entered using command line arguments.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Course Outcomes:
Upon the completion of the course, the student will be able to:
CO1: Apply and practice logical ability to solve the problems.
CO2: Identify C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
CO3: Analyze the complexity of problems, modularize the problems into small modules and then convert them into programs.
CO4: Apply the in-built functions and customized functions for solving the problems.
CO5: Create C programs using pointers, memory allocation techniques.
CO6: Use files for dealing with variety of problems.

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Internal: 20 Marks   External: 0 Marks

Semester-end: 30 Marks

ENGINEERING EXPLORATION PROJECT

COURSE OBJECTIVES:
- Build mindsets & foundations essential for designers
- Learn about the Human-Centered Design methodology and understand their real-world applications
- Use Design Thinking for problem solving methodology for investigating illdefined problems.
- Undergo several design challenges and work towards the final design challenge.

 Apply Design thinking on the following Streams to
- Project Stream 1: Electronics, Robotics, IOT and Sensors
- Project Stream 2: Computer Science and IT Applications
- Project Stream 3: Mechanical and Electrical tools
- Project Stream4: Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources, Agriculture, Environmental science and other fields of engineering.

HOW TO PURSUE THE PROJECT WORK?
- The first part will be learning-based-masking students to embrace the methodology by exploring all the phases of design thinking through the wallet/ bag challenge and podcasts.
- The second part will be more discussion-based and will focus on building some necessary skills as designers and learning about complementary material for human-centered design.
- The class will then divide into teams and they will be working with one another for about 2 – 3 weeks. These teams and design challenges will be the basis for the final project and final presentation to be presented.
- The teams start with **Design Challenge** and go through all the phases more in depth from coming up with the right question to empathizing to ideating to prototyping and to testing.
- Outside of class, students will also be gathering the requirements, identifying the challenges, usability, importance etc
- At the end, Students are required to submit the final reports, and will be evaluated by the faculty.

TASKS TO BE DONE:
Task 1: Everyone is a Designer
- Understand class objectives & harness the designer mindset

Task 2: The Wallet/Bag Challenge and Podcast
- Gain a quick introduction to the design thinking methodology
- Go through all stages of the methodology through a simple design challenge
- Podcast: Observe, Listen and Engage with the surrounding environment and identify a design challenge.

Task 3: Teams & Problems
- Start Design Challenge and learn about teams & problems through this
- Foster team collaboration, find inspiration from the environment and learn how to identify problems.

Task 4: Empathizing
- Continue Design Challenge and learn empathy
- Learn techniques on how to empathize with users
- Go to the field and interview people in their environments
- Submit Activity Card

Task 5: Ideating
- Continue Design Challenge and learn how to brainstorm effectively
- Encourage exploration and foster spaces for brainstorming
- Submit Activity Card

Task 6: Prototyping
- Continue Design Challenge and learn how to create effective prototypes
- Build tangible models and use them as communication tools
- Start giving constructive feedback to classmates and teammates
- Submit Activity Card

Task 7: Testing
- Finish Design Challenge and iterate prototypes and ideas through user feedback
- Evolve ideas and prototypes through user feedback and constructive criticism
- Get peer feedback on individual and group performance
- Submit Activity Card

Task 8:
- Final Report Submission and Presentation

Note: The colleges may arrange for Guest Speakers from Various Design Fields: Graphic Design, Industrial Design, Architecture, Product Design, Organizational Design, etc to enrich the students with Design Thinking Concept.

REFERENCES:
1. Tom Kelly, *The Art of Innovation: Lessons in Creativity From IDEO, America's Leading Design Firm* (Profile Books, 2002)
2. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation (HarperBusiness, 2009)
3. Jeanne Liedtka, Randy Salzman, and Daisy Azer, Design Thinking for the Greater Good: Innovation in the Social Sector (Columbia Business School Publishing, 2017)

OTHER USEFUL DESIGN THINKING FRAMEWORKS AND METHODOLOGIES:
- Human-Centered Design Toolkit (IDEO); https://www.ideo.com/post/design-kit
- Design Thinking Boot Camp Bootleg (Stanford D-School); https://dschool.stanford.edu/resources/the-bootcamp-bootleg
- Collective Action Toolkit (frogdesign); https://www.frogdesign.com/wpcontent/uploads/2016/03/CAT_2.0_English.pdf
- Design Thinking for Educators (IDEO); https://designthinkingforeducators.com/

I Year - II Semester Course Code : UR19MC203 L T P C
  0 0 0 0

Internal: 100 Marks External: 0 Marks

CONSTITUTION OF INDIA
(CE,EEE, ME & ECE)

Course Objectives:
- To Enable the student to understand the importance ofconstitution
- To understand the structure of executive, legislature andjudiciary
- To understand philosophy of fundamental rights andduties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of india and election commission ofindia.
- To understand the central and state relation financial andadministrative.

UNIT – I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT – II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and CentralSecretariat,LokSabha,RajyaSabha,TheSupremeCourtandHighCourt:PowersandFunctions;

UNIT – III

State Government and its Administration Governor - Role and Position -CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

UNIT – IV

A.Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy.

UNIT – V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women.

TEXT BOOKS:
1.Subash Kashyap, Indian Constitution, National Book Trust
  2.J.A. Siwach, Dynamics of Indian Government & Politics

REFERENCE BOOKS:
1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2.D.C. Gupta, Indian Government and Politics
 3.H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)

4.J.C. Johari, Indian Government and Politics Hans

5.J. Raj Indian Government and Politics

6.M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice –

Hall of India Pvt. Ltd.. New Delhi

7.Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil

Right), Challenges to Civil Rights Guarantees in India, Oxford University Press2012.

NPTEL ONLINE COURSE:

Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Explain the concept of Indian constitution and Evaluate Preamble Fundamental Rights and Duties

CO2: Judge the structure of Indian government, Differentiate between the state and central government.

CO3: Explain the role of President and Prime Minister and Know the Structure of Supreme Court and High court.

CO4: Analyze the role Governor and Chief Minister and explain the role of state Secretariat

CO5: Explain theroleofMyerandelectedrepresentativesofMunicipalities,EvaluateZillapanchayat block levelorganization

CO6: Identify the roles of Election Commission apply knowledge and Evaluate various commissions of viz SC/ST/OBC andwomen.

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USHA RAMA COLLEGE OF ENGINEERING AND TECHNOLOGY
(An Autonomous College in the jurisdiction of JNTUK, Kakinada)
I B. Tech I Semester Regular Examinations, Jan-2020
UR19HM101: COMMUNICATIVE ENGLISH
(Common to ALL Branches)

Time: 3 hours   Max. Marks: 5x14 = 70

Answer either A or B from each Question. All Questions carry equal marks

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1.A. i) What is the theme of the poem, 'Life'?   **7M** (BL2)
ii) Write a paragraph on 'Eradication of Corruption in India'.   **7M** (BL6)
<div align="center">OR</div>
1.B. i) How does Sarojini Naidu depict the life of children in the poem, 'Life'? **7M** (BL2)
ii) What are the ways to develop positive attitude?   **7M** (BL6)

2.A. i) What could be the reason for the drawer remaining locked for close to 25 years? **7M** (BL2)
ii) Write a letter to the Sub-Inspector of police of your area complaining about the loss of your purse.   **7M** (BL6)
<div align="center">OR</div>
2.B. i) How does the writer support her statement that the1990's had a fine balancing act in the lesson 'A Drawer full of happiness'?   **7M** (BL2)
ii) How do you improve self management skills?   **7M** (BL6)

3.A. i) Half a rupee worth ---Justify the title   **7M** (BL5)
ii) Explain non-verbal communication in detail?   **7M** (BL4)
<div align="center">OR</div>
3.B. i) Describe Subbaiah's Character in 'Half a rupee Worth'.   **7M** (BL1)
ii) What are the steps to be more assertive?   **7M** (BL4)

4.A. i) Discuss Turning point with reference to Prof. Stephen Hawking's life.   **7M** (BL2)
ii) Explain the ways of behavior in assertive people?   **7M** (BL4)
<div align="center">OR</div>
4.B. i) What are the greatest contributions to Science by Prof. Hawking?   **7M** (BL1)
ii) Write a speech on "Independence Day".   **7M** (BL6)

5.A. i) Justify the title of the poem 'Once Upon a Time'.   **7M** (BL5)
ii) Write an email to your classmate regarding intra-college quiz competition to be held at Usha Rama College of Engineering.   **7M** (BL6)
<div align="center">OR</div>
5.B. i) What is the relationship between the narrator and the listener in the poem 'Once Upon a Time'?   **7M** (BL2)
ii) What are the steps to 'Setting a Goal'?   **7M** (BL4)

<div align="center">*****</div>

USHA RAMA COLLEGE OF ENGINEERING AND TECHNOLOGY
(An Autonomous College in the jurisdiction of JNTUK, Kakinada)
I B. Tech I Semester Regular Examinations, Jan-2020
UR19BSC101: LINEAR ALGEBRA & CALCULUS
(Common to ALL Branches)

Time: 3 hours   Max. Marks: 5x14 = 70

Answer either A or B from each Question. All Questions carry equal marks

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1.A. i) Solve $10x - 7y + 3z + 5u = 6$, $-6x + 8y - z - 4u = 5$, $3x + y + 4z + 11u = 2$, **7M** (BL3)
$5x - 9y - 2z + 4u = 7$ by Gauss elimination method.

ii) Find the eigen values and eigen vectors of the matrix $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$ **7M** (BL5)

OR

1.B. i) Show that the sum of the eigen values of a matrix is its trace. **5M** (BL2)

ii) Verify Cayley-Hamilton theorem, hence find the inverse of $A = \begin{bmatrix} 3 & 2 & 4 \\ 4 & 3 & 2 \\ 2 & 4 & 3 \end{bmatrix}$ **9M** (BL3)

2.A. i) Test for convergence of the series $\sum_{n=2}^{\infty} \frac{x^n}{n(n-1)(n-2)}$ **7M** (BL3)

ii) Discuss the convergence of $\sum \left(\frac{n}{n+1} \right)^{n^2}$ **7M** (BL3)

OR

2.B. i) Obtain the Fourier series for $f(x) = e^{-x}$ in the interval $0 < x < 2\pi$ **7M** (BL2)

ii) Find a Fourier series to represent x^2 in the interval $(-\pi, \pi)$ **7M** (BL2)

3.A. i) Verify Rolle's theorem for $f(x) = (x-a)^m (x-b)^n$ where m, n are positive integers. **7M** (BL3)

ii) Verify Lagrange's mean value theorem for $(x-1)(x-2)(x-3)$ in [0, 4] **7M** (BL3)

OR

3.B. i) Verify Maclaurin's theorem for $f(x) = (1-x)^{5/2}$ with lagrange's form of remainder. **7M** (BL3)

ii) Find the value of 'c' by Cauchy's mean value theorem for $Sinx$ and $Cosx$ in $(0, \pi)$ **7M** (BL3)

4.A. i) If $u = \tan^{-1}(y/x)$ where $x = e^t - e^{-t}$ and $y = e^t + e^{-t}$ find du/dt. **7M** (BL5)

ii) If $u = F(x-y, y-z, z-x)$ prove that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$ **7M** (BL2)

OR

4.B. i) Show that $u = x\sqrt{1-y^2} + y\sqrt{1-x^2}$, $v = Sin^{-1}x + Sin^{-1}y$ are functionally related and find the relationship. **7M** (BL2)

ii) Discuss the maxima and minima of $f(x,y) = x^3 y^2 (1-x-y)$ **7M** (BL2)

5.A. i) Evaluate $\iint\limits_{A} xy\,dx\,dy$ where A is the domain bounded by x-axis, ordinate $x = 2a$ and the curve $x^2 = 4ay$.   **7M (BL5)**

ii) Change of order of integration, evaluate $\int\limits_{0}^{4a}\int\limits_{x^2/4}^{2\sqrt{ax}} dy\,dx$ **7M (BL5)**

OR

5.B. i) Evaluate $\int\limits_{-1}^{1}\int\limits_{0}^{z}\int\limits_{x-z}^{x+z}(x + y + z)\,dx\,dy\,dz$ **7M (BL5)**

ii) Find the volume bounded by the cylinder $x^2 + y^2 = 4$ and the planes $y + z = 4$ and $z = 0$.   **7M (BL4)**

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USHA RAMA COLLEGE OF ENGINEERING AND TECHNOLOGY
(An Autonomous College in the jurisdiction of JNTUK, Kakinada)
I B. Tech I Semester Regular Examinations, Jan-2020
UR19BSC108: APPLIED PHYSICS
(EEE & ECE)

Time: 3 hours   Max. Marks: 5x14 = 70

Answer either A or B from each Question. All Questions carry equal marks

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1.A. i) What are necessary conditions for obtaining interference of fringes? **4M** (BL1)
ii) With ray diagram discuss the theory of thin films and derive the condition for constructive and destructive interference in reflected light. **10M** (BL2)

OR

1.B. i) Explain with theory the Fraunhofer diffraction at a single slit. **10M** (BL2)
ii) Calculate the possible order of spectra with a plane transmission grating having 18,000 lines per inch when light of wavelength 4500Å is used. **4M** (BL5)

2.A. i) Describe Davisson and Germer's experiment in support of the existence of matter waves. **10M** (BL3)
ii) Compute the de-Broglie wavelength of an electron whose kinetic energy is 10ev. **4M** (BL5)

OR

2.B. i) State and explain Heisenberg's uncertainty principle. **4M** (BL2)
ii) Obtain an expression for energy levels of an electron in a one dimensional potential well of infinite height. **10M** (BL5)

3.A. i) What are the merits and demerits of classical free electron theory? **6M** (BL1)
ii) Derive an expression for density of states based on quantum free electron theory. **8M** (BL3)

OR

3.B. i) How does the band theory of solids lead to the classification of solids into conductors, Semiconductors and insulators? **6M** (BL1)
ii) Explain the concept of effective mass of an electron. **8M** (BL2)

4.A. i) Draw the diagram to show the variation of the Fermi level with temperature in Intrinsic Semiconductor. **4M** (BL3)
ii) Derive an expression for density of charge carriers in an extrinsic n-type Semiconductor. **10M** (BL5)

OR

4.B. i) Explain Hall Effect and derive an expression for Hall coefficient. Give any two of its Applications. **8M** (BL2)
ii) Define Drift and Diffusion currents and obtain the relation between mobility and Diffusion coefficient **6M** (BL4)

5.A. i) Explain the origin of magnetism in materials and derive expression for magnetic moment **7M** (BL2)
ii) Draw and explain B-H curve for a ferromagnetic material placed in a magnetic field. **7M** (BL4)

OR

5.B. i) Derive an expression for internal filed in a dielectric placed in field E **8M** (BL5)
ii) Obtain Clasius- Mossotti equation **6M** (BL5)

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USHA RAMA COLLEGE OF ENGINEERING AND TECHNOLOGY
(An Autonomous College in the jurisdiction of JNTUK, Kakinada)
I B. Tech I Semester Regular Examinations, Jan-2020
UR19ESC108: ENGINEERING GRAPHICS AND DRAFTING
(CIVIL / EEE / ECE)
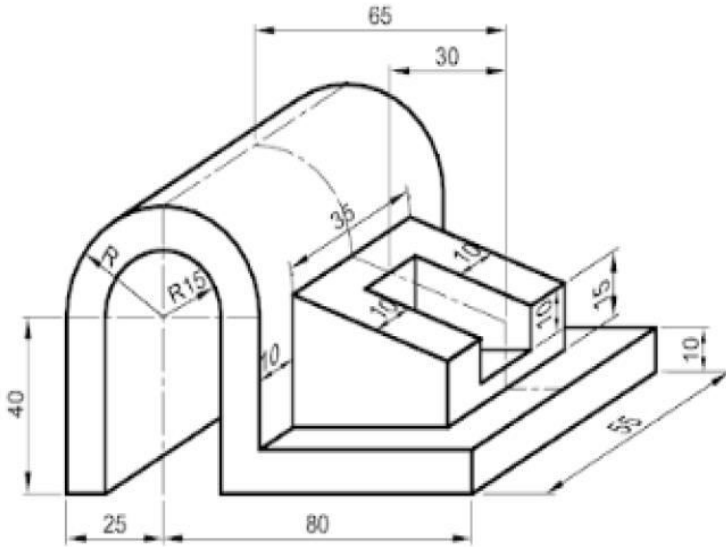
Time: 3 hours   Max. Marks: 5x14 = 70

*Answer either A or B from each Question. All Questions carry equal marks*

1.A. i) Draw regular pentagon, hexagon and a heptagon on a common edge of side 30mm. **6M** (BL1)

ii) Construct a scale of 1:40 to read metres, decimeters and centimeters and long enough to measure up to 6 m. Mark a distance of 4.76 m on it. **8M** (BL6)

OR

1.B. i) Inscribe the largest possible ellipse in a rectangle of sides 160 mm and 100 mm. **6M** (BL2)

ii) The distance between two stations by road is 200 km and it is represented on a certain map by a 5 cm long line. Find the R.F and construct a diagonal scale showing single kilometer and long enough to measure up to 600 km. Show a distance of 467 km on this scale. **8M** (BL3)

2.A. i) Two points P and Q lying in the VP are 90 mm apart. The horizontal distance between the points is 60 mm. if the point P is 15 mm above the HP. Find the height of the point Q above the HP and the inclination of the line joining P and Q with the HP. **6M** (BL1)

ii) A 60 mm long line AB is parallel to and 20 mm in front of the VP the ends A and B of the line are 10 mm and 50 mm above the HP, respectively. Draw the projections of the line and determine its inclination with the HP. **8M** (BL5)

OR

2.B. i) A point U is 12 mm below HP, 25 mm behind VP and 38 mm away from Profile Plane. Draw front view, top view and left side view of the point. **6M** (BL1)

ii) An 80 mm long line PQ is inclined at 300 to the VP and is parallel to the HP. The end P of the line is 20 mm above the HP and 40 mm in front of the VP. Draw the projections of the line and determine its traces **8M** (BL5)

3.A. i) A pentagon ABCDE of side 30 mm has its side AB in the VP and inclined at 300 to the HP and the corner B is 15 mm above the HP and the corner D is 30 mm in front of the VP. Draw the projections of the plane and find its inclination with the VP. **14M** (BL1)

OR

3.B. i) A pentagonal prism, of base side 30 mm and axis 70 mm is resting on one of its rectangular faces in the VP. Draw its projections **14M** (BL1)

4.A. i) The front and top views of an object are shown in figure. Draw its isometric view. **14M** (BL1)

OR

4.B. i) Convert the following isometric view in to orthographic views. All dimensions are in **14M** (BL2)
millimeters.
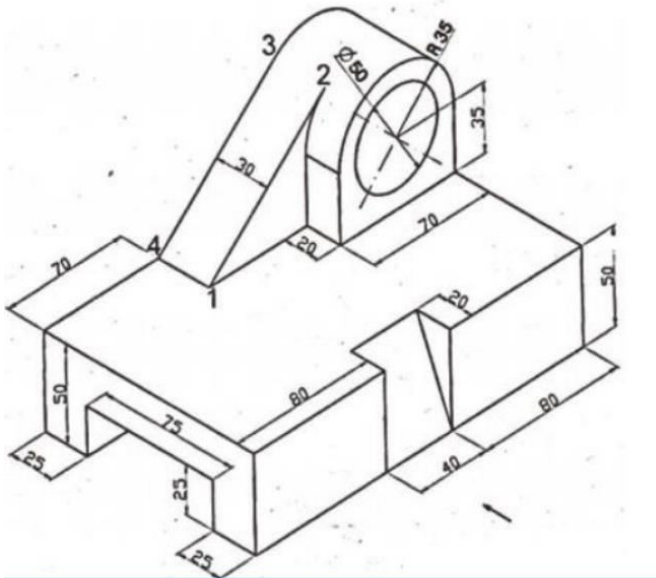
5.A. i) State and explain various advantages & applications of computer aided drafting. **14M** (BL5)

OR

5.B. i) Describe briefly various Display commands in AUTOCAD. **14M** (BL2)

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USHA RAMA COLLEGE OF ENGINEERING AND TECHNOLOGY
(An Autonomous College in the jurisdiction of JNTUK, Kakinada)
I B. Tech I Semester Regular Examinations, Jan-2020
UR19ESC109: FUNDAMENTALS OF COMPUTER SCIENCE
(Common to EEE, CSE & IT)

Time: 3 hours   Max. Marks: 5x14 = 70

Answer either A or B from each Question. All Questions carry equal marks

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1.A. i) Explain the evolution of computers. Further state how computers in one generation or better than predecessors. **7M** (BL2)

ii) Distinguish between the machine, Assembly and High Level language programming. **7M** (BL4)

OR

1.B. i) Explain various parts of a digital computer. **7M** (BL2)

ii) Explain the block diagram of a digital computer. **7M** (BL2)

2.A. i) How to represent the fixed and floating point numbers in number system explain with examples. **8M** (BL1)

ii) Change the Decimal 987654 into Octal and Hexadecimal number systems **6M** (BL6)

OR

2.B. i) Explain the algorithms in the number system with example. **10M** (BL2)

ii) Explain how to convert given hexadecimal number into binary number **4M** (BL2)

3.A. i) List the different types of memories used in computer system. **7M** (BL4)

ii) Explain the working of following **7M** (BL2)
(i) Keyboard (ii) Mouse (iii) I/O (iv) DMA

OR

3.B. i) List the peripheral devices using in computer environment **6M** (BL4)

ii) Explain the briefly the following memories. **8M** (BL2)
(i) Cache Memory   (ii) EPROM   (iii) EEPROM

4.A. i) Explain about control unit **4M** (BL2)

ii) Discuss about instruction formats **10M** (BL6)

OR

4.B. i) Discuss about ALU. **4M** (BL6)

ii) Explain the design of control unit – Micro programmed control and Hard wired control units **10M** (BL2)

5.A. i) List the various applications of the computers and explain **7M** (BL4)

ii) Explain about different computer networks. **7M** (B2L)

OR

5.B. i) Explain about IoT. **4M** (BL2)

ii) Explain briefly IoT applications. **10M** (BL2)

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