



KARPAGAM ACADEMY OF HIGHER EDUCATION
(Deemed to be University Established under Section 3 of UGC Act 1956)
Accredited with A+ Grade by NAAC in the Second cycle

Eachanari, Coimbatore-641 021. INDIA

FACULTY OF ENGINEERING
DEGREE OF BACHELOR OF ENGINEERING / TECHNOLOGY
REGULAR PROGRAMME
REGULATIONS 2022
CHOICE BASED CREDIT SYSTEM

These regulations are effective from the academic year 2022 – 2023 and applicable to the candidates admitted to B. E. / B. Tech. during 2022 - 2023 and onwards.

1. ADMISSION

1.1 Candidates seeking admission to the first semester of the eight semesters B. E./B.Tech Degree Programme:

Should have passed the Higher Secondary Examination (10+2) prescribed by the State Government / Central Government with Mathematics/ Physics/ Chemistry/ Computer Science/ Electronics/ Information Technology/ Biology/ Informatics Practices/ Biotechnology/ Technical Vocational subject/ Agriculture/ Engineering Graphics/ Business Studies/ Entrepreneurship. (Any of the above three subjects) or any similar Examination of any other institution/ University or authority accepted by the Karpagam Academy of Higher Education as equivalent thereto).

Should obtained at least 45% marks (40% marks in case of candidates belonging to reserved category) in the above subjects taken together.

(OR)

Passed min. 3 years Diploma examination with at least 45% marks (40% marks in case of candidates belonging to reserved category) subject to vacancies in the First Year, in case the vacancies at lateral entry are exhausted. (The Universities will offer suitable bridge courses such as Mathematics, Physics, Engineering drawing, etc., for the students coming from diverse backgrounds to achieve desired learning outcomes of the programme)

1.2 Lateral Entry Admission

Candidates who possess Diploma in Engineering / Technology (10+3 or 10+2+2) awarded by the Directorate of Technical Education with passed minimum THREE years / TWO years (Lateral Entry) Diploma examination with at least 45% marks (40% marks in case of candidates belonging to reserved category) in ANY branch of Engineering and Technology are eligible to apply for admission to the third semester of B. E./B. Tech.. Such candidates shall undergo two additional engineering subjects in the 3rd and 4th semester as prescribed by the University.

OR

Passed B.Sc. Degree from a recognized University as defined by UGC, with at least 45% marks (40% marks in case of candidates belonging to reserved category) and passed 10+2 examination with Mathematics as a subject.

OR

Passed D.Voc. Stream in the same or allied sector.

(The Universities will offer suitable bridge courses such as Mathematics, Physics, Engineering drawing, etc., for the students coming from diverse backgrounds to achieve desired learning outcomes of the programme)

Eligibility criteria for admission in the third semester is given in the table below.

S. No.	Program me	Eligibility criteria
1.	B.E Bio Medical Engineering	Passed Minimum THREE years / TWO years (Lateral Entry) Diploma examination with at least 45% marks (40% marks incase of candidates belonging to reserved category) in ANY branch of Engineering and Technology.
2	B. E. Civil Engineering	
3.	B. E. Computer Science and Design	OR Passed B.Sc. Degree from a recognized University as defined by UGC, with at least 45% marks (40% marks in case of candidates belonging to reserved category) and passed 10+2 examination with Mathematics as a subject.
4.	B. E. Computer Science and Engineering	
5.	B. E. Electrical and Electronics Engineering	
6.	B. E. Electronics and Communications Engineering	OR Passed D.Voc. Stream in the same or allied sector. (The Universities will offer suitable bridge courses such as Mathematics, Physics, Engineering drawing, etc., for the students coming from diverse backgrounds to achieve desired learning outcomes of the programme)
7.	B. E. Mechanical Engineering	
8.	B. Tech. Artificial Intelligence and Data Science	
9.	B. Tech Bio - Technology	
10.	B. Tech Food Technology	
11.	B.E Computer Science and Engineering (Cyber Security)	

1.3 Migration from other University

Candidates who have completed their first to sixth semesters of B. E./B. Tech. study in any University are eligible to apply for admission to their next semester of B. E./B. Tech. in the branch corresponding to their branch of study. The student will be exempted from appearing for Examination of the equivalent courses passed in the earlier programme and will have to appear for courses which he/she has not done during the period of his/her earlier programme. Along with the request letter and mark sheets, he/she has to submit a copy of syllabus of the programme duly attested by the Registrar, Competent authority, he/she has undergone. Equivalence Certificate shall be provided by the “Students’ Affairs Committee” of Karpagam Academy of Higher Education.

Students' Affairs Committee comprises all the Heads of the Departments and Dean of the Faculty of Engineering and a nominee of the Registrar.

2 . PROGRAMMES OFFERED

A candidate may undergo a programme in any one of the branches of study approved by the University as given below.

List of B. E. and B. Tech. Degree Programmes

1. B.E Bio Medical Engineering
- 2.B. E. Civil Engineering
- 3.B. E. Computer Science and Design
- 4.B. E. Computer Science and Engineering
- 5.B. E. Electrical and Electronics Engineering
- 6.B. E. Electronics and Communications Engineering
- 7.B. E. Mechanical Engineering
- 8.B.Tech. Artificial Intelligence and Data Science
- 9.B. Tech. Bio-Technology
10. B. Tech Food Technology
11. B.E Computer Science and Engineering (Cyber Security)

3.MODE OF STUDY

3.1 Full-Time:

In this mode of study, the candidates are required to attend classes regularly on the specified working days of the University.

3.2 Conversion from full time mode of study to part time is not permitted.

3.3 Change from one programme to another is not permitted.

4. STRUCTURE OF PROGRAMMES

4.1 Every programme will have a curriculum with syllabus consisting of theory and practical courses such as:

- (i) General core courses comprising Mathematics, Basic Sciences, Engineering Sciences and Humanities.
 - (ii) Core courses of Engineering/Technology.
 - (iii) Elective courses for specialization in related fields.
 - (iv) Workshop practice, computer practice, engineering graphics, laboratory work, in-plant training, seminar presentation, project work, industrial visits, camps, etc.
- Every student is encouraged to participate in at least any one of the following programmes
- NSS / Sports/Physical exercise/NCC/YRC/Red Ribbon club/Environment club and Energy club

- Other Co-Curricular and Extra Curricular activities

(v) Choice Based Credit System

CBCS is introduced for students admitted in the academic year 2017-18. As per AICTE guidelines, CBCS is an approach in which students opt for courses of their choice. CBCS provides greater flexibility with multiple courses and enable students to undergo additional courses. CBCS is applicable to Full Time Undergraduate & Post Graduate Programmes of study. It provides a choice for students to select from the prescribed courses (Professional soft core, Professional Hard core, Professional Electives, Open Electives, Value added courses, Humanity Sciences, Basic sciences & Engineering sciences). A course designated as hard core for a particular programme of study must invariably be completed by the student to receive the degree in the programme. The Hardcore courses cannot be substituted by another courses. Students can exercise their choice among a set of Soft core courses from the list of Soft core courses specified for each Programme of study. The student should meet the criteria for prerequisites to become eligible to register for that course. The student should request for the course for every semester within the first week of semester. Maximum no of students to be registered in each course shall depend on availability of physical facilities, classroom availability and lab capacity. Registration of already requested courses by students in previous semester is not allowed.

4.2 Each course is normally assigned certain number of credits.

No. of credits per lecture period per week	1
No. of credits per tutorial period per week	1
No. of credits for 3 periods of laboratory course per week	2
No. of credits for 3 periods of project work per week	2
No. of credits for 2 periods of Value added course per week	1
No. of credits for 3 weeks of in-plant training during semester vacations	1

4.3 In every semester, the curriculum shall normally have a blend of theory courses not exceeding 6 and practical courses not exceeding 3. However, the total number of courses per semester shall not exceed 8.

4.4 The prescribed credits required for the award of the degree shall be within the limits specified below.

PROGRAMME	PRESCRIBED CREDIT RANGE
B. E./B. Tech.	160– 165

4.5 The medium of instruction for all Courses, Examinations, Seminar presentations and Project/Thesis reports is English.

4.6 Value Added Course

Besides core courses and elective courses, value added course is introduced. The blend of different courses is so designed that the student would be trained not only in his / her relevant professional field but also as a socially conscious human being.

4.7 Evaluation in the courses comprises two parts, one is the Continuous Internal Assessment (CIA) and the other one is the End Semester Examination (ESE). Evaluation in few courses may be by Internal Assessment only.

5. DURATION OF THE PROGRAMME

5.1 The prescribed duration of the programme shall be

Programme	Min. No. of semesters	Max. No. of semesters
B. E./B. Tech. (H. Sc. Candidates)	8	14
B. E./B. Tech. (Lateral Entry Candidates)	6	12

5.2 Each semester shall normally consist of 90 working days or 540 hours.

5.3 Additional classes for improvement, conduct of model test, etc., over and above the specified periods shall be arranged, if required. But for the purpose of calculation of attendance requirement for eligibility to appear for the end semester Examinations (as per Clause 11) by the students, 540 hours conducted within the specified academic schedule alone shall be taken into account and the overall percentage of attendance shall be calculated accordingly.

6. REQUIREMENTS FOR COMPLETION OF THE SEMESTER

6.1 Ideally every student is expected to attend all classes and secure 100% attendance. However, in order to allow for certain unavoidable circumstances, the student is expected to attend at least 75% of the classes and the conduct of the candidate has been satisfactory during the course.

6.2 A candidate who has secured attendance between 65% and 74% (both included), due to medical reasons (Hospitalization / Accident / Specific Illness) or due to participation in University / District / State / National / International level sports or due to participation in Seminar / Conference / Workshop / Training Programme / Voluntary Service / Extension activities or similar programmes with prior permission from the Registrar shall be given exemption from prescribed attendance requirements and shall be permitted to appear for the Examination on the recommendation of the Head of the Department concerned and Dean to condone the lack of attendance. The Head of the Department has to verify and certify the genuineness of the case before recommending to the Dean. However, the candidate has to pay prescribed condonation fees.

6.3 Candidates who are not recommended for condonation and those who have less than 65% attendance will not be permitted to proceed to the next semester and have to redo the course. However, they are permitted to write the arrear Examinations, if any.

7. CLASS ADVISOR

To help the students in planning their courses of study and for general advice on the academic programme, the Head of the Department will attach a certain number of students to a teacher of the Department who shall function as Class Advisor for those students throughout their period of study. Such Class Advisors shall advise the students and monitor the courses undergone by the students, check the attendance and progress of the students and counsel them periodically. If necessary, the Class Advisor may display the cumulative attendance particulars in the Department notice board and also discuss with or inform the Parents/Guardian about the progress of the students. Each student shall be provided with course plan for each course at the beginning of each semester.

8. CLASS COMMITTEE

8.1 Every class shall have a class committee consisting of teachers of the class concerned, Maximum of six student representatives [boys and girls] and the concerned Head of the Department. It is like the 'Quality Circle' with the overall goal of improving the teaching-learning process. The functions of the class committee include

- Clarifying the regulations of the degree programme and the details of rules therein particularly Clause 4 and 5 which should be displayed on Department Notice-Board.
- Informing the student representatives the details of Regulations regarding weight age used for each assessment. In the case of practical courses (laboratory / drawing / project work / seminar, etc.) the breakup of marks for each experiment / exercise / module of work, should be clearly discussed in the class committee meeting and informed to the students.
- Solving problems experienced by students in the class room and in the laboratories.
- Informing the student representatives the academic schedule, including the dates of assessments and the syllabus coverage for each assessment.
- Analyzing the performance of the students of the class after each test and finding the ways and means of solving problems, if any.
- Identifying the weak students, if any and requesting the teachers concerned to provide some additional academic support.

8.2 The class committee for a class under a particular branch is normally constituted by the Head of the Department. However, if the students of different branches are mixed in a class (like the first semester which is generally common to all branches), the class committee is to be constituted by the Dean.

8.3 The class committee shall be constituted within the first week of each semester.

8.4 The Chairperson of the Class Committee may convene the meeting of the class committee.

8.5 The Dean may participate in any Class Committee of the Faculty.

8.6 The Chairperson is required to prepare the minutes of every meeting, submit the same to Dean through the HOD within two days of the meeting and arrange to circulate it among the students and teachers concerned. If there are some points in the minutes requiring action by the

8.7 Management, the same shall be brought to the notice of the Registrar by the HOD through Dean.

8.8 The first meeting of the Class Committee shall be held within one week from the date of commencement of the semester, in order to inform the students about the nature and weightage of assessments within the framework of the regulations. Two subsequent meetings may be held in a semester at suitable intervals. During these meetings the student members representing the entire class, shall meaningfully interact and express their opinions and suggestions of the other students of the class in order to improve the effectiveness of the teaching-learning process.

9. COURSE COMMITTEE FOR COMMON COURSES

Each common theory course offered to more than one discipline or group, shall have a “Course Committee” comprising all the teachers handling the common course with one of them nominated as Course Coordinator. The nomination of the Course Coordinator shall be made by the Dean depending upon whether all the teachers teaching the common course belong to a single department or to several departments. The ‘Course Committee’ shall meet to arrive at a common scheme of evaluation for the test and shall ensure a uniform evaluation of the tests. Where ever feasible, the Course Committee may also prepare a common question paper for the Internal Assessment test(s).

10. PROCEDURE FOR AWARDING MARKS FOR INTERNAL ASSESSMENT

10.1 Every teacher is required to maintain an 'ATTENDANCE AND ASSESSMENT RECORD' (Log book) which consists of attendance marked in each theory or practical or project work class, the test marks and the record of class work (topic covered), separately for each course.

10.2 Continuous Internal Assessment (CIA): The performance of students in each subject will be continuously assessed by the respective teachers as per the guidelines given below:

THEORY COURSES:

S. No.	CATEGORY	MAXIMUM MARKS
1.	Assignment	5
2.	Seminar *	5
3.	Attendance	5
4.	Test – I	8
5.	Test – II	8
6.	Test – III	9
Continuous Internal Assessment : TOTAL		40

*Evaluation shall be made by a committee.

PATTERN OF TEST QUESTION PAPER (Test I & II)

INSTRUCTION	REMARKS
Maximum Marks	60
Duration	2 Hours
Part- A	1 to 9 Two Mark Questions, uniformly covering the two units of the syllabus. All the 9 Questions are to be answered. (9 x 2 =18Marks).
Part- B	Question 10 to 12 will be of either or type, covering two units of the syllabus. Each Question may have subdivision. (3 x 14 =42 Marks).

PATTERN OF TEST QUESTION PAPER(Test III)

INSTRUCTION	REMARKS
Maximum Marks	100
Duration	3 Hours
Part - A	Part A will be online Examination. 20 Objective type Questions, Covering all the 5 units. (20 x 1= 20 Marks) (Online Examination).
Part- B	21 to 25 Two Mark Questions, uniformly covering the Five units of the syllabus. All the 5 Questions are to be answered. (5 x 2= 10Marks).
Part- C	Question 26 to 30 will be of either or type, covering Five units of the syllabus. Each Question may have subdivision. (5 x 14=70 Marks).

PRACTICAL COURSES:

S. No	CATEGORY	MAXIMUM MARKS
1.	Attendance	5
2.	Observation work	5
3.	Record work	5
4.	Model Examination	15
5.	Viva – Voce [Comprehensive]	10
Continuous Internal Assessment: TOTAL		40

Every practical exercise / experiment shall be evaluated based on the conduct of exercise/ experiment and records maintained.

INTEGRATED THEORY AND PRACTICAL COURSES

The Continuous Internal Assessment for Integrated Theory Course is awarded for 40 Marks with marks split up similar to regular theory course.

The external evaluation of integrated practical component from End semester Examination by internal mode is awarded for 50 Marks and later scaled down to 15 Marks and similarly the external evaluation for integrated theory from End semester Examination is awarded for 100 Marks and later scaled down to 45 Marks. Hence the external assessment for Integrated theory and practical components contribute to 60 Marks.

10.3 ATTENDANCE

Attendance carries a maximum of 5 marks and the distribution is as under:

S. No.	Attendance %	Marks
1	91 and above	5.0
2	81-90	4.0
3	76-80	3.0

10.4 PROJECT WORK/ INTERNSHIPS

Final year project work will be always in-house. However, as a special case, if a student is able to get a project from a government organization or private or public sector company,, the student may be permitted to do his/her project work in reputed institution/research organization/industry. Hence final year students may have commencement of eighth semester classes for 30 days in fast track mode and complete their final semester and are made eligible for undergoing Internships in Industry and also interested students are permitted for doing projects in Industries.

10.5 CERTIFICATION COURSES

Students have to undergo a minimum of one value added course beyond curriculum as a certified course per semester for duration not less than 30 hours.

11. REQUIREMENTS FOR APPEARING FOR END SEMESTER EXAMINATION (ESE)

A candidate shall normally be permitted to appear for the ESE of any semester commencing from I semester if he/she has satisfied the semester completion requirements (Subject to Clause 5) and has registered for Examination in all courses of the semester. Registration is mandatory for Semester Examinations as well as arrear Examinations failing which the candidate will not be permitted to attend the next semester. A candidate already appeared for a subject in a semester and passed the Examination is not entitled to reappear in the same subject of the semester for improvement of grade.

12. END SEMESTER EXAMINATION

ESE will be held at the end of each semester for each subject, for 100 marks, later scaled down to 60 marks.

PATTERN OF ESE QUESTION PAPER

INSTRUCTION	REMARKS
Maximum Marks	100
Duration	3 Hours
Part - A	Part A will be online Examination. 20 Objective type Questions. Covering all the 5 units. 20*1= 20 Marks (Online Examination)
Part- B	21 to 25 Two Mark Questions, uniformly covering the Five units of the syllabus. All the 5 Questions are to be answered. (5 *2= 10Marks).
Part- C	Question 26 to 30 will be of either or type, covering Five units of the syllabus. Each Question may have subdivision. (5*14=70 Marks)

13. PASSING REQUIREMENTS

13.1 Passing minimum: The passing minimum for CIA is 20 (i.e. out of 40 marks). The passing minimum for ESE is 30 (i.e. out of 60 marks). The overall passing minimum for theory/laboratory course is 50 (Sum of his/her score in CIA and ESE) out of 100 marks.

13.1.1 The passing minimum for value added course is 50 marks out of 100marks. There will be two tests, the first covering 50% of syllabus for 50 marks and the other for 50 marks.

13.2 If the candidate fails to secure a pass in a particular course ESE, it is mandatory that candidate shall register and reappear for the Examination in that course during the subsequent semester when Examination is conducted in that course. Further the candidate should continue to register and reappear for the Examination till a pass is secured in such supplementary Examination within the stipulated maximum duration of the programme (Clause 5.1).

The CIA marks obtained by the candidate in his/her first or subsequent appearance where he/she secures a pass shall be retained by the office of the Controller of Examinations and considered valid for all remaining attempts till the candidate secures a pass in his/her ESE.

13.3 If the candidate fails to secure a pass in a particular course in CIA, it is mandatory that candidate shall register and reappear for the CIA in that course during the subsequent semester when CIA is conducted in that course by the faculty member assigned for that particular course during that semester by the concerned HOD. Further, the candidate should continue to register and reappear for the CIA till a pass is secured in such subsequent Examination within the stipulated maximum duration of the programme (Clause 5.1).

13.3.1 If a candidate fails to secure a pass in value added course, he/she has to appear for the tests when course is conducted subsequently.

13.4 ONLINE COURSE(MOOC) COORDINATOR

To help students in planning their online courses and for general advice on online courses, the HOD shall nominate a MOOC coordinator for the online courses. The Online course MOOC coordinator

shall identify the courses which students can select for their programme from the available online courses offered by the different agencies periodically and inform the same to the students. Further, the coordinator shall advise the students regarding the online courses and monitor their course.

13.4.1 Student Shall study atleast one online course from Sawayam/NPTEL in anyone of the first seven semesters for which examination shall be conducted at the end of the course by the respective organization body. The student can register to the course which are approved by the department. The student shall produce a pass certificate from the respective body before the end of the seventh semester.

14. AWARD OF LETTER GRADES

14.1 All assessments of a course will be done on absolute mark basis. However, for the purpose of reporting the performance of a candidate letter grades, each carrying certain number of points will be awarded as per the range of total marks (out of 100) obtained by the candidate in each subject as detailed below:

Letter grade	Marks Range	Grade Point	Description
O	91 - 100	10	OUTSTANDING
A+	81- 90	9	EXCELLENT
A	71-80	8	VERY GOOD
B+	66- 70	7	GOOD
B	61 – 65	6	ABOVE AVERAGE
C	55 - 60	5	AVERAGE
D	50 - 54	4	PASS
RA	<50	-	REAPPEARANCE
AB		0	ABSENT

14.2 GRADE SHEET

After results are declared, Grade sheet will be issued to each student which will contain the following details:

- The list of courses enrolled during the semester and the grade scored,
- The Grade Point Average (**GPA**) for the semester and
- The Cumulative Grade Point Average (**CGPA**) of all courses enrolled from first semester onwards.

GPA is the ratio of the sum of the products of the number of Credits (**C**) of courses enrolled and the Grade Points (**GP**) corresponding to the grades scored in those courses, taken for all the courses to the sum of the number of credits of all the courses in the semester.

$$\text{GPA} = \frac{\text{Sum of [C*GP]}}{\text{Sum of C}}$$

CGPA will be calculated in a similar manner, considering all the courses enrolled from First semester. **RA** grade and value added course will be excluded for calculating **GPA** and **CGPA**.

14.3 REVALUATION

Revaluation and Re-totaling is allowed on representation. A candidate can apply for revaluation of his/her semester Examination answer paper in a theory course, within 2 weeks from the declaration of results, on payment of a prescribed fee through proper application to the Controller of Examinations through the Head of the Department and Dean. A candidate can apply for revaluation of answer scripts for not exceeding 5 subjects at a time. The Controller of Examinations will arrange for the revaluation and the results will be intimated to the candidate through the Head of the Department and Dean. Revaluation is not permitted for Supplementary Examinations, Practical Examinations, Technical Seminars, In-plant Training and Project Work.

14.4 TRANSPARENCY AND GRIEVANCE COMMITTEE

A student may get the Photostat copy of the answer script on payment of prescribed fee, if he/she wishes. The students can represent the grievance, if any, to the Grievance Committee, which consists of Dean of the Faculty, (if Dean is HOD, the Dean of another Faculty nominated by the University), HOD of the Department concerned, the faculty of the course and Dean from other discipline nominated by the University and the COE. If the Committee feels that the grievance is genuine, the script may be sent for external valuation; the marks awarded by the External Examiner will be final. The student has to pay prescribed fee for the same.

15. ELIGIBILITY FOR AWARD OF DEGREE

A student shall be declared to be eligible for award of Degree if he/she has

- Successfully gained the required number of total credits as specified in the curriculum corresponding to his/her programme within the stipulated time.
- No disciplinary action is pending against him/her.

The award of the degree must be approved by the Board of Management of Karpagam University.

16. CLASSIFICATION OF THE DEGREE AWARDED

16.1 A candidate who qualifies for the award of the Degree (vide Clause 15) having passed the Examination in all the courses in his/her first appearance within the specified minimum number of semesters (vide Clause 5.1) securing a CGPA of not less than 8 shall be declared to have passed the Examination in First Class with Distinction.

16.2 A regular candidate or a lateral entrant is eligible to register for BE(Honors), B.Tech(Honors). If, he / she has passed all the courses in the first appearance and

holds / maintains a CGPA of 7.5 at VI Semester. He / she has to take an additional 20 credits by studying online courses through Swayam/NPTEL . Such a candidate is eligible for the award of BE (Honor),B.Tech(Honor). However, is he / she fails in securing 20 additional credits but maintains CGPA of 7.5 and above is not eligible for Honors degree but eligible for First classwith Distinction.

16.3 A candidate who qualifies for the award of the Degree (vide Clause 15) having passed the Examination in all the courses within the specified minimum number of semesters (vide Clause 5.1) plus one year (two semesters), securing CGPA of not less than **6.5** shall be declared to have passed the Examination in First Class.

16.4 All other candidates (not covered in Clauses 17.1 and 17.2) who qualify for the award of the degree (vide Clause 15) shall be declared to have passed the Examination in Second Class.

17. PROVISION FOR WITHDRAWAL FROM END-SEMESTER EXAMINATION

17.1 A candidate may for valid reasons and on prior application, be granted permission to Withdraw from appearing for the examination of any one course or consecutive examinationsof more than one course in a semester examination. .

17.2 Such withdrawal shall be permitted only once during the entire duration of the degree programme. Withdrawal application shall be valid only if the candidate is otherwise eligible to write the Examination

17.3 Withdrawal application is valid only if it is made within 10 days prior to the commencement of the Examination in that course or courses and recommended by the Head of the Department, Dean and approved by the Registrar.

17.3.1 Notwithstanding the requirement of mandatory TEN days notice, applications for withdrawal forspecial cases under extraordinary conditions may be considered on the merit of the case.

17.4 Withdrawal shall not be construed as an appearance for the eligibility of a candidate for First Class with Distinction. This provision is not applicable to those who seek withdrawal during III semester.

17.5 Withdrawal from the ESE is NOT applicable to arrear Examinations.

17.6 The candidate shall reappear for the withdrawn courses during the Examination conducted in the subsequent semester.

18. PROVISION FOR AUTHORISED BREAK OF STUDY

18.1 Break of Study shall be granted only once for valid reasons for a maximum of one year during the entire period of study of the degree programme. However, in extraordinary situation the candidate may apply for additional break of study not exceeding another one year by paying prescribed fee forbreak of study. If a candidate intends to temporarily discontinue the programme in the middle of the semester for valid reasons and to rejoin the programme in a subsequent year, permission may be granted based on the merits of the case provided he/she applies to the Registrar, through the Head of the Department and Dean stating reasons thereof and the probable date of rejoining the programme.

18.2 The total number of semesters for completion of the programme from the commencement of the first semester to which the candidate was admitted shall not exceed the maximum no. of semesters specified in Clause 5.1 irrespective of the period of break of study (vide Clause 18) in order that he/she may be eligible for the award of the degree (vide Clause 15). The candidate thus permitted to rejoin the programme at the commencement of the semester after the break shall be governed by the curriculum and regulations in force at the time of rejoining. Such candidates may have to do additional courses as per the curriculum and regulations in force at that period of time.

18.3 The authorized break of study (for a maximum of one year) will not be counted for the duration specified for passing all the courses for the purpose of classification (vide Clause 17). However, additional break of study granted will be counted for the purpose of classification.

18.4 The total period for completion of the programme reckoned from, the commencement of the first semester to which the candidate was admitted shall not exceed the maximum period specified in Clause 5.1 irrespective of the period of break of study (vide Clause 18.3) in order that he/she may be eligible for the award of the degree.

18.5 If any student is detained for want of requisite attendance, progress and good conduct, the period spent in that semester shall not be considered as permitted 'Withdrawal' or 'Break of Study' (Clause 18 and 19 respectively).

19. SUPPLEMENTARY ESE: After the publication of VIII semester results, if a student has **ONE** arrear in any theory course of the entire programme, he/she will be permitted to apply within 15 days of the publication of results, and appear for supplementary Examination.

20. INDUSTRIAL VISIT

Every student is required to undergo one industrial visit for every semester, starting from the third semester of the programme.

21. DISCIPLINE

Every student is required to observe discipline and decorous behavior both inside and outside the University and not to indulge in any activity which will tend to bring down the prestige of the University. The erring student will be referred to the Disciplinary Committee constituted by the University, to enquire into acts of indiscipline and recommend to the University about the disciplinary action to be taken.

If a student indulges in malpractice in any of the ESE/CIA he/she shall be liable for punitive action as prescribed by the University from time to time.

22. REVISION OF REGULATION AND CURRICULUM

The University may from time to time revise, amend or change the Regulations, Scheme of Examinations and syllabi, if found necessary on the recommendations of Board of Studies, Academic Council and Board of Management of Karpagam University.



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FACULTY OF ENGINEERING
Department of Computer Science and Engineering
Computer Science and Engineering (Cyber Security)

List of PEOs, POs and PSOs

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- I. To perform well in their professional career by acquiring enough knowledge in the domain of Artificial Intelligence and Data Science.
- II. To improve communication skills, follow professional ethics and involve in team work in their profession.
- III. To update with evolving technology and use it for career advancement.

PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

- a) **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- b) **Problem Analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- c) **Design/ Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- d) **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- e) **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- f) **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- g) **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- h) **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

- i) **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- j) **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- k) **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- l) **Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs):

- 1.The ability to apply, analyse, design and develop the application software that meet the automation needs of society and industry.
2. The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future.

MAPPING:

PEO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PEO1	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
PEO2	✓	✓	✓	✓	✓			✓	✓	✓				✓
PEO3	✓	✓	✓		✓	✓	✓	✓		✓	✓		✓	✓

FACULTY OF ENGINEERING (FOE)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
UG PROGRAM (CBCS) – B.E COMPUTER SCIENCE AND ENGINEERING
(CYBER SECURITY)
(2022-203 Batch and Onwards)

COURSE CODE	NAME OF THE COURSE	CATEGORY	Instruction hours/week			CREDIT(S)	Maximum Marks			Page No.
			L	T	P		CIA	ESE	TOTAL	
SEMESTER I										
22BECY101	Technical English – I	HS	3	1	0	4	40	60	100	1
22BECY102	Mathematics-I (Matrices and Calculus)	BS	4	1	0	5	40	60	100	3
22BECY103	Environmental Studies	HS	3	0	0	3	40	60	100	5
22BECY141	Engineering Physics	BS	3	1	2	5	40	60	100	8
22BECY142	Programming Logic and Design	ES	4	0	2	5	40	60	100	11
22BECY111	Engineering Practices for Computer Sciences	ES	0	0	4	2	40	60	100	14
SEMESTER TOTAL			17	3	6	24	240	360	600	
SEMESTER II										
22BECY201	Mathematics-II (Vector Calculus and Integral Transforms)	BS	4	1	0	5	40	60	100	16
22BECY202	Basics Of Cyber Crime And Cyber Security	PC	3	0	0	3	40	60	100	18
22BECY203	Basics Of Cyber Forensics	PC	3	0	0	3	40	60	100	20
22BECY241	Technical English–II	HS	3	0	2	4	40	60	100	22
22BECY242	Object Oriented Programming with Python	ES	3	0	2	4	40	60	100	25
SEMESTER TOTAL			16	1	4	19	200	300	500	

22BECY101	TECHNICAL ENGLISH – I	SEMESTER-I 4H-4C
Instruction Hours/week: L:3 T:1 P:0	Marks: Internal:40 External:60 Total:100 End Semester Exam:3 Hours	

COURSE OBJECTIVES:

The goal of this course is for the students :

- To recall the usage of grammar and understand the basic reading and writing skills.
- To emphasize on listening and develop speaking skills
- To engage in formal writing.
- To enrich the receptive and productive skills.
- To develop fluency in language.

COURSE OUTCOMES:

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

- Recall the usage of grammar and understand and implement reading and writing skills.
- Know precise transition between sentences, ideas and paragraphs.
- Apply the linguistic parameters in everyday speaking and listening effectively.
- Enrich the vocabulary by understanding word formation.
- Detect the errors and restructure paragraphs and compose, compile and synthesize documents for various purposes.
- Critically listen and interpret ideas and make effective presentation and participate in discussion

UNIT I**9**

Grammar: Parts of Speech – Gerunds and infinitives

Reading: Reading comprehension: (vocabulary, referents, and inferences/conclusions).

Writing: Letter Writing (Formal and Informal) – Email Writing

UNIT II**9**

Grammar: Tenses – Simple Present and Present continuous – Types of Sentences – Direct and Indirect – Connectives.

Reading: Identifying main and secondary information, transferring and interpreting information.

UNIT III**9**

Writing: Resume writing with cover letter – Check lists – Building Itineraries – Paragraph writing.

Speaking: Describing people, places, jobs and things – Self Introduction – Asking questions.

Listening: Listening comprehension – Telephone conversation – Job description

UNIT IV

9

Grammar: Tenses: Perfect and Perfect continuous tenses – Reported speech – Active Passive - Identifying common errors.

Listening: Critical listening – Listening and Interpretation of ideas.

UNIT V

9

Reading: Reading comprehension: Cause and effect identification, reconstruction, rewording.

Writing: Business letters – Creative writing – Memo – Notice – Agenda.

Speaking: Oral presentations – Group discussions.

TOTAL: 45+15

TEXT BOOKS:

1. Jack C Richards with Jonathan Hull and Susan Proctor I, Interchange Student's Book 1, Cambridge University Press, Fourth Edition, 2016.
2. Barun K Mitra, Effective Technical Communication, Oxford University Press, First Edition, 2017

REFERENCE BOOKS:

1. Jack C Richards, Interchange Student's Book 1, Cambridge University Press, Fourth Edition, 2015.
2. Raymond Murphy, Essential English Grammar, Cambridge University Press, Second Edition, 2016.
3. Ashraf Rizvi M, Effective Technical Communication, McGraw Hill Education, First Edition, 2013.
4. University of Cambridge BEC Preliminary 1 (Exam Papers with answers), Cambridge University Press, 2010.

WEBSITES:

1. www.onestopenglish.com
2. www.britishcouncil.org
3. www.learnenglishtoday.com
4. www.talkenglish.com
5. www.bogglesworldesl.com

COURSE OBJECTIVES:

The goal of this course is for the students:

- To compute eigenvalues and eigenvectors of real symmetric matrix.
- To acquaint the students with the concepts of functions of several variables and optimizing multivariate function.
- To make the students acquire sound knowledge in techniques of solving linear ordinary differential equations.
- To impart knowledge in definite integrals and Beta, Gamma integrals.
- To develop the knowledge in multiple integrals and its applications.

COURSE OUTCOMES:

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

- Identify a real symmetric matrix and diagonalize it by orthogonal transformation.
- Solve extreme value problems with or without constraints.
- Apply the knowledge of solving linear differential equations in order to solve engineering problems.
- Make use of concept of definite integrals and Beta, Gamma functions in appropriate context of engineering problems.
- Apply the concept of multiple integrals to find area and volume of any definite shape.
- To apply the knowledge acquired to solve various engineering problems.

UNIT I**12**

Matrices: Eigenvalues and eigenvectors of a real matrix – Properties of eigenvalues – Statement and applications of Cayley-Hamilton theorem – Diagonalization by orthogonal reduction – Quadratic forms – Reduction of quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

UNIT II**12**

Functions of several variables: Partial derivatives – Total differential coefficients – Implicit functions – Jacobian – Properties – Maxima and minima of functions of two variables – Lagrange's method of constrained maxima and minima.

UNIT III**12**

Ordinary linear differential equations: Linear differential equation of second and higher order with constant coefficients – Euler-Cauchy linear differential equation – Method of variation of parameters.

UNIT IV**12**

Definite integrals: Properties of definite integrals – Applications – Bernoulli's extension formula – Beta and Gamma integrals – Properties – Applications.

UNIT V**12**

Multiple integrals: Evaluation of double integrals – Sketch the region of integration – Change of order of integration – Change of variables – Area using double integrals – Evaluation of triple integrals – Volume of solids.

TOTAL: 60+15**TEXT BOOKS:**

1. Ramana B V, Higher Engineering Mathematics, McGraw Hill Education, Twenty Ninth Reprint, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons, Tenth Edition, 2017.

REFERENCE BOOKS:

1. Kandasamy P, Thilagavathy K and Gunavathy K, Higher Engineering Mathematics, S Chand and Co., First Edition, 2016.
2. Grewal B S, Higher Engineering Mathematics, Khanna Publishers, Forty Forth Edition, 2017.
3. Veerarajan T, Engineering Mathematics (For Semesters I and II), McGraw Hill Education, First Edition, 2017.
4. George Brinton Thomas and Ross L Finney, Calculus and Analytic Geometry, Pearson Publishers, Ninth edition, 2002.

WEBSITES:

1. www.nptel.ac.in/courses/122104018/
2. www.nptel.ac.in/courses/122101003/31
3. www.nptel.ac.in/courses/111107098/11

Instruction Hours/week: L:3 T:0 P:0**Marks: Internal:40 External:60 Total:100****End Semester Exam:3 Hours****COURSE OBJECTIVES:**

The goal of this course is for students to:

- Create the awareness about environmental problems among people.
- Develop an attitude of concern for the environment.
- Motivate public to participate in environment protection and improvement.
- To gain a variety of experiences and acquire a basic understanding of environment and its associated problems.
- To help the individuals in acquiring skills for identifying and solving environmental problems.
- Relate critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

COURSE OUTCOMES:

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

- Demonstrate core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Identify concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- Distinguish the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- Analyze the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
- Prioritize and analyses the social issues.
- Integrate the environmental principles in the projects undertaken in field of engineering and technology.

UNIT I – INTRODUCTION - ENVIRONMENTAL STUDIES & ECOSYSTEMS**9**

Environment Definition, Scope and importance; Ecosystem, Structure and functions of ecosystem. Energy flow, Food chains and food webs, Ecological succession. Classification of ecosystem. Forest ecosystem, Grass and Ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT II - NATURAL RESOURCES - RENEWABLE AND NON RENEWABLE RESOURCES

9

Natural resources - Renewable and Non – Renewable resources. Land resources and land use change, Land degradation, soil erosion and desertification. Forest resources -Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water resources- Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water. Use of alternate energy sources, growing energy needs, case studies. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT III – BIODIVERSITY AND ITS CONSERVATION

9

Levels of biological diversity - genetic, species and ecosystem diversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value. Bio-geographical classification of India. Biodiversity patterns (global, National and local levels). Hot-spots of biodiversity. India as a mega-diversity nation. Endangered and endemic species of India. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT IV -ENVIRONMENTAL POLLUTION

9

Definition, causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution. Nuclear hazards and human health risks. Solid waste management and control measures of urban, industrial and e-wastes. Role of an individual in prevention of pollution. Case studies.

UNIT V - SOCIAL ISSUES AND THE ENVIRONMENT

9

Concept of sustainability and sustainable development. Water conservation -Rain water harvesting, watershed management. Climate change, global warming, ozone layer depletion, acid rain and its impacts on human communities and agriculture. Environment Laws (Environment Protection Act, Air Act, Water Act, Wildlife Protection Act, Forest Conservation Act). International agreements (Montreal and Kyoto protocols). Resettlement and rehabilitation of project affected persons. Disaster management (floods, earthquake, cyclones and landslides). Environmental Movements (Chipko, Silent valley, Bishnois of Rajasthan). Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi). Human population growth: Impacts on environment, human health and welfare.

TOTAL : 45

REFERENCE BOOKS:

1. Anubha Kaushik., and Kaushik, C.P. 2004. Perspectives in Environmental Studies. New Age International Pvt. Ltd. Publications, New Delhi.
2. Erach Bharucha. 2004. A text book for Environmental Studies, University Grants Commission and Bharat Vidypeeth Institute of Environmental Education Research, New Delhi.
3. Rajagopalan, R. 2016. Environmental Studies: From Crisis to Cure, Oxford University Press.
4. Sing, J.S., Sing. S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand & Publishing Company, New Delhi.
5. Mishra, D.D. 2010. Fundamental Concepts in Environmental Studies. S. Chand& Company Pvt. Ltd., New Delhi.
6. Arvind Kumar. 2004. A Textbook of Environmental Science. APH Publishing Corporation, New Delhi.
7. Singh, M.P., Singh, B.S., and Soma, S. Dey. 2004. Conservation of Biodiversity and Natural Resources. Daya Publishing House, New Delhi.
8. Tripathy. S.N., and Sunakar Panda. (2004). Fundamentals of Environmental Studies (2nd ed.). Vrianda Publications Private Ltd, New Delhi.
9. Verma, P.S., and Agarwal V.K. 2001. Environmental Biology (Principles of Ecology). S. Chand and Company Ltd, New Delhi.
10. Uberoi, N.K. 2005. Environmental Studies. Excel Books Publications, New Delhi.

(i)THEORY**COURSE OBJECTIVES:**

The goal of this course is for students to

- Inculcate the basics of properties of matter, sound and its applications.
- Basics of laser and optical fiber with appropriate applications.
- Disseminate the fundamentals of thermal physics and their applications.
- Introduce the concepts of quantum mechanics for diverse applications.
- Impart the basic knowledge of crystal and its various crystal structures.

COURSE OUTCOMES:

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

- Explain the elastic nature of materials.
- Infer the characteristics of laser for various engineering applications.
- Extend the knowledge on optical fiber for communication purposes.
- Illustrate the thermal properties of materials through various methods.
- Develop the idea of quantum mechanics through applications.
- Identify the different atomic arrangements of crystals and its defects.

UNIT I – PROPERTIES OF MATTER AND SOUND**9**

Elasticity – basic definitions, stress - strain diagram - factors affecting elastic modulus and tensile strength – Poisson’s ratio – Twisting couple - Torsion pendulum- bending of beams – bending moment – young’s modulus – cantilever method, uniform and non-uniform bending – I- shaped girders. Loudness, decibel, echo, reverberation, Sabine’s formula, Ultrasonic – Production, Industrial and medical applications.

UNIT II – LIGHT, LASER AND FIBER OPTICS**9**

Light – interference – reflection, refraction – Air wedge - LASER- Principle – characteristics - emission and absorption process - Einstein’s coefficients derivation. Types of LASER - Nd:YAG, CO₂, Semiconductor LASER- Applications of LASER in industry and medicine.

Fiber optics: Total internal reflection – modes of propagation of light in optical fibers – numerical aperture and acceptance angle – types of optical fibers (Material, refractive index and mode) – fiber optical communication system (block diagram) - Fiber optic sensors: pressure and displacement.

UNIT III – THERMAL PHYSICS

9

Introduction– thermal expansion of solids and liquids – expansion joints – bimetallic strips – Mode of heat transfer - heat conduction in solids – thermal conductivity – derivation, Phonons - Forbe's and Lee's disc method: theory and experiment – conduction through compound media (series and parallel) – thermal insulation – applications: heat exchangers, refrigerators, ovens and solar water heaters.

UNIT IV – QUANTUM PHYSICS

9

Merits of quantum theory, Demerits of classical theory – Black body radiation, Photo electric effect – Compton scattering: experimental description, dual nature of matter and radiation – de Broglie wavelength, uncertainty principle – Schrödinger's wave equation – time dependent and time independent equations – particle in one dimensional box- physical significance of wave function, Scanning Electron Microscope, Transmission Electron Microscope.

UNIT V – CRYSTAL PHYSICS

9

Crystalline materials – types - unit cell, primitive cell, intercepts, interfacial angle - crystal systems, Bravais lattices, Miller indices – determination of inter-planar distances - Coordination number and packing factor for SC, BCC, FCC, HCP structures-crystal imperfections: point defect, line defect, surface and volume defect. Crystal growth techniques: Czochralski and Bridgman method.

TOTAL : 45+15

TEXT BOOKS:

1. Bhattacharya D.K. & Poonam T., Engineering Physics, Oxford University Press, 2015.
2. Gaur R.K. and Gupta S.L, Engineering Physics, Dhanpat Rai Publications, 2012.
3. Pandey .B.K. & Chaturvedi .S, Engineering Physics, Cengage Learning India, 2012.
4. Halliday.D., Resnick R. & Walker. J, Principles of Physics, Wiley, 2015.
5. Charles Kittel, Kittel's Introduction to Solid State Physics, Wiley India Edition, 2019.

REFERENCE BOOKS:

1. P.M. Mathews, K.Venkatesan, A text book of Quantum Mechanics, 2/e, Mc Graw Hill Education, 2017.
2. Laser Fundamentals, William T Silfvast, Cambridge Univ Press. 2012.
3. Fiber Optics and Optoelectronics, R P Khare, Oxford, 2012.
4. Daniel V.Schroeder, An Introduction to Thermal Physics, Pearson, 2014.
5. D.S. Mathur, Elements of properties of matter, S.Chand, 2010.

WEBSITES:

1. <https://nptel.ac.in/courses/122/103/122103011/>
2. <https://nptel.ac.in/courses/113/104/113104081/>
3. <http://hyperphysics.phy-astr.gsu.edu/hbase/optmod/lascon.html>

(ii) LABORATORY**LIST OF EXPERIMENTS –(Any 10 Experiments)**

1. Torsional pendulum – Determination of rigidity modulus of wire and moment of inertia of disc
2. Uniform bending (or) Non-uniform Bending – Determination of young's modulus.
3. Viscosity of liquids-Determination of co-efficient of viscosity of a liquid by Poiseuille's flow
4. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids.
5. Laser- Determination of the wave length of the laser using grating, Acceptance angle of optical fiber.
6. Spectrometer- Determination of wavelength using grating.
7. Air wedge – Determination of thickness of a thin sheet/wire.
8. Lee's disc – Determination of thermal conductivity.
9. Determination of Band gap of a semiconductor.
10. Potentiometer – Determination of thermo emf of a thermo couple.
11. Characteristics of photo diode.
12. Particle size determination using LASER.

TOTAL: 30

22BECY142**PROGRAMMING LOGIC AND DESIGN**
(Theory & Lab.)**SEMESTER-I****6H-5C****Instruction Hours/week: L:4 T:0 P:2****Marks: Internal:40 External:60 Total:100****End Semester Exam:3 Hours****(i) THEORY****COURSE OBJECTIVES:**

The goal of this course is for the students :

- To understand the method of developing an algorithm and to understand the simple program design
- To analyse the loop structures
- To apply the concept of console I/O and arrays
- To learn the working of two dimensional arrays
- To evaluate the modularization concepts and storage classes

COURSE OUTCOMES:

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

- Illustrate steps in program development and basics of C programming.
- Identify the working of loop structure.
- Develop the programs in console I/O and arrays
- Solve the programs using functions
- Describe the working of structures and file management in C
- Apply the knowledge of programming to develop application software.

UNIT I**9**

Logic and Scenarios – Steps in program development – An introduction to algorithm and pseudocode – Structure of C program – Basic data types and sizes – Constants – Variables – Operators – Input/output statements – Algorithms using selection – If and else statements – The CASE Structure – Switch statement – Goto statement, an Introduction to SCRATCH tool.

UNIT II**9**

Loop -while-do while- for - break – continue – Types of I/O – Formatted I/O – Unformatted I/O functions – Header files – #include – Preprocessor directive – Macros.

UNIT III**9**

Conditional compilation statements – #line – #error – The minimum field width specifier – Scanset – Arrays – Declaration – Array operations – Declare array size using macro – Index range checking. Two dimensional – multi-dimensional arrays – Application of arrays.

UNIT IV

9

Functions – Types – Reusability – User defined functions – Standard library functions. Function calls – Parameter passing – Call by value – Return statements – Arrays and functions – Recursive functions – Indirect – Direct – Tail – Recursion Vs iteration – Storage classes.

UNIT V

9

Structures – initialization - nested structures – structures and arrays – structures and pointers - union – typedef and enumeration types - bit fields - File Management in C – Files and Streams – File handling functions – Sequential access file- Random access file – Command line arguments.

TOTAL: 45

TEXT BOOKS:

1. Brian W Kernighan and Dennis M Ritchie, The C Programming Language, Prentice Hall, Second Edition, 2015.
2. Jeri R Hanly, Elliot B Koffman, Problem Solving and Program Design in C, Pearson Education, Eighth Edition, 2015.

REFERENCE BOOKS:

1. Herbert Schildt, C: The Complete reference, McGraw Hill, Fourth Edition , 2013.
2. David Griffiths and Dawn Griffiths, Head First C O'Reilly Media, First Edition, 2012.
3. Bryon S Gottfried, Programming with C, McGraw Hill, Second Edition, 2010.

WEBSITES:

1. www.hackerrank.com
2. www.codechef.com
3. www.learn-c.org
4. www.udemy.com
5. www.hackearth.com

(ii) LABORATORY

LIST OF EXPERIMENTS:

1. Programs on ranges of data types
2. Programs on constants and variables
3. Programs on operators
4. Programs on selection control structure
5. Programs using looping statements
6. Programs on console I/O functions
7. Programs using pre-processor directive
8. Programs on array operation
9. Programs using two dimensional array
10. Programs using inbuilt Functions
11. Programs using User Defined function and recursive function
12. Programs using storage classes

TOTAL: 30

COURSE OBJECTIVES:

The goal of this course is for the students

- To check and measure Personal Computer's power supply voltage.
- To study the mother boards and various types of interface cards.
- To study and replaces hard disk.
- To study the different network cables and network devices.
- To assemble a Personal Computer.

COURSE OUTCOMES:

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

- Identify hardware components in a computer system.
- Predict non working computer system and suggest for repair.
- Explain about assembling and disassembling of a working computer.
- Explain about the Installation of I/O devices, interfacing and device driver.
- Identify the network components.
- Apply the knowledge to assemble and to connect computer in a network.

LIST OF EXPERIMENTS:**PC Hardware Servicing**

1. Demonstration of power supply requirement of Personal Computer.
2. Demonstration of Mother Boards.
3. Demonstration of various cards used in a Computer System viz. Display Card, Ethernet Card etc
4. Installation of I/O devices, interfacing and device driver.
5. Hard disk partition, defragmentation and installation.
6. Installation of OS (operating System), Software packages and programming development kits installation along with it.
7. Assembling a Personal Computer.
8. Assembling a laptop.

Networking and configuring Networks

1. Demonstration of different types of network cables.
2. Demonstration of network devices in detail.
3. Assigning IP address to the PC.
4. Connects the computer in Local Area Network.
5. Study of basic network commands and configuration commands.
6. WiFi configuration in the PC

TOTAL: 60

(VECTOR CALCULUS AND INTEGRAL TRANSFORMS)

Instruction Hours/week: L:4 T:1 P:0

Marks: Internal:40 External:60 Total:100

End Semester Exam:3 Hours

COURSE OBJECTIVES:

The goal of this course is for the students

- To familiarize the concept of vector differential operator and its applications.
- To make the students to understand the concept of periodic function and represent them in Fourier series.
- To introduce the concept of Fourier transform techniques.
- To provide knowledge about the Laplace transform and their properties.
- To afford different techniques of finding inverse Laplace transform, which are useful in solving problems in basic engineering sciences.

COURSE OUTCOMES:

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

- Explain the concept of vector calculus in appropriate context in engineering fields.
- Describe Fourier series in appropriate context of engineering problems.
- Apply differential equations to engineering fields with the help of Fourier transforms.
- Demonstrate Laplace transform of standard functions in an appropriate context.
- Apply inverse Laplace transform techniques and solve linear differential equations.
- Apply the knowledge to solve real world problems.

UNIT I**12**

Vector calculus: Vector differential operator – Gradient, divergence and curl – Identities (Statement only) – Directional derivative – Irrotational and solenoidal vector fields –Conservative vector fields – Vector integration – Green’s theorem in a plane, Gauss divergence theorem and Stoke’s theorem (excluding proofs) – Simple applications involving square, rectangle, cubes and rectangular parallelepipeds.

UNIT II**12**

Fourier series: Dirichlet’s conditions – Odd and even functions – Half range sine and cosine series – Parseval’s identity – Harmonic analysis.

UNIT III**12**

Fourier transforms: Statement of Fourier integral theorem – Complex Fourier transform – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity of Fourier transform.

UNIT IV**12**

Laplace transform: Transforms of standard functions – Transform of unit step function – Dirac-Delta function – Properties of Laplace transform – Transforms of derivatives and integrals – Initial and final value theorem – Transforms of periodic functions.

UNIT V**12**

Inverse Laplace transform: Inverse Laplace transforms of standard functions – Inverse Laplace transform using second shifting theorem – Method of partial fractions – Convolution theorem – Solution of ordinary differential equations with constant coefficients using Laplace transforms.

TOTAL: 60+15**TEXT BOOKS:**

1. Ramana B V, Higher Engineering Mathematics, McGraw Hill Education, Twenty Ninth Reprint, 2017.
2. Grewal B S, Higher Engineering Mathematics, Khanna Publishers, Forty Forth Edition, 2017.

REFERENCE BOOKS:

1. Kandasamy P, Thilagavathy K and Gunavathy K, Higher Engineering Mathematics, S Chand and Co., First Edition, 2016.
2. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons, Tenth Edition, 2017.
3. Veerarajan T, Transforms and Partial Differential Equation, McGraw Hill Education, Third Edition, 2016.
4. Manish Goyal and Bali N P, A textbook of Engineering mathematics, Laxmi publications, Eighth edition, 2011.

WEBSITES:

1. www.nptel.ac.in/courses/122104017/29
2. www.nptel.ac.in/courses/122107037/24
3. www.nptel.ac.in/courses/122107037/28
4. www.nptel.ac.in/courses/111105035/22
5. www.nptel.ac.in/courses/111105035/24

Instruction Hours/week: L:3 T:0 P:0**Marks: Internal:40 External:60 Total:100****End Semester Exam:3 Hours****PRE-REQUISITE:** Programming Logics and Design**COURSE OBJECTIVES:**

- To understand the fundamental concepts of cyber crime.
- To explore knowledge on cyber crimes in wireless devices.
- To aware of tools used in the cyber security.
- To familiar with various Indian IT Act in cyber crime and cyber security.
- To enhance the knowledge in handheld devices and digital forensics.

COURSE OUTCOMES:

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

- Understand the basics of cyber crime and security
- Describe organizational measures and the Security policies
- Analyze the tools and methods used in cyber security.
- Understand the different theoretical and cross-disciplinary approaches in Indian IT Act and in digital devices.
- Analyse and assess the impact of cybercrime in digital devices on government, business, individual and society.
- Apply the fundamentals concepts for identifying cyber attacks.

UNIT I**9**

Introduction to Cyber Crime: Cyber Crime and Information Security – Classifications of Cyber Criminals – Cyber Crime Legal Perspective and Indian Perspective – Cyber Crime and Indian ITA – A Global perspective on Cyber crimes – Categories of Cyber crimes – Criminal plans for attack – Social Engineering – Cyber talking – Cyber cafe and cyber criminals – Botnet – Attack vector – Cloud Computing.

UNIT II**9**

Cyber Crime Mobile and Wireless Devices: Proliferation – Trends in Mobility – Credit card frauds – Security challenges – Registry setting – Authentication service – Attacks – Security Implication for Organization – Organizational measures – Organizational Security Policies – Physical security counter measures.

UNIT III**9**

Tools and methods used in cyber security: Proxy servers and anonymizers – Phishing – Password cracking – Keyloggers and spywares – Virus and worms – Trojan horse – Steganography – DoS and DDoS attack – SQL Injection – Buffer overflow – Attacks on wireless networks – Phishing and Identity theft.

UNIT IV**9**

Cyber Crime and Legal landscape – Indian IT Act – Digital Signature and Indian IT Act – Amendments to the Indian IT Act – Cyber crime and punishment. Understanding Computer Forensics: Need for computer forensics – Cyber forensics and digital evidence – Digital forensics life cycle – Network forensics – Computer forensics and steganography - Computer forensics from compliance perspective – Challenges

UNIT IV**9**

Special tools and techniques –Hand held devices and digital forensics. Cyber security organizational implications: Cost of cyber crimes and IPR – Web threads for organizations – Security and privacy implications – Social media marketing – Incident handling – Forensics best practices for organization.

TOTAL: 45**TEXT BOOKS:**

1. Nina Godbole and Sunit Belapure, Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley Publisher, First Edition, 2011

REFERENCE BOOKS:

1. Harish Chander, Cyber Laws and IT Protection, PHI Learning, First Edition, 2012
2. James Graham, Ryan Olson and Rick Howard, Cyber Security Essentials, CRC Press, First Edition, CRC Press, First Edition

WEBSITES:

1. www.lexology.com/library/
2. www.swayam.gov.in/nd2_ugc19_hs25/preview
3. www.educba.com/cyber-security-tools/
4. www.intaforensics.com
5. www.itu.int/en/ITU-D/Cybersecurity

Instruction Hours/week: L:3 T:0 P:0**Marks: Internal:40 External:60 Total:100****End Semester Exam:3 Hours****COURSE OBJECTIVES:**

- To be aware of fundamentals on cyber forensics and usage of cyber forensics tools.
- To be familiar with the file systems and challenges in the Linux and mac operating system.
- To explore knowledge on the network and different operating systems on mobile devices.
- To learn various services like FaaS and MaaS.
- To enhance the knowledge on database, email and threats in crypto currency.

COURSE OUTCOMES:

- Explain the basic of Forensics investigation process.
- Understand Linux forensics and file systems and the challenges in various devices.
- Apply a solid foundation grounding in networks, operating systems, hardware and mobile devices to digital investigation and network resources from unauthorized activities.
- Analyse and validate the cloud forensics data.
- Understand Bit coin forensics.
- Explain different process involved in cyber forensics.

UNIT I**9**

Introduction to Cyber forensics: Forensics investigation process – Forensics protocol – Digital forensics standards – Digital evidence – Types of cyber crime – Notable data breaches – Case study – Challenges in Cyber security – Cyber forensics tools. Windows forensics: Digital Evidence – File systems – Time analysis – Challenges- Case Study.

UNIT II**9**

Linux forensics: Popular linux – File systems – Process – Artifacts – Linux distribution used for forensics analysis – Challenges – Case study. Mac OS forensics: File systems – Process – Artifacts – Information to collect Mac book forensics investigation – Case study. Anti-forensics: Data wiping and shredding – Trial obfuscation – Encryption – Data hiding – Anti-forensics detection technique

UNIT III**9**

Network forensics: OSI Model – Artifacts – ICPM Attack – Analysis tools. Mobile forensics: Android operating system – Mutual Extraction – Physical acquisition – Chip-off – Micro-read – Challenges – iOS operating system.

UNIT IV**9**

Cloud forensics: Cloud computing model – Server-side forensics – Client-side forensics – Challenges – Artifacts – use – Forensics as a Service. Malware forensics: Types – Analysis – Tools – Challenges –

Malware as a Service. Web attack forensics: Web attack test – Intrusion forensics – Database forensics – Log forensics – Content analysis – File metadata forensics

UNIT V

9

Emails and email criminals: Protocols – Email criminals – Email forensics. Solid State device forensics: Components –Data wiping – Analysis. Bit coin forensics: Crypto currency – Block chain – Artifacts – Challenges.

TOTAL: 45

TEXT BOOKS:

1. Niranjana Reddy , Practical Cyber Forensics: An Incident-Based Approach to Forensic Investigations, Apress, First Edition, 2019

REFERENCE BOOKS:

1. Marjorie Britz T, Computer Forensics and Cyber Crime: An Introduction, Prentice Hall, Third Edition, 2013
2. Albert Marcella J and Frederic Guillosoy, Cyber Forensics: From Data to Digital Evidence, Wiley Publisher, First Edition, 2012

WEBSITES:

1. www.champlain.edu/computer-forensics
2. www.swayam.gov.in/nd2_ugc19_hs25/preview
3. www.educba.com/cyber-security-tools/
4. www.intaforensics.com
5. www.cs.nmt.edu/~df/lectures.html

(i) THEORY**COURSE OBJECTIVES:**

The goal of this course is for the students

- To make students realize the importance of writing reading and Listening.
- To understand the contexts of grammar and listening accompanied by fine reading skills in Speaking.
- To emphasize speaking in English through activities.
- To develop reading and writing skills through analysis of the facts between paragraphs.
- To enhance students' ability to listen and speak effectively in formal and informal contexts.

COURSE OUTCOMES:

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

- Identify and recognize the aspects of writing reading and Listening.
- Comprehend the contents and reproduce the essence of it.
- Apply the English speaking and listening skills in the social milieu.
- Analyse and understand grammar and reading contexts
- Apply the rules of writing and Speaking in formal and informal assignments.
- To enable students to prepare for essay writing and interviews.

UNIT I**9**

Grammar: Prepositions – Adjectives – Adverbs

Reading: Skimming – Scanning.

Writing: Paragraph writing: Compare and Contrast – Cause and Effect

Listening: Types of Listening – Barriers to listening

UNIT II**9**

Grammar: Tenses – Use of sequence words – Modal Verbs

Reading: Note making – Mind map – Cohesion and Coherence in reading

UNIT III**9**

Writing: Paragraph writing – Jumbled sentences – Interpreting visual materials

Speaking: Role-play – Group interaction – Speaking in formal Situations

Listening: Listening and responding to video lectures – Listening to specific tasks – Focused Listening – Note taking

UNIT IV

9

Grammar: Concord – Use of Imperatives – WH Questions – Identifying common errors

Reading: Reading and Making inference – Reading and interpreting visual materials – Critical Reading – Shifting facts from opinions

Writing: Essay writing - Report – Proposals – Free writing

UNIT V

9

Speaking: Impromptu Speeches – Making presentations on given topics – Responding to questions – Mock interviews

Listening: Watching videos or documentaries and answering – Listening to different accents – Listening to Speeches

TOTAL: 45

TEXT BOOKS:

1. Jack C Richards with Jonathan Hull and Susan Proctor, Interchange Student's Book 2, Cambridge University Press, Fourth Edition, 2016.
2. Rajesh K Lidiya, Communication Skills, Oxford University Press, Second Edition, 2017.

REFERENCE BOOKS:

1. Meenakshi Raman and Sangeeta Sharma, Fundamentals of Technical Communication, Oxford University Press, First Edition, 2015.
2. Ashraf Rizvi M, Effective Technical Communication, McGraw Hill Education, First Edition, 2013.
3. Russel Whitehead and Micheal Black, Pass Cambridge BEC Vantage (Self Study Practice tests with key), Summer town Publishing, Second Edition, 2014.
4. University of Cambridge, BEC Vantage 4 (Exam Papers with answers), Cambridge University Press, Second Edition, 2010.

WEBSITES:

1. www.nonverbal.com.
2. www.onestopenglish.com.
3. www.eslflow.com.
4. www.myenglishpages.com.
5. www.ielts.net.com.

(ii) LABORATORY

LIST OF EXPERIMENTS:

1. Skimming and Scanning
2. Listening and Responding
3. Listening to different Accents
4. Movie review
5. Group discussion
6. Listening and paraphrasing.
7. Mock interview
8. Listening and note making
9. Presentation
10. Report Writing.

TOTAL: 30

(i) THEORY**COURSE OBJECTIVES:**

The goal of this course is for the students

- To learn about basic python language syntax and semantics, control structures and data structures in python.
- To be comfortable using the built-in functions and creating user-defined functions in python.
- To understand the object-oriented programming concepts in python.
- To gain knowledge in identifying relationships among classes in python.
- To learn how to handle exception and files in python.

COURSE OUTCOMES:

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

- Define and explain the fundamental concepts of python programming.
- Explain about different types of functions in Python.
- Apply the knowledge of python programming concepts and to know about OOPs concepts.
- Apply OOPs concepts to solve engineering problems.
- Explain about file concepts.
- Develop solution using object-oriented concepts in python for a given problem statement.

UNIT I**9**

Python Basics: Introduction to Python – Data types – Keywords – Expressions – Comments – Operators – Command line arguments – Control Statements – Break, Continue and Pass statement. Python Data Structures: String – Mutable vs immutable types – indexing and slicing – String functions. Tuple: Tuple operations – List – List operations – List as array – List comprehension. Set – Set operations – Dictionary – Dictionary operations.

UNIT II**9**

Functions: Python built-in functions – User defined functions – Creating function – Calling functions – Types of function arguments – Recursion and lambda or anonymous functions. Packages: Defining, Creating and Accessing a Package, importing packages and user defined modules.

UNIT III**9**

OOPS: Elements of OOP-Class, Object, Inheritance, Data Abstraction, Encapsulation, Polymorphism – UML Class diagram – access specifiers – Creating classes – Creating object – Accessing members – init() method – instance, static and class methods - Importance of self – Implementing encapsulation.

UNIT IV**9**

Inheritance: Implementing inheritance – Types of inheritance. Polymorphism: Implementing polymorphism – Method overloading – Method overriding – Operator overloading. Abstraction: Abstract classes – Association and aggregation.

UNIT V**9**

Exception handling: Errors vs exceptions – Handling exceptions – Raising exception – Creating user defined exception-Introduction to Files – File Path – Opening and Closing Files – Reading and Writing Files – File Position

TOTAL: 45**TEXT BOOKS:**

1. Allen B Downey, Think Python: How to Think Like a Computer Scientist, O'Reilly, Second Edition, 2016.
2. Guido van Rossum and Fred L Drake Jr, An Introduction to Python Revised and updated for Python 3.2, Network Theory Ltd., First Edition, 2011.
3. Dusty Phillips, Python 3 Object-oriented Programming, Packt Publishing, Third Edition, 2018.

REFERENCE BOOKS:

1. Mark Lutz, Learning Python, O'Reilly Media, Fifth Edition 2013.
2. Mark Summerfield, Programming in Python 3, Dorling Kindersley India Pvt. Ltd., First Edition, 2009.

WEBSITES:

1. www.docs.python.org/3.5/
2. www.programiz.com/python-programming
3. www.pythonspot.com/
4. www.learnpython.org/
5. www.developers.google.com/edu/python/

(ii) LABORATORY

LIST OF EXPERIMENTS:

1. Programs using operators and control statements.
2. Programs using string operations.
3. Programs using tuple and list.
4. Programs using set and dictionary.
5. Programs using built-in functions.
6. Implementing user defined functions with various parameter options
7. Implementation of class and objects.
8. Implementation of inheritance and association.
9. Implementation of overloading and overriding.
10. Implementation of Exception handling and File handling

TOTAL: 30