BAPATLA ENGINEERING COLLEGE:: BAPATLA

(Autonomous)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

R24-Scheme & Syllabus

(w.e.f. 2024-2025)

4 Year B.Tech Program

of

Electronics and Communication Engineering

BAPATLA ENGINEERING COLLEGE :: BAPATLA

(AUTONOMOUS UNDER ACHARYA NAGARJUNA UNIVERSITY)

(SPONSORED BY BAPATLA EDUCATION SOCIETY)

BAPATLA - 522102 BAPATLA DISTRICT, A.P.

www.becbapatla.ac.in

Bapatla Engineering College :: Bapatla
(Autonomous)

Academic Rules & Regulations
(R24 Regulations)
Regulations for Four Year Bachelor of Technology (B.Tech)
Degree Program for the Students Admitted from the Academic Year 2024-25

1. Admissions

The sanctioned intake in a particular B.Tech program comprises of Category-A (presently 70%) and Category-B (30%) seats which is supplemented with supernumerary (10%) EWS seats. Admissions for the Category-A seats and the supernumerary seats shall be made by the Andhra Pradesh (A.P.) State Government based on the merit rank obtained by the student in the common entrance examination conducted. Admissions for the remaining Category-B seats shall be made by the college in accordance with the guidelines issued by the A.P. State Government.

2. Medium of Instruction and Examination:

The medium of instruction of the entire B.Tech undergraduate program in Engineering and Technology and the examinations will be in English only.

3. Minimum Instruction Days:

A semester comprises of 90 working days and the year is divided into two semesters.

4. Award of B.Tech. Degree:

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

a. The student pursues a program of study in B.Tech for four academic years and in not more than eight academic years. A lateral entry student pursues a program of study for three academic years and not more than six academic years. However, for the students availing Gap year facility, this period shall be extended by two years at the most and these two years would not be counted in the maximum time permitted for graduation.

b. The student registers for 160 credits and secures all 160 credits. However, a lateral entry student registers for 121 credits and secures all the 121 credits from III semester to VIII semester of regular B. Tech program.

c. **Award of B. Tech degree with Minor:**
The student secures an additional 16 credits from Minor stream chosen and fulfills all the requisites of a B.Tech program i.e. secures 160 (Regular program) / 121 (Lateral Entry program) credits.
Minor is to be completed simultaneously with B.Tech program. Registering for a Minor degree is optional.

d. **Award of B.Tech degree with Honors:**
The student secures an additional 16 credits fulfilling all the requisites of B.Tech program i.e. secures 160 (Regular program) / 121 (Lateral Entry program) credits.

Registering for Honors is optional and is to be completed simultaneously with B.Tech program.

Students can register either for Honors stream or Minor stream.

5. Courses of study:

At present the following B.Tech programs of study are offered.

S. No.	Title of the UG Program	Abbreviation
1.	Civil Engineering	CE
2.	Computer Science & Engineering	CS
3.	Computer Science & Engineering (Cyber Security)	CB
4.	Computer Science & Engineering (Data Science)	DS
5.	Computer Science & Engineering (Artificial Intelligence & Machine Learning)	CM
6.	Electronics & Communication Engineering	EC
7.	Electrical & Electronics Engineering	EE
8.	Information Technology	IT
9.	Mechanical Engineering	ME

6. Credits:

a. **Credit:** A unit by which the course work is measured. It determines the number of hours (60 minutes) of instruction required per week. One credit is equivalent to one hour of teaching (Lecture/Tutorial) or two hours of practical work/field work per week.

b. **Academic Year:** Two consecutive (one odd & one even) semesters constitute one academic year.

c. **Choice Based Credit System (CBCS):** The CBCS provides a choice for students to select courses (Professional, Job Oriented & Open Electives) from the prescribed set of courses.

d. Each course in a semester is assigned certain number of credits based on the following

1 Hr. Lecture (L) per week	1 Credit
1 Hr. Tutorial (T) per week	1 Credit
1 Hr. Practical (P) per week	0.5 Credit
Internship of 4 – 6 weeks	2 Credits
Project Work of 16 weeks	12 Credits

7. Course Structure:

Every course of the B.Tech program will be placed in one of the 7 categories with suggested credits as listed below.

S. No.	Category	AICTE Recommended Credits (%)	Breakup of Credits (Total 160)
1.	Humanities and Social Sciences including Management (HM)	5 – 8 %	8 – 13
2.	Basic Science Courses (BS)	12 – 16 %	19 – 26
3.	Engineering Science Courses (ES)	10 – 18 %	16 – 29
4.	Professional Core Courses (PC)	30 – 36 %	48 – 58
5.	Electives – Professional Electives (PE); Job Oriented Electives (JOE); Open Electives (OE); Skill Enhancement Courses (SEC)	19 – 23 %	37
6.	Internships & Project Work (PR)	8 – 11 %	16
7.	Mandatory Courses (MC)	-	Non-credit

8. Course Evaluation Process:

The performance of the students in each semester shall be assessed course wise. All assessments will be done on an absolute mark basis. However, for the purpose of reporting the performance of a candidate, letter grades and grade points will be awarded.

The performance of a student in each course is assessed with alternate assessment methods, term examinations on a continuous basis during the semester called Continuous Internal Evaluation (CIE) and a Semester End Examination (SEE) conducted at the end of the semester. For each course, there shall be a comprehensive SEE of three hours duration at the end of each semester, except Mandatory courses.

The performance of a student in Internships, NSS/NCC/Scouts & Guides/Community Service and Health & Wellness/Yoga/Sports will be evaluated after completion of the course at the end of that semester.

8.1 Weightage for Course Evaluation:

The distribution of marks between CIE and SEE to be conducted at the end of the semester will be as follows:

Nature of the Course	CIE	SEE
Theory Courses	40	60
Practical Courses	40	60
Mandatory Courses	40	-
NSS/NCC/Scouts & Guides/Community Service and Health & Wellness/Yoga/Sports	-	100
Summer Internship	-	100
Project Work	40	60

8.2.1 CIE in Theory/Mandatory Courses:

In each Semester there shall be two Term Examinations and ***Alternate Assessment Tools (AAT)*** like Home Assignment, Class Test, Problem Solving, Group Discussion, Quiz, Seminar and Field Study in every theory course. The AAT with detailed modality of evaluation for each course shall be finalized by the teacher concerned before beginning of the course. It will be reviewed and approved by the Department Committee.

The Term Examination is conducted in the regular mode according to a schedule which will be common for a particular semester of study. The maximum weightage for Term Examinations, AATs and the calculation of marks for CIE in a theory course is given in the following Table.

Term Exams (Max. 20 marks*)	**AAT (Max. 15 marks**)**	**Attendance (Max. 5 marks)**
75% of marks obtained in the best performed term exam + 25% of marks obtained in the other term exam	Continuous assessment by teacher as per the predetermined course delivery & assessment plan. (Minimum two & maximum four assessments). AAT marks shall be considered based on average of all tests conducted.	Attendance secured & marks awarded will be as under: ≥75% and <80% - 2 marks ≥80% and <85% - 3 marks ≥85% and <90% - 4 marks ≥90% - 5 marks

*Term Examination will be conducted for 30 marks and reduced to 20 marks.

**Each AAT will be conducted for 10 marks and the average performance shall be scaled up to 15 marks.

8.2.2 CIE in Laboratory Courses:

The CIE for 40 marks of a laboratory course comprises of 15 marks for day-to-day laboratory work, 5 marks for record submission, 5 marks for attendance and 15 marks for a laboratory examination at the end of the laboratory course work. In any semester, a minimum of 90% of prescribed number of experiments / exercises specified in the syllabi for laboratory course shall be completed by the students. They shall complete these experiments / exercises in all respects and get the record certified by the internal lab teacher concerned and the Head of the Department.

8.2.3 CIE in Project Work:

The CIE is for 40 marks which consist of 20 marks for reviews at the end of each month as per the process document in the form of seminars / presentations, 5 marks for attendance and 15 marks for the evaluation of project report submitted at the end of the semester.

8.2.4 Pass criteria for CIE:

A minimum of 20 (50%) marks are to be secured exclusively in the CIE with a minimum of 65% attendance in that course to be declared as qualified (Q) in that course and be eligible to appear for the SEE of that course. If a student fails to obtain 20 marks in CIE or a minimum of 65% attendance in that course, then the student will be regarded as not qualified (NQ) and such a student can register for the course repetition as per the guidelines mentioned in clause 13 to qualify in that course. After securing 20 marks in course repetition, the student can appear for the SEE of that course as a supplementary candidate.

8.3.1 SEE in Theory Course, Laboratory Course and Project Work:

a) For each theory course, there shall be a comprehensive SEE of three hours duration at the end of each Semester for 60 marks.

b) For each laboratory course, the SEE shall be conducted by one internal and one external examiner appointed by the Principal and the duration of the exam shall be for three hours. The SEE is for 60 marks which include 15 marks for write up, 35 marks for lab experiment / exercise and 10 marks for Viva-voce.

c) Project Work shall be evaluated in the form of a Viva-Voce and demonstration of the thesis work for 60 marks. Viva-voce Examination in project work shall be conducted by one internal examiner appointed by the HOD and one external examiner to be appointed by the Principal.

8.3.2 Evaluation of Internships:

Summer Internship at the end of IV & VI semesters carried out in industry / organization are to be evaluated in V & VII semesters respectively after the submission of certificate provided by the organization and a concise report submitted by the student to the department committee. The internship will be evaluated by the department committee for a total of 100 marks with 50 marks for the report and 50 marks based on seminars / presentation given to the department committee by the student.

8.3.3 Evaluation of NSS/NCC/Scouts & Guides/Community Service and Health & Wellness/Yoga/Sports:

The above courses will be evaluated by the department committee for a total of 100 marks with 50 marks for the activities pursued by the student during that semester and 50 marks based on seminars / presentation given to the department committee by the student.

8.3.4 Pass Criteria for SEE:

a) Theory/Laboratory Courses and Project Work

A minimum of 21 (35%) marks are to be secured exclusively in the SEE of the above courses for the award of the grade and securing the credits for that course.

A student eligible to appear for the SEE in a course but is absent or has failed the examination may appear for SEE of that course in the next supplementary examination when offered.

b) Internship, NSS/ NCC/ Scouts & Guides/ Community Service and Health & Wellness/ Yoga/ Sports

A minimum of 40 (40%) marks are to be secured exclusively in the evaluation of the above courses for the award of the grade and securing the credits for that course.

A student eligible to appear for the evaluation in the above courses but is absent or has failed in the examination may appear for evaluation of that course in the next supplementary examination when offered.

9. Choice Based Courses:

Students can select a course from a prescribed set of courses offered by the department in the following categories.

a) Professional Elective Courses: There shall be five Professional Elective Courses from V Semester to VII. For each elective course there shall be a choice such that the student can choose a course from the list of courses offered by the department for that elective.

b) Job Oriented Elective Courses: There shall be three Job Oriented Elective Courses in all programs from V to VII semester. For each elective course there shall be a choice such that the student can choose a course from the list of courses offered by the department for that elective.

c) Open Elective Courses: One Open Elective Course in VII semester will be offered by various departments. A student can choose and register for an open elective course which is offered by other departments only and he / she has not studied the same course in any form during the Program.

d) Massive Open Online Courses (MOOCs): A Student must pursue and complete one course compulsorily through MOOCs from approved organizations for awarding the degree. A student can pursue MOOCs courses from Professional Elective / Job Oriented Elective / Open Elective Courses only. The student must inform and take

prior permission / approval from the Internal Department Committee. The courses must be of a minimum of 8 weeks in duration and shall contain proctored examinations. The student must acquire a certificate for the concerned course from the agency to earn the credits for that course. For further details and guidelines**,** the students can visit the college website.

The Internal Department Committee comprising Head of Department and two senior faculty members shall evaluate the certificate / grades / marks awarded for a course by external agencies and convert the same to equivalent marks / grades.

10. Induction Program:

There shall be a mandatory induction program for three weeks before the commencement of the first semester with no credits.

11. There shall be credit programs like NSS/NCC/Scouts & Guides/Community Service and Health & Wellness/Yoga/Sports. Also Design Thinking & Innovation and Tinkering lab are made compulsory credit courses for all branches.

12. Make-up Test:

a) A student can appear for a Make-up Test for a maximum of two theory courses of a semester to improve marks in the Continuous Internal Evaluation (CIE).

b) A student is eligible for the Make-up test which is conducted after the second Mid Term examination and before SEE examination if the student satisfies the following conditions.

i) Unable to secure 50% internal marks (CIE) and has more than or equal to 65% attendance in a particular theory course (After finalizing the internal marks).

ii) Attendance in Remedial classes is more than or equal to 65% (if Remedial classes are conducted) or secured greater than 50% marks in the I Mid Term Examination and AAT-1 together.

iii) Attended 50% of CIE tests (at least one AAT & one Mid Term Examinations).

The make-up test will be conducted for 40 marks (8 questions of 1 mark each, 2 questions of 16 marks each) in Mid Examination format covering the entire syllabus and the marks obtained in this test are final. However, the maximum marks awarded will be 20 only.

The students must apply to the principal through the respective HOD by paying prescribed fees.

The documents for registration of the Make-up test are available from the departments and college website.

13. Course Repetition:

The students not qualified to write SEE in a course may register for the repeater courses through Course Repetition. The students must apply to the principal through the respective HOD by paying prescribed fees.

A student can take up a maximum of two theory courses and one laboratory course in a semester immediately after the semester end examinations of that semester. The students who are not taking regular semester courses may additionally register for one more theory course.

The documents for registration of course and monitoring the candidates registered for course repetition are available from the departments and college website.

14. Minimum Academic Requirements for Promotion:

a) Semester Promotion

A student is eligible to register for SEE if he/she satisfies the following conditions. However, the student can appear only for the SEE of those courses in which the student is qualified (Q).

i) Attendance Requirements

A student shall be eligible to register for SEE, if he / she acquires a minimum of 75% of attendance in aggregate of all the courses in a semester.

Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted on genuine medical grounds with a doctor certificate and duly approved by the principal.

A shortage of attendance below 65% in aggregate shall in NO case be condoned. Students whose shortage of attendance is not condoned in any semester are not eligible to take their SEE of that semester and will be considered as detained in that semester.

If a student does not satisfy the attendance requirements of the present semester, he / she will not be promoted to the next semester (considered as detained in the present semester). They may seek readmission for that semester when offered next.

A stipulated fee shall be payable towards condonation of shortage of attendance to the college.

ii) Qualification in CIE

A student must qualify in a minimum of three courses in each semester (as per Clause 8.2.4) in CIE to register for the SEE of that semester.

If a student does not satisfy the above conditions, he / she will not be promoted to the next semester (considered as detained in that semester). They may seek readmission for the detained semester when offered next.

b) Promotion / Detention Conditions based on the minimum credits to be secured by the student:

A student shall be promoted from I to II, III to IV, V to VI and VII to VIII semesters if he / she fulfills the academic requirement as specified in 14.a). For other semesters i.e. II to III (1st year to 2nd year), IV to V (2nd year to 3rd year) and VI to VII (3rd year to 4th year) semesters, the following criteria is to fulfilled in addition to 14.a) clause.

i) II semester to III semester (1st year to 2nd year)

A student shall be promoted from II semester to III semester only if he / she fulfills the academic requirement of securing 25% of the credits in the courses that have been studied up to I Semester.

ii) IV semester to V semester (2nd year to 3rd year)

A student shall be promoted from IV semester to V semester only if he/she fulfills the academic requirement of securing 40% of the credits in the courses that have been studied up to III Semester.

iii) VI semester to VII semester (3rd year to 4th year)

A student shall be promoted from VI semester to VII semester only if he/she fulfills the academic requirements of securing 40% of the credits in the courses that have been studied up to V semester.

If a student is not promoted or detained for want of credits in a particular semester as per clause 14.b) above, the student may secure the required credits through supplementary examinations and only after securing the required credits he / she shall be permitted to join in the III or V or VII Semester as the case may be.

c) With–holding of Results

If the candidate has any dues not paid to the college or case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld in such cases until the issue is resolved.

15. Guidelines for offering a Minor in a discipline:

Minor in a discipline concept is introduced in the curriculum for all conventional B. Tech programs in which it offers a Major Program (B.Tech degree). The main objective of Minor in a discipline is to provide additional learning opportunities for academically motivated students and it is an optional added feature of the B. Tech. program.

a. Students who are desirous of pursuing their special interest areas other than the chosen discipline of Engineering may opt for additional courses in Minor specialization groups offered by a department other than their parent department.
b. The BOS concerned shall identify as many tracks as possible in the areas of emerging technologies and industrial relevance / demand. For example, the Minor tracks can be the fundamental courses in CSE, ECE, EEE, CE, ME etc or industry tracks such as Artificial Intelligence (AI), Machine Learning (ML), Data Science (DS), Robotics, Electric vehicles, VLSI etc.
c. The list of disciplines / branches eligible to opt for a particular industry relevant minor specialization shall be clearly mentioned by the respective BOS.

d. There shall be no limit on the number of programs offered under Minor. The Institution can offer Minor programs in emerging technologies based on expertise in the respective departments or can explore the possibility of collaborating with the relevant industries/agencies in offering the program.
e. The concerned BOS shall decide on the minimum enrolments for offering Minor program by the department. If a minimum enrolments criterion is not met, then the students may be permitted to register for the equivalent MOOC courses as approved by the concerned Head of the department in consultation with BOS.
f. A student shall be permitted to register for Minor program at the beginning of 4th semester provided that the student must have acquired a minimum of **7.0 CGPA** up to the end of 3rd semester without any backlogs. A CGPA of 7.0 must be maintained in the subsequent semesters without any backlog to keep the Minor registration active.
g. A student must earn an additional 16 credits in the specified area to be eligible for the award of B. Tech degree with Minor. This is in addition to the credits essential for obtaining the Undergraduate degree in Major discipline (i.e. 160 credits for regular students and 121 credits for Lateral Entry students). The concerned BOS shall finalize the modalities to earn the above credits.
h. For securing the above additional 16 credits, the students must register and complete three courses of 4 credits each offered by the department concerned. These 3 courses must contain a laboratory component also (i.e. Embedded course having three lecture hours and two practical hours). The balance of 4 credits may be secured through two MOOCs courses of 2 credits each or an embedded course offered by the department.
i. Courses that are used to fulfil the student's primary Major may not be double counted towards the Minor. Courses with content substantially equivalent to courses in the student's primary Major may not be counted towards the Minor.
j. The student registered for Minor shall pass in all subjects that constitute the requirement for the Minor program. No class / division (i.e., second class, first class, distinction, etc.) shall be awarded for Minor degree programme
k. If a student drops (or terminated) from the Minor program, they cannot convert the earned credits into free or core electives; they will remain extra.
l. In case a student fails to meet the CGPA requirement for B.Tech degree as per clause 15.f or drops (or terminated) from the Minor program, he/she will be dropped from the list of students eligible for Minors degree and they will receive B.Tech degree only. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.
m. The Minor will be mentioned in the Major degree certificate only. No additional degree certificate will be given for Minor degree.
n. Transfer of credits from Minor to regular B. Tech degree and vice-versa shall not be permitted
o. Minor must be completed simultaneously with a Major degree program. A student cannot earn the Minor degree after he / she has already earned bachelor's degree.
p. The documents for registration of Minor courses are available from the departments and college website.

16. Guidelines for offering an Honors in a Discipline:

The objective of introducing B.Tech (Honors) is to facilitate the students to choose additional specialized courses of their choice and build their competence in a specialized area in the UG level. The programme is a best choice for academically excellent students having good academic record and interest towards higher studies and research.

Honors is introduced in the curriculum of all B. Tech. programs offering a Major degree and is applicable to all B. Tech (Regular and Lateral Entry) students admitted in Engineering & Technology. Students are eligible to opt for Honors program offered by the same Department / Discipline.

a. Students who are desirous of pursuing special interest / advanced areas of their discipline of Engineering may opt for additional courses as part of Honors programs offered by the parent department.
b. The BOS concerned shall identify as many tracks as possible in the areas of emerging technologies and industrial relevance / demand.
c. A student shall be permitted to register for Honors program at the beginning of 4th semester provided that the student must have acquired a minimum of **7.5 CGPA** up to the end of 3rd semester without any backlogs. A CGPA of 7.5 must be maintained in the subsequent semesters without any backlog to keep the Honors registration active.
d. A student must earn additional 16 credits for award of B.Tech. (Honors) degree from the same branch / department / discipline registered for Major degree. This is in addition to the credits essential for obtaining the Undergraduate degree in Major discipline (i.e., 160 credits for regular students and 121 credits for Lateral Entry students). The concerned BOS shall finalize the modalities to earn the above credits.
e. For securing the above additional 16 credits, the students must register and complete three courses of 4 credits each offered by the department concerned. These 3 courses must contain a laboratory component also (i.e. Embedded course having three lecture hours and two practical hours). The balance of 4 credits may be secured through two MOOCs courses of 2 credits each or an embedded course offered by the department.
f. Courses that are used to fulfil the student's primary Major may not be counted towards the Honors.
g. The student registered for Honors shall pass in all subjects that constitute the requirement for the Honors program. No class / division (i.e., second class, first class and distinction, etc.) shall be awarded for Honors program.
h. If a student drops or is terminated from the Honors program, the additional credits earned so far cannot be converted into open or core electives; they will remain extra.
i. In case a student fails to meet the CGPA requirement for B.Tech degree as per clause 16.c or drops (or terminated) from the Honors program, he/she will be dropped from the list of students eligible for degree with Honors and they will receive B.Tech degree only. However, such students will receive a separate grade sheet mentioning the additional courses completed by them
j. The Honors will be mentioned in the Major degree certificate only as Bachelor of Technology (Honors). No additional degree certificate will be given for Honors.

k. Transfer of credits from Honors to regular B. Tech degree and vice-versa shall not be permitted.
l. Honors is to be completed simultaneously with a Major degree. A student cannot earn the Honors after he / she has already earned bachelor's degree
m. The documents for registration of Honors are available from the departments and college website.

17. Summer Internships:

Students shall undergo two summer internships each for a minimum of four weeks duration at the end of second and third years of the program for 2 credits each. The organization in which the student wishes to carry out Internship needs to be approved by Internal Department Committee comprising Head of Department and two senior faculty members. The student shall submit a report along with an internship certificate from the organization. The evaluation of the first and second summer internships shall be conducted at the end of the V Semester & VII semester respectively.

Completion of the internship is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such a case, the student shall repeat the internship in the subsequent summer. The student pursuing two summer internships in the same summer is not permitted.

Community Service Project focussing on specific local issues shall be an alternative to the four weeks of summer Internship. The Community Service Project shall be for 4 weeks in duration which includes preliminary survey for 1 week, community awareness programs for one week, community immersion program in consonance with Government agencies for 1 week and a community exit report (a detailed report) for 1 week.

18. A student shall register and put-up minimum attendance in all 160 credits and earn all the 160 credits. In the case of lateral entry students, the number of credits is 121.

19. Students who fail to earn 160 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech. Program, and their admission shall be cancelled. However, for the students availing the Gap year facility, this period shall be extended by corresponding gap year duration availed.

Lateral entry students who fail to earn 121 credits as indicated in the course structure within six academic years from the year of their admission shall forfeit their seat in B.Tech. Course and their admission shall be cancelled. However, for the students availing gap year facility, this period shall be extended by corresponding gap year duration availed.

20. Securing Credits and award of Grade Points:

Grading

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

Structure of Grading of Academic Performance

Range in which the % of marks in the course fall	Grade	Grade Points Assigned
≥ 90	S (Superior)	10
80-89	A (Excellent)	9
70-79	B (Very Good)	8
60-69	C (Good)	7
50-59	D (Average)	6
40-49	E (Below Average)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

A student obtaining Grade F shall be considered failed and will be required to reappear for that course when the next supplementary SEE is offered. Same is the case with a student who obtains 'Ab' in the SEE.

Since there are no credits for Mandatory /Audit courses, only 'Pass' or 'Fail' shall be mentioned for such courses.

21. Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

(i) The Semester Grade Point Average (SGPA) in a particular semester 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.,

$$\text{SGPA} = \frac{\sum_{i=1}^{n} C_i \times GP_i}{\sum_{i=1}^{n} C_i}$$

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

(ii) The Cumulative Grade Point Average (CGPA) will be computed in the same manner considering all the courses undergone by a student over all the semesters of a program, i.e.,

$$\text{CGPA} = \frac{\sum_{j=1}^{m} SGPA_j \times TC_j}{\sum_{j=1}^{m} TC_j}$$

where "$SGPA_j$" is the SGPA of the j^{th} semester and TC_j is the total number of credits in that semester.

(iii) Both SGPA and CGPA shall be truncated to 2 decimal points and reported in the transcripts.

(iii) While computing the SGPA, the courses in which the student is awarded Zero grade points will also be included.

(iv) Grade Point: It is a numerical weightage allotted to each letter grade on a 10-point scale.

(v) Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters S, A, B, C, D, E and F.

22. 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 / she shall be placed in one of the following four classes.

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5
First Class	≥ 6.5 < 7.5
Second Class	≥ 5.5 < 6.5
Pass Class	≥ 5.0 < 5.5

23. Gap Year:

Gap year concept for Student Entrepreneur shall be introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue entrepreneurship program / to establish startups. This period may be extended to two years at the most and these two years would not be counted as the maximum time for graduation.

An evaluation committee shall be constituted by the College to evaluate the proposal submitted by the student and the committee shall decide whether to permit the student(s) to avail themselves of the Gap Year.

After rejoining the student can pursue the remaining period of study under transitory regulations (if the regulation changes).

24. Transitory Regulations:

Discontinued or detained candidates (as per clause 14.b) are eligible for readmission as and when the semester is offered and after fulfillment of academic regulations. Candidates who have been detained as per clause 14.a) are eligible for readmission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered.

Candidates who were permitted with Gap Year shall be eligible for rejoining into the succeeding year of their B.Tech from the date of commencement of class work.

The readmitted students must follow the regulations in which he/she is admitted and residual courses if any must be completed based on the equivalent courses for each semester specified by the BOS considering the previous and readmitted regulations.

25. Credit Transfer Policy:

Adoption of MOOCs is mandatory, to enable blended model of teaching-learning as also envisaged in the NEP 2020. As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the Institution shall allow up to a maximum of 15 credits (5 courses, approximately 10% for the total credits of the program) through MOOCs platform.

a. The Institution shall offer credit mobility for MOOCs and give the equivalent credit weightage to the students for the credits earned through online learning courses.
b. Student registration for the MOOCs shall be only through the respective department of the institution, it is mandatory for the student to share necessary information and take prior approval from the department.
c. Credit transfer policy will be applicable to the Professional Elective Courses, Job Oriented Elective Courses, Open Elective Courses & Management Courses only.
d. The concerned department shall identify the courses permitted for credit transfer.
e. The department shall notify the list of the online learning courses at the beginning of semester eligible for credit transfer.
f. The department shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the course.
g. The department shall ensure no overlap of MOOC exams with that of the university examination schedule. In case of delay in results, the Institution will re-issue the marks sheet for such students.
h. Credits transfer will be considered only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and/or grades.
i. The institution shall submit the following to the examination section:
    1. List of students who have passed MOOC courses in the current semester along with the certificate of completion.
    2. Undertaking form filled by the students for credit transfer.
j. The Institution shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state government.

26. Academic Bank of Credits (ABC):

The College has implemented Academic Bank of Credits (ABC) to promote flexibility in curriculum as per NEP 2020 to

a. Provide option of mobility for learners across the universities of their choice.
b. Provide option to gain the credits through MOOCs from approved digital platforms.
c. Facilitate award of Certificate / Diploma / Degree (B.Sc) in line with the accumulated credits in ABC
d. Execute Multiple Entry and Exit system with credit count and credit transfer.

27. Exit Policy:

The students can choose to exit the four-year programme at the end of first / second / third year of study.

a. **UG Certificate** (in Field of study / discipline) - Programme duration: First year (first two semesters) of the undergraduate programme, 39 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6-credit job-specific internship / apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

b. **UG Diploma** (in Field of study / discipline) - Programme duration: First two years (first four semesters) of the undergraduate programme, 80 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6-credit job-specific internship / apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

c. **Bachelor of Science** (in Field of study / discipline) i.e., B.Sc. Engineering in (Field of study / discipline)- Programme duration: First three years (first six semesters) of the undergraduate programme, 120 credits.

28. Student Transfers

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh and the affiliated University from time to time.

29. Punishments for Malpractice cases – Guidelines:

a) If any student caught under malpractice during the CIE examinations, the entire cycle of examinations will be cancelled and awarded zero marks for all the courses during that cycle. For example, if any student is caught while doing malpractice in an AAT, the AAT marks of all the courses in that cycle will be cancelled. Similar punishment will be considered for mid-term examinations also.

b) For Semester End Examinations, the examinations committee may take the following guidelines into consideration while dealing with the suspected cases of malpractice reported by the invigilators / squad members etc. The punishment may be more severe or less severe depending on the merits of the individual cases.

S. No.	Nature of Malpractice/Improper conduct	Punishment
1.	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cellphones, pager, palm computers or any other form of material concerned with or related to the course of the examination (theory or practical) in which he is appearing but has not made use of	Expulsion from the examination hall and cancellation of the performance in that course only.

	(material shall include any marks on the body of the student which can be used as an aid in the course of the examination).	
2.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that course.
3.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that course and all other courses the candidate has appeared including practical examinations and project work of that semester/year examinations.
4.	Gives assistance or guidance or receives it from any other student orally or by any other body language methods or communicates through cell phones with any other student 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 course only of all the students involved. In case of an outsider, he will be handed over to the police and a case shall be registered against him.
5.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the course of the examination (theory or practical) in which the student is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses including practical examinations and project work of that semester/year.
6.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses including practical examinations and project work of that semester/year.
7.	Smuggles in the Answer book or takes out or arranges to send out the question paper during the examination or answer book during or after the examination	Expulsion from the examination hall and cancellation of performance in that course and all the other courses including practical examinations and project work of that semester/year. The student is also debarred for two consecutive semesters from class

		work and all examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeit of seat.
8.	Refuses to obey the orders of the Chief Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-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 course and all other courses of that semester/year. The students also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case shall be registered against them.
9.	Leaves the exam hall taking away answer script or intentionally tears up the script or any part there of inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses including practical examinations and project work of that semester/year. The candidate is also debarred for two consecutive semesters from classwork and all end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

10.	Possesses any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses including practical examinations and project work of that semester/year. The student is also debarred and forfeits the seat.
11.	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 S.No. 7 to S.No. 9.	For Student of the college: Expulsion from the examination hall and cancellation of the performance in that course and all other courses including practical examinations and project work 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 shall be registered against them.
12.	Impersonates any other student in connection with the examination	The student who has impersonated shall be expelled from examination hall. The student is debarred from writing the remaining exams, and rusticated from the college for one academic year during which period the student will not be permitted to write any exam. If the imposter is an outsider, he will be handed over to the police and a case shall be registered against him. The performance of the original student who has been impersonated, shall be cancelled in all the courses of the examination including practical's and project work of that semester/ year. The student is rusticated from the college for two consecutive years during which period the student will not be permitted to write any exam. The

		continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.
13.	If any malpractice is detected which is not covered in the above S.No. 1 to S.No. 12 items, it shall be reported to the college academic council for further action and award suitable punishment.	
14.	Malpractice cases identified during sessional examinations will be reported to the examination committee nominated by Academic council to award suitable punishment.	

30. ADDITIONAL ACADEMIC REGULATIONS:

a. Any attempt to impress upon the teachers, examiners, faculty and staff of Examinations, bribing for either marks or attendance will be treated as malpractice.
b. When a component of Continuous Internal Evaluation (CIE) or Semester End Examination (SEE) is cancelled as a penalty, he/she is awarded zero marks in that component.

31. AMENDMENTS TO REGULATIONS:

The Academic Council of Bapatla Engineering College (Autonomous) reserves the right to revise, amend, change or nullify the Regulations, Schemes of Examinations and / or Syllabi, Academic schedules, Examination schedules, Examination pattern, Moderation to students, Special opportunity to complete degree beyond stipulated time and any other matter pertained that meets to the needs of the students, society and industry without any notice and the decision is final.

Bapatla Engineering College :: Bapatla

Estd.1981 (Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION

For

Electronics & Communication Engineering

Effective from the Academic Year 2024-2025 (R24 Regulations)

First Year B.Tech (Semester – I)

Course Code	Category	Course Title	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
24EC101	BS	Linear Algebra and Ordinary Differential Equations	2	1	0	3	40	60	100	3
24EC102	BS	Engineering Chemistry	3	0	0	3	40	60	100	3
24EC103	ES	Fundamentals of Electrical & Electronics Engineering	3	0	0	3	40	60	100	3
24EC104	ES	Programming using C	3	0	0	3	40	60	100	3
24EC105	ES	Circuit Theory	3	0	0	3	40	60	100	3
24ECL101	BS	Engineering Chemistry Lab	0	0	2	2	40	60	100	1
24ECL102	ES	Fundamentals of Electrical & Electronics Engineering Lab	0	0	3	3	40	60	100	1.5
24ECL103	ES	Programming using C Lab	0	0	3	3	40	60	100	1.5
24ECL104	ES	IT Workshop	0	0	2	2	40	60	100	1
Induction Program		First Three Weeks (Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Familiarization to Dept./Branch & Innovations)								
TOTAL			**14**	**1**	**10**	**25**	**360**	**540**	**900**	**20**

L: Lecture T: Tutorial P: Practical

CIE: Continuous Internal Evaluation SEE: Semester End Examination

Bapatla Engineering College :: Bapatla

Estd.1981 (Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION

For

Electronics & Communication Engineering

Effective from the Academic Year 2024-2025 (R24 Regulations)

First Year B.Tech (Semester – II)

Course Code	Category	Course Title	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
24EC201	BS	Numerical Methods & Advanced Calculus	2	1	0	3	40	60	100	3
24EC202	BS	Semiconductor Physics and Nanomaterials	3	0	0	3	40	60	100	3
24EC203	HM	Communicative English	2	0	0	2	40	60	100	2
24EC204	ES	Programming using C++	3	0	0	3	40	60	100	3
24ECL201	ES	Engineering Graphics Lab	1	0	3	4	40	60	100	2.5
24ECL202	ES	Engineering Mechanics & Surveying Lab	1	0	2	3	40	60	100	2
24ECL203	BS	Semiconductor Physics Lab	0	0	2	2	40	60	100	1
24ECL204	HM	English Communication Skills Lab	0	0	2	2	40	60	100	1
24ECL205	ES	Programming using C++ Lab	0	0	3	3	40	60	100	1.5
TOTAL			**12**	**1**	**12**	**25**	**360**	**540**	**900**	**19**

L: Lecture T: Tutorial P: Practical

CIE: Continuous Internal Evaluation SEE: Semester End Examination

BAPATLA ENGINEERING COLLEGE:: BAPATLA

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

LINEAR ALGEBRA AND ORDINATRY DIFFERENTIAL EQUATIONS
I B. Tech. I Semester (24EC101)

Lectures	2	Tutorial	1	Practical	0	Credits	3
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: None.

Course Objectives:

- Solve a system of linear homogeneous and non-homogeneous equations, finding the inverse of a given square matrix and also its Eigen values and Eigen vectors
- Identify the type of a given differential equation and select and apply the appropriate Analytical technique for finding the solution of first order ordinary differential equations.
- Create and analyze mathematical models using higher order differential equations to solve application problems that arise in engineering.
- Verify mean value theorems and expand functions of a single variable using Taylor's and Maclaurin's series.

Course Outcomes: At the end of this course, Students will be able to

CO1	Find the eigen values and eigen vectors of a given matrix and its inverse.
CO2	Apply the appropriate analytical technique to find the solution of a first order ordinary differential equation.
CO3	Solve higher order linear differential equations with constant coefficients arise in engineering applications.
CO4	Learn the applications of mean value theorems and Taylor's theorem.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	POs												PSOs		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	2	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	2	-	-	-
CO4	2	2	2	-	-	-	-	-	-	-	-	2	-	-	-

UNIT-I

Linear Algebra: Rank of a Matrix; Elementary transformations of a matrix; Gauss-Jordan method of finding the inverse; Normal form of a matrix, Consistency of linear System of equations: Rouche's theorem, System of linear Non-homogeneous equations, System of linear homogeneous equations; vectors; Eigen values; properties of Eigen values(without proofs); Cayley-Hamilton theorem (without proof).

[Sections: 2.7.1; 2.7.2; 2.7.6; 2.7.7; 2.10.1; 2.10.2; 2.10.3; 2.12; 2.13; 2.14; 2.15.]

UNIT-II

Differential Equations of first order: Definitions; Formation of a Differential equation; Solution of a Differential equation; Equations of the first order and first degree; variables separable; Linear Equations; Bernoulli's equation; Exact Differential equations; Equations reducible to Exact equations: I.F found by inspection, I.F of a Homogeneous equation, In the equation M dx+ N dy = 0, $\frac{\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}}{N}$ is a function of x and $\frac{\frac{\partial N}{\partial x}-\frac{\partial M}{\partial y}}{M}$ is a function of y.

Applications of a first order Differential equations: Newton's law of cooling; Rate of decay of Radio-active materials.
[Sections: 11.1; 11.3; 11.4.1; 11.5; 11.6; 11.9; 11.10; 11.11;
11.12.1; 11.12.2; 11.12.4; 12.6; 12.8]

UNIT-III

Linear Differential Equations: Definitions; Theorem; Operator D; Rules for finding the complementary function; Inverse operator; Rules for finding the Particular Integral; Working procedure to solve the equation; Method of Variation of Parameters; Applications of Linear Differential Equations: Introduction,Oscillatory Electrical Circuits.
[Sections: 13.1; 13.2; 13.3; 13.4; 13.5; 13.6; 13.7;13.8.1;14.1;14.5].

UNIT-IV

Differential Calculus:
Mean Value Theorems: Rolle's theorem, Lagrange's mean value theorem with their geometrical interpretation. Cauchy's mean value theorem. Taylor's and Maclaurin theorems with remainders (without proof),Maclaurin's series, Expansion by use of known series, Taylor's series.
[4.3.1; 4.3.2; 4.3.3; 4.3.4; 4.4.1; 4.4.2; 4.4.3]

Text Books :	1. B.S.Grewal, "Higher Engineering Mathematics", 44th edition, Khanna publishers, 2017.
References :	[1] Erwin Kreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons. [2] N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Engineering Chemistry
I B. Tech. – Semester-I
(Code:24EC102)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: None.

Course Objectives:

- To familiarize importance of usage of various polymers and fuels in household & industry
- Outline the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
- To impart the concept of soft and hard waters, softening methods of hard water and various instrumental methods of analysis of samples.
- Outline the basics of some advanced concepts like computational chemistry, nanomaterials and liquid crystals.

Course Outcomes: At the end of this course, Students will be able to

CO1	Explain the preparation, properties, and applications of plastics, elastomers and biodegradable polymers also to explain calorific value, characteristics and applications of conventional and alternative fuels.
CO2	Apply the knowledge of electrochemistry for understanding the working of electrodes and electrochemical energy systems, as well as corrosion theories and protection methods.
CO3	Analyse the methods to produce soft water for industrial use and potable water by economical means and study the principles of different analytical techniques and their applications.
CO4	Demonstrate the knowledge of computational chemistry, and applications of advanced materials in engineering.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	2			2	3					2			
CO2	3	3	3				2					2			
CO3	3	3	3	2		2	2					3			
CO4	3	3	2	3	3							2			

UNIT-1: POLYMERS AND FUEL CHEMISTRY — 12 Hours

Introduction to polymers, functionality of monomers. Thermoplastics and Thermo-setting plastics- Preparation, properties and applications of PVC and Bakelite.
Biodegradable polymers- Preparation, properties and applications of PHB and PHBV
Elastomers-Preparation, properties and applications of Buna S and Buna N
Fuels-Types of fuels, calorific value of fuels-determination by Bomb calorimeter, Liquid Fuels-refining of petroleum, Knocking, Octane and Cetane number, Flue gas analysis by Orsat's apparatus, Introduction to alternative fuels-methanol, ethanol and bio fuel-bio diesel (preparation and applications).

12 Hours

UNIT-2: ELECTROCHEMICAL CELLS AND CORROSION	
Single electrode potential, Reference electrodes- construction and working of standard hydrogen electrode and calomel electrode; Batteries (Li ion battery and zinc air cells), fuel cells (H_2-O_2, and molten carbonate). Electrochemical sensors-potentiometric sensors and amperometric sensors with examples. Corrosion-Definition, theories of corrosion (chemical and electrochemical), Types of corrosion-galvanic corrosion, differential aeration corrosion, stress corrosion, factors influencing rate of corrosion, corrosion control (cathodic protection), Protective coatings-electroplating (Gold) and electroless plating (nickel).	
UNIT-3: WATER TECHNOLOGY AND INSTRUMENTAL METHODS OF ANALYSIS	12 Hours
WATER TECHNOLOGY: Soft and hard water, Estimation of hardness of water by EDTA Method-numerical problems, Boiler troubles-Priming, foaming**,** scale and sludge, Caustic embrittlement, Specifications for drinking water- World health organization (WHO) standards, Industrial water treatment- Ion-exchange process, desalination of brackish water by reverse osmosis (RO) and electro dialysis. **INSTRUMENTAL METHODS OF ANALYSIS:** Electromagnetic spectrum-UV (Principle, instrumentation, and applications), FT-IR (Principle, instrumentation, and applications), magnetic resonance imaging and CT scan (procedure and applications).	
UNIT-4: ADVANCED CONCEPTS/MATERIALS IN ENGINEERING CHEMISTRY	12 Hours
Computational chemistry: Introduction to computational chemistry, and docking studies Semiconductors-Introduction, basic concept, Types-Intrinsic & Extrinsic Semiconductors, applications. Nano materials: Introduction, classification of nano materials, engineering applications, properties and applications of Carbon nano tubes and Graphenes nanoparticles. Liquid crystals: Introduction, liquid crystalline displays (LCD)-applications. Polymers for light emitting diodes (LEDs)-Introduction, classification of polymer LEDs, Organic LEDs-their commercial uses.	
Text Books :	1. P.C. Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi 17th edition (2017). 2. Seshi Chawla, "Engineering Chemistry" DhanpatRai Pub, Co LTD, New Delhi 13 th edition, 2013. 3. S.S. Dara, "A Textbook of Engineering Chemistry", S.Chand & Co, (2010).
References :	1. Engineering Chemistry by K. Maheswaramma, Pearson publishers 2015. 2. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition 3. B. S. Murthy, P. Shankar and others, "Textbook of Nanoscience and Nanotechnology", University press (latest edition) 4. CNR Rao and JM Honig (Eds) "Preparation and characterization of materials" Academic press, New York (latest edition)

BAPATLA ENGINEERING COLLEGE::BAPATLA
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Fundamentals Of Electrical and Electronics Engineering I B. Tech. I Semester (24EC103)							
Lectures	2	Tutorial	1	Practical	0	Credits	3
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: None.

Course Objectives:

- Understand the fundamentals of electrical components like R,L,C and get familiarity with current, voltage, work and energy
- Calculate RMS, Peak value, Average value of AC signal and analyze behavior of different R,L,C circuits.
- Verify the operation and characteristics of PN junction diode as well as zener diode.
- Verify the operation and characteristics of bipolar junction transistor, MOSFET, JFET. verify the output waveforms of rectifiers

Course Outcomes: At the end of this course, Students will be able to

CO1	Summarize the significance of electrical circuit elements
CO2	Calculate the RMS, Average, Peak values for various AC signals.
CO3	Understand the characteristics of BJT,MOSFET and JFET.
CO4	Learn the applications of PN junction diode and Zener diode.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	POs												PSOs		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	2	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	2	-	-	-
CO4	2	2	2	-	-	-	-	-	-	-	-	2	-	-	-

UNIT-I

Basic Concepts, Laws and Principles

Introduction ,Conductors, Insulators, and Semiconductors, Electric Field and Magnetic Field, Electric Current, Resistance, Potential, and Potential Difference ,Ohm's Law ,Work, Power, and Energy , Electromagnetism and Electromagnetic Induction, Dynamically Induced EMF and Statically Induced EMF, Self-induced EMF and Mutually Induced EMF, Self-inductance of a Coil, Mutual Inductance , Electrical Circuit Elements, Energy Stored in a Capacitor, Capacitor in Parallel and in Series

UNIT-II

AC Fundamentals and Single-phase Circuits

Introduction , Generation of Alternating Voltage in an Elementary Generator ,Concept of Frequency, Cycle, Time Period, Instantaneous Value, Average Value and Maximum Value of

Sinusoidal and Non-sinusoidal Wave Forms ,Concept of Average Value and Root Mean Square (RMS)Value of an Alternating Quantity ,Concept of Phase and Phase Difference , Single-phase AC Circuits, Behavior of R, L, and C in AC Circuits, L–R Series Circuit ,R–C Series Circuit, R–L–C Series Circuit ,AC Parallel Circuits, AC Series—Parallel Circuits

UNIT-III

Semiconductor Devices and circuits

Introduction, Intrinsic and Extrinsic Semiconductors, Fermi level, The p–n Junction, Biasing of p–n Junction , Volt-ampere Characteristic of a Diode, An Ideal Diode, Diode Resistance, Diode Parameters and Diode Ratings, Zener Diode , Zener Diode As Voltage Regulator

UNIT-IV

Transistors

Construction and working of Bipolar Junction Transistor, Transistor current components, Transistor Configurations, Input and Output characteristics of Transistor in CB,CE,CC Configurations, Transistor As an Amplifier , Field Effect Transistors: Junction Field Effect Transistor ,Characteristics of JFET, MOSFET : The Enhancement MOSFET (EMOSFET), The Depletion MOSFET , Characteristics of EMOSFET and DMOSFET

Rectifiers and Filter

Introduction, Analysis of Half-wave Rectifier, center tapped Full wave Rectifier, Bridge Rectifier ,Analysis of Full-wave Rectifier , Comparison of Half-wave and Full-wave Rectifiers ,half wave rectifier with capacitive Filter

Text Books :	"Basic Electrical and Electronics Engineering", S.K. Bhattacharya, Pearson Publications
References :	[1] "Basic Electrical, Electronics and Computer Engineering", Muthusubramanian R, Salivahanan S and Muraleedharan K A, Tata McGraw Hill, Second Edition, (2006). [2]. "Basics of Electrical and Electronics Engineering", Nagsarkar T K and Sukhija M S, Oxford press University Press.

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BAPATLA ENGINEERING COLLEGE:: BAPATLA

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAMMING Using C

I B.Tech. I Semester (Code:24EC104)

Lectures	:	3 Hours/Week	Tutorial	:	0 Hour/Week	Practical	:	0
CIE Marks	:	40	SEE Marks	:	60	Credits	:	3

Pre-Requisite: None

Course Objectives: Students will learn how to

➢	Understand basic concepts of C-Programming such as: C-tokens, Operators, Input/ output, and Arithmetic rules.
➢	Develop problem solving skills to translate "English" described problems into Programs written using C language
➢	Apply pointers for parameter passing, referencing and differencing and linking data structures
➢	Manipulate variables and types to change the problem state, including numeric, character, array and pointer types, as well as the use of structures and

Course Outcomes: After studying this course, the students will be able to

CO1	Formulate simple algorithms for arithmetic and logical problems and rememberthe basics of computer fundamentals of computer history.
CO2	Translate the algorithms to programs also to test and execute the programs and correct syntax and logical errors and implementing conditional branching, iterationand recursion.
CO3	Analyze the problem for its decomposition into functions.
CO4	Understand the file handling and dynamic memory allocation using c programming language.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3													
CO2	3	3													
CO3	3	3													
CO4	3	3													
AVG	3	3													

UNIT-1 (12 Hours)

Introduction to C: Overview of C, Constants, Variables and Data Types, Operators and Expressions, Managing I/O Operations. Decision Making and Branching.

Programming Exercises for Unit- I: C-expressions for algebraic expressions, evaluation of arithmetic and Boolean expressions. Syntactic and logical errors in a given program, output of a given program, values of variables at the end of execution of a program fragment, Programs using Scientific and Engineering formulae. Finding the largest of the three given numbers.

Computation of discount amount on different types of products with different

discount percentages. Finding the class of an input character, finding the type of triangle formed with the given sides, computation of income-tax, finding given year is leap year or not, and conversion of lower case character to its uppercase.	
UNIT-2	(12 Hours)
Decision Making and Looping, Arrays, Character Arrays and Strings. **Programming Exercises for Unit-II:** To print the sum of the digits of a given number and to display the image of a given number. To find whether a given number is prime, printing Fibonacci sequence and to find prime factors of a given number. To print graphic patterns of symbols and numbers. To find the length of a string, compare strings, reverse a string, copy a string and to find whether the given string is palindrome or not with and without using String Handling Functions. Transpose of a matrix and sorting of names using arrays.	
UNIT-3	(12 Hours)
User-defined Functions, Structures and Unions, Pointers **Programming Exercises for Unit -III:** Functions-Recursive functions to find factorial & GCD (Greatest Common Divisor), string operations using pointers and pointer arithmetic. Swapping two variable values. Sorting a list of student records on register number using array of pointers.	
UNIT-4	(12 Hours)
File Management in C, Dynamic Memory Allocation, Preprocessor **Programming Exercises for Unit - IV**: Operations on complex numbers, and to read an input file of marks and generate a result file, sorting a list of names using command line arguments. Copy the contents of one file to another file. Allocating memory to variables dynamically.	
Text Books :	1. "Programming in ANSIC" by E. Balaguruswamy, Fifth Edition, McGraw Hill Education India. 2. "Let us C" by Yashavant P.Kanetkar, 14th Edition, BPB Publications.
References :	1. Kernighan BW and Dennis Ritchie M, "C programming language", 2nd edition, Prentice Hall. 2. Herbert Schildt, "C:The Complete Reference",4thedition,Tata Mcgraw-Hill. 3. Ashok N.Kamthane,"Programming in C", PEARSON 2nd Edition.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CIRCUIT THEORY

I B. Tech. – I Semester (Code: 24EC105)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: Basics of Mathematics, Physics and Chemistry

Course Objectives: Students will be able

- Learn basics of circuit analysis-KVL, KCL, Mesh analysis and Nodal Analysis
- Learn basics of circuit analysis using star and delta models
- Analyze dc/ac electric circuits and important theorems of circuit analysis
- Illustrate the transient response of source free and driven RL, RC circuits

Course Outcomes: At the end of this course, Students will be able to

CO1	Solve various DC circuits by applying network reduction & analysis techniques
CO2	Apply Nodal and Mesh Analysis techniques to analyze electrical circuits.
CO3	Analyze circuits using network theorems.
CO4	Analyze RL and RC circuits, including the transient response, to understand their time-dependent behavior and responses under different driving conditions.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-	2	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	2	-	-

UNIT-I

VOLTAGE AND CURRENT LAWS: Introduction, nodes, paths, loops and branches, Kirchhoff's current and voltage laws, series and parallel connection of resistors, capacitors & inductors, source transformations, voltage and current division.

UNIT-II

BASIC NODAL AND MESH ANALYSIS: Nodal analysis, the super node, Mesh analysis, and The super mesh, A comparison of Nodal vs. Mesh analysis, Super Node vs. Super Mesh.

UNIT-III

NETWORK THEOREMS: superposition, Thevenin and Norton equivalent circuits, maximum power transfer Theorem, Reciprocity Theorem, and delta-wye conversion.

UNIT-IV

BASIC RL AND RC CIRCUITS: The source free RL circuit, properties of the exponential response, the source free RC circuit, driven RL circuits, natural and forced response, driven RC circuits.

Text Books :	1. William H. Hayt, Jack E. Kemmerly and Steven M. Durbin, Engineering Circuit Analysis, 8th Edition,TMH, 2012. 2. C K Alexander and M. N. O. Sadiku, Electric Circuits, McGraw Hill Education, 5th Edition, 2016.
References :	1. Abhijit chakrabarti, Circuit theory analysis and synthesis, Dhanapatrai & co (p) Ltd, 2018. 2. A Sudhakar and Shyam Mohan SP, Circuits and Networks: Analysis and Synthesis, 4th Edition, TMH, 2010. 3. A Edminister, Electric circuits, Schaum outline series, 7th Edition, McGraw Hill, 2017. 4. M E Vanvalkenburg, Network Analysis, 3rd Edition, PHI, 2006. 5. C L Wadhwa, Network analysis and synthesis, New Age International, 2nd Edition, 2006.
NPTEL Course Links:	1. NPTEL :: Electrical Engineering - NOC:Network Analysis, https://nptel.ac.in/courses/108/105/108105159 2. NPTEL :: Electrical Engineering - NOC:Basic Electric Circuits, https://nptel.ac.in/courses/108/104/108104139/ 3. NPTEL :: Electrical Engineering - NOC:Basic Electrical Circuits, https://nptel.ac.in/courses/108/106/108106172/

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION

ENGINEERING CHEMISTRY LAB I B. Tech. – Semester-I (Code: 24ECL101)							
Lectures	0	Tutorial	0	Practical	2	Credits	1
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: None.

Course Objectives: Students will be able

- To familiarize students with practical chemical analysis techniques for determining key water quality parameters.
- To provide hands-on experience in performing volumetric and instrumental titrations to understand their chemical principles and applications.
- To develop proficiency in using laboratory equipment, following safety protocols, and accurately conducting experiments.
- To teach students the synthesis of common organic compounds and their characterization techniques.

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

CO-1	Determine water quality parameters such as alkalinity and hardness.
CO-2	Conduct volumetric titrations to estimate the concentration of chemical substances.
CO-3	Apply instrumental methods such as pH metry and conductometry for titration experiments and colorimetry for verification of Beers law.
CO-4	Synthesize and characterize common organic compounds like soap, resins, and aspirin.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

CO	**POs**												**PSO's**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	1	2	3
CO-1	3	3	2	3		3						2			
CO-2	3	3	2	2		3						2			
CO-3	3	3	2	3	3							2			
CO-4	2			3		2									

LIST OF EXPERIMENTS

1. Determination of Alkalinity of Tap water.
2. Determination of Total Hardness of ground water sample by EDTA method
3. Estimation of Mohr's salt by Permanganometry.
4. Estimation of Active Chlorine Content in Bleaching Powder
5. pH metric titration between strong acid and strong base.

6. Conductometric Titrations between Strong acid and strong base. 7. Verification of Beers Law using potassium permanganate by colorimetry. 8. Preparation of Soap. 9. Preparation of Urea-formaldehyde resin 10. Preparation of Aspirin.	
Text Books :	1. Practical Engineering Chemistry by K.Mukkanti, Etal, B.S. Publicaitons, Hyderabad, 2009. 2. Inorganic quantitative analysis, Vogel, 5th edition, Longman group Ltd. London, 1979.
References :	1. Text Book of engineering chemistry by R.n. Goyal and HarrmendraGoel. 2. A text book on experiments and calculations- Engineering Chemistry. S.S. Dara. 3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Fundamentals Of Electrical and Electronics Engineering Lab
I B. Tech. I Semester (24ECL102)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: None.

Course Objectives:

- Experiments like CRO, Function generator, RPS and multimeter give knowledge about their applications in electronic devices and circuits .
- The verification of KCL, KVL and theorems make the student to understand how currents and voltages can be found in circuits.
- The experiments like PN diode, Zener diode, CE characteristics provide the thorough understanding of fundamental Electronic devices useful in Engineering and Industrial applications.
- Utilization of diodes as rectifiers can be understood in half wave and full wave rectifiers.

Course Outcomes: At the end of this course, Students will be able to

CO1	Acknowledge the importance of CRO,Function Generator, RPS and multimeter in analyzing electronic devices and circuits
CO2	Analyze Kirchhoff voltage & current laws and verify circuit theorems
CO3	Get hands-on experience upon electronic devices like PN diode, Zener diode, BJT and their applications
CO4	To apply the usage of diode as half wave and full wave rectifiers

	POs												PSOs		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	2			3					3				3		
CO2		2		3					3				3		
CO3	2			3					3				3		
CO4		3		3					3				3		
AVG	2	2.5		3					3				3		

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

LIST OF EXPERIMENTS

1. Identification and testing of various circuit elements (R, L, C, diode, transistor).
2. Study of CRO and Function Generator.
3. Frequency and Amplitude Measurement Using CRO
4. Study of RPS, Bread Board and Multimeter.
5. Verification of KCL and KVL
6. Verification of Thevenin 's Theorem
7. Verification of Norton's Theorem
8. Verification of Maximum Power Transfer Theorem
9. Verification of Super Position Theorem
10. V-I characteristics of PN Diode.
11. V-I characteristics of Zener Diode
12. Characteristics of BJT in Common Emitter configuration
13. Verification of output waveforms of Half wave rectifier
14. Verification of output waveforms of Full wave rectifier

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Note: A minimum of **ten (10 no.)** experiments to be done and recorded

Text Book :	Fundamentals of Electrical and Electronics Engineering laboratory Manual .

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAMMING USING C LAB
I B.Tech. I Semester (Code:24ECL103)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Evaluation		40		Semester End Examination		60	

Pre-Requisite: None.

Course Objectives: Students will be able to

➢	Understand basic concepts of C Programming such as: C-tokens, Operators, Input/output, Arithmetic rules.
➢	Develop problem solving skills to translate "English" described problems into Programs written using C language
➢	Apply pointers for parameter passing, referencing and differencing and linking data structures.
➢	Manipulate variables and types to change the problem state, including numeric, character, array and pointer types, as well as the use of structures and unions, File

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

CO1	Address the challenge, pick and analyze the appropriate data representation formats and algorithms.
CO2	Choose the best programming construct for the job at hand by comparing it to other structures and considering their constraints.
CO3	Develop the program on a computer, edit, compile, debug, correct, recompile and run it.
CO4	Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3			3										
CO2		2	3		3										
CO3		2	3		3										
CO4		3	2		3										
AVG	3	2.5	2.67		3										

LIST OF EXPERIMENTS — 36 Hours

1. A program for electricity bill taking different categories of users, different slabs in each category. (Using nested if else statement).

Domestic Customer		
Consumption Units	**Consumption Units**	
0 – 200	0.50 per unit	
201 – 400	100 plus	0.65 per unit
401 – 600	230 plus	0.80 per unit
601 and above	390 plus	1.00 per unit

Domestic Customer		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 50	0.50 per unit	
100 – 200	50 plus	0.60 per unit
201 – 300	100 plus	0.70 per unit
301 and above	200 plus	1.0 per unit

2. Write a C program to evaluate the following (using loops):
   a) $1 + x^2/2! + x^4 / 4!+$ …upto ten terms
   b) $x + x^3/3! + x^5/5!+$ … upto 7 digit accuracy
3. Write a C program to check whether the given number is
   a) Prime or not.
   b) Perfect or Abundant or Deficient.
4. Write a C program to display statistical parameters (using one – dimensional array).
   a) Mean b) Mode c) Median d) Variance.
5. Write a C program to read a list of numbers and perform the following operations
   a) Print the list. b)Delete duplicates from the list. c)Reverse the list.
6. Write a C program to read a list of numbers and search for a given number using Binary search algorithm and if found display its index otherwise display the message "Element not found in the List".
7. Write a C program to read two matrices and compute their sum and product.
8. A menu driven program with options (using array of character pointers).
   a) To insert a student name
   b) To delete astudent name
   c) To print the names of students
9. Write a C program to read list of student names and perform the following operations
   a) To print the list of names.
   b) To sort them in ascending order.
   c) To print the list after sorting.
10. Write a C program that consists of recursive functions to
    a) Find factorial of a given number
    b) Solve towers of Hanoi with three towers (A, B & C) and three disks initially on tower A.
11. A Bookshop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book the sales person inputs the title and the author, and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed, if it is, then the system displays the book details and request for the number of copies required, if the requested copies are available the total cost of the requested copies is displayed otherwise the message "required copies not in stock" is displayed. Write a program for the above in structures with suitable functions.
12. Write a C program to read a data file of students' records with fields (Regno, Name, M1,M2,M3,M4,M5) and write the successful students data (percentage > 40%) to a data file.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

IT Workshop

B.Tech – I Semester (24ECL104)

Common to all Branches

Lectures	0	Tutorial	0	Practical	2	Credits	1
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: None.

Course Objectives: Students will be able

- Introduce the internal parts of a computer, peripherals, and I/O ports.
- Demonstrate configuring the system with Windows Operating System and other Application Software's.
- Introduce Office tools such as Word processors, Excel and Presentation tools.
- Demonstrate AI tools such as ChatGPT, Dialogflow.

Course Outcomes: At the end of this course, Students will be able to

CO1	Explore computer system peripherals and components of a mother board.
CO2	Evaluate computer system architectures.
CO3	Troubleshoot a computer system
CO4	Prepare a PPT, Certificate and Calculate GPA.
CO5	Generate a report using Mail merge.
CO6	Implement AI Solutions in their respective engineering branches.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	POs												PSOs		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	2	-	-	-	-	-	-	-	3	2	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	3	2	-	-	-	-	-
CO3	2	2	2	2	2	-	-	-	3	2	-	-	-	-	-
CO4	3	3	3	2	3	-	-	-	3	2	-	-	-	-	-
CO5	3	2	2	2	2	-	-	-	3	2	-	-	-	-	-
CO6	3	3	3	2	3	-	-	-	3	2	-	-	-	-	-

LIST OF EXPERIMENTS

1. Explore Peripherals of a Computer, Components of a motherboard and its functions.
2. Install and Uninstall System and Application software on a Computer.
3. Disassemble and Assemble the PC.
4. Troubleshoot a computer.
5. Prepare the following using MS office:
   i) PPT using MS-Power Point.
   ii) Design a Project Certificate and Newsletter using MS-Word
6. Implement the following using Excel:
   i) Create an Excel Work sheet for the six subjects and calculate Total, Average, Grade and Rank.
   ii) Merge the contents of two excel sheets using VLOOKUP and sort them.
7. Generating reports using Mail Merge.
8. Prepare a report using Latex or equivalent (FOSS) tool word as word Processors.
9. Prompt Engineering in Chat GPT.
10. Develop a simple AI Chatbot.

References:

1. "IT Essentials PC Hardware and Software Companion Guide", by David Anfinson and Ken Quamme, Third edition, CISCO Press, Pearson Education, 2008, ISBN: 978-1-58713-199-8.
2. "LaTeX Companion" by Frank MittelBach, Ulrike Fischer, Third Edition, Addison-Wesley Professional, 2023. ISBN: 978-0138166489.
3. "ChatGPT: Comprehensive Study On Generative AI Tool " by Midhun Moorthi C, Dr. K. Vimala Devi, Dr. V. Manjula, Tareek Pattewar, First Edition, AG Publishing House,2023, ISBN: 978-81-19338-79-5

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

NUMERICAL METHODS AND ADVANCED CALCULUS

I B. Tech. – II Semester (Code:24EC201)

Lectures	2	Tutorial	1	Practical	0	Credits	3
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: None.

Course Objectives:

- Solve algebraic, transcendental and system of linear equations with the help of numerical methods.
- Apply the techniques of numerical integration whenever and wherever routine methods are not applicable and solve the first order ordinary differential equations numerically with the given initial condition using different methods.
- Evaluate double and triple integrals and apply them to find areas and volumes.
- Evaluate the line, surface and volume integrals and learn their inter-relations andapplications.

Course Outcomes: At the end of this course, Students will be able to

CO1	Solve non-linear equations and system of linear equations with the help of Numericaltechniques.
CO2	Solve the first order ordinary differential equations numerically with the given initialcondition.
CO3	Find the area and volume of plane and three dimensional figures using multipleintegrals.
CO4	Apply vector integral theorems to obtain the solutions of engineering problemsinvolving circulation, flux, and divergence in vector fields.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	POs												PSOs		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-

UNIT-I

Numerical Solution of Equations: Introduction; Solution of algebraic and transcendental equations: Bisection method, Method of false position, Newton-Raphson method; Useful deductions from the Newton-Raphson formula; Solution of linear simultaneous equations; Direct methods of solution: Gauss-Jordan method, Factorization method; Iterative methods of solution: Jacobi's iteration method, Gauss-Seidel iteration method.

[Sections: 28.1; 28.2; 28.3; 28.5; 28.6.2, 28.6.3; 28.7.1; 28.7.2].

UNIT-II
Finite differences and Interpolation: Finite differences: Forward differences, Backward differences; Newton's interpolation formulae: Newton's forward interpolation formula; Newton'sbackward interpolation formula; Interpolation with unequal intervals; Lagrange's interpolation formula; Divided differences; Newton's divided difference formula; Numerical integration; Trapezoidal rule; Simpson's one-third rule; Simpson's three-eighth rule; **Numerical solution of ODE's**: Introduction; Euler's method; Runge-Kutta method. [Sections: 29.1.1; 29.1.2; 29.6; 29.9; 29.10; 29.11; 29.12; 30.4; 30.6; 30.7; 30.8; 32.1; 32.4; 32.7].
UNIT-III
Multiple Integrals: Double integrals; Change of order of integration; Double integrals in polar coordinates; Area enclosed by plane curves; Triple integrals; Volumes of solids: Volume as Triple integral, Change of variables: For triple integrals. [Sections: 7.1; 7.2; 7.3; 7.4; 7.5; 7.6.2; 7.7.2].
UNIT-IV
Vector calculus and its Applications: Scalar and vector point functions; Del applied to scalar point functions-Gradient: Definition, Directional derivative; Del applied to vector point functions: Divergence, Curl; Line integral; Surfaces: Surface integral, Flux across a surface; Green's theorem in the plane (without proof); Stokes theorem (without proof); Gauss Divergence theorem (without proof). [Sections: 8.4; 8.5.1; 8.5.3; 8.6; 8.11; 8.12.2; 8.12.3; 8.13; 8.14; 8.16]

Text Books :	B.S.Grewal, "Higher Engineering Mathematics", 44th edition, Khanna publishers,2017.
References :	[1] Erwin Kreyszig, "Advanced Engineering Mathematics", 9th edition, JohnWiley & Sons. [2] N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" LaxmiPublications, 2010.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SEMICONDUCTOR PHYSICS AND NANOMATERIALS

I B. Tech.

Common to CS,CM,CB,DS,EC,IT

Code: 24EC202

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: None.

Course Objectives:

- This unit aim to build the interest on the concept of quantum mechanics and its importance to solve and evaluate the properties of materials (conductors and semiconductors).
- This unit provides various types of properties of semiconductor materials and their importance in various device fabrications.
- This unit aim to educate the student on various opto-electronic devices and theirapplications.
- This unit provide information about the principles of processing, manufacturing and characterization of nano materials, nanostructures and their applications.

Course Outcomes: At the end of this course, Students will be able to

CO1	Understand concepts of quantum mechanics and its applications to explain material properties.
CO2	Know the concept of Fermi level and various semiconductor junctions.
CO3	Familiar with working principles of various Opto-electronic devices and their applications.
CO4	Understand importance of Nano-materials and their characteristic properties.

Mapping of Course Outcomes with Program Outcomes

	POs											
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	3	-	-	-	-	-	-	-	-	-	2
CO2	3	3	2	-	-	-	-	-	-	-	-	2
CO3	3	3	2	-	-	-	-	-	-	-	-	2
CO4	3	3	3	-	-	-	-	-	-	-	-	2

UNIT-I
QUANTUM MECHANICS AND APPLICATIONS: Schrodinger time independent wave equation, Applications: Particle in one dimensional box, Quantum Tunneling, Scanning Tunneling Microscope, Somerfield free electron theory: conductivity of metals and concept of Fermi level, Failure of quantum free electron theory (Qualitative), Band theory of solids (Kronig –Penny model), E-K diagrams, Effective mass, Concept of hole, Types of Electronic materials: Metals, Semiconductors and Insulators
UNIT-II
SEMICONDUCTORS AND PROPERTIES: Introduction to semiconductors, intrinsic and extrinsic semiconductors, Direct and Indirect band gap semiconductors. Density of states, C arrier concentration equations, Fermi level and temperature dependence, Drift and Diffusion currents, Continuity equation, P-N junction diode (V-I characteristics).
UNIT-III
OPTO-ELECTRONIC DEVICES AND DISPLAY DEVICES: Principle and working of LED, Semiconducting laser (Laser diode), Photo detectors: Photo diode, PIN & APD Diode, Applications of Photo detectors, Photo voltaic effect, Solar cell, Efficiency of solar cell and applications, Types of liquid crystals, Liquid crystal display(LCD), Opto electric effect(Kerr effect), Magneto optic effect (Faraday Effect).
UNIT-IV
NANO MATERIALS: Introduction to nano technology, Quantum confinement, Surface to volume ratio, Properties of nano materials, Synthesis of nano-materials: CVD, Sol-gel methods, Laser ablation. Carbonnano tubes: Types, Properties, Applications. Characterization of Nano materials: XRD, SEM, Applications of Nano materials.

Text Books :	1. A text book of engineering physics by Avadhanulu and Kshirsagar S.Chand & Co. (2013) 2. Applied physics by Dr.P. Srinivasa Rao. Dr.K. Muralidhar
References :	1. Text book on Nanoscience and Nanotechnology (2013): B.S. Murty, P. Shankar, Baldev Raj, B.B. Rath and J. Murday, Springer Science & Business Media. 2. Opto electronics by T. Wilson, J.F.Hawkes, PHI

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Communicative English							
I B. Tech. – II Semester (Code: 24EC203)							
Lectures	2	Tutorial	0	Practical	0	Credits	2
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: None.

Course Objectives:

- To enhance the vocabulary competency of the students
- To enable the students to demonstrate proficiency in the use of written English, including Proper spelling, grammar, and punctuation
- To enhance theoretical and conceptual understanding of the elements of grammar
- Understand and apply the conventions of academic writing in English

Course Outcomes: At the end of this course, Students will be able to

CO1	Understand how to build academic vocabulary to enrich their writing skills
CO2	Produce accurate grammatical sentences
CO3	Analyse the content of the text in writing
CO4	Produce coherent and unified paragraphs with adequate support and detail

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	POs												**PSOs**		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	-	-	-	-	-	-	-	2	2	3	2	2	-	-	-
CO2	-	-	-	-	-	-	-	2	2	3	2	2	-	-	-
CO3	-	-	-	-	-	-	-	2	2	3	2	2	-	-	-
CO4	-	-	-	-	-	-	-	2	2	3	2	2	-	-	-

UNIT-I

1.1 **Vocabulary Development:** Word formation-Formation of Nouns, Verbs & Adjectives from Root words-Suffixes and Prefixes

1.2 **Essential Grammar:** Prepositions, Articles

1.3 **Basic Writing Skills:** Punctuation in writing

1.4 **Writing Practices:** Mind Mapping, Paragraph writing (structure-Descriptive, Narrative, Expository & Persuasive)

UNIT-II

2.1 **Vocabulary Development:** Synonyms and Antonyms

2.2 **Essential Grammar:** Concord, Conjunctions, Common Errors: Practice

2.3 **Basic Writing Skills**: Coherence in Writing: Jumbled Sentences

2.4 **Writing Practices**: Letter writing

UNIT-III

3.1 **Vocabulary Development:** One word Substitutes

3.2 **Essential Grammar:**Tenses, Modal Verbs, Voices

3.3 **Basic Writing Skills:** Using Phrases and clauses 3.4 **Writing Practices:** Note Making	
UNIT-IV	
4.1 **Vocabulary Development**: Words often confused 4.2 **Essential Grammar**: Reported speech, Common Errors: Practice 4.3 **Basic Writing Skills**: Sentence structures (Simple, Complex & Compound) 4.4 **Writing Practices**: Paraphrasing &Summarizing, Essay Writing	
Text Books :	1. Communication Skills, Sanjay Kumar & Pushpa Latha. Oxford University Press: 2011. 2. Practical English Usage, Michael Swan. Oxford University Press: 1995. 3. Remedial English Grammar, F.T.Wood. Macmillan: 2007. 4. Study Writing, Liz Hamplyons & Ben Heasley. Cambridge University Press:2006

BAPATLA ENGINEERING COLLEGE:: BAPATLA

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAMMING USING C++

I B. Tech. – II Semester (Code: 24EC204)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation		40		Semester End Examination		60	

Pre-Requisite: C Language

Course Objectives: Students will learn how to

➢	Develop a greater understanding of the issues involved in programming language design and implementation
➢	Develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.
➢	Implement several programs in languages other than the one emphasized in the core curriculum (C++).
➢	Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing.

Course Outcomes: After studying this course, the students will be able to

CO1	Learn the features of C++ supporting object oriented programming.
CO2	Understand the relative merits of C++ as an object oriented programming language.
CO3	Apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism.
CO4	Analyze advanced features of C++ specifically stream I/O, templates and operator over loading.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3														
CO2	3	2													
CO3	3	2													
CO4	2	3													
AVG	2.67	2.33													

UNIT-1 (12 Hours)

Introduction: Basic concepts of OOP, benefits and applications of OOP, what is C++, applications of C++, C++ statements, structure of a C++ program, creating the source file, compiling and linking. C++ tokens, keywords, identifiers and constants, data types in C++, operators in C++,symbolic constants, type compatibility, declaration of variables, dynamic initialization of variables, reference variables, scope resolution operator, member dereferencing operator, memory management operator, type cast operator, expressions and their types, special assignment expressions, implicit conversions, operator overloading, operator precedence, control structures. C++ streams and stream classes, unformatted I/O operations, formatted I/O operations, managing output with manipulators

UNIT-2	(12 Hours)
Functions in C++: main function, function prototyping, call by reference, return by reference, inline functions, default arguments, const arguments, function overloading, friend and virtual functions. **Classes and objects:** specifying a class, defining member functions, nesting member functions, private member functions, static data members and member functions, arrays of objects, objects as function arguments, returning objects, local classes.	
UNIT-3	(12 Hours)
Constructors and Destructors: constructors, parameterized constructors, multiple constructors in a class, constructors with default arguments, dynamic initialization of objects, Copy constructor, dynamic constructor, const objects, and destructors. Defining Operator Overloading, overloading unary and binary operators, overloading binary operators using friends, rules for operator overloading, manipulation of strings using operators.	
UNIT-4	(12 Hours)
Pointers: pointers to objects, this pointer, pointers to derived classes, pure virtual functions. **Inheritance:** single inheritance, making a private member inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance, virtual base classes, abstract classes	
Text Books :	1. Object oriented programming with C++, Balagurusamy, 4th edition, Tata McGraw-Hill publications, 2008. 2. Object oriented programming with ANSI and turbo C++, Ashok N. Kamthane, Pearson Education, 2005.
References :	1. C++ programming language by Bjarne Stroustup, 3rd edition, Pearson education, 2009.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ENGINEERING GRAPHICS

I B.Tech – II Semester (Code:24ECL201)

Lectures	1	Tutorial	0	Practical	3	Credits	2.5
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: None.

Course Objectives:

- Clear picture about the importance of engineering graphics in the field of engineering
- The drawing skills and impart students to follow Bureau of Indian Standards
- To give an idea about Geometric constructions and orthographic projections
- Imagination skills about orientation of points, surfaces and solids
- Basic drafting skills of AutoCAD

Course Outcomes: At the end of this course, Students will be able to

CO1	Draw projections of points and projections of lines using Auto CAD
CO2	Plot projections of surfaces like circle, pentagon, hexagon and rhombus
CO3	Plot the Projections of solids like Prisms and pyramids
CO4	Convert the Isometric views into Orthographic views for simple objects.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	POs												PSOs		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	1	2	1										1	1	2
CO2	3	2	1										2	3	2
CO3	1	2	3										1	3	2
CO4	1	2	1										1	2	3

LIST OF EXPERIMENTS

UNIT-I

INTRODUCTION: Introduction to Engineering drawing, geometrical constructions.

INTRODUCTION TO AUTOCAD: Advantages of AutoCAD over manual drafting, Basics of sheet selection, Draw tools, Modify tools, Dimensioning.

METHOD OF PROJECTIONS: Principles of projection, First angle and third angle projections, projections of points, projections of straight lines inclined to one plane only.

UNIT-II

PROJECTIONS OF PLANES: Projections of plane figures: circle, triangle, pentagon, hexagon and rhombus.

UNIT-III

PROJECTIONS OF SOLIDS: Projections of solids like square, pentagonal, hexagonal prisms and pyramids, axis inclined to one plane only.

UNIT-IV

ORTHOGRAPHIC PROJECTIONS: Conversion of pictorial views into Orthographic views. (Treatment is limited to simple castings only).

Text Books :	1. Engineering Drawing with AutoCAD by Dhananjay M. Kulkarni, Revised publication), 2018. 2. Engineering Drawing by N.D. Bhatt & V.M. Panchal, 43rd Edition,(Charotar Publishing House, Anand). (First angle projection) 2014.
References :	1. Engineering Drawing by Dhananjay A Jolhe, Revised Edition, Tata McGraw hill publishers,20219.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ENGIINEERING MECHANICS & SURVEYING LAB

I B.Tech – II Semester (Code: 24ECL202)

Lectures	1	Tutorial	0	Practical	2	Credits	2
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: Basics of Mathematics & Physics

Course Objectives:

1.	The course aims to equip students with the fundamental principles and techniques necessary to solve problems related to forces and supports in engineering mechanics.
2.	The course is designed to provide students with a thorough understanding of frictional forces and their applications in engineering mechanics.
3.	The course is designed to provide students with the essential skills and knowledge to analyze truss structures.
4.	The course aims to provide students with a deep understanding of rotational dynamics and the principles governing the motion of rigid bodies.
5.	The course aims to provide students with the fundamental skills and techniques required for various surveying methods in civil engineering.

Course Outcomes: At the end of this course, Students will be able to

CO1	Utilize the Parallelogram Law, Triangle Law, and Polygon Law to determine the resultant of concurrent forces. Apply Varignon's Principle to find the magnitude and position of the resultant force in a system. Calculate support reactions for beams subjected to transverse loads using principles of equilibrium. Calculate the geometric center (centroid) of various lamina shapes through integration and composite area methods.
CO2	Determine the coefficient of static friction between a block and a rough surface under horizontal force. Calculate the angle of inclination at which a block just starts to slide down an inclined plane.
CO3	Determine the axial forces in truss members using the method of joints.
CO4	Experimentally determine and verify the angular acceleration of a rolling disc on an inclined plane. Calculate the moment of inertia of a flywheel through experimental procedures.
CO5	Perform a cross-staff survey to determine the area of a plot. Determine the elevation difference between two points and the height of the ceiling of a building using leveling techniques. Determine the horizontal distance between inaccessible points and the height of an object using a theodolite.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	POs												**PSOs**			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**
CO1	3	3	-	2	-	-	-	-	-	1	-	2	3	3	3	3
CO2	3	3	-	2	-	-	-	-	-	1	-	2	3	3	3	3

CO3	3	3	-	2	-	-	-	-	-	1	-	2	3	3	3	3
CO4	3	3	-	2	-	-	-	-	-	1	-	2	3	3	3	3

LIST OF EXPERIMENTS

FORCE SYSTEM	
Force – characteristics of force – system of forces – moment of a force - laws of forces – supports and their reactions, Centroid – determination of centroid for plane figures. (2)	
List of Experiments	
1.	Determination of the magnitude of the resultant force using a) Parallelogram law and b) Triangle law c) Polygon law
2.	Determination of the magnitude of the resultant force using Varignon's principle.
3.	Determination of the support reactions for a beam subjected to transverse loads.
4.	Determination of the geometric center of different lamina.
FRICTION	
Friction – laws of friction – coefficient of friction – angle of repose. (2)	
List of Experiments	
5.	Determination of the coefficient of static friction between the block and rough surface when the block is subjected to horizontal force.
6.	Determination of the angle of inclination at which a block just starts to slide down an inclined plane.
ANALYSIS OF TRUSS	
Truss – Method of analysis. (2)	
List of experiments	
7.	Determination of the axial forces in the truss members.
MASS MOMENT OF INERTRIA & ROTATION OF A RIGID BODY ABOUT A FIXED AXIS	
Area moment of inertia – mass moment of inertia – Relation between mass and area moment of inertia, Kinematics of rotation – Equation of motion for a rigid body rotating about a fixed axis – D'Alembert's principle. (3)	
List of experiments	
8.	Verification of angular acceleration of a rolling disc on an inclined plane.
9.	Determination of the moment of inertia of flywheel.
SURVEYING	
Surveying – principles of surveying – chain surveying – theodolite surveying – leveling. (5)	

List of experiments	
10.	Determination of the area of a plot using cross - staff survey.
11.	Determination of the elevation difference between two points using leveling and height of ceiling of a building.
12.	Determination of the horizontal distance between inaccessible points using theodolite.
13.	Determination of the height of an object using theodolite.

Note: A minimum of Ten (10 No) shall be done and recorded

Text Books :	1. Engineering mechanics by S. Timoshenko and D. H. Young – Mc Graw-Hill International edition (For concepts and symbolic problems) 2. Surveying Volume I by Dr K.R.Arora.
References :	1. Engineering mechanics statics and dynamics by A. K. Tayal – Umesh publication, Delhi (For numerical problems using S.I. system of units 2. Surveying Volume I by B.C.Punmia

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SEMICONDUCTOR PHYSICS LAB (Code:24ECL203)

I B.Tech

Lectures	0	Tutorial	0	Practical	2	Credits	1
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: None.

Course Objectives:

- Basic experiments such as Magnetic Field Measurements, Hall Effect and LCR resonance give the knowledge to apply them in magnetic applications and circuits design.
- The measurements relating to various physical parameters of materials make the student to understand their utility, design and fabrication of several devices.
- The experiments like CRO, Solar Cell, Photo cell provides the thorough understanding of Opto Electronic devices useful in Engineering and Industrial applications.
- Utilization of the principles of light such as interference and diffraction to measure wavelength and radius of curvature of Lenses.

Course Outcomes: At the end of this course, Students will be able to

CO1	Acknowledge the important aspects of earth magnetic field, realize the use of Maxwell's equations in various magnetic applications
CO2	Realization of material properties and parameters
CO3	Get hands-on experience in various Opto-electronic devices like CRO, Solar Cell, Photo Cell and their applications
CO4	To apply the phenomenon of interference and LASER principles to find radius of curvature and wavelength respectively by various methods

Mapping of Course Outcomes with Program Outcomes

	POs											
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	3	2	2	-	-	-	-	2	-	-	-
CO2	3	3	2	2	-	-	-	-	2	2	-	-
CO3	3	3	2	2	2	-	-	-	2	-	-	-
CO4	3	2	-	-	-	-	3	-	-	-	-	2

LIST OF EXPERIMENTS

1. Determination of acceleration due to gravity at a place using compound pendulum.
2. To study the variation of intensity of magnetic field along the axis of a circular coil using Stewart-Gee's apparatus.
3. To draw the characteristic curves of P-N Junction diode.
4. Determination of radius of curvature of a Plano convex lens by forming Newton's rings.
5. Determination of wavelengths of mercury spectrum using grating normal incidence method.
6. To draw the characteristic curves of Zener diode.
7. To draw the resonant characteristic curves of L.C.R. series circuit and calculate the Resonant frequency.
8. To draw the characteristic curves of a photocell and calculate the maximum velocity of electron.
9. Verify the laws of transverse vibration of stretched string using Sonometer.
10. Determination of rigidity modulus of the given material of the wire using Torsional pendulum.
11. To draw the load characteristic curves of a solar cell.
12. Determination of Hall coefficient of a semiconductor.
13. Determination of voltage and frequency of an A.C. signal using C.R.O.
14. Determination of Forbidden energy gap of Si &Ge.
15. Determination of wavelength of laser source using Diode laser.
16. To draw the characteristic curves of Photo diode.
17. To draw the Diode valve characteristics.

Any three experiments are virtual

Note: A minimum of **ten (10 no.)** experiments to be done and recorded

Text Books :	Engineering Physics laboratory Manual by P.Sreenivasarao & K.Muralidhar, Himalaya Publications.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

English Communication Skills Lab

I B. Tech. – II Semester (Code: 24ECL204)

Lectures	0	Tutorial	0	Practical	2	Credits	1
Continuous Internal Evaluation			40	Semester End Examination			60

Pre-Requisite: None.

Course Objectives:

- To comprehend the importance, barriers and strategies of listening skills in English.
- To illustrate and impart practice Phonemic symbols, stress and intonation.
- To practice oral skills and receive feedback on learners' performance.
- To practice language in various contexts through pair work, role plays, group work and dialogue conversations

Course Outcomes: At the end of this course, Students will be able to

CO1	Better understand the nuances of English language through audio- visual experience and group activities
CO2	Develop neutralization of accent for intelligibility
CO3	Build confidence to enhance their speaking skills
CO4	Use effective vocabulary both in formal and informal situations

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	POs												PSOs		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	-	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO2	-	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO3	-	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO4	-	-	-	-	-	-	-	-	2	3	-	2	-	-	-

LIST OF EXPERIMENTS

Unit-I

1.1 Introduction to Communication Skills- Importance-Process-Types

1.2 Barriers to Communication & Strategies for effective Communication

1.3 Listening Skills; Importance – Purpose- Process- Types

1.4 Barriers to Listening & Strategies for Effective Listening

Unit-II

2.1 Phonetics; Introduction to Consonant, Vowel and Diphthong sounds

2.2 Syllable & Stress

2.3 Rhythm & Intonation

Unit-III

3.1Interpersonal Communication in English

3.2 Conversational Practice in English

Unit-IV 4.1 JAM Session 4.2 Debates	
Text Books :	1. Communication Skills, Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011 2. Better English Pronunciation, J.D. O' Connor. Cambridge University Press:1984 3. New Interchange (4rth Edition), Jack C Richards. Cambridge University Press:2015 English Conversation Practice, Grant Taylor. McGraw Hill:2001
References (Software) :	1. iTell Orell Digital Lab 2. Buzzers for conversations, New Interchange series

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAMMING USING C++ LAB I B. Tech. – II Semester (Code: 24ECL205)							
Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Evaluation		40		Semester End Examination		60	

Pre-Requisite: None.

Course Objectives: Students will be able to

□	Understand advantages of C++ programming over procedural oriented programming learn the basics of variables, operators, control statements, arrays, classes and objects.
□	Understand, write and implement the following concepts: Inheritance, Interfaces, Packages, Strings and Collections
□	Understand and write programs on Exception Handling, I/O, and Multithreading
□	Understand and implement applications using Applets, AWT, Swings and Events

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

CO1	Understand basics of variables and operators such as variables, conditional and iterative execution methods etc.
CO2	Identify classes, objects, members of a class and relationships among them needed for a specific problem and Write C++ principles and proper program
CO3	Demonstrate the concepts of polymorphism, inheritance, packages and interfaces.
CO4	Write C++ to implement error-handling techniques using exception handling

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												**PSO's**		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3				3										
CO2	3				3										
CO3	3				3										
CO4		2	2		3										
AVG	3	2	2		3										

LIST OF EXPERIMENTS	36 Hours

Write C++ programs to illustrate the concept of the following:

1. Arrays
2. Structures
3. Pointers
4. Objects and Classes
5. Console I/O operations
6. Scope resolution and memory management operators
7. Inheritance

8. Polymorphism
9. Virtual Functions
10. Friend Functions
11. Operator overloading
12. Function overloading
13. Constructors and Destructors
14. This pointer
15. File I/O operations

Note: A minimum of ten programs are to be executed and recorded to attain eligibility for University Practical examination.