sasi INSTITUTE OF TECHNOLOGY & ENGINEERING
autonomous
Accredited by NAAC with "A" Grade,
Recognised by UGC under section 2(f) &12(B)
Approved by AICTE - New Delhi
Permanently Affiliated to JNTUK, SBTET,
Ranked as "A" Grade by Govt. of A.P.,

SITE21

REGULATIONS,

COURSE STRUCTURE

For

I B.Tech.

Common to all Branches

With effective from the Academic Year

2021-2022

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B.Tech Regulations

1.1 Short title and Commencement

The regulations listed under this head are common for all degree level under graduate programs (B.Tech.) offered by the college with effect from the academic year 2021-22 and they are called as "SITE21" regulations.

The regulations here under are subject to amendments as may be made by the Academic Council of the college from time to time, keeping the recommendations of the Board of Studies in view. Any or all such amendments will be effective from such date and to such batches of candidates including those already undergoing the program, as may be decided by the Academic Council.

1.2. Definitions

a. "Commission" means University Grants Commission(UGC)
b. "Council" means All India Council for Technical Education(AICTE)
c. "University" Means Jawaharlal Nehru Technological University Kakinada(JNTUK)
d. "College" means Sasi Institute of Technology & Engineering, Tadepalligudem.
e. "Program" Means any combination of courses and /or requirements leading to award of a degree
f. "Course" Means a subject either theory or practical identified by its course title and code number and which is normally studied in asemester.
g. For example, (ELECTRONC DEVICES) is a course offered at third semester of B.Tech (ECT) and its code is (21ETETT3030)
h. "Degree" means an academic degree conferred by the university upon those who complete the undergraduate curriculum
i. "Regular Student" means student enrolled into the four year programme in the first year
j. "Lateral entry Students" Means student enrolled into the four year programme in the second year

1.3. Academic Programs

1.3.1. Nomenclature of Programs

The nomenclature and its abbreviation given below shall continue to be used for the degree programs under the University, as required by the Council and Commission. The name of specialization shall be indicated in brackets after the abbreviation. For e.g. UG engineering degree in Mechanical Engineering program is abbreviated as B.Tech. (ME). Bachelor of Technology (B.Tech.) degree program offered in:

1. Artificial Intelligence & Machine Learning(AI & ML)
2. Civil Engineering(CE)
3. Computer Science and Engineering(CSE)
4. Computer Science and Technology(CST)
5. Electronics and Communication Engineering(ECE)
6. Electronics and Communication Technology(ECT)
7. Electrical and Electronics Engineering(EEE)
8. Information Technology(IT)
9. Mechanical Engineering(ME)

- Curriculum framework is important in setting the right direction for a Degree program as it takes into account the type and quantum of knowledge necessary to be acquired by a student to qualify for a award in his/her chosen branch or specialization.
- Besides, this also helps in assigning the credits for each course, sequencing the courses semester-wise and finally arriving at the total number of courses to be studied and the total number of credits to be earned by a student to fulfill the requirements for conferment of degree.
- Each theory course shall consist of five units.

1.3.2. Curriculum Structure

The curriculum structure is designed in such a way that it facilitates the courses required to attain the expected knowledge, skills and attitude by the time of their graduation as per the needs of the

stakeholders. The curriculum structure consists of various course categories (as described in 1.6.3 to 1.6.9) to cover the depth and breadth required for the program and for the attainment of program outcomes of the corresponding program. Each Programme of study will be designed to have 40-45 theory courses and 16-18 laboratory courses. The distribution and types of courses offered from the above is indicated in the following table 3.

1.3.3. Induction Program

The Induction Program for two weeks is designed to make the newly joined students feel comfortable, sensitize them towards exploring their academic interests and activities, reducing competition and making them work for excellence, promote bonding within them, build relations between teachers and students and building of character. Induction program covers

Physical activity
Creative arts
Universal human values
Literary and Proficiency modules
Lectures by Eminent peoples

1.4Admission Criteria

The eligibility criteria for admission into UG engineering programs are as per the norms approved by government of Andhra Pradesh from time to time. The sanctioned seats in each program in the college are classified into CATEGORY-A and CATEGORY-B at first year level and Lateral Entry at second year level.

- **CATEGORY – A Seats:** These seats will be filled as per the norms approved by the Government of Andhra Pradesh.
- **CATEGORY – B Seats:** These seats will be filled by the College as per the norms approved by the Government of Andhra Pradesh.
- **CATEGORY – Lateral Entry Seats** : Lateralentry candidates shall be admitted into the Third semester directly as per the norms approved by government of Andhra Pradesh. The percentages of Category-A, Category-B and Lateral Entry Seats are decided time to time by the Government of Andhra Pradesh.

2. Award of B. Tech. Degree

a) A student will be declared eligible for the award of B. Tech. Degree if he fulfills the following academic regulations:
   i. A student shall be declared eligible for the award of B. Tech Degree, if he pursues a course of study in not less than four and not more than eight academic years. After eight academic years from the year of their admission, he/she shall forfeit their seat in B.Tech course and their admission stands cancelled.
   ii. The candidate shall register for 160 credits and secure all the 160 credits.

b) The medium of instruction for the entire under graduate programmer in Engineering &Technology will be in **English** only.

3. Programme Pattern:

a) Total duration of the of B. Tech (Regular) Programme is four academic years
b) Each Academic year of study is divided into Two Semesters.
c) Minimum number of instruction days in each semester is 90.
d) Grade points, based on percentage of marks awarded for each course will form the basis for calculation of SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average).
e) The total credits for the Programme is 160.
f) Three week induction program is mandatory for all first year UG students and shall be conducted as per AICTE/UGC/APSCHE guidelines.
g) Student is introduced to "Choice Based Credit System (CBCS)".
h) A pool of interdisciplinary and job-oriented mandatory skill courses which are relevant to the industry are integrated into the curriculum of concerned branch of engineering (total five skill courses: two basic level skill courses, one on soft skills and other two on advanced level skill courses)
i) A student has to register for all courses in a semester.
j) All the registered credits will be considered for the calculation of final CGPA.

k) Each semester has - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'.Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated by UGC and course structure as suggested by AICTE are followed.

l) A 10 months industry/field mandatory internship, both industry and social, during the summer vacation and also in the final semester to acquire the skills required for job and make engineering graduates to connect with the needs of the industry and society at large.

m) All the students shall be mandatorily registered for NCC, NSS activities and Community Service Project as per the Government and University norms.

n) Each college shall assign a faculty advisor/mentor after admission to each student or group of students from same department to provide guidance in courses registration / career growth/placements/opportunities for higher studies/ GATE / other competitive exams etc.

4. Registration for Courses:

a) In each semester a student shall mandatorily register courses which he/she wishes to pursue within a week from the starting of the class work with the advice of Head of the Department and mentor of the student of the concerned department of the college.

b) If any student wishes to withdraw the registration of the course, he/she shall submit a letter to the Principal of the college through the Head of the Department and mentor within fifteen days.

c) The concerned college shall thoroughly verify and upload the data/courses registered by each student in the university examination center within 20 days. The Principal of the concerned college shall ensure that there no wrong registration courses by the student. The university registration portal will be closed after 20 days.

5. (a) Award of B. Tech. Degree: A student will be declared eligible for the award of B. Tech. Degree if he fulfills the following academic regulations:

i. A student shall be declared eligible for award of the B. Tech Degree, if he pursues a course of study in not less than four and not more than eight academic years. After eight academic years from the year of their admission, he/she shall **forfeit** their seat in B. Tech course and their admission stands cancelled.

ii. The student shall register for 160 credits and must secure all the 160 credits.

iii. All students shall mandatorily register for the courses like Environmental Sciences, Universal Human Values, Ethics, Indian Constitution, Essence of Indian Traditional Knowledge etc., shall be included in the curriculum as non-credit mandatory courses. Environmental Sciences is to be offered compulsorily as mandatory course for all branches. A student has to secure at least 40% of the marks allotted in the internal evaluation for passing the course and shall maintain 75% of attendance in the subject.

iv. All students shall mandatorily register for NCC/NSS activities and will be required to participate in an activity specified by NSS officer during second and third semesters. Grade shall be awarded as Satisfactory or Unsatisfactory in the mark sheet on the basis of participation, attendance, performance and behavior. If a student gets an unsatisfactory Grade, he/she shall repeat the above activity in the subsequent years, in order to complete the degree requirements.

v. Credits are defined as per AICTE norms.

(b) Award of B. Tech. (Honor)/B. Tech. (Minor):B. Tech. with Honors or a B. Tech. with a Minor will be awarded if the student earns 20 additional credits are acquired as per the regulations/guidelines. The regulations/guidelines are separately provided. Registering for an Honors/Minor is optional.

6. Attendance Requirements

a) A student is eligible to write the University examinations if he acquires a minimum of 40% in each subject and 75% of attendance in aggregate of all the subjects.

b) Condonation of shortage of attendance in aggregate up to 10% (65% and above, and below 75%) may be granted by the College Academic Committee. However, this condonation concession is applicable only to any two semesters during the entire programme.

c) Shortage of Attendance below 65% in aggregate shall not be condoned.

d) A student who is short of attendance in a semester may seek re-admission into that semester when offered within 4 weeks from the date of commencement of class work.

e) Students whose shortage of attendance is not condoned in any semester are not eligible to write

their end semester examination of that class.

f) A stipulated fee of Rs. 500/- in the concerned semester shall be payable towards condonation of shortage of attendance. Students availing condonation on medical ground shall produce a medical certificate issued by the competitive authority.

g) A student will be promoted to the next semester if he satisfies the (i) attendance requirement of the present semester and (ii) minimum required credits.

h) If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

i) For induction programme attendance shall be maintained as per AICTE norms.

j) For non-credit mandatory courses the students shall maintain the attendance similar to credit courses

7. Evaluation-Distribution and Weightage of marks

i. Paper setting and evaluation of the answer scripts shall be done as per the procedures laid down by the University Examination section from time to time.

ii. To maintain the quality, external examiners and question paper setters shall be selected from reputed institutes like IISc, IITs, IIITs, IISERs, NITs and Universities.

iii. For non-credit mandatory courses, like Environmental Sciences, Universal Human Values, Ethics, Indian Constitution, Essence of Indian Traditional Knowledge, the student has to secure 40% of the marks allotted in the internal evaluation for passing the course. No marks or letter grade shall be allotted for all mandatory non-credit courses.

iv. A student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to each theory/practical design/drawing subject/ project etc by securing not less than 35% of marks in the end semester exam and minimum 40% of marks in the sum total of the internal marks and end semester examination marks together.

v. **Distribution and Weightage of marks:** The assessment of the student's performance in each course will be as per the details given:

S.No	Components	Internal	External	Total
1	Theory	30	70	100
2	Engineering Graphics/Design/Drawing	30	70	100
3	Practical	15	35	50
4	Mini Project/Internship/Industrial Training/ Skill Development programs/Research Project	-	50	50
5	Project Work	60	140	200

(vi) Continuous Internal Theory Evaluation:

a) For theory subjects, during a semester, there shall be two mid-term examinations. Each mid-term examination consists of (i) one online objective examination (20 multiple choice questions) for 10 marks for a duration of 20 minutes (ii) one descriptive examination (3 full questions for 5 marks each) for 15 marks for a duration of 90 minutes and (iii) one assignment for 05 marks. All the internal exams shall be conducted as per university norms from first 50% of the syllabi.

b) In the similar lines, the second online, descriptive examinations assignment shall be conducted on the rest of the 50% syllabus.

c) The total marks secured by the student in each mid-term examination are evaluated for 30 marks. The first mid marks (Mid-1) consisting of marks of online objective examination, descriptive examination and assignment shall be submitted to the University examination section within one week after completion of first mid examination.

d) The mid marks submitted to the University examination section shall be displayed in the concerned college notice boards for the benefit of the students.

e) If any discrepancy found in the submitted Mid-1 marks, it shall be brought to the notice of university examination section within one week from the submission.

f) Second mid marks (Mid-2) consisting of marks of online objective examination, descriptive examination and assignment shall also be submitted to University examination section within one week after completion of second mid examination and it shall be displayed in the notice boards. If any discrepancy found in the submitted mid-2 marks, it shall be brought to the notice of university examination section within one week from the submission.
g) Internal marks can be calculated with 80% weightage for better of the two mids and 20% Weightage for other mid exam.

Example: **Mid-1 marks** = Marks secured in
(Online examination-1 + descriptive examination-1 +one assignment-1)
Mid-2 marks = Marks secured in
(Online examination-2+descriptive examination-2+one assignment-2)

Final internal Marks = (Best of (Mid-1/Mid-2) marks x 0.8 + Least of (Mid-1/Mid-2) marks x 0.2)

h) With the above criteria, university examination section will send mid marks of all subjects in consolidated form to all the concerned colleges and same shall be displayed in the concerned college notice boards. If any discrepancy found, it shall be brought to the notice of university examination section through proper channel within one week with all proofs. Discrepancies brought after the given deadline will not be entertained under any circumstances.

(vii) Semester End Theory Examinations Evaluation:

a) The semester end examinations will be conducted university examination section for 70 marks consists of five questions carrying 14 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.
b) For practical subjects there shall be continuous evaluation during the semester for 15 internal marks and 35 end examination marks. The internal 15 marks shall be awarded as follows: day to day work - 5 marks, Record-5 marks and the remaining 5 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacher concerned and external examiner appointed.
c) For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 30 marks for internal evaluation (15 marks for continuous Assessment (day–to–day work) and 15 marks for internal tests) and 70 marks for end examination. There shall be two internal tests in a Semester for 15 marks each and final marks can be calculated with 80% weightage for better of the two tests and 20% weightage for other test and these are to be added to the marks obtained in day to day work.
d) Evaluation of the summer internships: It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Industries, Hydel and thermal power projects and also in software MNCs in the area of concerned specialization of the UG programme. Students shall pursue this course during summer vacation just before its offering as per course structure. The minimum duration of this course is at least 6 weeks. The student shall register for the course as per course structure after commencement of academic year. A supervisor/mentor/advisor has to be allotted to guide the students for taking up the summer internship. The supervisor shall monitor the attendance of the students while taking up the internship. Attendance requirements are as per the norms of the University. After successful completion, students shall submit a summer internship technical report to the concerned department and appear for an oral presentation before the departmental committee consists of an external examiner; Head of the Department; supervisor of the internship and a senior faculty member of the department. A certificate from industry/skill development center shall be included in the report. The report and the oral presentation shall carry 40% and 60% weightages respectively. It shall be evaluated for 50 external marks at the end of the semester. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion. In case, if a student fails, he/she shall reappear as and when semester supplementary examinations are conducted by the University.
e) The job oriented skill courses may be registered at the college or at any accredited external agency. A student shall submit a record/report on the on the list skills learned. If the student completes job oriented skill course at external agency, a certificate from the agency shall be included in the report. The course will be evaluated at the end of the semester for 50 marks (record: 15 marks and viva-voce:

35 marks) along with laboratory end examinations in the presence of external and internal examiner (course instructor or mentor). There are no internal marks for the job oriented skill courses.

f) Mandatory Course (M.C): Environmental Sciences, Universal Human Values, Ethics, Indian Constitution, Essence of Indian Traditional Knowledge etc non-credit (zero credits) mandatory courses. Environmental Sciences shall be offered compulsorily as mandatory course for all branches. A minimum of 75% attendance is mandatory in these subjects. There shall be an external examination for 70 marks and it shall be conducted by the college internally. Two internal examinations shall be conducted for 30 marks and a student has to secure at least 40% of the marks for passing the course. There is no online internal exam for mandatory courses. No marks or letter grade shall be printed in the transcripts for all mandatory non-credit courses, but only Completed (Y)/Not-completed (N) will be specified.

g) **Procedure for Conduct and Evaluation of MOOC:** There shall be a Discipline Centric Elective Course through Massive Open Online Course (MOOC) as Program Elective course. The student shall register for the course (Minimum of 12 weeks) offered by SWAYAM/NPTEL through online with the approval of Head of the Department. The Head of the Department shall appoint one mentor for each of the MOOC subjects offered. The student needs to register the course in the SWAYAM/NPTEL portal. During the course, the mentor monitors the student's assignment submissions given by SWAYAM/NPTEL. The student needs to submit all the assignments given and needs to take final exam at the proctor center. The student needs to earn a certificate by passing the exam. The student will be awarded the credits given in curriculum only by submission of the certificate. In case if student does not pass subjects registered through SWAYAM/NPTEL, the same or alternative equivalent subject may be registered again through SWAYAM/NPTEL in the next semester with the recommendation of HOD and shall be pass.

h) ***Major Project (*****Project - Project work, seminar and internship in industry):**

In the final semester, the student should mandatorily register and undergo internship and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship. The project report shall be evaluated with an external examiner.

Evaluation*:* The total marks for project work 200 marks and distribution shall be 60 marks for internal and 140 marks for external evaluation. The supervisor assesses the student for 30 marks (Report: 15 marks, Seminar: 15 marks). At the end of the semester, all projects shall be showcased at the department for the benefit of all students and staff and the same is to be evaluated by the departmental Project Review Committee consisting of supervisor, a senior faculty and HOD for 30 marks. The external evaluation of Project Work is a Viva-Voce Examination conducted in the presence of internal examiner and external examiner and is evaluated for 140 marks.

8 Results Declaration:

i. Before results declaration, an academic council meeting shall be conducted and results shall be placed before the academic council for approval.
ii. With the approval of academic council, the results shall be submitted to the University to get the Approval from Honorable Vice-Chancellor.
iii. The University may normalize the result, if required, before declaration of the result (Guidelines for normalization will be provided separately)
iv. A copy of approved results in a CD shall be submitted to the University examination Center.

9. Academic Audit: Academic audit in each semester will be conducted as per norms.

10. Recounting or Re-evaluation of Marks in the End Semester Examination: A student can request for recounting of revaluation of his/her answer book on payment of a prescribed fee as per norms.

11. Supplementary Examinations: A student who has failed to secure the required credits can appear for a supplementary examination, as per the schedule announced by the University.

12. Malpractices in Examinations: Disciplinary action shall be taken in case of malpractices during Mid/End examinations as per the rules framed by the University.

13. Promotion Rules: The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.5 for promotion to higher classes

a) A student shall be promoted from first year to second year if he fulfills the minimum attendance

requirement as per University norm.

b) A student will be promoted from II year to III year if he fulfills the academic requirement of 40% of credits up to either II year I-Semester or II year II-Semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in II year II semester.

c) A student shall be promoted from III year to IV year if he fulfills the academic requirements of 40% of the credits up to either III year I semester or III year II semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year II semester.

14. Course Pattern

a) The entire course of study is for four academic years; all years are on semester pattern.

b) A student eligible to appear for the end semester examination in a subject, but absent from it or has failed in the end semester examination, may write the exam in that subject when conducted next.

c) When a student is detained for lack of credits / shortage of attendance, he may be re-admitted into the same semester/year in which he has been detained. However, the academic regulations under which he was first admitted shall continue to be applicable to him.

15. Earning of Credit:

A student shall be considered to have completed a course successfully and earned the credits if he/she secures an acceptable letter grade in the range A+ to E as given below. Letter grade 'F' in any course implies failure of the student in that course and no credits earned. Absent is also treated as no credits earned. For project same % percentages will be followed for grading.

Marks Range Max:100	Marks range Max:50	Level	Letter Grade	Grade point
≥ 90	≥ 45	Outstanding	A+	10
≥80 to <89	≥40 to <44	Excellent	A	9
≥70 to <79	≥35 to <39	Very Good	B	8
≥60 to <69	≥30 to <34	Good	C	7
≥50 to <59	≥25 to <29	Fair	D	6
≥40 to <49	≥20 to <24	Satisfactory	E	5
<40	<20	Fail	F	0
-		Absent	AB	0

16. Award of Class:

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

Class Awarded	CGPA to be secured	Remarks
First Class with Distinction	≥7.75 (Without any supplementary appearance)	From the CGPA secured from 160 Credits
First Class	≥ 6.75	
Second Class	≥ 5.75 to < 6.75	
Pass Class	≥ 5.00 to < 5.75	

17. Minimum Instruction Days:

The minimum instruction days for each semester shall be 90 working days. There shall be no branch transfers after the completion of the admission process. There shall be no transfer from one college/stream to another within the Constituent Colleges and Units of Jawaharlal Nehru Technological University Kakinada.

18. Withholding of Results:

If the student is involved in indiscipline/malpractices/court cases, the result of the student will be withheld.

19. Transitory Regulations

a) Discontinued or detained candidates are eligible for re-admission as and when next offered.

b) The re-admitted candidate will be governed by the rules & regulations under which the candidate has been admitted.

c) In case of transferred students from other Universities, credits shall be transferred to JNTUK as per the academic regulations and course structure of JNTUK.

d) The students seeking transfer to colleges affiliated to JNTUK from various other Universities / Institutions haveto obtain the credits of any equivalent subjects as prescribed by JNTUK. In addition, the transferred candidates have to pass the failed subjects at the earlier Institute with already obtained internal/sessional marks to be conducted by JNTUK.

20. Gap – Year:

Gap Year concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after I/II/III year to pursue entrepreneurship full time. This period shall be counted for the maximum time for graduation. An evaluation committee at university level shall be constituted to evaluate the proposal submitted by the student and the committee shall decide on permitting the student for availing the Gap Year.

21. General:

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

b) The academic regulation should be read as a whole for the purpose of any interpretation.

c) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.

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

ACADEMIC REGULATIONS (SITE21M) FOR B.Tech (LATERAL ENTRY SCHEME)

Applicable for the students admitted into II year B. Tech. from the Academic Year 2020-21 onwards

1. Award of B. Tech. Degree

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

a) A student shall be declared eligible for the award of the B. Tech Degree, if he pursues a course of study in not less than three academic years and not more than six academic years. After six academic years from the year of their admission, he/she shall forfeit their seat in B. Tech course and their admission stands cancelled.

b) The candidate shall register for 121 credits and secure all the 122 credits.

2. The attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech (lateral entry)

3. **Promotion Rules:** A student shall be promoted from second year to third year if he fulfills the minimum attendance requirement.

   A student shall be promoted from III year to IV year if he fulfills the academic requirements of 40% of the credits up to either III year I semester or III year II semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year II semester.

4. **Award of Class**

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

Class Awarded	CGPA to be secured	Remarks
First Class with Distinction	≥ 7.75 (Without any supplementary appearance)	From the CGPA secured from 121 Credits from II Year to IV Year
First Class	≥ 6.75	
Second Class	≥ 5.75 to < 6.75	
Pass Class	≥ 5.00 to < 5.75	

The Grades secured, Grade points and Credits obtained will be shown separately in the memorandum of marks.

5. All the other regulations as applicable to **B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme**

COMMUNITY SERVICE PROJECT

Introduction

1. Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development

2. Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.

3. Community Service Project is meant to link the community with the college for mutual benefit. The community will be benefited with the focused contribution of the college students for the village/ local

development. The college finds an opportunity to develop social sensibility and responsibility among students and also emerge as a socially responsible institution.

Objective

Community Service Project should be an integral part of the curriculum, as an alternative to the 2 months of Summer Internships / Apprenticeships / On the Job Training, whenever there is an exigency when students cannot pursue their summer internships. The specific objectives are;

1. To sensitize the students to the living conditions of the people who are around them,
2. To help students to realize the stark realities of the society.
3. To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability
4. To make students aware of their inner strength and help them to find new /out of box solutions to the social problems.
5. To make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.
6. To help students to initiate developmental activities in the community in coordination with public and government authorities.
7. To develop a holistic life perspective among the students by making them study culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Implementation of Community Service Project

1. Every student should put in a minimum of **180 hours** for the Community Service Project during the summer vacation
2. Each class/section should be assigned with a mentor.
3. Specific Departments could concentrate on their major areas of concern. For example, Dept. of Computer Science can take up activities related to Computer Literacy to different sections of people like - youth, women, house-wives, etc.
4. A log book has to be maintained by each of the student, where the activities undertaken/involved to be recorded. The log book has to be countersigned by the concerned mentor/faculty in charge.
5. Evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.
6. The final evaluation to be reflected in the grade memo of the student.
7. The Community Service Project should be different from the regular programs of NSS/NCC/Green Corps/Red Ribbon Club, etc.
8. Minor project report should be submitted by each student. An internal Viva shall also be conducted by a committee constituted by the principal of the college.
9. Award of marks shall be made as per the guidelines of Internship/apprentice/ on the job training

Procedure

1. A group of students or even a single student could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, so as to enable them to commute from their residence and return back by evening or so.
2. The Community Service Project is a twofold one –

a) First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the Village or Ward volunteers, rather, it could be another primary source of data.

b) Secondly, the student/s could take up a social activity, concerning their domain or subject area. The different areas, could be like –

- Agriculture
- Health
- Marketing and Cooperation
- Animal Husbandry
- Horticulture
- Fisheries
- Sericulture

- Revenue and Survey
- Natural Disaster Management
- Irrigation
- Law & Order
- Excise and Prohibition
- Mines and Geology
- Energy
- Internet
- Free Electricity
- Drinking Water

EXPECTED OUTCOMES **BENEFITS OF COMMUNITY SERVICE PROJECT TO STUDENTS**

Learning Outcomes

1. Positive impact on students' academic learning.
2. Improves students' ability to apply what they have learned in "the real world".
3. Positive impact on academic outcomes such as demonstrated complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development.
4. Improved ability to understand complexity and ambiguity.

Personal Outcomes

1. Greater sense of personal efficacy, personal identity, spiritual growth, and moral development.
2. Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills

Social Outcomes

1. Reduced stereotypes and greater inter-cultural understanding
2. Improved social responsibility and citizenship skills
3. Greater involvement in community service after graduation

Career Development

1. Connections with professionals and community members for learning and career opportunities
2. Greater academic learning, leadership skills, and personal efficacy can lead to greater opportunity

Relationship with the Institution

1. Stronger relationships with faculty
2. Greater satisfaction with college
3. Improved graduation rates

BENEFITS OF COMMUNITY SERVICE PROJECT TO FACULTY MEMBERS

1. Satisfaction with the quality of student learning
2. New avenues for research and publication via new relationships between faculty and community
3. Providing networking opportunities with engaged faculty in other disciplines or institutions
4. A stronger commitment to one's research

BENEFITS OF COMMUNITY SERVICE PROJECT TO COLLEGES AND UNIVERSITIES

1. Improved institutional commitment
2. Improved student retention
3. Enhanced community relations

BENEFITS OF COMMUNITY SERVICE PROJECT TO COMMUNITY

1. Satisfaction with student participation
2. Valuable human resources needed to achieve community goals
3. New energy, enthusiasm and perspectives applied to community work
4. Enhanced community-university relations.

SUGGESTIVE LIST OF PROGRAMMES UNDER COMMUNITY SERVICE PROJECT

The following the recommended list of projects for engineering students. The lists are not exhaustive and open for additions, deletions and modifications. Colleges are expected to focus on specific local issues for this kind of projects. The students are expected to carry out these projects with involvement, commitment, responsibility and accountability. The mentors of a group of students should take the responsibility of motivating, facilitating, and guiding the students. They have to interact with

local leadership and people and appraise the objectives and benefits of this kind of projects. The project reports shall be placed in the college website for reference. Systematic, Factual, methodical and honest reporting shall be ensured.

For Engineering Students

1. Water facilities and drinking water availability
2. Health and hygiene
3. Stress levels and coping mechanisms
4. Health intervention programs
5. Horticulture
6. Herbal plants
7. Botanical survey
8. Zoological survey
9. Marine products
10. Aqua culture
11. Inland fisheries
12. Animals and species
13. Nutrition
14. Traditional health care methods
15. Food habits
16. Air pollution
17. Water pollution
18. Plantation
19. Soil protection
20. Renewable energy
21. Plant diseases
22. Yoga awareness and practice
23. Health care awareness programs and their impact
24. Use of chemicals on fruits and vegetables
25. Organic farming
26. Crop rotation
27. Floury culture
28. Access to safe drinking water
29. Geographical survey
30. Geological survey
31. Sericulture
32. Study of species
33. Food adulteration
34. Incidence of Diabetes and other chronic diseases
35. Human genetics
36. Blood groups and blood levels
37. Internet Usage in Villages
38. Android Phone usage by different people
39. Utilization of free electricity to farmers and related issues
40. Gender ration in schooling level- observation.

Complementing the community service project, the students may be involved to take up some awareness campaigns on social issues/special groups. The suggested list of programs are;

Programs for School Children:

1. Reading Skill Programme (Reading Competition)
2. Preparation of Study Materials for the next class.
3. Personality / Leadership Development
4. Career Guidance for X class students
5. Screening Documentary and other educational films
6. Awareness Programme on Good Touch and Bad Touch (Sexual abuse)
7. Awareness Programme on Socially relevant themes.

Programs for Women Empowerment

1. Government Guidelines and Policy Guidelines
2. Women's' Rights
3. Domestic Violence
4. Prevention and Control of Cancer
5. Promotion of Social Entrepreneurship

General Camps

1. General Medical camps
2. Eye Camps
3. Dental Camps
4. Importance of protected drinking water
5. ODF awareness camp
6. Swatch Bharat
7. AIDS awareness camp
8. Anti-Plastic Awareness
9. Programs on Environment
10. Health and Hygiene
11. Hand wash programs
12. Commemoration and Celebration of important days

Programs for Youth Empowerment

1. Leadership
2. Anti-alcoholism and Drug addiction
3. Anti-tobacco
4. Awareness on Competitive Examinations
5. Personality Development

Common Programs

1. Awareness on RTI
2. Health intervention programs
3. Yoga
4. Tree plantation
5. Programs in consonance with the Govt. Departments like –

i. Agriculture
ii. Health
iii. Marketing and Cooperation
iv. Animal Husbandry
v. Horticulture
vi. Fisheries
vii. Sericulture
viii. Revenue and Survey
ix. Natural Disaster Management
x. Irrigation
xi. Law & Order
xii. Excise and Prohibition
xiii. Mines and Geology
xiv. Energy

Role of Students:

1. Students may not have the expertise to conduct all the programmes on their own. The students thencan play a facilitator role.
2. For conducting special camps like Health related, they will be coordinating with the Governmental agencies.
3. As and when required the College faculty themselves act as Resource Persons.
4. Students can work in close association with Non-Governmental Organizations like Lions Club, Rotary Club, etc or with any NGO actively working in that habitation.
5. And also, with the Governmental Departments. If the programme is rolled out, the District Administration could be roped in for the successful deployment of the programme.
6. An in-house training and induction programme could be arranged for the faculty and participating students, to expose them to the methodology of Service Learning.

Timeline for the Community Service Project Activity

Duration: 8 weeks

1. Preliminary Survey (One Week)

a) A preliminary survey including the socio-economic conditions of the allotted habitation to be conducted.

b) A survey form based on the type of habitation to be prepared before visiting the habitation with the help of social sciences faculty. (However, a template could be designed for different habitations, rural/urban.

c) The Governmental agencies, like revenue administration, corporation and municipal authorities and village secretariats could be aligned for the survey.

2. Community Awareness Campaigns (Two Weeks)

Based on the survey and the specific requirements of the habitation, different awareness campaigns and programmes to be conducted, spread over two weeks of time. The list of activities suggested could be taken into consideration.

3. Community Immersion Programme (Four Weeks)

Along with the Community Awareness Programmes, the student batch can also work with any

one of the below listed governmental agencies and work in tandem with them. This community involvement programme will involve the students in exposing themselves to the experiential learning about the community and its dynamics. Programmes could be in consonance with the Govt. Departments.

4. Community Exit Report (One Week)

During the last week of the Community Service Project, a detailed report of the outcome of the 8 weeks works to be drafted and a copy shall be submitted to the local administration. This report will be a basis for the next batch of students visiting that particular habitation. The same report submitted to the teacher-mentor will be evaluated by the mentor and suitable marks are awarded for onward submission to the University.

Throughout the Community Service Project, a daily log-book need to be maintained by the students batch, which should be countersigned by the governmental agency representative and the teacher-mentor, who is required to periodically visit the students and guide them.

Course Numbering Scheme

The Course number code consists of 11alphabets. A typical course number code is illustrated in the followingFigure-1.

Mechanical Engineering (ME)

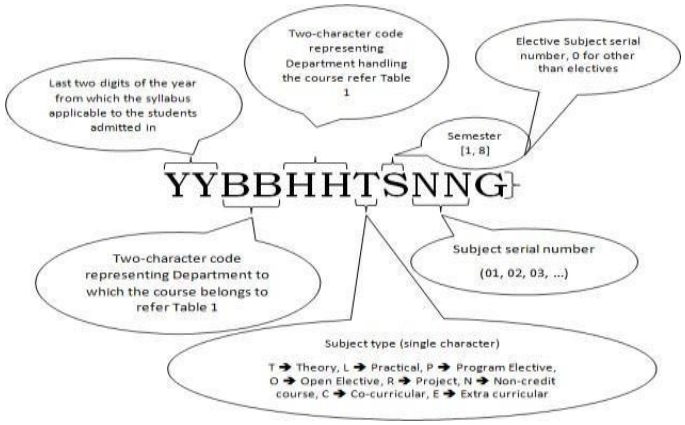


Figure 1: Course Numbering Scheme

The department codes are in given in following table 1.

Table 1: Department Codes

Department	Two-character code
Artificial Intelligence and Machine Learning	AM
Civil Engineering	CE
Electrical & Electronics Engineering	EE
Mechanical Engineering	ME
Electronics & Communications Engineering	EC
Electronics & Communications Technology	ET
Computer Science Engineering	CS
Computer Science Technology	CT
Information Technology	IT
Management Science	MS

Mathematics	MA
Physics	PH
Chemistry	CH
English	EG
Biology	BI
Common to All Branches	CM

Example: ED in 3rd semester for ECT with S.No 3

Course Code: 21ETETT3030

Table 2: Comparison of Number of credits given by AICTE and Approved credits

S. No.	Category		No. of Credits									
			ECE/ECT		EEE		CSE/IT/CST		ME		CE	
		AICTE	APSCHE	Approved	AICTE	Approved	AICTE	Approved	AICTE	Approved	AICTE	Approv
1	Humanities and Social Sciences	12	7	7.5	12	11	12	11	12	11	12	08
2	Basic Science courses	25	18	21	26	25	24	26	25	26	26	26
3	Engineering Science courses	24	22.5	19.5	20	20	29	29.5	24	23	29	24.5
4	Professional Core courses	48	55.5	55.5	53	62	49	48.5	48	55	47	56.5
5	Professional Elective Courses	18	15	15	18	15	18	18	18	18	23	21
6	Open elective courses	18	15	15	18	12	12	12	18	12	11	9
7	Project work , Seminar and Internship	15	26.5	26.5	11	15	15	15	15	15	12	15
8	Mandatory Courses	-		-	-	-	-	-	-	-	-	-
Total Credits		160	160	160	158	160	159	160	160	160	160	160

Malpractice

DISCIPLINARY ACTION FOR MALPRACTICES/IMPROPER CONDUCT IN EXAMS

S. No.	Nature of Malpractices/Improper conduct	Punishment
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
1. (b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year.The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be

		handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – 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 subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all

		University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

MALPRACTICES

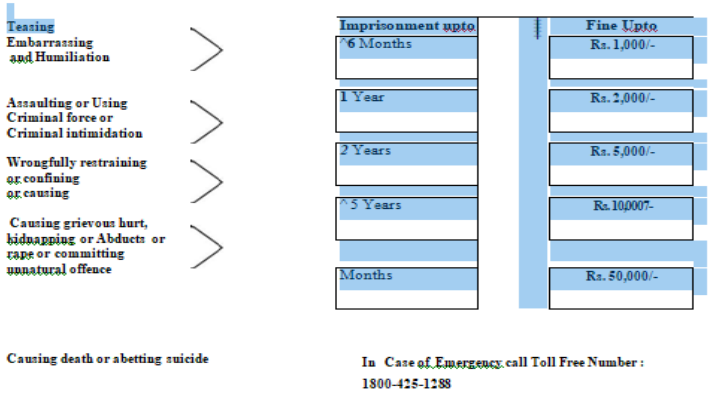
- The Principal shall refer the cases of malpractices in Continuous Evaluation and Semester-End Examinations, to Malpractice Enquiry Committee, constituted by him/her for the purpose. Such committee shall follow the approved scales of punishment. The Principal shall take necessary action, against the erring students based on the recommendations of thecommittee.

- Any action on the part of student at an examination trying to get undue advantage in the performance or trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder. The involvement of the Staff, who are in charge of conducting examinations, valuing examination papers and preparing/keeping records of documents relating to the examinations in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and recommended for award of appropriate punishment after thorough enquiry.

Ragging

Prohibition of ragging in educational institutions Act 26 of 1997 Salient Features

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



In Case of Emergency call Toll Free Number :
1800-425-1288

LET US MAKE SITE RAGGING FREE INSTITUTE

Program Outcomes for an Engineering Graduates:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **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.
4. **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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. 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.
7. **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.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.
11. **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.
12. **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.

I B.Tech I Semester Course Structure SITE21 Regulations						
Common for CSE,ECE &IT						
S.N	Subject Code	Course	L	T	P	C
1	21CMEGT1010	Technical English	3	0	0	3
2	21CMMAT1020	Engineering Mathematics-I	3	0	0	3
3	21CMEET1030	Basic Electrical Engineering	3	0	0	3
4	21CMCST1040	Programming for Problem Solving	3	0	0	3
5	21CSMEL1050 21ECMEL1050 21ITMEL1050	Computer Aided Engineering Graphics	2	0	2	3
6	21CMEGL1060	English Communication Skills Lab	0	0	3	1.5
7	21CMEEL1070	Basic Electrical Engineering Lab	0	0	3	1.5
8	21CMCSL1080	Programming for Problem Solving Lab	0	0	3	1.5
9	21CMESN1090	Environmental Science	2	0	0	0
TOTAL			**16**	**0**	**11**	**19.5**

I B.Tech II Semester Course Structure SITE21 Regulations						
Common for CSE,ECE,IT						
S.N	Subject code	Course	L	T	P	C
1	21CMMAT2010	Engineering Mathematics - II	3	0	0	3
2	21CSPHT2020 21ECPHT2020 21ITPHT2020	Engineering Physics	3	0	0	3
3	21CMCHT2030	Engineering Chemistry	3	0	0	3
4	21CMCST2040	Python Programming	3	0	0	3
5	21ECECT2050	Network Analysis	3	0	0	3
5	21CSCST2050 21ITITT2050	Data Structures	3	0	0	3
6	21CSPHL2060 21ECPHL2060 21ITPHL2060	Engineering Physics Lab	0	0	3	1.5
7	21CMEEL2070	Engineering Chemistry Lab	0	0	3	1.5
8	21ECMEL2080	Engineering Workshop	0	0	3	1.5
8	21CSCSL2080 21ITITL2080	Data Structures Lab	0	0	3	1.5
9	21CMMSN2090	Constitution of India, Professional Ethics & Human Rights	2	0	0	0
TOTAL			**16**	**0**	**11**	**19.5**

I B.Tech I Semester Course Structure SITE21 Regulations						
Common for AI&ML,CE,CST,ECT, EEE, ME						
SN	Subject Code	Course	L	T	P	C
1	21CMMAT1010	Engineering Mathematics – I	3	0	0	3
2	21AMPHT1020 21CEPHT1020 21CTPHT1020 21ETPHT1020 21EEPHT1020 21MEPHT1020	Engineering Physics	3	0	0	3
3	21CMCHT1030	Engineering Chemistry	3	0	0	3
4	21CMCST1040	Programming for Problem Solving	3	0	0	3
5	21AMMEL1050 21CTMEL1050 21ETMEL1050	Computer Aided Engineering Graphics	2	0	2	3
5	21CEMEL1050 21EEMEL1050 21MEMEL1050	Engineering Graphics	2	0	2	3
6	21AMPHL1060 21CEPHL1060 21CTPHL1060 21ETPHL1060 21EEPHL1060 21MEPHL1060	Engineering Physics Lab	0	0	3	1.5
7	21CMCHL1070	Engineering Chemistry Lab	0	0	3	1.5
8	21CMCSL1080	Programming for Problem Solving Lab	0	0	3	1.5
9	21CMMSN1090	Constitution of India, Professional Ethics & Human Rights	2	0	0	0

TOTAL	**16**	**0**	**11**	**19.5**

I B.Tech II Semester Course Structure SITE21 Regulations						
Common for AI &ML,CE, CST,ECT,EEE &ME						
S.N	Subject Code	Course	L	T	P	C
1	21CMEGT2010	Technical English	3	0	0	3
2	21CMMAT2020	Engineering Mathematics – II	3	0	0	3
3	21CMEET2030	Basic Electrical Engineering	3	0	0	3
4	21CMCST2040	Python Programming	3	0	0	3
5	21ETETT2050	Network Analysis	3	0	0	3
5	21AMAMT2050 21CTCTT2050	Data Structures	3	0	0	3
5	21CEMET2050 21EEMET2050 21MEMET2050	Engineering Mechanics	3	0	0	3
6	21CMEGL2060	English Communication Skills Lab	0	0	3	1.5
7	21CMEEL2070	Basic Electrical Engineering Lab	0	0	3	1.5
7	21AMAML2070 21CTCTL2070	Data Structures Lab	0	0	3	1.5
8	21CEMEL2080 21EEMEL2080 21ETMEL2080 21MEMEL2080	Engineering Workshop Lab	0	0	3	1.5
9	21CMCHN2090	Environmental Science	2	0	0	0
TOTAL			**16**	**0**	**11**	**19.5**

TECHNICAL ENGLISH SEMESTER I/II			
Subject Code	21CMEGT1010/2010	IA Marks	30
Number of Lecture Hr/We	03	Exam Marks	70
Total Number of Lecture Hr	50	Exams Hours	03
Credits -03			
Course Objectives: To enable the students to learn and apply fundamental principles in Technical English & Communication by focusing on: 1. Technical English Vocabulary 2. Writing Skills 3. Common Errors in Writing 4. Nature and Style of Sensible Technical Writing 5. Writing Technical Reports and Letters			
Unit I			
Principles of Scientific Vocabulary • Principles of Scientific vocabulary: short and simple words-compact substitutes for wordy phrases-redundant words and expressions-Avoid hackneyed and stilted phrases, verbosity and incorrect use of words • The role of roots in word building, prefixes and suffixes, confusing words and expressions.			10 hours
Unit II			

Writing Skills • Distinguishing between academic and personal styles of writing • Use of clauses in technical phrases and sentences • Techniques of Sentence and paragraph writing • Measuring the clarity of a text through Fog Index or Clarity Index	10 hours
Unit III	
Common Errors in Writing • Subject-verb agreement and concord of nouns, pronouns and possessive adjectives • Common errors in the use of articles, prepositions, adjectives and adverbs • Punctuation • Technical Guidelines for Communication • Avoiding the pitfalls	10 hours
Unit IV	
Nature and Style of Sensible Technical Writing • Academic Writing Process • Describing, processes and products • Defining, Classifying • Effective use of charts, graphs, and tables	10 hours
Unit V	
Report writing and Letter writing • Writing Technical Reports, Précis writing ,Letter Writing & Essay writing	10 Hours
COURSE OUTCOMES On Completion of the course student will acquire 1. Ability to understand Scientific vocabulary and use them confidently 2. Familiarity with the basic principles of writing clear sentences and paragraphs 3. Ability to write error free simple technical passages 4. Knowledge of writing different writing styles 5. Confidence to write letters and technical reports clearly and coherently	
Question paper pattern: 1. Question paper consists of 10 questions. 2. Each full question carrying 14 marks. 3. Each full question will have sub question covering all topics under a unit. 4. The student will have to answer 5 full questions selecting one full question from each unit.	

Text Books

1. **Effective Technical Communication by Barun K Mitra**, Oxford University Publication

Non-detailed Text

1. **Karmayogi: A Biography of E Sreedharan by M S Ashokan**

Reference Books

1. *Communication Skills* by Sanjay Kumar & Pushpa Latha, OUP
2. Study Writing by Liz Hamp-Lyons and Ben Heasly, Cambridge University Press.
3. Remedial English Grammar by F T Wood, Macmillian 2007
4. *Practical English Usage* by Michael Swan Oxford University Press
5. *English Collocations in Use* by Michael McCarthy & Felicity O'Dell
6. *Effective Technical Communication* by Arsahf Rizvi,
7. *Essential English Grammar by Raymond Murphy, CUP, 2017*

Unit	Title	Text books/Reference Books
I	Principles of Scientific Vocabulary	Text Book 1/Reference Book 5
II	Writing Skills	Text Book 1Reference Book 2 Reference Book 6
III	Common Errors in Writing	Text Book 1,Reference Book 3 Reference Book 4,Reference Book 7
IV	Nature and Style of Sensible Technical Writing	Text Book 1,Reference Book 1 Reference Book 2
V	Report writing and Letter writing	Text Book 1,Reference Book 1 Reference Book 2

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
1	-	-	-	-	-	-	-	-	-	**2**	-	-
2	-	-	-	-	-	-	-	-	-	**2**	-	-
3	-	-	-	-	-	-	-	-	-	**2**	-	-
4	-	-	-	-	-	-	-	-	-	**2**	-	-
5	-	-	-	-	-	-	-	-	-	**2**	-	-
6	-	-	-	-	-	-	-	-	-	**2**	-	-

ENGINEERING MATHEMATICS-I
(Calculus & Differential Equations)
Common to all the branches
SEMESTER I

Subject Code	21CMMAT1010/1020	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03

Credits – 03

Course Objectives:

1. To solve the differential equations related to various engineering fields
2. To enlighten the learners in the concept of differential equations.
3. To familiarize with functions of several variables which is useful in optimization
4. To solve the partial partial differential equations of first order
5. To apply double integration techniques in evaluating areas bounded by region.

Unit -1	**Hours**
Differential Equations of first order and first degree : Linear differential equations - Bernoulli's equations – Exact equations and Equations reducible to exact form. Applications: Newton's law of cooling - Law of natural growth and decay - Orthogonal trajectories.	**10**
Unit -2	
Linear differential equations of higher order: Homogeneous and Non-homogeneous differential equations of higher order with constant coefficients – with non-	**10**

homogeneous term of the type e^{ax}, sin ax, cos ax, polynomials in x^n, e^{ax} V(x) and x^n V(x) – Method of Variation of parameters. Applications: LCR circuit.	
Unit – 3	
Partial differentiation: Introduction – Homogeneous function – Euler's theorem– Total derivative– Chain rule– Jacobian – Functional dependence –Taylor's and MacLaurin's series expansion of functions of two variables. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method.	**10**
Unit – 4	
PDE of first order: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solutions of first order linear (Lagrange) equation and nonlinear (standard types) equations.	**08**
Unit – 5	
Multiple integrals: Double and Triple integrals – Change of order of integration in double integrals – Change of variables to polar, cylindrical and spherical coordinates. Applications: Finding Areas and Volumes.	**12**
Course outcomes: On completion of this course, students are able to 1. Solve the differential equations related to various engineering fields (L3) 2. Solve the differential equations of higher order related to various engineering fields (L3) 3. familiarize with functions of several variables which is useful in optimization (L3) 4. Solve the partial partial differential equations of first order (L3) 5. Apply double integration techniques in evaluating areas bounded by region (L3).	
Question paper pattern: 1. Question paper consists of 10 questions. 2. Each full question carrying 14 marks. 3. Each full question will have sub question covering all topics under a unit. 4. The student will have to answer 5 full questions selecting one full question from each unit.	
Text Books: 1. B. S. Grewal, Higher Engineering Mathematics, 44th Edition, Khanna Publishers. 2. B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.	
Reference Books: 1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India. 2. Joel Hass, Christopher Heil and Maurice D. Weir, Thomas calculus, 14thEdition, Pearson. 3. Lawrence Turyn, Advanced Engineering Mathematics, CRC Press, 2013. 4. Srimantha Pal, S C Bhunia, Engineering Mathematics, Oxford University Press.	

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3	3	-	-	-	-	-	-	-	-	-	-
2	3	3	-	-	-	-	-	-	-	-	-	-
3	3	3	-	-	-	-	-	-	-	-	-	-
4	3	3	-	-	-	-	-	-	-	-	-	-

5	3	3	-	-	-	-	-	-	-	-	-	-
Course	3	3	-	-	-	-	-	-	-	-	-	-

BASIC ELECTRICAL ENGINEERING SEMESTER I/ II **(Common to All)**			
Subject Code	21CMEET103 0/2030	IA Marks	30
Number of Lecture Hours/Week	3L + 1T	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits-03			
Course Objectives: This course will enable student to 1. Understand basic electrical circuit operation. 2. Understand the concept of Alternating Voltage and Current. 3. Understand the operation of DC machines. 4. Understand the working of measuring instruments. 5. Understand the operation of different types of ac machines. 6. Understand the concept of Electrical Safety.			
Unit -1z			**Hours**
Basic Electrical Circuits: Basic definitions(Electric Charge, Current, Electro Magnet Force, Potential Difference; Electric Power and Energy) – types of network elements – Ohm's Law – Kirchhoff's Laws –series & parallel circuits - network theorems (Super position, Thevinen's, Norton's, Maximum power transfer theorems)			**10**
Unit -2			
AC Fundamentals & Basic Electromagnetic Laws: Study of AC Voltage and Current, RMS and Average Values, Three phase Star-Delta connections, Alternating Voltage applied to Pure Resistance, Inductance, Capacitance and their combinations, Concept of Power and Power Factor in AC Circuit. Concept of Magnetic Field, Magneto Motive Force (MMF), Permeability; Self and Mutual Induction, Basic Electromagnetic laws,			**10**
Unit – 3			
DC Machines: DC Machine -Principle of operation & construction – emf equation- torque equation - speed control methods – losses and efficiency – brake test. Applications of DC motors.			**10**
Unit – 4			
AC Machines: Single Phase Transformers - Construction and Operation- Principles - Classification - Applications-OC & SC test of single phase transformer-regulation & Efficiency. Three Phase Induction Motors: working principle-construction, speed- torque characteristics-losses and efficiency.			**10**
Unit – 5			
Electrical Safety: Electrical Shock and Precautions against it, Treatment of Electric Shock; Concept of Fuses and Their Classification, Selection and Application; Concept of Earthing.			**10**

Course Outcomes: The student should be able to 1. Understand basic electrical circuit operation. 2. Understand the concept of Alternating Voltage and Current. 3. Understand the operation of DC machines. 4. Understand the working of measuring instruments. 5. Understand the operation of different types of ac machines. 6. Understand the concept of Electrical Safety.	
Question paper pattern: 1. Question paper consists of 10 questions. 2. Each full question carrying 14 marks. 3. Each full question will have sub question covering all topics under a unit. 4. The student will have to answer 5 full questions selecting one full question from each unit.	
Text Books: i. Electrical Circuit Theory and Technology by John Bird, Routledge Taylor &Francis Group. ii. Principles of Electrical Machines by V.K. Mehta & Rohit Mehta, S.Chand and Company Limited.	
Reference Books: i. Theory and Performance of Electrical Machines by J.B. Gupta, S.K.Kataria & Sons. ii. A Textbook of Electrical Technology – Volume II: AC & DC Machines by B.L.Theraja & A.K. Theraja, S.Chand and Company Limited. iii. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition. iv. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah, TMH Publications v. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition. vi. Electrical Technology by Surinder Pal Bali, Pearson Publications.	

COURSE-OUTCOMES-TO-PROGRAM-OUTCOMES-MAPPING:

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	2	2	1									
CO2	2	2	1									
CO3	2	2	1									
CO4	2	2	1									
CO5	2	2	1									
CO6	2	2	1									
Overall Course	**2**	**2**	**1**									

PROGRAMMING FOR PROBLEM SOLVING SEMESTER I (Common to All)			
Subject Code	21CMCST1040	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits – 03			

COURSE OBJECTIVES:

The Objectives of Programming for problem solving are:

- To learn about C programming language syntax, semantics, and the runtime environment
- To be familiarized with general computer programming concepts like data types,conditionalstatements, loops and functions.
- To be familiarized with general coding techniques and procedure-oriented programming.

Unit -1	**Hours**
History & Hardware: (TB 1: 1-22) Computer Hardware, Components, Types of Software, Memory Units.**Introduction to Problem solving**: (TB1:33-50) Algorithm, Characteristics of Algorithms, PseudoCode, Flowchart, Types of Languages, Relation between Data, Information, Input and Output. **Basics of C**: (TB1:58-67)History and Features of C, Importance of C, Procedural Language, Compiler versus Interpreter, Structure of C Program, Program Development Steps, Programming Errors.	**10**
Unit -2	
Overview of C: (TB:68-125) Character Set, C-Tokens, Data Types, Variables, Constants, Operators, Operator Precedence and Associativity, Evaluation of C-Expressions, Input/output Functions. **Conditional Branching: (TB1:143-152)** if statement, if...else statement, Nested if...else statement, If…else…if ladder, switch statement. **Unconditional Branching: (TB1:174-175)** go to**. Control flow Statements:** break, continue**. Looping Constructs:** (TB1:156-170) do-while statement, while statement, for statement	**10**
Unit -3	
Arrays: (TB1:188-222) Introduction,1-DArrays,Character arrays and string representation, 2-D Arrays(Matrix), Multi-Dimensional Arrays. **Strings**: Working with Strings, String Handling Functions (both library and user defined). **Functions:** (TB1:230-260) Basics, Necessity and Advantages, Types of Functions, Parameter Passing Mechanisms, Recursion, Storage Classes, Command Line Arguments, Conversion from Recursion toIteration and Vice-Versa.	**10**
Unit -4	
Pointers: (TB1:288-347) Understanding Pointers, Pointer Expressions, Pointer and Arrays, Pointers and Strings, Pointers to Functions. **Dynamic Memory Allocation:** Introduction to Dynamic Memory Alloca-tion- malloc(), calloc(), realloc(), free(). **Structures and Unions:** (TB1:370-394) Defining a Structure, typedef, Advantage of Structure, Nested Structures, Arrays of Structures, Structures and Arrays, Structures and Functions, Structures and Pointers, Defining Unions, Self-Referential Structures, Bitfields, Enumerations.	**10**
Unit -5	
Preprocessing Directives: (TB2:325-333) Macro Substitution, File Inclusion, Conditional Compilation and Other Directives. **File Management In C:** (TB1:408-422) Introduction to File Management, Modes andOperations on Files, Types of Files, Error Handling during I/O Operations.	**10**

COURSE OUTCOMES:

On completion of the course student will be able to

- Demonstrate computer components, algorithms, translate them into programs.
- Choose thesuitable control structures for the problem to besolved.
- Make use of arrays, pointers, structures,and unions effectively.
- Organize reusable code in a program into functions.
- Demonstration of file operations.

Question paper pattern:

1 Question paper consists of 10 questions.
2 Each full question carrying 14 marks.
3 Each full question will have sub question covering all topics under a unit.
4 The student will have to answer 5 full questions selecting one full question from each unit.

TEXT BOOKS:

1) Programming in C ,Pradip Dey , Manas Ghosh, OXFORD
2) Programming in ,C Reema Thareja,Second Edition, OXFORD
3) Programming for Problem Solving, Behrouz A. Forouzan, Richard F.Gilberg, CENGAGE.

REFERENCE BOOKS:

1) Computer Fundamentals and Programming, Sumithabha Das, Mc Graw Hill.
2) Programming in C, Ashok N. Kamthane, Amit Kamthane, Pearson.

Course Outcomes to Program Outcomes Mapping

COs VS POs MAPPING (DETAILED; HIGH:3; MEDIUM:2; LOW:1):

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
1	2				3					2				3
2	2				3					2				3
3	2				3					2				3
4	2				3					2				3
5	2				3					2				3
Over all	2				3					2				3

COMPUTER AIDED ENGINEERING GRAPHICS

(Common to AI&M, CSE, CST,ECE,ECT & IT)

Subject Code	221AMMEL1050/1ECMEL1050/ 21ETMEL1050/21CSMEL1050/ 21CTMEL1050/21ITMEL1050	IA Marks	30
Number of Lecture Hr/W	1(L)+0(T)+4(P)	Exam Marks	70
Total Number of Leccturer Hr	50	Exam Hours	3

Credits – 03

COURSE OBJECTIVES: On successful completion of this course, Students should be able to

1. draw engineering objects with appropriate lettering and dimensioning using various commands of AutoCAD
2. draw geometric constructions, polygons, various types of curves and scales
3. construct multi views of points, lines and planes
4. construct multi views of solids by orthographic projection method
5. convert the orthographic views into isometric views and vice versa by 2D- Commands in AutoCAD

Unit -1: INTRODUCTION	**Hours**

Introduction to Engineering Graphics, sheet sizes & layouts (ISO), line types with application, scales, drawing sheet sizes, title block, shee markings, dimensioning

AutoCAD: Overview of Computer Graphics, starting with auto CAD, templates, menu- bar, drawing area, option buttons (drawing settings), command line area, draw commands (point, line, polyline, circle, circular arc, ellipse, elliptical arc, spline fit, spline CV, rectangle & polygon), modify commands (move, rotate, trim/extend, erase, copy, mirror, chamfer/ fillet, explode, stretch, scale, array & offset), layers (layering, setting up and use of layers, layers to create drawings

and create, edit and use customized layers) & annotation commands (applying dimensions/ annotations to drawings), drawing settings (grid, snap-mode, ortho, polar tracking, object snap, iso-draft), dimension settings (edit/ modify dimension style: text size & style, arrow size & style, line types & thickness and setting other parameters of dimension text, dimension lines & extension lines) Printing documents to paper and to PDF using plot command.	12
Unit -2: CONICS AND SCALES	
Geometrical constructions, polygons, conic sections – ellipse, parabola, hyperbola (Eccentricity method only); scales – plain, diagonal and vernier scales**.**	10
Unit – 3: ORTHOGRAPHIC PROJECTION OF POINTS, LINE AND PLANES	
Principles of Orthographic Projections, Projections of Points, projection of lines (inclined to HP & VP); Projections of planes (inclined to one reference plane).	10
Unit – 4: ORTHOGRAPHIC PROJECTION OF SOLIDS	
Projections of Regular Solids- Prisms, Pyramids, Cylinder & Cone (simple position and inclined to one reference plane only)	8
Unit-5: ISOMETRIC PROJECTIONS AND ORTHOGRAPHIC VIEWS	
Isometric Projections and orthographic views: Principles of isometric projection – isometric scale, isometric views, conventions; isometric views of lines, planes, simple solids, Conversion of Isometric Views to Orthographic Views and vice-versa	10

COURSE OUTCOMES: On successful completion of this course, students will be able to

1. understand the BIS conventions of engineering drawing with basic concepts & draw engineering objects with appropriate lettering and dimensioning using various commands of AutoCAD
2. construct polygons, various types of Curves and scales used engineering application like maps, buildings, bridges
3. draw multi views of points, lines and planes by orthographic projection method
4. draw multi views of solids by orthographic projection method
5. convert the orthographic views into isometric views and vice versa by 2D- Commands in AutoCAD

Text Books

1. N.D. Bhatt & V.M. Panchal, Engineering Drawing, 48th edition, 2005, Charotar Publishing House, Gujarat
2. R.B.Choudary, Engineering Drawing with AutoCAD 2008, Anuradha Publishers

Reference Books

1. S. Trymbaka Murthy, Computer Aided Engineering Drawing, I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised editio 2006.
2. K.R. Gopalkrishna, Engineering Graphics, 32nd edition, 2005 Subash Publishers, Bangalore

COURSE OUTCOMES TO PROGRAM UTCOMES MAPPING:

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
1	2									3				
2	2									3				
3	2									3				
4	2									3				
5	2				3					3				3
Overall	2				3					3				3

ENGINEERING GRAPHICS (Common to CE,EE &ME)			
Subject Code	21CEMET1050/21EEMET1050 21MEMET1050	IA Marks	30
Number of Lecture	1(L)+04(P)	Exam Marks	70

Hr/Wk			
Total Number of Lecture Hours	50	Exam Hours	03

Credits – 03

COURSE OBJECTIVES: On successful completion of the course, **s**tudents should be able to

1. construct polygons, scales, engineering curves (parabola, ellipse, hyperbola, cycloids, involutes)
2. draw orthographic projections of points, lines and planes.
3. draw the orthographic projections of simple solids
4. draw sectional views of solids
5. convert given isometric view into orthographic view and vice versa using AutoCAD software.

Unit -1	**Teaching Hours**
Introduction to Engineering Drawing covering Principles of Engineering Graphics and their significance, usage of drawing instruments, lettering, Conic sections – Ellipse, Parabola, Hyperbola (Eccentricity method only); plain Cycloid, and Involutes; Scales – Plain and Vernier scales only.	10
Unit -2	
Projections of Points, Projections of straight lines and the line inclined to bothplanes; Projections of planes (inclined to one reference plane only).	08
Unit – 3	
Projections of regular polyhedrons – tetrahedron, hexahedron, octahedron (axis inclined to one reference plane only).Projections of irregular polyhedrons – Prisms, Pyramids, Cones and Cylinders(axis inclined to one reference plane only).	08
Unit – 4	
Sectional Views of Right Angular Solids covering Prism, Cylinder, Pyramid andCone	12
Unit – 5	
Introduction to AutoCAD - The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension Tools), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and Windows. Isometric Projections, Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids;Conversion of Isometric Views to Orthographic Views and Vice-versa.	12

COURSE OUTCOMES: On the successful completion of this course, the students will be able to

1. construct polygons, scales and engineering curves
2. draw the orthographic views of points, lines and planes
3. construct the projections of regular and irregular polyhedrons
4. draw the sectional views of solids
5. draw isometric/orthographic views using AutoCAD

Text/Reference Books

1. N.D. Bhatt, Engineering Drawing, Charotar Publications
2. R.B.Choudary, Engineering Drawing, Anuradha Publishers
3. Agarwal & Agarwal, Engineering Drawing, Tata McGraw Hill Publishers
4. K.L.Narayana & P.Kannaiah, Engineering Drawing, Scitech Publishers

5. K.C. John, Engineering Graphics for Degree, PHI Publishers
6. PI Varghese, Engineering Graphics, Mc GrawHill Publishers
7. K Venugopal, V. Prabhu Raja, Engineering Drawing + AutoCAD, New Age

COs VS POs MAPPING (DETAILED; HIGH:3; MEDIUM:2; LOW:1):

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
1	2				3					2				3
2	2				3					2				3
3	2				3					2				3
4	2				3					2				3
5	2				3					2				3
Over all	2				3					2				3

ENGINEERING PHYSICS
(Semiconductor Physics & Semiconductor Optoelectronics)
(Common for AI&MLCSE,CST,EEE&IT)

Subject Code	21AMAMT1020/21CTPHT1020/21EEPHT2020/21CSPHT2020/ 21ITPHT2020	IA Marks	30
Number of Lecture Hours/Week	03	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03

Credits – 03

COURSE OBJECTIVES:
The objectives of this course, help the students

- **To impart** the knowledge of Quantum mechanics for understanding the conducting mechanism in solids.
- **To understand** the physics of semiconductors and their working mechanism for their utility.

Unit -1	
Quantum Mechanics: Dual nature of matter, Significance and properties of wave function, Schrodinger time independent wave equations, Particle in a one dimensional infinite potential well. **Free Electron Theory and Band theory:** Classical free electron theory (Qualitative with discussion of merits and demerits), Quantum free electron theory, Equation for electrical conductivity based on quantum free electron theory, Fermi-Dirac distribution, Density of states (3D), Fermi energy; Band theory of Solids - Bloch's theorem; Kronig - Penney model (Qualitative), Effective mass of electron.	**Hours – 12**
Unit -2	
Semiconductors: Introduction; Intrinsic semiconductors- Density of charge carriers, Electrical conductivity, Fermi level; Extrinsic semiconductors- density of charge carriers, dependence of Fermi energy on carrier concentration and temperature; Drift and diffusion currents- Einstein's equation; Hall effect- Hall coefficient- Applications of Hall effect.	**Hours – 11**
Unit – 3	
Light interaction with matter: Stimulated absorption, spontaneous emission, and stimulated emission, Einstein coefficients, Population inversion, Characteristics of lasers, Pumping mechanisms- Ruby laser, He-Ne laser, Direct and indirect band gap semiconductors, Optical transitions in bulk semiconductors Construction and working of laser diode and their applications.	**Hours – 10**
Unit – 4	
Semiconductor light emitting diodes (LEDs) : Injection Electro luminescence; Construction and working of LED, characteristics of LED's -Internal efficiency, Extraction efficiency, External Efficiency, Power conversion efficiency, Responsivity & I V characteristics, Double junction Hetero structure and its importance, LED configurations-SLED's and ELED'S, applications of LEDs.	**Hours – 9**
Unit – 5	
Photo diodes: Introduction- construction and working principle of PN photodiode, P-i-N photodiode, and Avalanche photodiode (APD), and their IV characteristics, Photovoltaic effect, construction and working of Solar cell, fill factor and efficiency of solar cell.	**Hours – 8**

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO 12	PSO 1	PSO 2	PSO 3
1	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
3	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
5	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
6	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ENGINEERING PHYSICS (Introduction to Mechanics)			
Subject Code	21CEPHT2020 21MEPHT2020	IA Marks	30
Number of Lecture Hours/Week	03	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits – 03			
COURSE OBJECTIVES: The objectives of this course, help the students • **To explore** the knowledge of fundamental vibrations. • **To impart** the concept of Newton's law of motion in central force field. • **To enable** the students to understand the Rigid body dynamics. • **To study** the structure- property relationship exhibited by solid materials with in the elastic limits.			
Unit -1			
One Dimensional motion: Newton's Equation of motion in one dimension-examples of particle falling under a gravity, Simple harmonic motion (Mechanical oscillator) and its characteristics, Damped harmonic motion (Mechanical oscillator) and damping conditions (over-damped, critically damped and under damped conditions), Forced oscillations (Mechanical oscillator) - un damped and damped conditions, Resonance.			**11**

Unit -2	
Two dimensional motions: Two Dimensional motion in the Cartesian coordinate system – Example of Projectile motion without air drag; Two Dimensional motion in Radial polar coordinate system- Example of planetary motion, Kepler's laws and their deduction, Newton equations for variable mass system (rocket), Calculations of Centre of mass and its characteristics .	**11**
Unit -3	
Conservative & Non Conservative motion: Invariance of Newton's equations-Under shift of coordinate system - Galileo transformation - Accelerating frames of reference, Reference frame rotating with a constant angular velocity, Centrifugal Force-Apparent gravitational acceleration, Coriolis force -Effect of Coriolis force on a freely falling body. Conservative and Non Conservative forces.	**09**
Unit – 4	
Rigid body dynamics: Angular momentum of a single particle and system of particle, conservation of angular momentum; Equation of motion of a rigid body; Kinetic energy of a rigid rotating body; Moment of Inertia, Calculations of moment of inertia-Rectangular lamina and Uniform cylinder (rod, circular disc); Parallel axis theorem and perpendicular axis theorem and their applications; Euler's equation describing rigid body motion.	**10**
Unit – 5	
Elasticity: Stress, Strain, Hook's law, stress strain curve, generalized Hook's law with and without thermal strains for isotropic materials, Factors affecting the elastic behavior, energy stored per unit volume in stretched wire, different types of moduli and their relations, bending of beams, Bending moment of a beam, Depression of cantilever.	**09**

COURSE OUTCOMES:

On completion of the course student will able to

1. **Distinguish** the various harmonic motions and resonance.
2. **Apply** Newton's law of motion to understand the motions of mechanical systems.
3. **Verify** the invariance of Newton's equation of motion.
4. **Understand** the concept of conservative and non-conservative motions.
5. **Formulate** the rigid body dynamics.
6. **Study** the structure- elastic property correlation under load within the elastic limits.

QUESTION PAPER PATTERN:

1. It will have 5 questions with internal choice.
2. Each question carries 14 marks.
   Each full question comprises sub questions covering all topics under a unit.

TEXT BOOKS:

1. Introduction to Mechanics — MK Verma.
2. A Text Book of Engineering Physics- M.N.Avadhanulu, 11e , S.CHAND,

REFERENCE BOOKS:

1. S.L Gupta& D.L. Gupta, Unified physics
2. An Introduction to Mechanics — D Kleppner & R Kolenkow
3. Principles of Mechanics — JL Synge & BA Griffiths.
4. Engineering Physics- Ch. Srinivas, Ch. Sesubabu Cengage learning.

WEB SOURCES:

1. W1: http://www.physics.org/news.asp
2. W2: http://www.phys.lsu.edu/newwebsite/lecturedemo/
3. W3: http://www.nptl.ac.in

4. W3: American Association of Physics Teachers
   [http://www.aapt.org/]
5. W3: Society of Physics Students
   [http://www.aip.org/education/sps/sps.htm]

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
3	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
5	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
6	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ENGINEERING PHYSICS (Introduction to Electromagnetic Theory)			
Subject Code	**21ETPHT1020/21ECPHT2020**	IA Marks	30
Number of Lecture HR/Week	03	Exam Marks	70
Total Number of Lecture Hr	50	Exam Hours	03
		Credits – 03	

COURSE OBJECTIVES:

The objectives of this course, help the students:

- **To impart** the knowledge of Electrostatics and Magneto statics in vacuum and in dielectric medium.
- **To impart** the knowledge of Maxwell's equations to understanding the propagation of EM waves.

Unit -1	**Hours**
Electrostatics in vacuum: Coulomb's law, Electrostatic field (E) and Electrostatic potential or Scalar potential (V) due to a point charge, Equipotential surfaces, Relation between E&V, Gauss law in electrostatics, Applications of Gauss law-Calculation of Electric field strength and potential due to the uniform charge distribution over a (i) wire (ii) sheet (c) solid sphere and (e) solid cylinder, Divergence and Curl of electrostatic field, Energy of a discrete and continuous charge distribution.	**10**

Unit -2	
Electrostatics in dielectric medium: Electrostatic field and potential due to a Electric dipole, Types of dielectrics, Electric displacement (D), Dielectric polarization (P), Dielectric polarizability, Susceptibility and Dielectric constant, Relation between D, E and P, Bound charge due to electric polarization, Boundary conditions at interface of dielectric media, Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field- Clausius-Mossotti equation.	**10**
Unit – 3	
Magneto statics: Biot- Savart's law, Magnetic field due to long straight current carrying conductor, Magnetic field on the axis of a current loop, Helmholtz coils, Magnetic field induction due to a solenoid, Divergence of magnetic field (Gauss law in magneto statics), Curl of Magnetic field (Ampere's circuital law); Magnetic Scalar and Vector potential, Motion of charged particle in electrical field and in a magnetic field, Hall effect.	**11**
Unit – 4	
Electromagnetic induction: Electromotive force, Faradays laws of electromagnetic induction, Differential form of Faraday's law, motional EMF; Relation between electric potential and magnetic vector potential using faraday's law, Lenz's law, Self-inductance of Solenoid, Energy density stored in an inductor, Continuity equation for current densities; Displace current; Modified Amperes circuital law.	**10**

Unit – 5	
Maxwell's equations and EM waves: Maxwell's equation in vacuum and non-conducting medium; Wave equation of EM waves; Plane electromagnetic waves in vacuum, their transverse nature; Relation between electric and magnetic fields of an electromagnetic wave; Energy density in EM fields, Pointing Theorem, polarization of EM waves, Momentum carried by electromagnetic waves and radiation pressure.	**9**

COURSE OUTCOMES:

On completion of the course student will able to

1. **Formulate** the electric field and electric potential using fundamental laws in electrostatics.
2. **Understand** the microscopic behavior of dielectrics in electrical field**.**
3. **Calculate** the static magnetic fields due to current carrying conductors.
4. **Estimate** the physical parameters of a system using the basic laws of electricity and magnetism.
5. **Recognize** the relation between electrical fields and time varying magnetic fields.
6. **Apply** Maxwell's equations for the propagation of EM waves.

Question paper pattern:

1. Question paper consists of 10 questions.
2. Each full question carrying 14 marks.
3. Each full question will have sub question covering all topics under a unit.
4. The student will have to answer 5 full questions selecting one full question from each unit.

TEXT BOOKS:

1. Saroj K. Dash, Smaruti R. Khuntia, Fundamentals of Electromagnetic theory.
2. David Griffiths, Introduction to Electrodynamics.

REFERENCE BOOKS:

1. W. Saslow, Electricity, magnetism and light.
2. S.L Gupta& D.L. Gupta, Unified physics.
3. Ch. Srinivas, Ch. Seshubabu, Engineering Physics, Cengage learning.

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
3	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
5	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
6	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ENGINEERING CHEMISTRY			
Subject Code	21CMCHT1030/ 21CMCHT2030	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

COURSE OBJECTIVES:

The objectives of this course, help the students to

1. Explain the mechanism of corrosion
2. Interpret various boiler troubles and importance of water quality standards.
3. Learn preparation of semiconducting materials, nano materials and liquid crystals – their applications
4. Acquire knowledge on nonconventional energy resources and different types of batteries
5. Know various spectroscopic techniques.
6. Acquire knowledge on volumetric analysis.

Unit -1	**Hours**
Electrochemistry and Corrosion **Electro chemistry:** Introduction, electrode potential, standard electrodes – Hydrogen and Calomel electrodes, Nernst equation and applications. **Corrosion:** Introduction, Mechanism of Wet chemical corrosion, control methods – proper designing, cathodic protection- Sacrificial anodic and impressed current cathodic protection.	**9**
Unit -2	
Water Chemistry and Surface Properties **Water chemistry:** Surface and subsurface water quality parameters – turbidity, pH, total dissolved salts, chloride content, Hardness of water, Temporary and Permanent hardness, Units, determination of hardness by complexometric method. Boiler troubles, Caustic Embrittlement, Priming and foaming, Boiler corrosion. Break point chlorination. **Surface properties:** Determination of surface tension and viscosity of liquids.	**9**
Unit -3	
Material Chemistry **Non-elemental semiconducting materials:** Stoichiometric, controlled valency and chalcogen photo/semiconductors and preparation of semiconductors (distillation, zone refining, Czochralski crystal pulling, epitaxy, diffusion and ion implantation). **Liquid crystals:** Introduction, types and applications. **Nanoparticles**: Introduction, preparation methods – Sol-gel method, Chemical reduction method – Preparation of carbon nanotubes (Arc discharge, chemical vapour deposition and laser ablation methods) properties and applications.	**10**
Unit -4	

ENERGY SOURCES: **Non-conventional energy sources,** Design, working, schematic diagram, advantages and disadvantages of photovoltaic cell, hydropower, geothermal power, tidal and wave power, ocean thermal energy conversion. **Batteries and fuel cells:** Primary and secondary batteries - Dry cell, Lead Acid Cell, Lithium ion battery and Zinc air cells and fuel cells - H_2-O_2, CH_3OH-O_2, Phosphoric acid and molten carbonate.	**10**
Unit -5	
SPECTROSCOPY AND CHROMATOGRAPHY TECHNIQUES Regions of electromagnetic spectrum - Principles of vibrational and rotational spectroscopy. Vibrational and rotational spectroscopy of diatomic molecules: Rigid diatomic molecules - selection rule - simple Harmonic Oscillator - diatomic vibrating rotator. Nuclear magnetic resonance – Principle and Instrumentation. Principles of chromatography – Thin Layer & Paper Chromatography.	**10**

COURSE OUTCOMES:

On completion of the course student will be able to

1. Interpret the mechanism of corrosion
2. Summarize the problems faced in industries due to boiler troubles.
3. Recall the properties and applications of advanced materials.
4. Summarize the advantages of non-conventional energy resources and batteries.
5. Able to gain knowledge on spectroscopic techniques and the ranges of the electromagnetic spectrum used for exciting different molecular energy levels.
6. Determine the strength of acid, base and some elements by volumetric and instrumental analysis.

Question paper pattern:

1. Question paper consists of 10 questions.
2. Each full question carrying 14 marks.
3. Each full question will have sub question covering all topics under a unit.
4. The student will have to answer 5 full questions selecting one full question from each unit.

TEXT BOOKS:

1. P.C. Jain and M. Jain "**Engineering Chemistry**", 15/e, Dhanpat Rai & Sons, Delhi, (Latest edition).
2. Shikha Agarwal, "**Engineering Chemistry**", Cambridge University Press, New Delhi, (2019).
3. S.S. Dara, "**A Textbook of Engineering Chemistry**", S.Chand & Co, (2010).
4. Shashi Chawla, "Engineering Chemistry", Dhanpat Rai Publicating Co. (Latest edition).
5. Fundamentals of Molecular Spectroscopy, by C. N. Banwell.

REFERENCE BOOKS:

1. K. Sesha Maheshwarammam and Mridula Chugh, "**Engineering Chemistry**", Pearson India Edn.
2. O.G. Palana, "**Engineering Chemistry**", Tata McGraw Hill Education Private Limited, (2009).
3. CNR Rao and JM Honig (Eds) "**Preparation and characterization of materials**" Academic press, New York (latest edition)

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
1	3	-	-	-	-	-	-	-	-	-	-	-
2	-	3	-	-	-	-	-	-	-	-	-	-
3	-	3	-	-	-	-	-	-	-	-	-	-
4	-	3	-	-	-	-	-	-	-	-	-	-
5	-	-	3	-	-	-	-	-	-	-	-	-
6	3	-	-	-	-	-	-	-	-	-	-	-
Course	2	2	1	-	-	-	-	-	-	-	-	-

ENGINEERING MATHEMATICS-II (Linear algebra, Laplace transforms & Numerical Methods) Common to all the branches			
Subject Code	21CMMAT2010/2010	IA Marks	30
Number of Lecture Hours/Week	03	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits – 03			

Course objectives:

To enable students to apply the knowledge of Mathematics in various engineering fields by making them to learn the following'

1. To develop the use of matrix algebra techniques that is needed by engineers for practical applications and solve system of linear equations
2. To find the inverse and power of a matrix by Cayley-Hamilton theorem and reduce the Quadratic form
3. To solve initial value problems by using Laplace transforms
4. To find the solution of algebraic/ transcendental equations and also interpolate the functions.
5. To apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations.

Unit -1	**Hr**
Solving systems of linear equations: Rank of a matrix by echelon form and normal form – Solving system of homogeneous and non homogeneous linear equations – Gauss Elimination method- Jacobi and Gauss-Seidel methods for solving system of equations numerically.	**10**

Unit -2	
Eigen values and Eigen vectors, Cayley–Hamilton theorem and Quadratic forms: Eigen values and Eigen vectors and properties- Cayley-Hamilton theorem (without proof) – Reduction to Diagonal form – Quadratic forms and nature of the quadratic forms – Reduction of quadratic form to canonical forms by orthogonal transformation, Diagonalisation and Lagrange's reduction	**10**
Unit – 3	
Laplace Transforms: Laplace transforms – Definition and Laplace transforms of some certain functions– Shifting theorems – Transforms of derivatives and integrals – Unit step function –Dirac's delta function Periodic function – Inverse Laplace transforms– Convolution theorem (without proof). Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.	**10**
Unit – 4	
Numerical Methods: Introduction - Method of false position - Newton-Raphson method (One Variable) Introduction– Errors in polynomial interpolation – Finite differences– Forward differences– Backward differences –Central differences – Relations between operators – Newton's forward and backward formulae for interpolation – Interpolation with unequal intervals – Lagrange's interpolation formula.	**10**
Unit – 5	
Numerical integration, Solution of ordinary differential equations with initial conditions: Trapezoidal rule - Simpson's 1/3rd and 3/8th rule - Solution of initial value problems by Taylor's series– Picard's method of successive approximations– Euler's method – Runge -Kutta method (second and fourth order).	**10**

Course outcomes:

On completion of this course, students are able to,

1. Develop the use of matrix algebra techniques that is needed by engineers for practical applications and solve system of linear equations (L6)
2. Find the inverse and power of a matrix by Cayley-Hamilton theorem and reduce the Quadratic form (L3)
3. Solve initial value problems by using Laplace transforms (L3)
4. Find the solution of algebraic/ transcendental equations and also interpolate the functions(L3)
5. Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3).

Question paper pattern:

5. Question paper consists of 10 questions.
6. Each full question carrying 14 marks.
7. Each full question will have sub question covering all topics under a unit.
8. The student will have to answer 5 full questions selecting one full question from each unit.

Text Books:

1. B. S. Grewal," Higher Engineering Mathematics", Khanna publishers, 44th Edition, 2016.
2. Kreyszig, "Advanced Engineering Mathematics " - Wiley, 9th Edition, 2013.
3. B.V.Ramana "Higher Engineering M athematics" Tata Mc Graw-Hill, 2006

Reference Books:

1. Dr.K.V.Nageswara Reddy and Dr.B.Rama Bhupal Reddy, "Engineering Mathematics, Volume II" Scitech Publications, 2017.
2. Steven C. Chapra, Applied Numerical Methods with MATLAB for Engineering and Science, Tata McGraw Hill Education, 4th Edition, 2018
3. M. K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publications, 3rd Edition, 2020.
4. Lawrence Turyn, Advanced Engineering Mathematics, CRC Press, 1st Edition 2014.

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	3	3	-	-	-	-	-	-	-	-	-	-
2	3	3	-	-	-	-	-	-	-	-	-	-
3	3	3	-	-	-	-	-	-	-	-	-	-
4	3	3	-	-	-	-	-	-	-	-	-	-
5	3	3	-	-	-	-	-	-	-	-	-	-
Course	3	3	-	-	-	-	-	-	-	-	-	-

PYTHON PROGRAMMING Common to All SEMESTER II			
Subject Code	21CMCST2040	Internal Marks	30
Number of Lecture Hours/Week	1	External Marks	70
Total Number of Lecture Hours		Exam Hours	03
Pre-requisite		Credits – 03	

The Objectives of Python Programming are:

- To learn about Python programming language syntax, semantics, and the runtime environment
- To be familiarized with general computer programming concepts like data types, conditionalstatements, loops and functions.
- To be familiarized with general coding techniques and object-oriented programming andGraphical User Interfaces.

Unit -1	**Hours**

Introduction:(TB1:22-30,TB2:1.1-1.4,TB2:1.21-1.33) Introduction Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Variables, Reading Input fromthe Keyboard, Operators. **Data Types, and Expression: (TB1:41-59)** Strings Assignment, and Comment, Numeric Data Types andCharacter Sets, Type conversions, Expressions, Using functions and Modules. **Decision Structures and Boolean Logic:(TB1:77-85)** if, if-else, if-elif-else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables.	08

Unit -2	
Control Statement:(TB1:65-72, TB1:86-91) Definite iteration for Loop Formatting Text for output, Selection if and if else Statement ConditionalIteration, The While Loop, Nested Loops. **Strings and Text Files:(TB1:103-125)** Accessing Character and Substring in Strings, Data Encryption, Strings and Number Systems, String Methods, Text Files.	10
Unit -3	
List and Dictionaries:(TB1:135-145, TB1:153-158) Lists,Tuples,Sets, Dictionaries. **Design with Function:(TB1:146-149, TB1:169-190)**Functions as Abstraction Mechanisms, Problem Solving with Top Down Design, Design with Recursive Functions, Case Study Gathering Information from a File System. **Modules**: **(TB2:8.1-8.5)** Modules, Standard Modules, Packages.	12
Unit – 4	
File Operations:(TB1:122-123) Reading config files in python, Writing log files in python, Understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and writelines(). **Object Oriented Programming:(TB2:5.1-5.20, TB2:6.1-6.17)**Concept of class, object and instances,Constructor, class attributes and destructors, Inheritance. **Design with Classes:(TB1:294-301, TB1:309-330)** Objects and Classes, Data modeling Examples, CaseStudy an ATM.	12
Unit – 5	
Errors and Exceptions:(TB2:7.1-7.8) Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions, User-defined Exceptions, Defining Clean-up Actions, Redefined Clean-up Actions**.** **Graphical User Interfaces:(TB1:245-288)** The Behavior of Terminal Based Programs and GUI -BasedPrograms, Coding Simple GUI-Based Programs, Other Useful GUI Resources.	8

Course outcomes:

On completion of the course student will be able to

- Able to learn the fundamental concepts in the Python language
- Implementation of python iterative statements and strings
- Demonstrate python lists, dictionaries and functions
- Understand the concepts of modules and packages in python
- Complete coding challenges relating to object-oriented programming's essential concepts and techniques.
- Apply variety of error handling and GUI programming techniques

Question paper pattern:

1. Question paper consists of 10 questions.
2. Each full question carrying 14 marks.
3. Each full question will have sub question covering all topics under a unit.
4. The student will have to answer 5 full questions selecting one full question from each unit.

Text Books

1. Fundamentals of Python First Programs, Kenneth. A. Lambert, Cengage.
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.

Reference Books:

1)Introduction to Python Programming, Gowrishankar.S, Veena A, CRC Press.

2)Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

E-Resources:

https://www.tutorialspoint.com/python3/python_tutorial.pdf

Course Outcomes to Program Outcomes mapping:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	3
2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	3
3	2	2	3	-	2	-	-	-	-	-	-	-	-	-	3
4	3	2	3	-	3	-	-	-	-	-	-	-	-	-	2
5	3	3	3	-	2	-	-	-	-	-	-	-	-	-	2
6	3	2	3	-	3	-	-	-	-	-	-	-	-	-	3
Course	**3**	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**

NETWORK ANALYSIS			
Subject Code	21ECECT2050/ 21ETETT2050	Internal Marks	30
Number of Lecture Hours/Week	03	External Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Pre-requisite		Credits – 03	

COURSE OBJECTIVES:

- To understand the basic concepts on RLC circuits.
- To know the behavior of the steady states and transients states in RLC circuits.
- To know the basic Laplace transforms techniques in periods' waveforms.
- To understand the two port network parameters.
- To understand the properties of LC networks and filters.

Unit -1	**Hours**
Fundamentals and Network Topology: Definitions of branch, node, tree, planar, non-planar graph, incidence matrix, basic tie set schedule, basic cut set schedule. Definitions of terms associated with periodic functions: Time period, Angular velocity and frequency, RMS value, Average value, Form factor and peak factor- problem solving, Phase angle, Phasor representation, Addition and subtraction of phasors, mathematical representation of sinusoidal quantities, explanation with relevant theory, problem solving. Principal of Duality with examples.	08
Unit -2	
Electric Circuits: Review of Kirchhoff's laws, Mesh analysis and Nodal analysis problem solving including dependent sources also. **Network Theorems:** Thevinin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegens- problem solving using dependent sources also.	10
Unit -3	
Steady State Analysis of A.C Circuits: Impedance concept, phase angle, series R-L, R-C, R-L- C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, problem solving. **Transients:** First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, Evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots. Solutions using Laplace transform method.	12
Unit – 4	
Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, Condition for maximum impedance, current in anti resonance, Bandwidth of parallel resonance, general case-resistance present in both branches, anti resonance at all frequencies. **Coupled Circuits:** Coupled Circuits: Self inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, Conductively coupled equivalent circuits- problem solving.	12
Unit – 5	
Two-port Networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h-parameters, Inverse h-parameters, Inverse Transmission line parameters, Relationship between parameter sets, Parallel connection	8

of two port networks, Cascading of two port networks, series connection of two port networks, problem solving including dependent sources also.	

Course outcomes:

On completion of the course student will be able to

1. Gain the knowledge on basic network elements.
2. Will analyze the RLC circuits' behavior in detailed.
3. Analyze the performance of periodic waveforms.
4. Gain the knowledge in characteristics of two port network parameters (Z,Y,ABCD,h&g).
5. Analyze the filter design concepts in real world applications.

Question paper pattern:

1. Question paper consists of 10 questions.
2. Each full question carrying 14 marks.
3. Each full question will have sub question covering all topics under a unit.
4. The student will have to answer 5 full questions selecting one full question from each unit.

Text Books:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rdEdition,2000.
2. Network Analysis by K.Satya Prasad and S Sivanagaraju,CengageLearning
3. Electric Circuit Analysis by Hayt andKimmarle,TMH

Reference Books:

1. Network lines and Fields by John. D. Ryder 2ndedition, Asiapublishinghouse.
2. Basic Circuit Analysis by DR Cunninghan, Jaico Publishers. 3.Network Analysis and Filter Design by Chadha,UmeshPublications.

Course Outcomes to Program Outcomes mapping:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	3
2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	3
3	2	2	3	-	2	-	-	-	-	-	-	-	-	-	3
4	3	2	3	-	3	-	-	-	-	-	-	-	-	-	2
5	3	3	3	-	2	-	-	-	-	-	-	-	-	-	2
6	3	2	3	-	3	-	-	-	-	-	-	-	-	-	3
Cour se	**3**	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**

S.No.	Unit Name	Text Book/ Reference	Chapte r No.
1.	Fundamentals and Network Topology	T2 &R1	1
2.	Electric Circuits and Network Theorems	T2&R1	2 &3
3.	Steady State Analysis of A.C Ckts &Transient	T2,T1,R2	4,5 &6
4.	Resonance and Coupled Circuits	T2,R2	6,7& 8
5.	Two-port Networks	T1	4 & 5

DATA STRUCTURES Common to AI&ML,CSE.CST&IT)			
Subject Code	21CSAMT2050/21CSCST2050 21CSCT2050/21ITITT2050	Internal Marks	30
Number of Lecture Hours/Week	03	External Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Pre-requisite		Credits – 03	

COURSE OBJECTIVES:

- Introduce the fundamental concepts of data structures and abstract data types.
- Emphasize the importance of data structures in developing and implementing efficient algorithms.
- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms.

Unit -1	**Hours**
Data Structures -(RB3: 1.1-1.20) Definition, Classification of Data Structures, Operations on Data Structures, Abstract Data Type (ADT), Preliminaries of algorithms. Time and Space complexity.**Searching(TB1: 424-434)**- Linear search, Binary search, Fibonacci search.**Sorting (TB1: 434-460)**- Insertion sort, Selection sort, Exchange (Bubble sort, quick sort), distribution (radix sort), merging (Merge sort) algorithms.	08
Unit -2	
Linked List: (TB1: 162-211) Introduction, Single linked list, Representation of Linked list in memory, Operations on Single Linked list-Insertion, Deletion, Search and Traversal ,Reversing Single Linked list, Applications on Single Linked list- Polynomial Expression Representation, Addition and Multiplication, Sparse Matrix Representation using Linked List, Advantages and Disadvantages of Single Linked list, Double Linked list-Insertion, Deletion, Circular Linked list-Insertion, Deletion.	10
Unit -3	
Queues: (TB1: 253-275) Introduction to Queues, Representation of Queues-using Arrays and using Linked list, Implementation of Queues-using Arrays and using Linked list, Application of Queues, Circular Queues, Deques, Priority Queues, Multiple Queues. **Stacks:(TB1 : 219-243)**Introduction to Stacks, Array Representation of Stacks, Operations on Stacks, Linked list Representation of Stacks, Operations on Linked Stack, Applications-Reversing list, Factorial Calculation, Infix to Postfix Conversion, Evaluating Postfix Expressions.	12
Unit – 4	
Trees:(TB1: 279-306) Basic Terminology in Trees, Binary Trees-Properties, Representation of Binary Trees using Arrays and Linked lists. Binary Search Trees- Basic Concepts, BST Operations: Insertion, Deletion, Tree Traversals, Applications-Expression Trees, Heap Sort, Balanced **[Binary Trees (RB3: 7.50-7.57)**- AVL Trees, Insertion, Deletion and Rotations.]	12
Unit – 5	
Graphs: (TB1: 383-419) Basic Concepts, Representations of Graphs-Adjacency Matrix and using Linked list, Graph Traversals (BFT & DFT), Applications- Minimum Spanning Tree Using Prims &Kreskas Algorithm, Dijkstra's shortest path, Transitive closure, Wars hall's Algorithm.	8

Course outcomes:

After completing this course a student will be able to:

- Discuss the Basics of data structures and computational efficiency of algorithms for sorting & searching.
- Illustration of linked lists and its operations.
- Design programs using a variety of data structures such as stacks and queues.
- Demonstrate different tree traversing method.
- Describing the graphs concepts.

Question paper pattern:

- Question paper consists of 10 questions.
- Each full question carrying 14 marks.
- Each full question will have sub question covering all topics under a unit.
- The student will have to answer 5 full questions selecting one full question from each unit.

Text Books:

- Data Structures Using C. 2nd Edition. Reema Thareja, Oxford.
- Data Structures and algorithm analysis in C, 2nded, Mark Allen Weiss

Reference Books:

- Fundamentals of Data Structures in C, 2nd Edition, Horowitz, Sahni, Universities Press.
- Data Structures: A PseudoCode Approach, 2/e, Richard F.Gilberg, Behrouz A.Forouzon, Cengage.
- Data Structures with C, Seymour Lipschutz TMH

e-Resources:

- http://algs4.cs.princeton.edu/home/
- https://faculty.washington.edu/jstraub/dsa/Master_2_7a.pdf

Course Outcomes to Program Outcomes mapping:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
1	3	3	3									2		2
2	3	3	3									2		2
3	3	3	3									2		2
4	3	3	3									2		2
5	3	3	3									2		2
Course	**3**	**3**	**3**									**2**		**2**

ENGINEERING MECHANICS			
Subject Code	21CEMET2050/21EEMET2050 21MEMETT2050	IA Marks	
Number of Lecture Hours/Week	3(L)	Exam Marks	
Total Number of Lecture Hours	50	Exam Hours	03

Credits - 03

Course objectives

On successful completion of the course, the students should be able to

1. understand the effect of forces and moments on the solid rigid bodies
2. analyze static problems using free body diagrams by considering friction.
3. locate centroid and calculate moment of inertia for different cross sections.
4. calculate velocity and acceleration of particles having rectilinear motion and rotation
5. analyze dynamic problems using work energy method and impulse-momentum method.

Unit -1	**Hours**
Introduction to engineering mechanics: Basic terminologies in mechanics, laws of mechanics, characteristics of force, system of force. **Resultant system of forces**: Resolution of forces, method of composition of forces, resultant of coplanar concurrent force system, moment of a force and couple. **Friction:** Frictional force, laws of Coulomb friction, angle of friction, limiting friction and angle of repose, problems on blocks resting on horizontal and inclined planes.	10 Hours

Unit -2	
Equilibrium of system of forces: Equilibrium of a rigid body subjected to coplanar concurrent forces and coplanar non-concurrent forces, free body diagrams, Lami's theorem, equilibrium of connected bodies.	9 Hours
Unit – 3	
Centroid and centre of gravity: Centre of gravity, centroid, use of axis symmetry determination of centroid of simple figures from first principles, centroid of composite sections. **Moment of inertia**: Moment of inertia, polar moment of inertia, theorems of moment of inertia, moment of inertia of rectangle, triangle, circle, semi circle, quarter circle from first principles, moment of inertia of L, T and I sections only. Mass moment of inertia, radius of gyration, mass moment of inertia of uniform rod, rectangular plate and circular plate only.	12 Hours
Unit-4 **Kinematics:** General principles in dynamics, types of motion, rectilinear motion, motion curves, motion with uniform velocity, motion with uniform acceleration, motion with varying acceleration, angular motion, relationship between linear and angular motions. **Kinetics:** Bodies in rectilinear translation, kinetics of bodies rotating about fixed axes, Newton's second law of motion, D-Alembert's principle.	10 Hours
Unit - 5 Work-Energy Method: Equation of Translation, work energy application to particle motion, connected system - Fixed axis rotation and plane motion, Impulse momentum method.	9 Hours

Course outcomes

On completion of this course, students will be able to

1. Determine resultant force and moment for different force systems.
2. analyse the rigid bodies associated with frictional forces using conditions of equilibrium
3. Locate the centroid / center of gravity and determine the moment of inertia of plane sections/solids.
4. Understand the behavior of moving bodies in rectilinear motion and solve kinematic equations of motion curves.
5. Solve the problem using work energy method and impulse momentum method.

Text Books

1. S.S. Bhavikatti and K.G. Rajashekarappa, Engineering Mechanics, New Age, 2012.
2. N.H. Dubey, Engineering Mechanics, Mc Graw Hill, 2012

Reference Books

1 F. L. Singer, Engineering Mechanics, Harper–Collins, 1994
2. B. Bhattacharya, Engineering Mechanics, Oxford University Press, 2008
3. A.K.Tayal, Engineering Mechanics, Umesh Publications, 2012.
4. R.K.Bansal, Engineering Mechanics, Laxmi Publications, 1996.
5. R.K.Rajput, A Text book of Applied Mechanics, Laxmi Publications, 2011.
6. S.Timoshenko and D.H.Young, Engineering Mechanics, 4th Ed. , Mc Graw Hill
7. A.Nelson, Engineering Mechanics - Statics and Dynamics, TMG, New Delhi, 2009.

WEB REFERENCES

W1. https://nptel.ac.in/courses
W2. http://learnmech.com/

COs vs. POs MAPPING (high: 3; medium: 2; low: 1)

COs / POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	1	2				1							1	
CO2	1	2				1							1	
CO3	1	2				1							1	
CO4	1	3				1							1	
CO5	1	2				1							1	
Overall Level of mapping	**1**	**2**				**1**							**1**	

Practical Examination Evaluation Procedure Internal:15 Marks

1.Continuous Evaluation by submitting the Record book for every experiments:05

2. Conduct the internal examination at the end of the semester:10

Practical Examination at the time of final Examination:35

Question paper pattern:

Ten questions are given, and student should choose one question (blind option), which carries 50 marks in total.

1. 10 marks are allotted for procedure.
2. 10 marks for conduction of the experiment.
3. 05 marks for results and conclusions.

10 marks for viva voce

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB			
Subject Code	18CMEGL1050/ 2050	IA Marks	1
Number of Practical Hr./week	02	Exam Marks	1
Total Number of Practical Hr	32	Exam Hours	0

Credits – 01

Objectives: To enable the students to learn communication skills of Listening, Speaking, Reading and Writing by focusing on:

- Listening Comprehension
- Pronunciation
- Functional English in formal and Informal Situations
- Interpersonal Communication Skills
- Presentation Skills

List of Experiments

UNIT I: Listening Comprehension

UNIT II: Pronunciation , Stress, Intonation & Rhythm

UNIT III: Common Everyday Situations: Conversations & Dialogues, Communication at Workplace

UNIT IV: Interpersonal Communication Skills- Group discussions and debates

UNIT V: Formal Presentations

Outcomes:

By the end of the course the students will be able to acquire basic Proficiency in English by practicing the following:

- Listening Comprehension, Pronunciation, Dialogues, Interpersonal Communication Skills ,Presentation Skills &Discussions and Debate

Learning Resources:

- Interact – English Lab Manual for Undergraduate Students by Orient Black Swan
- Ted Talks, Interviews with Achievers and select movies
- Toastmaster's speeches and table topics
- Book Reviews and movie reviews
- Exercises in Spoken English Parts: I-III, CIEFL, Hyderabad.
- Oxford Guide to Effective Writing and Speaking by John Seely
- https://www.ted.com/talk

Course Outcomes Vs Program Outcomes Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	-	-	-	-	-	-	-	-	-	2	-	-
2	-	-	-	-	-	-	-	-	-	3	-	-

3	-	-	-	-	-	-	-	-	-	3	-	-
4	-	-	-	-	-	-	-	-	-	2	-	-
5	-	-	-	-	-	-	-	-	-	3	-	-
6	-	-	-	-	-	-	-	-	-	2	-	-

BASIC ELECTRICAL ENGINEERING LABORATORY (Common to All)			
Subject Code	21CMEEL1070/ 21CMEEL2070	IA Marks	15
Number of Lecture Hours/Week	3P	Exam Marks	35
Total Number of Lecture Hours	36	Exam Hours	03
Credits-1.5			

Course Objectives:

This course will enable the student to

1. Verify the Kirchhoff's laws, network theorems for a given circuit.
2. Analyze the performance of DC shunt generator.
3. Control the speed of DC motor.
4. Predetermine the efficiency DC machine.
5. Analyze performance of three phase induction motor.
6. Determine the regulation of an alternators.

List of Experiments(Any ten experiments must be conducted)

1. Verification of Kirchoff's laws.
2. Verification of Thevenin's Theorem.
3. Verification of Norton's Theorem.
4. Verification of Superposition theorem.
5. Verification of Maximum Power Transfer Theorem.
6. Speed control of D.C. shunt motor.
7. Brake test on DC shunt motor.
8. Calibration of wattmeter.
9. OC & SC tests on single-phase transformer.
10. Brake test on 1-phase Induction motor.
11. Brake test on 3-phase Induction motor.
12. Study experiment on Ear thing.

COURSE OUTCOMES:

On completion of the course student will be able to:

1. Verify the Kirchoff's laws.
2. Verify network theorems for a given circuit.
3. Control the speed of DC motor.
4. Analyze performance of single phase induction motor
5. Analyze performance of three phase induction motor.
6. Identify different types of earthling's

COURSE-OUTCOMES-TO-PROGRAM-OUTCOMES-MAPPING:

COs / POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1			2												
CO2			2												
CO3			2												
CO4			2												
CO5			2												
CO6			2												
Overall Course			**2**												

PROGRAMMING FOR PROBLEM SOLVING LAB

(Common to All)

SEMESTER I

Subject Code	21CMCSL1080	Internal Marks	15
Number of Lecture Hours/ Week	3	External Marks	35
Total Number of Hours	36	Exam Hours	03

Credits – 1.5

Course Objectives:

This course will enable students to

1. To understand the various steps in Program development.
2. To understand the basic concepts in C Programming Language.
3. To learn how to write modular and readable C Programs.
4. To learn to write programs (using structured programming approach) in C to solve problems.
5. To introduce basic data structures such as lists, stacks and queues.

Exercise 1 (Familiarization with programming environment)

a) Familiarization of CODE BLOCKS C++ Editor to edit, compile, Execute, Test and debugging C programs.

b) Familiarization of RAPTOR Tool to draw flow charts and understand flow of control.

Acquaintance with basic LINUX commands.

Exercise 2 (Simple computational problems using arithmetic expressions)

a) Write a C Program to display real number with 2 decimal places.

b) Write a C Program to convert Celsius to Fahrenheit and vice versa.

c) Write a C Program to calculate the area of triangle using the formula area = $\sqrt{}$ (s(s−a)(s−b)(s −c) where =a+b+c/2

d) Write a C program to find the largest of three numbers using ternary operator.

e) Write a C Program to swap two numbers without using a temporary variable.

Exercise 3 (Problems involving if-then-else structures)

a) Write a C Program to check whether a given number is even or odd using bitwise operator, shiftoperator and arithmetic operator.

b) Write a C program to find the roots of a quadratic equation.

c) Write a C Program to display grade based on 6 subject marks using if…else…if ladder.

d) Write a C program, which takes two integer operands and one operator form the user, performsthe operation & then prints the result using switch control statement.(Consider the operators +, -,*,/, %)

Exercise 4 (Iterative problems)

a) Write a C Program to count number of 0's and 1's in a binary representation of a given number.

b) Write a C program to generate all the prime numbers between two numbers supplied by theuser.

c) Write a C Program to print the multiplication table corresponding to number supplied as input

Exercise 5 (Iterative problems)

a) Write a C Program to Find Whether the Given Number is i)Armstrong Number ii) Palindrome Number

b) Write a C Program to print sum of digits of a given number

Exercise 6 (Series examples)

a) Write a C Program to calculate sum of following series

b) 1+2+3+…. n b) 1+1/2+1/3+……+1/n c)1+x+x2+x3……+xn

Exercise 7 (1D Array manipulation)

a) Write a C program to interchange the largest and smallest numbers in the array.

b) Write a C program to search an element in an array (linear search).

c) Write a C Program to print the following pattern using a character array SA

SASSASI

Exercise 8 (Matrix problems, String operations)

a) Write a C program to add two matrices.
b) Write a C program to multiply two matrices if they are compatible or print an error message
"Incompatible matrix sizes" otherwise.
c) Write a C program to check given matrix is symmetric or not.

Implement the following string operations with and without library functions. i)copy ii) concatenate iii) length iv) compare

Exercise 9 (Simple functions)

a) Write a C Program demonstrating the following function types
b) With arguments and with return value.
c) With arguments and without return alue
d) Without arguments and without return value.
e) Without arguments and with return value.
f) Write a C Program illustrating call by reference

Exercise 10 (Recursive functions)

Write a C Program illustrating the following with Recursion without Recursion
a)Factorial b) GCD c) Power d) Fibonacci

Exercise 11(Pointers and structures)

a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.
b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function. Note: Understand the difference between the above two programs.
c) Write a C Program to read and print student details using structures.

Exercise 12 (File operations)

a) Write a C programto open a file and to print it contents on screen.
b) Write a C program to copy files
c) Write a C program merges two files onto a new file.
d) Write a C program to delete a file.

Text Books:

1. Computer Programing ANSI C, E Balagurusamy, Mc Graw Hill Education(Private), Limited (TB1)
2. Programming in C, ReemaThareja, Second Edition, Oxford Higher Education (TB2)

Reference Books:

1. Computer Basics and C Programming, V Raja Raman, Second Edition, PHI (RB1) Course Outcomes:
2. Attain knowledge on using CODE BLOCKS and RAPTOR tools in solving problems. Examine and analyze alternative solutions to a problem.
3. Design an algorithmic solution to a problem using problem decomposition and step- wise refinement.
4. Demonstrate conversion of iterative functions to recursive and vice-versa.
5. Implement the concepts of arrays, structures, Unions and files.

Course Outcomes to Program Outcomes Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	3										3	
2	3	3	3		2								3	
3	3	3	3		2								3	
4	3	3	3		2								3	
5	3	3	3		2								3	

Course	**3**	**3**	**3**		**2**							**3**	

ENGINEERING PHYSICS LAB
(Common to AI &ML,CSE,CST,EEE & IT)

Subject Code	21AMPHL1060/21CTPHL1060/ 21EEPHL1060 21ITPHL2060/21CSPHL2060	IA Marks	15
Number of Practice Hours/Week	03	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03

Credits – 1.5

COURSE OBJECTIVES:

The objectives of this course, help the students

- **To apply** the theoretical knowledge of Physics through hands on the experimental instruments.
- **To improve** the experimental knowledge in the later studies.
- **To understand** the basic need of experiments.
- **To know** how to measure the different physical quantities.
- **To gain** the knowledge about different electrical components and basic electrical circuits.

List of Experiments

1. Determination of the Fermi energy of copper using meter bridge.
2. Determination of the Energy band gap of P-N junction diode.
3. Study of the spectral response of photo cell-Planck's constant.
4. Study of V-I characteristics of LED (Light Emitting Diode) and to determine knee voltage, frequency of the light emitting diode.
5. Determination of the frequency of electrical vibrator-Melde's experiment.
6. Determination of the wavelength of Laser diode using diffraction.
7. Determination of the V-I characteristics of photo diode and to find the variation of photo current as a function of light intensity.
8. Study of the characteristics of a photo voltaic cell (Solar cell) and to find Fill factor and efficiency.
9. Study of the V-I characteristics of Semiconductor diode, and to determine barrier potential and forward resistance.
10. Study of the I/V Characteristics of Zener diode.

Demonstration experiments:

1. Determination of the resistivity of a semiconductor using four probes method.
2. Estimation of the Hall coefficient of a semiconductor-Hall effect.

COURSE OUTCOMES:

On completion of the course student will able to

1. **Compare** the theory and correlated with experiments.
2. **Design** experiments.
3. **Analyze** the experimental result.
4. **Apply** appropriate techniques to perform the experiments.
5. **Understand** the interaction of the light with semiconductor.

TEXT BOOKS:

1. "*Physics Laboratory Manual"* Prepared by Department of Physics, SITE.

REFERENCE BOOKS:

1. S. Balasubrahmanian, M.N. Srinivasan ''A Text book of Practical Physics''- S. Chand Publishers, 2017.
2. Advanced Practical Physics Vol 1& 2 SP Singh & M.S Chauhan Pragati Prakashan, Meerut

WEB SOURCES:http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

6. **Study** the characteristic curves of the optoelectronic semiconductor devices.

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2	**2**	**1**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
3	**2**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4	**3**	**1**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
5	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
6	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ENGINEERING PHYSICS LAB
(Common for ECE &ECT)

Subject Code	21ETPHL1060/ 21ECL2060	IA Marks	15
Number of Practice Hours/Week	03	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03

Credits – 1.5

COURSE OBJECTIVES:

The objectives of this course, help the students

- **To apply** the theoretical knowledge of Physics through hands on the experimental instruments
- **To improve** the experimental knowledge in the later studies
- **To understand** the basic need of experiment**s.**
- **To know** how to measure the different physical quantities.
- **To acquire** ability to use instrumentation techniques.
- **To train** the students to develop techniques based on the principles related to various devices or components.

List of Experiments

1. Determination of the dielectric constant of the dielectric material in the given capacitor using a RC charging and discharging circuit.
2. Measuring of the magnetic field induction of circular coil-Stewart-Gee's experiment.
3. Determination of the horizontal component of earth magnetic field using Helmholtz coil galvanometer..
4. Study of the motion of charged particle in electric and magnetic fields and determine the value of e/m by magnetic focusing.
5. Determination of the frequency of the AC Source using Sonometer.
6. Determination of the electromotive force (emf) of an unknown cell using a stretched wire potentiometer.
7. Study of the particle behavior of EM wave and estimation of Planck's constant using photocell.
8. Determination of the frequency of electrical vibrator-Melde's experiment.
9. Determination of the wavelength and frequency of the electromagnetic wave using diffraction.
10. Verification of laws of transverse waves in a stretched string.

Demonstration experiments:

1. Estimation of Hall coefficient and estimate the concentration of charge carriers using Hall Effect.
2. Determination of the self inductance and resistance of a coil with air core.

COURSE OUTCOMES:

On completion of the course student will able to

7. **Compare** the theory and correlated with experiments
8. **Design** experiments
9. **Analyze** the experimental result
10. **Apply** appropriate techniques to perform the experiments
11. **Apply** the fundamental laws in electromagnetism to understand the behavior of electromagnetic fields.
12. **Calculate** the frequency and wavelength of EM Waves**.**

Question paper pattern:

Ten questions are given, and student should choose one question (blind option), which carries 50 marks in total.

a. 15 marks are allotted for procedure including circuit diagrams and model graphs.

b. 15 marks for conduction of the experiment.

c. 10 marks for results and conclusions.

d. 10 marks for viva voce.

TEXT BOOKS:"*Physics Laboratory Manual"* Prepared by Department of Physics, SITE.

REFERENCE BOOKS:

3. S. Balasubrahmanian, M.N. Srinivasan ''A Text book of Practical Physics''- S. Chand Publishers, 2017.
4. Advanced Practical Physics Vol 1& 2 SP Singh & M.S Chauhan Pragati Prakashan, Meerut

WEB SOURCES:http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University.

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2	**2**	**1**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
3	**2**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4	**3**	**1**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
5	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
6	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ENGINEERING PHYSICS LAB (Common CE & ME)			
Subject Code	21CEPHL1060/21MEPHL1060	IA Marks	15
Number of Practice Hr/Week	03	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03

Credits – 1.5

COURSE OBJECTIVES:

The objectives of this course, help the students

- **To apply** the theoretical knowledge of Physics through hands on the experimental instruments
- **To improve** the experimental knowledge in the later studies
- **To understand** the basic need of experiments.
- **To know** how to measure the different physical quantities.
- **To acquire** ability to use instrumentation techniques.
- **To train** the students to develop techniques based on the principles related to various devices or components.

List of Experiments

1. Investigation of the Motion of Coupled Oscillators.
2. Determination of the rigidity modulus η of wire-Torsional pendulum.
3. Determination of acceleration due to gravity g and radius of gyration K - Compound pendulum.
4. Determination of the Frequency of an electrically maintained tuning fork by Melde's Experiment.
5. Determination of the velocity of sound in air-Volume resonator.
6. Verification of the laws of transverse vibrations of stretched wire.
7. Determination of the Young's modulus and draw load depression graph in uniform bending.
8. Determination of the Moment of Inertia of a Flywheel.
9. Verification of the parallel axis and perpendicular axis theorems and determine the moment of inertia of a regular rectangular body -Bifilar pendulum.
10. Determination of the frequency of the AC Source using Sonometer.

Demonstration experiments:

1. Determination of Young's Modulus, Modulus of rigidity and Poisson's ratio of the material of a given wire by Searle's dynamical method
2. Study of the variation of moment of inertia of a system with the variation in the distribution of mass and hence to verify the theorem of parallel axes (Maxwell' needle method).

COURSE OUTCOMES:

On completion of the course student will able to

13. **Compare** the theory and correlated with experiments
14. **Design** experiments
15. **Analyze** the experimental result
16. **Apply** appropriate techniques to perform the experiments
17. **Apply** the knowledge in simple harmonic motions and resonance to understand the rigid body dynamics**.**

TEXT BOOKS:

2. "*Physics Laboratory Manual"* Prepared by Department of Physics, SITE.

REFERENCE BOOKS:

5. S. Balasubrahmanian, M.N. Srinivasan ''A Text book of Practical Physics''- S. Chand Publishers, 2017.
6. Advanced Practical Physics Vol 1& 2 SP Singh & M.S Chauhan Pragati Prakashan, Meerut.

WEB SOURCES:

6. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

18. **Verify** the parallel axis and perpendicular theorems of moment of inertia**.**

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2	**2**	**1**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
3	**2**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4	**3**	**1**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
5	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
6	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ENGINEERING CHEMISTRY LABORATORY (Common to All)			
Subject Code	21CMCHL1070/ 21CMCHL2070	IA Marks	15
Number of Practice Hr/Week	3	Exam Marks	35
Total Number of Practice Hr	36	Exam Hours	03
Credits – 1.5			

List of Experiments

(Any 10 experiments must be conducted)

Determination of HCl using standard Na2CO3 solution
Determination of alkalinity of a sample containing Na2CO3 and NaOH
Determination of surface tension
Determination of viscosity of a liquid by Ostwald viscometer
Determination of chloride content of water
Determination total hardness of water by EDTA.
Determination of Mg^{+2}using standard oxalic acid solution.
Determination of Cu^{+2}using standard hypo solution.
Determination of the rate constant of first order reaction (Ester hydrolysis)
Determination of strength of strong acid using conductometeric titration.
Determination of strength of weak acid using conductometeric titration .
Determination of Ferrous iron using potentiometer.
Chemical oscillations- Iodine clock reaction
Estimation of Vitamin C.

Demonstration Experiments

Thin Layer Chromatography
Determination of $Fe^{+3}$by a colorimetric method.

Question paper pattern:

Ten questions are given, and student should choose one question (blind option), which carries 50 marks in total.

a. 10 marks are allotted for procedure including circuit diagrams and model graphs.
b. 10 marks for conduction of the experiment.
c. 05 marks for results and conclusions.
10 marks for viva voce.

DATA STRUCTURES LAB

(Common to AI& ML,CSE,CST&IT)

Subject Code	**2**1AMAMPL2060/21CSCSPL 2060 21CTCTP2060/21ITITP2060	IA Marks	15
Number of Practice Hr/Week	03	Exam Marks	35
Total Number of Practice Hr	36	Exam Hours	03

Credits – 1.5

COURSE OBJECTIVES:

The objectives of this course, help the students

- Demonstrate the different data structures implementation

List of Experiments

Exercise -1 (Arrays and Dynamic memory allocation)

- Write C program to insert and delete the elements of one dimensional array.
- Write C program to create Dynamic memory allocation using malloc (), calloc ().
- Write C program to create Dynamic memory allocation using realloc ().

Exercise -2 (Searching)

- Write C program that use both recursive and non-recursive functions to perform Linear search for a key value in a given list.
- Write C program that use both recursive and non-recursive functions to perform Binary search for a key value in a given list.

Exercise -3 (Sorting-I)

- Write C program that implement Bubble sort, to sort a given list of integers in ascending order.
- Write C program that implement Quick sort, to sort a given list of integers in ascending order.
- Write C program that implement Insertion sort, to sort a given list of integers in ascending order.

- Write C program that implement merge sort, to sort a given list of integers in ascending order.

Exercise -4(Singly Linked List)

- Write a C program that uses functions to create a singly linked list.
- Write a C program that uses functions to perform insertion operation on a singly linked list.
- Write a C program that uses functions to perform deletion operation on a singly linked list.
- Write a C program to reverse elements of a single linked list.

Exercise -5(Queue)

- Write C program that implement Queue (its operations) using arrays.
- Write C program that implement Queue (its operations) using linked lists.

Exercise -6(Stack)

- Write C program that implement stack (its operations) using arrays.
- Write C program that implement stack (its operations) using Linked list.
- Write a C program that uses Stack operations to evaluate postfix expression.

- **Exercise -7(Binary Tree)**

Write a recursive C program for traversing a binary tree in preorder, in order and post order.

Exercise -8(Binary Search Tree)

- Write a C program to Create a BST
- Write a C program to insert a node into a BST.
- Write a C program to delete a node from a BST.

COURSE OUTCOMES:

By the end of this lab the student can

- Making use of basic data structures such as arrays and linked list to solve problems.
- Demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
- Solve various searching and sorting problems.

Course Outcomes to Program Outcomes Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
1	3	3	3									2		2
2	3	3	3									2		2
3	3	3	3									2		2
4	3	3	3									2		2
5	3	3	3									2		2
Course	**3**	**3**	**3**									**2**		**2**

	21MEMEL2080		
Number of Lecture Hours/Week	L(0)+T(0)+P(3)	Exam Marks	35
Total Number of Lecture Hours	36	Exam Hours	3

Credits – 1.5

Course objectives: On completion of the course students should be able to

1. Learn basic use of hand tools along with the techniques and methods applicable to the carpentry trade
2. Learn basic use of hand tools along with the techniques and methods applicable to the fitting trade
3. Learn basic use of hand tools along with the techniques and methods applicable to the forging trade
4. Learn basic use of hand tools along with the techniques and methods applicable to the casting trade
5. Learn basic use of hand tools along with the techniques and methods applicable to the welding trade

EXPERIMENTS

1. Preparation of T Lap joint using carpentry.
2. Preparation of Cross Lap joint using carpentry.
3. Preparation of Square fit using mild steel specimen.
4. Preparation of V fit using mild steel specimen.
5. Conversion of round rod to square rod by forging operation.
6. Preparation of *S* hooks by forging operation.
7. Preparation of green sand mould for a single piece pattern
8. Preparation of green sand mould for a split piece pattern
9. Preparation of a Butt joint using arc welding
10. Preparation of a Lap joint using arc Welding

ADDITIONAL EXPERIMENTS

1. Preparation of electrical wiring connections using wiring (one lamp controlled by one switch)
2. Preparation of house wiring (stair case wiring)

Course outcomes: On successful completion of this course, the students will be able to

1. Perform the joinery work of wooden pieces using carpentry.
2. Perform the joinery work of metallic pieces using fitting.
3. Produce the required shaped metallic products using black smithy.
4. Make the green sand moulds using different patterns
5. Fabricate different components using welding.

Question paper pattern:

Ten questions are given, and student should choose one question (blind option), which carries 50 marks in total.

a. 15 marks are allotted for procedure including circuit diagrams and model graphs.

b. 15 marks for conduction of the experiment.

c. 10 marks for results and conclusions.

d. 10 marks for viva voce.

COs vs POs MAPPING (HIGH: 3; MEDIUM: 2; LOW: 1)

COs / POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2								2					
CO2	2								2				2	
CO3	2								2				2	
CO4	2								2				2	
CO5	2								2					
CO6	1								1				1	
Course	**2**								**2**				**2**	

CONSTITUTION OF INDIA, PROFESSIONAL ETHICS & HUMAN RIGHTS (Common to all Branches)			
Subject Code	21CMMSN1090/ 21CMMSN2090	IA Marks	30
Number of Lecture Hr/week	03	Exam Marks	70
Total Number of Lecture Hr	50	Exam Hours	03
Credits – 00			

COURSE OBJECTIVES:

The objectives of this course help the students to

1. To provide basic information about Indian constitution.
2. To identify individual role and ethical responsibility towards society.
3. To understand human rights and its implications.

Unit - I	**Hours**
Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution. Preamble to the Indian Constitution Fundamental Rights & its limitations.	**10**
Unit - II	
Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. Union Executives – President, Prime Minister Parliament Supreme Court of India.	**10**
Unit – III	
State Executives – Governor, Chief Minister, State Legislature High Court of State. Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th &91st Amendments.	**10**
Unit –IV	
Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights- Working of National Human Rights Commission in India Powers and functions of Municipalities, Panchyats and Co - Operative Societies.	**10**
Unit – V	
Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering.	**10**

COURSE OUTCOMES:

On completion of the course student will

1. Have general knowledge and legal literacy and thereby to take up competitive examinations.
2. Understand state and central policies, fundamental duties.
3. Understand Electoral Process, special provisions.
4. Understand powers and functions of Municipalities, Panchayats and Co-operative Societies, and
5. Understand Engineering ethics and responsibilities of Engineers
6. Understand Engineering Integrity & Reliability

Question paper pattern:

1 Question paper consists of 10 questions.
2 Each full question carrying 14 marks.

3 Each full question will have sub question covering all topics under a unit.
4 The student will have to answer 5 full questions selecting one full question from each unit.

TEXT BOOKS:

1. Durga Das Basu: **"Introduction to the Constitution on India",** (Students Edn.) Prentice –Hall EEE, 19th / 20th Edn., 2001
2. Charles E. Haries, Michael S Pritchard and Michael J. Robins **"Engineering Ethics"** Thompson Asia, 2003-08-05.

REFERENCE BOOKS:

1. M.V.Pylee, "An Introduction to Constitution of India", Vikas Publishing, 2002.
2. M.Govindarajan, Natarajan, V.S.Senthilkumar, **"Engineering Ethics",** Prentice –Hall of India Pvt. Ltd. New Delhi, 2004
3. Brij Kishore Sharma,**" Introduction to the Constitution of India"**, PHI Learning Pvt. Ltd., New Delhi, 2011.
4. Latest Publications of Indian Institute of Human Rights, New Delhi

ENVIRONMENTAL SCIENCE			
Subject Code	21CMCHN2090	IA Marks	30
Number of Lecture Hours/Week	2	Exam Marks	70
Total Number of Lecture Hours	32	Exam Hours	03
		Credits – 00	

COURSE OBJECTIVES:

The objectives of this course, help the students to

1. Acquire knowledge on global environmental challenges.
2. Learn different types of natural resources
3. Create awareness on biodiversity and ecology.
4. Gain scientific knowledge on environmental pollution
5. Acquire knowledge on water conservation methods and environmental legislation

Unit -1	**Hours**
MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES **Environment -** Definition, Introduction - Scope and Importance - Global environmental challenges, global warming & climate change - Acid rains, ozone layer depletion - Role of Information Technology in Environment and human health.	**6**
Unit -2	
NATURAL RESOURCES Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use, deforestation - Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Floods, drought, , dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Food resources: Effects of modern agriculture - fertilizer-pesticide problems, water logging, eutrophication, biological magnification and salinity. Energy resources: Renewable and non-renewable energy resources Role of an individual in conservation of natural resources.	**6**
Unit – 3	
ECOSYSTEM AND BIODIVERSITY **Ecosystem** - Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the Forest and grassland ecosystem. **Biodiversity** - Introduction - Definition: genetic, species and ecosystem diversity. – Value of biodiversity: consumptive use, productive use, social, ethical and optional values - Hot-spots ofbiodiversity - Threats to biodiversity: habitat loss - Endangered andendemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	**8**
Unit – 4	
ENVIRONMENTAL POLLUTION Definition, Cause, effects and control measures of : a. Air pollution	**6**

b. Water pollution c. Soil pollution d. Noise pollution e. Nuclear hazards Solid waste Management: Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution.	
Unit – 5	
SOCIAL ISSUES AND THE ENVIRONMENT Urban problems related to energy -Water conservation, rain water harvesting, Resettlement and rehabilitation of people its problems and concerns. Environment Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act - Wildlife Protection Act -Forest Conservation Act .	**6**
COURSE OUTCOMES: On completion of the course student will be able to 1. Obtain knowledge on global warming & climate change - Acid rains, ozone layer depletion. 2. Preserve several natural resources 3. Summarize the concept of ecosystem 4. Control different types of pollution 5. Understand social issues and environmental legislation	
Question paper pattern: 1. Question paper consists of 10 questions. 2. Each full question carrying 14 marks. 3. Each full question will have sub question covering all topics under a unit. 4. The student will have to answer 5 full questions selecting one full question from each unit.	
TEXT BOOKS: 1. E. Bharucha (2003), "Environmental Studies", University Publishing Company, New Delhi. 2. J.G. Henry and G.W. Heinke (2004), "Environmental Science and Engineering", Second Edition, Prentice Hall of India, New Delhi. 3. G.M. Masters (2004)" Introduction to Environmental Engineering and Science", Second Edition, Prentice Hall of India, New Delhi	
REFERENCE BOOKS: 1. Text Book of Environmental Studies by Deeksha Dave & P. Udaya Bhaskar, Cengage Learning. 2. Environmental Studies by K.V.S.G. Murali Krishna, VGS Publishers, Vijayawada. 3. Environmental Studies, P.N. Palaniswamy, P. Manikandan, A. Geeta and K. Manjula Rani, Pearson Education, Chennai.	

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
1	-	-	-	-	-	-	3	-	-	-	-	-
2	-	3	-	-	-	-	-	-	-	-	-	-
3	3	-	-	-	-	-	-	-	-	-	-	-
4	-	-	3	-	-	-	-	-	-	-	-	-
5	-	3	-	-	-	-	-	-	-	-	-	-
Course	2	3	2	-	-	-	2	-	-	-	-	-

COURSE STRUCTURE AND DETAILED SYLLABUS

for

Sem-III to Sem-VIII

Computer Science and Engineering - IoT & Cyber Security with Block Chain Technology

	BS-21	ES-24	HS-10.5	PC-51	SOC-10	MC-00	OE-12	PE-15	PROJ-16.5	Total
I-I	3	12	4.5			✓				19.5
I-II	12	7.5				✓				19.5
II-I	3	4.5	3	9	2					21.5
II-II	3			16.5	2					21.5
III-I				12	2		3	3	1.5	21.5
III-II				10.5	2		3	6		21.5
IV-I				6	2		6	6	3	23
IV-II									12	12
TOTAL	21	24	7.5	51	10		12	18	16.5	**160**

Computer Science and Engineering - IoT & Cyber Security with Block Chain Technology-Program Structure

Semester III (Second year II-I)

S. No	Category	Code	Course Title	Hours			Credits
				L	T	P	
1	BS	21CIMAT3010	Probability Distributions & Statistical Methods	3	0	0	3
2	HS	21CMMST3020	Engineering Economics and Financial Management	3	0	0	3
3	ES	21CICIT3030	Digital Electronics &Computer Organization	3	0	0	3
4	PC	21CICIT3040	Java Programming	3	0	0	3
5	PC	21CICIT3050	Fundamentals of Internet of Things	3	0	0	3
6	ES	21CICIL3060	Digital Electronics &Computer Organization Lab	0	0	3	1.5
7	PC	21CICIL3070	Java Programming Lab	0	0	3	1.5
8	PC	21CICIL3080	Arduino Lab	0	0	3	1.5
9	SOC	21CICIS3090	Web Application Development-I	0	0	3	2
10	MC	21CICIN3100	Intellectual Property Rights	2	0	0	0
						Total credits	**21.5**

Category	CREDITS
Basic Science Courses	3.0
Professional core Courses	9
Engineering Science Courses	4.5
Humanities and social sciences	3
Skill oriented course	2
TOTAL CREDITS	**21.5**

DETAILED SYLLABUS

Semester-III

Probability Distributions & Statistical Methods			
Subject Code	21CIMAT3010	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

1. To apply least squares method to fit a curve.
2. To Analysis the data and evaluate the central tendency of data.
3. To know the Basic Concepts of Probability and corresponding distributions
4. To obtain the estimate of a parameter from sample statistic
5. To test the hypothesis.

Unit -1	**Hours**
Curve fitting: Method of least squares – fitting to Straight line – parabola – Exponential and Power curves.	**08**
Unit -2	
Statistical Methods: Introduction-Collection and classification of data-Graphical Representation – Comparison of frequency distributions- Measures of central tendency-Measures of dispersion- Coefficient of variation	**10**
Unit – 3	
Probability and Distributions: Probability-Condition probability and Baye's theorem- Random variables-Discrete and Continuous random variables-Distribution function-Mathematical Expectation and Variance-Binomial, Poisson, Uniform and Normal distributions	**10**
Unit – 4	
Sampling theory Introduction-Population and samples-Sampling distribution of means and Variance (definition only)-Central limit theorem (without proof).	**10**
Unit – 5	
Test of Hypothesis: Introduction-Hypothesis-Null and Alternative Hypothesis-Type I and Type II errors-Level of Significance-One tail and two tail tests-Tests concerning one mean and two means (Large and Small samples) z-test, t-distribution, Goodness of fit Test - Tests on proportions: z-test and t-test.	**10**

Text Books/ Reference Books:	
T1	Miller and Freund's, Probability and Statistics for Engineers,7/e, Pearson, 2008.
T2	. S.C.Gupta and V.K.Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand &Sons Publications, 2012.
T3	B.V.Ramana "Higher Engineering Mathematics" Tata Mc Graw-Hill, 2006.
R1	Shron L.Myers, Keying Ye, Ronald E Walpole, Probability and Statistics for Engineers and the Scientists,8th edition, Pearson 2007.
R2	Jay L Devore, Probability and Statistics for Engineering and the Sciences, 8thEdition, Cengage.
R3	Sheldon M.Ross, Introduction to probability and statistics Engineers and Scientists,4thEdition, Academic Foundation, 2011.
R4	Johannes Ledolter and Robert V.Hogg, Applied Staistics for Engineers and Physical Scientists, 3rd Edition, Pearson, 2010.

ENGINEERING ECONOMICS & FINANCIAL MANAGEMENT			
Subject Code	21CMMST3020	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	60	Exam Hours	03
Credits – 03			

Unit -1	**Hours**
Introduction to Managerial Economics and demand Analysis Definition of Managerial Economics and Scope-Managerial Economics and its relation with other subjects-Concepts of Demand-Types-Determents-Law of Demand its Exception-Elasticity of Demand-Types and Measurement-Demand forecasting and its Methods.	**14**
Unit -2	
Production and Cost Analysis Production function-Isoquants and Isocost-Law of Variable proportions-Cobb-Douglas Production Function-Economics of Sale-Cost Concepts-Opportunity Cost-Fixed vs Variable Costs-Explicit Costs vs Implicit Costs-Cost Volume Profit analysis- Determination of Break-Even Point (Simple Problems).	**12**
Unit – 3	
Introduction To Markets, Pricing Policies & forms Organizations and Business Cycles Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – Methods of Pricing: Market Skimming Pricing, And Internet Pricing: Flat Rate Pricing. Features and Evaluation of Sole Trader – Partnership – Joint Stock Company – State/Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle	**10**
Unit – 4	
Introduction to Accounting & Financing Analysis Introduction to Double Entry Systems – Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-Ratio Analysis – Preparation of Funds flow cash flow statements (Simple Problems)	**12**
Unit – 5	
Capital and Capital Budgeting Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Need for Capital Budgeting-Techniques of Capital Budgeting-Traditional and Modern Methods.	**12**

	Text(T) / Reference(R) Books:
T1	Managerial Economics and Financial Analysis, Dr. A. R. Aryasri, TMH 2011.
T2	Managerial Economics and Financial Analysis, 1/e, B. Kuberadu, HPH, 2013
T3	Management Science, Dr. P. Vijaya Kumar & Dr. N. Apparao, Cengage, Delhi, 2012
T4	Management Science, Dr. A. R. Arya Sri, TNH, 2011.
R1	Financial Accounting for Management, Ambrish Gupta, Pearson Education, New Delhi.
R2	Managerial Economics, 4th Ed, H. Craig Peterson & W. Cris Lewis, PHI.
R3	Essentials of management, Koontz and weihrich, TMH 2011
R4	Global management systems, Seth& Rastogi, Cengage learning,delhi,2011
R5	Managerial Economics, V. Maheswari, Sultan Chand
R6	Managerial Economics & Financial Analysis, Dr. B. Kuberudu and Dr. T. V. Ramana, Himalaya Publishing House 2011.
W1	https://www.coursera.org/courses?query=financial%20engineering
W2	https://www.mooc-list.com/categories/economics-finance

Digital Electronics & Computer Organization			
Subject Code	21CICIT3030	IA Marks	30
Number of Lecture hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits -3			

Course Objectives:

1. Principles and the Implementation of Computer Arithmetic.
2. Operation of CPUs including RTL, ALU, Instruction Cycle and Busses.
3. Fundamentals of different Instruction Set Architectures and their relationship to the CPU Design.
4. Memory System and I/O Organization.
5. Principles of Operation of Multiprocessor Systems and Pipelining.

UNIT I	**Hours**
Number Systems Binary Numbers, Octal and Hexadecimal Numbers, Complements of Numbers, Addition, Subtraction, Logic gates, Map simplification	10
UNIT II	
Digital Electronics Combinatorial Circuits, Flip flips, Decoders, Encoders, Multiplexers	10
Unit-III	
Basic Computer Organization and Design Micro operations, Instruction codes, Instruction cycle, Memory Reference & Input Output Instructions, Instruction formats, Addressing modes, Data Transfer & Manipulation, Program Control.	10
UNIT IV	
Control Unit Hardwired control unit, Control Memory, Address sequencing, Micro program example, Design of control unit	10
UNIT V	
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory. **Input-Output Organization**: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct Memory Access.	10

Text Books:

1) Computer System Architecture, M. Morris Mano, Third Edition, Pearson, 2008.
2) Digital Design, 5/e, M. Morris Mano, Michael D Ciletti, PEA

Reference Books:

1) Computer Organization and Architecture, William Stallings, 6/e, Pearson, 2006.
2) Structured Computer Organization, Andrew S. Tanenbaum, 4/e, Pearson, 2005.
3) Fundamentals of Computer Organization and Design, Sivarama P. Dandamudi, Springer, 2006.

Resources:

1) https://nptel.ac.in/courses/106/105/106105163/
2) http://www.cuc.ucc.ie/CS1101/David%20Tarnoff.pdf\

Java Programming			
Subject Code	21CICIT3040	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits – 03			

Unit -1:	**Hours**
Program Structure in Java: Introduction, Writing Simple Java Programs, Elements or Tokens in Java Programs, Java Statements, Command Line Arguments, User Input to Programs, Escape Sequences Comments, Programming Style. **Data Types, Variables, and Operators:** Introduction, Data Types in Java, Declaration of Variables, Data Types, Type Casting, Scope of Variable Identifier, Literal Constants, Symbolic Constants, Formatted Output with printf() Method, Static Variables and Methods, Attribute Final, Introduction to Operators, Precedence and Associativity of Operators, Assignment Operator (=), Basic Arithmetic Operators, Increment (++) and Decrement (- -)Operators, Ternary Operator, Relational Operators, Boolean Logical Operators, BitwiseLogical Operators. **Control Statements:** Introduction, if Expression, Nested if Expressions, if–else Expressions, Ternary Operator ?:, Switch Statement, Iteration Statements, while Expression, do–while Loop, for Loop, Nested for Loop, For–Each for Loop, Break Statement, Continue Statement.	**08**
Unit -2:	
Classes and Objects: Introduction, Class Declaration and Modifiers, Class Members, Declaration of Class Objects, Assigning One Object to Another, Access Control for Class Members, Accessing Private Members of Class, Constructor Methods for Class, Overloaded Constructor Methods, Nested Classes, Final Class and Methods, Passing Arguments by Value and by Reference, Keyword this. **Methods:** Introduction, Defining Methods, Overloaded Methods, Overloaded Constructor Methods, Class Objects as Parameters in Methods, Access Control, Recursive Methods,Nesting of Methods, Overriding Methods, Attributes Final and Static.	**10**
Unit – 3:	
Arrays: Introduction, Declaration and Initialization of Arrays, Storage of Array in Computer Memory, Accessing Elements of Arrays, Operations on Array Elements, Assigning Array to Another Array, Dynamic Change of Array Size, Sorting of Arrays, Search for Values in Arrays, Class Arrays, Two-dimensional Arrays, Arrays of Varying Lengths, Arrays, Arrays as Vectors. **Inheritance:** Introduction, Process of Inheritance, Types of Inheritances, Universal Super Class-Object Class, Inhibiting Inheritance of Class Using Final, Access Control and Inheritance, Multilevel Inheritance, Application of Keyword Super, Constructor Method and Inheritance, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Interfaces and Inheritance. **Interfaces:** Introduction, Declaration of Interface, Implementation of Interface, Multiple Interfaces, Nested Interfaces, Inheritance of Interfaces, Default Methods in Interfaces, Static Methods in Interface, Functional Interfaces, Annotations..	**10**
Unit – 4:	
Packages and Java Library: Introduction, Defining Package, Importing Packages and Classes into Programs, Path and Class Path, Access Control, Packages in Java SE, Java.lang Package and its Classes, Class Object, Enumeration, class Math, Wrapper Classes, Auto-boxing and Auto-unboxing,	**10**

Java util Classes and Interfaces, Formatter Class, Random Class, Time Package, Class Instant (java. time.Instant), Formatting for Date/Time in Java, Temporal Adjusters Class, Temporal Adjusters Class. **Exception Handling:** Introduction, Hierarchy of Standard Exception Classes, Keywords throws and throw, try, catch, and finally Blocks, Multiple Catch Clauses, Class Throwable, Unchecked Exceptions, Checked Exceptions, try-with-resources, Catching Subclass Exception, Custom Exceptions, Nested try and catch Blocks, Rethrowing Exception, Throws Clause.	
Unit – 5:	
String Handling in Java: Introduction, Interface Char Sequence, Class String, Methods for Extracting Characters from Strings, Methods for Comparison of Strings, Methods for Modifying Strings, Methods for Searching Strings, Data Conversion and Miscellaneous Methods, Class String Buffer, Class String Builder. **Multithreaded Programming:** Introduction, Need for Multiple Threads Multithreaded Programming for Multi-core Processor, Thread Class, Main Thread- Creation of New Threads, Thread States, Thread Priority- Synchronization, Deadlock and Race Situations, Inter-thread Communication - Suspending, Resuming, and Stopping of Threads. **Applets:** Applet class, Applet structure, An Example Applet Program, Applet Life Cycle,paint(), update() and repaint(). Swing: Introduction, JFrame, JApplet, JPanel, Components in swings, Layout Managers, JList and JScrollPane, Split Pane, JTabbedPane, Dialog Box, Pluggable Look and Feel.	**12**

Text(T) / Reference(R) Books:	
T1	JAVA one step ahead, Anitha Seth, B.L.Juneja, Oxford.
T2	The complete Reference Java, 8th edition, Herbert Schildt, TMH.
T3	Programming in JAVA, 2nd edition, Sachin Malhotra, Saurabh Choudary, Oxford.
R1	Introduction to java programming, 7th edition by Y Daniel Liang, Pearson
R2	Murach's Java Programming, Joel Murache
W1	https://nptel.ac.in/courses/106/105/106105191/
W2	https://www.w3schools.com/java/java_data_types.asp

Fundamentals of Internet of Things			
Subject Code	21CICIT3050	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits – 03			

Course objectives:

1. To study fundamental concepts of IoT
2. To understand roles of sensors in IoT
3. To Learn different protocols used for IoT design
4. To be familiar with data handling and analytics tools in IoT
5. Appreciate the role of big data, cloud computing and data analytics in a typical IoT system.
6. Understand the role of IoT in various domains of Industry.

Outcomes :

1.Understand the various concepts, terminologies and architecture of IoT systems.
2.Use sensors and actuators for design of IoT.
3.Understand and apply various protocols for design of IoT systems
4.Use various techniques of data storage and analytics in IoT
5.Understand various applications of IoT
6.Understand APIs to connect IoT related technologies

Unit -I	Hours
Introduction to IoT Fundamentals of IoT : Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.	**10**
Unit -II	
Sensors Networks : Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, RaspberriPi Development Kit, RFIDPrinciples and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT.	**10**
Unit-III	
Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet, Modbus.IP Based Protocols for IoT IPv6, 6LowPAN, RPL, REST, AMPQ, CoAP, MQTT. Edge connectivity and protocols.	**10**
Unit –IV	
Data Handling& Analytics Data Handling& Analytics: Introduction, Bigdata, Types of data, Characteristics of Big data, Data handling Technologies, Flow of data, Data acquisition, Data Storage, Introduction to Hadoop. Introduction to data Analytics, Types of Data analytics, Local Analytics, Cloud analytics and applications.	**10**
Unit-V	
Applications of IoT: Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.	**10**

Text Books	
T1	Hakima Chaouchi, — "The Internet of Things Connecting Objects to the Web" ISBN : 978-1-84821-140-7, Wiley Publications
T2	Olivier Hersent, David Boswarthick, and Omar Elloumi, — "The Internet of Things: Key Applications and Protocols", WileyPublications
T3	Vijay Madisetti and ArshdeepBahga, — "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
T4	J. Biron and J. Follett, "Foundational Elements of an IoT Solution", O'Reilly Media, 2016.

Reference Books:	
R1	Daniel Minoli, — "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications
R2	Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
Web References:	
W1	https://onlinecourses.nptel.ac.in/noc17_cs22/course
W2	http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html

Digital Electronics & Computer Organization Lab			
Subject Code	21CICIL3060	IA Marks	15
Number of Tutorial Hours/Week	03(P)	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03
Credits – 1.5			

List of Experiments

1.Verify the truth tables of Logic gates

2. Verify the NAND and NOR gates as Universal logic gates

3. Construct and verify the truth tables of Half and Full adders

4.Construct and Verify the truth tables of Multiplexer and Demultiplexer

5. Construct and Verify the truth tables of Multiplexer and Demultiplexer

6. Construct and test of an SR flipflop and JK flipflop

7.a) Write a Machine Language Program to perform Addition of two numbers.

b) Write a Machine Language Program to perform Subtraction of two numbers.

8.a) Write a Machine Language Program to perform Addition of n numbers.

b) Write a Machine Language Program to generate n numbers.

9.a) Write a Machine Language Program to generate n Even numbers.

b) Write a Machine Language Program to generate n Odd numbers.

10.a) Write a Machine Language Program to move data from one block to another block.

b) Write a Machine Language Program to mask 4 high-order bits.

11. a) Write a Machine Language Program to read data at location 4400 and unpack data into 07, 0Eand store in 4401 & 4402.

b) Write a Machine Language Program to Find factorial of given number.

12. a) Write a Machine Language Program to Find largest element among two numbers.

b) Write a Machine Language Program to Find smallest element among two numbers.

Java Programming LAB			
Subject Code	21CICIL3070	Internal Marks	15
Number of Tutorial Hours/Week	03(P)	External Marks	35
Total Number of Practice Hours	36	Exam Hours	03
Credits – 1.5			

Course Objectives: This course will enable the students to:

- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations

Exercise - 1 (Basics)

Write a JAVA program to display default value of all primitive data type of JAVA

Write a java program that display the roots of a quadratic equation $ax^2+bx=0$. Calculate the discriminate D and basing on value of D, describe the nature of root.

Five Bikers Compete in a race such that they drive at a constant speed which may or may not be the same as the other. To qualify the race, the speed of a racer must be more than the average speed of all 5 racers. Take as input the speed of each racer and print back the speed of qualifying racers.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
Write a JAVA program to sort for an element in a given list of elements using bubble sort
Write a JAVA program to sort for an element in a given list of elements using merge sort.
Write a JAVA program using String Buffer to delete, remove character.

Exercise - 3 (Class, Objects)

Write a JAVA program to implement class mechanism. Create a class, methods and invoke them inside main method.

Write a JAVA program to implement constructor.

Exercise - 4 (Methods)

a) Write a JAVA program to implement constructor overloading.
b) Write a JAVA program implements method overloading.

Exercise - 5 (Inheritance)

a) Write a JAVA program to implement Single Inheritance
b) Write a JAVA program to implement multi-level Inheritance
c) Write a java program for abstract class to find areas of different shapes

Exercise - 6 (Inheritance - Continued)

Write a JAVA program give example for "super" keyword.
Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?

Exercise - 7 (Exception)

a) Write a JAVA program that describes exception handling mechanism
b) Write a JAVA program Illustrating Multiple catch clauses

Exercise – 8 (Runtime Polymorphism)

Write a JAVA program that implements Runtime polymorphism
Write a Case study on run time polymorphism, inheritance that implements in above problem

Exercise – 9 (User defined Exception)

a) Write a JAVA program for creation of Illustrating throw
b) Write a JAVA program for creation of Illustrating finally
c) Write a JAVA program for creation of Java Built-in Exceptions
d) Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)

Write a JAVA program that creates threads by extending Thread class. First thread display "Good Morning "every 1 sec, the second thread displays "Hello "every 2 seconds and the third display "Welcome" every 3 seconds ,(Repeat the same by implementing Runnable)
Write a program illustrating **isAlive**and **join ()**
Write a Program illustrating Daemon Threads.

Exercise - 11 (Threads continuity)

Write a JAVA program Producer Consumer Problem
Write a case study on thread Synchronization after solving the above producer consumer problem

Exercise – 12 (Packages)

Write a JAVA program illustrates class path
Write a case study on including in class path in your os environment of your package.
Write a JAVA program that import and use the defined your package in the previous Problem

Exercise - 13 (Applet)

Write a JAVA program to paint like paint brush in applet.
Write a JAVA program to display analog clock using Applet.
Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 14 (Event Handling)

Write a JAVA program that display the x and y position of the cursor movement using Mouse.
Write a JAVA program that identifies key-up key-down event user entering text in a Applet.

Arduino Lab			
Subject Code	21CICIL3080	IA Marks	15
Number of Tutorial Hours/Week	03(P)	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03
Credits – 1.5			

List of Experiments

1. Understanding Arduino UNO Board and Components
2. Installing and work with Arduino IDE
3. Blinking LED sketch with Arduino
4. Simulation of 4-Way Traffic Light with Arduino
5. Using Pulse Width Modulation
6. LED Fade Sketch and Button Sketch
7. Analog Input Sketch (Bar Graph with LEDs and Potentio metre)
8. Digital Read Serial Sketch (Working with DHT/IR/Gas or Any other Sensor)
9. Working with Adafruit Libraries in Arduino
10. Spinning a DC Motor and Motor Speed Control Sketch
11. Working with Shields
12. Interfacing Adriano with Cloud (Thingspeak API)

Web Application Development-I			
Subject Code	21CICIS3090	IA Marks	15
Number of Tutorial Hours/Week	03(P)	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03
Credits – 1.5			

List of Experiments

List of Experiments

Perform experiments related to the following concepts:

A) HTML

1) Introduction to HTML

2) Browsers and HTML

3) Editor's Offline and Online

4) Tags, Attribute and Elements

5) Doctype Element

6) Comments

7) Headings, Paragraphs, and Formatting Text

8) Lists and Links

9) Images and Tables

B) CSS

1) Introduction CSS

2) Applying CSS to HTML

3) Selectors, Properties and Values

4) CSS Colors and Backgrounds

5) CSS Box Model

6) CSS Margins, Padding, and Borders

7) CSS Text and Font Properties

8) CSS General Topic

INTELLECTUAL PROPERTY RIGHTS			
Subject Code	21CICIN3100	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits – 00			

Unit -1	**Hours**
Introduction: Introduction to Intellectual property, types of intellectual property, importance of intellectual property rights, agencies Responsible for Intellectual property Registration, Regulatory – Compliance and Liability Issues.	**08**
Unit -2	
Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, Transfer of Rights, protectable matter, selecting and evaluating trade mark, Registrations of Trade Marks, Claims. **Trade Secrets**: Determination of trade secret status, liability for misappropriations of trade secrets, protection for submission,	**10**
Unit – 3	
Copy rights: Fundamental of copy right, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, notice of copy right. **Patents:** introduction, patent searching process, ownership rights and transfer	**10**
Unit – 4	
Cyber Law – Information Technology Act – Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy – International aspects of Computer and Online Crime.	**10**
Unit – 5	
New development of Intellectual Property: Emerging trends in trade mark; copy rights, patent, International overview on intellectual property.	**12**

Text(T) / Reference(R) Books:	
T1	Intellectual property right, Deborah, E. Bouchoux, cengage learning.
T2	Cyber Law. Text & Cases, South-Western's Special Topics collections
T3	R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi
R1	A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2 nd Edition
R2	Intellectual Property Rights: N K Acharya: ISBN: 9381849309

Semester IV (Second year II-II)

S.No	Category	Code	Course Title	Hours			Credits
				L	T	P	
1	BS	21CIMAT4010	Discrete Mathematics	3	0	0	3
2	PC	21CICIT4020	Data Base Management Systems	3	0	0	3
3	PC	21CICIT4030	Design and Analysis of Algorithms	3	0	0	3
4	PC	21CICIT4040	Automata Theory & Compiler Design	3	0	0	3
5	PC	21CICIT4050	Operating Systems	3	0	0	3
6	PC	21CICIL4060	Data Base Management Systems Lab	0	0	3	1.5
7	PC	21CICIL4070	Operating Systems & LINUX LAB	0	0	3	1.5
8	PC	21CICIL4080	Design and Analysis of Algorithms Lab	0	0	3	1.5
9	SOC	21CICIS4090	Web Application Development–II	2	0	0	2
10	PR	21CICIR4100	Summer Internship				
				Total credits			**21.5**

Category	CREDITS
Basic Science Courses	3
Professional core Courses	16.5
Skill oriented course	2
Summer Internship	
TOTAL CREDITS	**21.5**

DETAILED SYLLABUS

Semester-IV

DISCRETE MATHEMATICS			
Subject Code	21CIMAT4010	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

UNIT I: Mathematical Logic	**Hours**
Propositional Calculus: Statements and Notations, Connectives, Well Formed Formulas, Truth Tables, and Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications, and Normal Forms. Theory of Inference for Statement Calculus, Consistency of Premises, and Indirect Method of Proof. **Predicate Calculus:** Predicates, Predicative Logic, Statement Functions, Variables and Quantifiers, Free and Bound Variables, Inference Theory for Predicate Calculus.	10
UNIT II:Set Theory	
Sets Operations on Sets, Principle of Inclusion-Exclusion, **Relations** Properties, Operations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering, Hasse Diagrams, **Functions:** Bijective, Composition, Inverse, Permutation, and Recursive Functions**.**	10
UNIT III: Combinatorics and Number Theory.	
Number Theory: Properties of Integers, Division Theorem, Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic, Fermat's, and Euler's Theorems (Proofs not required). **Combinatorics:** Basics of Counting, Permutations, Permutations with Repetitions, Circular and Restricted Permutations, Combinations, Restricted Combinations.	10
UNIT IV: **Recurrence Relations**	
Generating Functions, Function of Sequences, Partial Fractions, Calculating Coefficient of Generating Functions, Recurrence Relations, and Formulation as Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, Method of Characteristic Roots.	10
UNIT V: Graph Theory	
Introduction to Graphs, Sub graphs, Graph Representations, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Bipartite and Planar Graphs.	8

Text(T) / Reference(R) Books:	
T1	Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and R. Manohar, Tata McGraw Hill.
T2	Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H. Rosen, 7th Edition, Tata McGraw Hill.
R1	Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel and T. P. Baker, 2nd Edition, Prentice Hall of India.
R2	Discrete Mathematical Structures, Bernand Kolman, Robert C. Busby and Sharon Cutler Ross, PHI.
R3	Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rdEdition, Tata McGraw Hill.
W1	https://nptel.ac.in/courses/106/106/106106094/

DATABASE MANAGEMENT SYSTEMS			
Subject Code	21CICIT4020	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

The learning objectives of this course are:

1. To introduce about database management systems
2. To give a good formal foundation on the relational model of data and usage of Relational Algebra
3. To introduce the concepts of basic SQL as a universal Database language
4. To demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization
5. To provide an overview of database transactions and concurrency control.

Unit -1: Database system architecture	**Hours**
Introduction to Databases: Characteristics of the Database Approach, Advantages of using the DBMS Approach, A Brief History of Database Applications. Overview of Database Languages and Architectures: Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database Users , Architecture for DBMS.	**10**
Unit -2 : E-R Models	
The E-R Models, The Relational Model, Introduction to Database Design, Data base Design and ER Diagrams, Entities Attributes, and Entity Sets, Relationship and Relationship Sets, Conceptual Design with the ER Models, The Relational Model Integrity Constraints Over Relations, Key Constraints, Foreign Key Constraints, General Constraints.	**10**
Unit - 3: Relational Algebra	
Relational Algebra, Selection and Projection, Set Operation, Renaming, Joins, Division, More Examples of Queries, Relational Calculus: Tuple Relational Calculus, Domain Relational Calculus. The Form of Basic SQL Query, Union, Intersect, and Except, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers and Active Database.	**10**
Unit - 4: Normalization	
Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency (1NF, 2NF and 3 NF), concept of surrogate key, Boyce-Codd normal form (BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).	**10**
Unit - 5: Transaction Management	
Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and save point. Concurrency control for lost updates, Uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods, lock granularity, lock types, two phase locking for ensuring serializability, deadlocks, Concurrency control with time stamp ordering: Wait/Die and Wound/Wait Schemes, Database Recovery management.	**8**

Text(T) / Reference(R) Books:	
T1	Introduction to Database Systems, C J Date, Pearson.
T2	Database Management Systems,3rd Edition,Raghurama Krishnan, Johannes Gehrke, TATA Mc Graw Hill.
T3	Database Systems-The Complete Book, H G Molina, J D Ullman, J Widom Pearson.
T4	Database Management Systems,6/e Ramez Elmasri, Shamkant B. Navathe, PEA
R1	DatabaseSystems design, Implementation, and Management,7thEdition,PeterRob&CarlosCoronel
R2	Database System Concepts, 5th edition, Silberschatz, Korth, TMH
R3	The Database Book Principles & Practice Using Oracle/MySQL, Narain Gehani, University Press.
W1	https://onlinecourses.nptel.ac.in/noc18_cs15/preview
W2	https://www.coursera.org/courses?query=database

DESIGN AND ANALYSIS OF ALGORITHMS			
Subject Code	21CICIT4030	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

The learning objectives of this course are:

- To provide an introduction to algorithms and performance analysis of algorithms.
- To introduce different algorithmic approaches for problem solving through numerous problems.

Unit -1	**Hours**
Introduction: What is an Algorithm, Algorithm Specification-Pseudo code Conventions, Recursive Algorithms, Performance Analysis-Space Complexity, Time Complexity, Asymptotic Notations, Practical Complexities, Performance Measurement. **Divide and Conquer:** The General Method, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort-Performance Measurement**.**	10
Unit -2	
The Greedy Method: The General Method, Knapsack Problem, Job Sequencing with Deadlines, Minimum-cost Spanning Trees-Prim's Algorithm, Kruskal's Algorithms, Single Source Shortest Paths..	10
Unit – 3	
Dynamic Programming: The General Method, All Pairs Shortest Paths, Single Source Shortest paths General Weights, Optimal Binary Search Trees, 0/1 Knapsack, The Travelling Sales Person Problem and Reliability Design.	10
Unit – 4	
Backtracking: The General Method, 8-Queens Problem, Sum of Subsets, Graph Coloring, and Hamiltonian Cycles.	10
Unit – 5	
Branch and Bound: The Method-Least cost (LC) Search, Control Abstraction for LC-Search, Bounding, FIFO Branch-and-Bound, LC Branch and Bound, 0/1 Knapsack Problem-LC Branch-and Bound Solution, FIFO Branch-and-Bound Solution, Traveling Salesperson.	8

Text(T) / Reference(R) Books:	
T1	Ellis Horowitz, Sartaj Sahni, SanguthevarRajasekaran, "Fundamentals of Computer Algorithms", 2nd Edition, Universities Press.
T2	Harsh Bhasin, "Algorithms Design & Analysis", Oxford University Press.
R1	Introduction to Algorithms Thomas H. Cormen, PHI Learning.
R2	The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E.Hopcroft, JeffreyD.Ullman.
W1	http://nptel.ac.in/courses/106101060/

AUTOMATATHEORY& COMPILER DESIGN			
Subject Code	21CICIT4040	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			
Unit -1: Introduction to Formal Languages, DFA, and NFA			**Hours**
Formal Languages and Regular Expressions: Languages, operations on languages, regular expressions (re), languages associated with (re), operations on (re), Identity rules for (re), Finite Automata: DFA, NFA, Conversion of a regular expression to NFA, NFA to DFA.			10
Unit -2: Context Free Grammars & Introduction to Compilers			
Context Free Grammars and parsing: Context free Grammars, Leftmost Derivations, Rightmost Derivations, Parse Trees, Ambiguity Grammars, Phases of compiler, Applications of Finite Automata to lexical analysis.			10
Unit – 3: Parsers			
Top-Down Parsing, Recursive Descent Parsers: LL(1)Parsers. Bottom-up Parsers: Shift Reduce Parser, LR Parsers: SLR, CLR, LALR			10
Unit – 4: Intermediate Code Generation & Code Optimization			
Intermediate code generation: Three address codes, abstract syntax tree, translation of simple statements, and control flow statements. **Code Optimization:** Issues in the design of code optimization, Principal sources of optimization, optimization of basic blocks, Loop optimization, peephole optimization			10
Unit – 5: Code Generation			
Code Generation: Issues in the design of code Generation, Machine Dependent Code Generation, object code forms, Register allocation and assignment, DAG representation of basic Blocks, Generating code from DAGs			8

Text(T) / Reference(R) Books:	
T1	A Text Book on Automata Theory, Nasir S.F.B, P.K.Srimani, Cambridge university Press
T2	Introduction to Automata Theory,Formal languages and computation, Shamalendukandar, Pearson
T3	Compilers Principles, techniques and Tools, Aho, Ullman, RaviSethi, PEA
R1	Introduction to theory of computation, 2nded, Michelsipser, CENGAGE
R2	Principles of Compiler Design, A.V. Aho. J.D.Ullman;PEA
R3	Theory of Computer Science, Automata languages and computation, 2/e, Mishra, Chandra Shekaran, PHI
R4	Theory of Computation, a problem solving approach, kaviMahesh,Wiley
W1	https://onlinecourses.nptel.ac.in/noc18_cs14/preview

OPERATING SYSTEMS			
Subject Code	21CICIT4050	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

- The learning objectives of this course are:
- Introduce the basic concepts of operating systems, its functions and services.
- To provide the basic concepts of process management and synchronization.
- Familiarize with deadlock issues.
- Understand the various memory management skills.
- Give exposure over I/O systems and mass storage structures.

Unit -1: Operating Systems Overview	**Hours**
Computer system organization, Operating system structure, Process, memory, storage management, Protection and security, Distributed systems, Computing Environments, Open-source operating systems, OS services, User operating-system interface.	10
Unit -2 :System Calls & IPC	
System calls, Types, System programs, OS structure, OS generation, System Boot Process concept, scheduling (Operations on processes, Cooperating processes, Inter-process communication), Multi-threading models	10
Unit – 3: Process Management	
Basic concepts, Scheduling criteria, Scheduling algorithms, Thread scheduling, Multiple processor scheduling Operating system, Algorithm Evaluation, The critical section problem, Peterson's solution, Synchronization hardware, Semaphores, Classic problems of synchronization, Critical regions, Monitors.	10
Unit – 4:Memory Management & Dead lock	
System model, Deadlock characterization, Methods for handling deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock detection, Recovery from deadlock. Storage Management: Swapping, Contiguous memory allocation, Paging, Segmentation Virtual Memory Background, Demand paging, copy on write, Page replacement and various Page replacement algorithms, Allocation of frames, Thrashing.	10
Unit – 5:I/O Systems	
File concept, Access methods, Directory structure, File system mounting, Protection, Directory implementation, Allocation methods, Free-space management, Disk scheduling, Disk management, Swap-space management, Protection.	8

Text(T) / Reference(R) Books:	
T1	Operating System Concepts Essentials, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, John Wiley & Sons Inc., 2010.
T2	Operating System Concepts, 9th Edition, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, John Wiley and Sons Inc., 2012
T3	Operating Systems, Second Edition, S Halder, Alex A Aravind, Pearson Education, 2016
T4	Operating Systems – Internals and Design Principles, 7th Edition, William Stallings, Prentice Hall, 2011
R1	Modern Operating Systems, Second Edition, Andrew S. Tanenbaum, Addison Wesley, 2001.
R2	Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata McGraw Hill Education, 1996.
R3	Operating Systems: A Concept-based Approach, Second Edition, D M Dhamdhere, Tata McGraw-Hill Education, 2007
R4	Operating Systems: Internals and Design Principles, Seventh Edition, William Stallings, Prentice Hall, 2011
W1	https://www.coursera.org/courses?query=operating%20system
W2	https://onlinecourses.nptel.ac.in/noc16_cs10/preview

DATABASE MANAGEMENT SYSTEMS LAB			
Subject Code	21CICIL4060	IA Marks	15
Number of Tutorial Hours/Week	03(P)	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03
Credits – 1.5			

List of Experiments

SQL

Exercise 1

Queries to facilitate acquaintance of Built-In Functions, String Functions, Numeric Functions, Date Functions and Conversion Functions.

Exercise 2

Queries using operators in SQL

Exercise 3

Queries to Retrieve and Change Data: Select, Insert, Delete, and Update

Exercise 4

Queries using Group By, Order By, and Having Clauses

Exercise 5

Queries on Controlling Data: Commit, Rollback, and Save point

Exercise 6

Queries for Creating, Dropping, and Altering Tables, Views, and Constraints

Exercise 7

Queries on Joins and Correlated Sub-Queries

Exercise 8

Queries on Working with Index, Sequence, Synonym, Controlling Access, and Locking Rows for Update, Creating Password and Security features

PL/SQL

Exercise 9

Write a PL/SQL Code using Basic Variable, Anchored Declarations, and Usage of Assignment Operation

Exercise 10

Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL

Exercise 11

Write a PL/SQL block using SQL and Control Structures in PL/SQL

Exercise 12

Write a PL/SQL Code using Cursors, Exceptions and Composite Data Types

Exercise 13

Write a PL/SQL Code using Procedures, Functions, and Packages FORMS

Exercise 14

Write a PL/SQL Code Creation of forms for any Information System such as Student Information System, Employee Information System etc.

Operating Systems & LINUX LAB			
Subject Code	21CICIL4070	IA Marks	15
Number of Tutorial Hours/Week	03(P)	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03
Credits – 1.5			

List of Experiments

UNIX Lab- Introduction to UNIX

1. Study of Unix/Linux general purpose utility commands
2. Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system.
3. Study of UNIX/LINUX File System(tree structure).
4. C program to emulate the UNIX ls –l command
5. C program that illustrates how to execute two commands concurrently with a command pipe. Ex: - ls–l | sort
6. Multiprogramming-Memory management-Implementation of fork (), wait (), exec() and exit () System calls

Operating Systems Lab

1. Simulate the Following CPU Scheduling Algorithms

A) FCFS B) SJF C) Priority D) Round Robin

2. Multiprogramming-Memory Management- Implementation of fork(), wait(), exec() and exit()
3. Simulate The Following
   a. Multiprogramming with A Fixed Number Of Tasks (MFT)
   b. Multiprogramming with A Variable Number Of Tasks (MVT)
4. Write a program to implement first fit, best fit and worst fit algorithm for memory management.
5. Simulate Bankers Algorithm for Dead Lock Avoidance

DESIGN AND ANALYSIS OF ALGORITHMS LAB			
Subject Code	21CICIL4080	Internal Marks	15
Number of Tutorial Hours/Week	03(P)	External Marks	35
Total Number of Practice Hours	36	Exam Hours	03
Credits – 1.5			

Course Objectives: This course will enable the students to:

- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations

LIST OF EXPERIMENTS:

Exercise 1 (Dynamic Programming Technique)

a) Longest common Subsequence
b) Develop Optimal Binary search trees

Exercise 2 (Dynamic Programming Technique)

a) 0/1 Knap Sack Problem ,
b) The Traveling Salesperson Problem.
c)

Exercise 3 (Greedy Methods)

a) Huffman codes
b) Knap Sack Problems

Exercise 4 (Greedy Methods)

a) Tree Vertex Splitting
b) Job Sequencing with Dead Lines

Exercise 5 (Back Tracking Techniques)

a) 8-Queens Problem
b) Sum of Sub sets
c)

Exercise 6 (Back Tracking Techniques)

a) Graph Coloring.
b) Hamiltonian Cycles

Exercise 7 (Back Tracking Techniques)

a) 0/1 Knap Sack Problem

Exercise 8 (Branch and Bound)

a) 0/1 Knap Sack Problem
b) Traveling Sales Person Problem

Exercise 9 (Graph Algorithms)

a) Breadth First Search
b) Depth First Search

Exercise 10 (Graph Algorithms)

a) Kruskal`s Algorithm
b) Prim`s Algorithms

Exercise 11 (Graph Algorithms)

a) Bellman Ford Algorithm
b) Dijkstra`s Algorithm

Exercise 12 (Graph Algorithms)

a) Floyd- Warshall Algorithm.

Web Application Development–II			
Subject Code	21CICIS4090	IA Marks	0
Number of Lecture hours/Week	1T+2P	Exam Marks	50
Total Number of Lecture Hours	36	Exam Hours	3
Credits -2			

List of Exercises

Perform experiments related to the following concepts:

1) Introduction to JavaScript

2) Applying JavaScript (internal and external)

3) Understanding JS Syntax

4) Introduction to Document and Window Object

5) Variables and Operators

6) Data Types and Num Type Conversion

7) Math and String Manipulation

8) Objects and Arrays

9) Date and Time

10) Conditional Statements

11) Switch Case

12) Looping in JS

13) Functions

Text(T) / Reference(R) Books:	
T1	Pro Mean Stack Development, 1st Edition, ELadElrom, ApressO'Reilly.
T2	Full Stack JavaScript Development with MEAN, Colin J Ihrig, Adam Bretz, 1st edition, SitePoint, SitePoint Pty. Ltd., O'ReillyMedia.
R1	Web Technologies, HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Black book, 1stEdition, DreamTech.
R2	An Introduction to Web Design, Programming, 1st Edition, Paul S Wang, Sanda S Katila, Cengage Learning.
W1	https://infyspringboard.onwingspan.com/en/app/toc/lex_17739732834840810000_shared/overview (HTML5)
W2	https://infyspringboard.onwingspan.com/en/app/toc/lex_18109698366332810000_shared/overview (Javascript)
W3	https://infyspringboard.onwingspan.com/en/app/toc/lex_32407835671946760000_shared/overview (Node.js &Express.js)
W4	https://infyspringboard.onwingspan.com/en/app/toc/lex_9436233116512678000_shared/overview(Typescript)

Semester V (Third year III-I)

S.No	Category	Code	Course Title	Hours			Credits
				L	T	P	
1	PC	21CICIT5010	Software Engineering	3	0	0	3
2	PC	21CICIT5020	Introduction to Cybersecurity	3	0	0	3
3	PC	21CICIT5030	Computer Networks	3	0	0	3
4	PE	21CICIP504X	Professional Elective -I	3	0	0	3
5	OE	21CIXXO505X	Open Elective - I	3	0	0	3
6	PC	21CICIL5060	Software Engineering Lab	0	0	3	1.5
7	PC	21CICIL5070	Cybersecurity Lab	0	0	3	1.5
8	SOC	21CICIS5080	Soft Skills & Aptitude Builder - 1	2	0	0	2
9	PR	21CICIR5090	Summer Internship (Mandatory) after II year (to be evaluated during V Semester)	0	0	0	1.5
9	MC	21CICIN5100	Biology for Engineers	2	0	0	0
					Total credits		**21.5**

Category	CREDITS
Professional core Courses	12
Open Electives	3
Professonal Electives	3
Skill oriented course	2
Summer Internship	1.5
TOTAL CREDITS	**21.5**

Professional Elective - I	
Code	**Course Title**
21CICIP504A	Data Warehousing and Mining
21CICIP504B	Wireless AD-HOC Networks
21CICIP504C	Computer Graphics

DETAILED SYLLABUS

Semester-V

SOFTWARE ENGINEERING			
Subject Code	21CICIT5010	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Unit -1: Software and Software Engineering	**Hours**
The Nature of Software, The Unique Nature of Web Apps, Software Engineering, Software Process, Software Engineering Practice, software Myths. ***Process Models:*** A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process. ***Requirements Analysis and Specification****:* Requirements Gathering and Analysis, Software Requirement Specification (SRS), Formal System Specification.	10
Unit -2: Software Design	
Overview of the Design Process: How to Characterize of a Design, Cohesion and Coupling, Layered Arrangement of Modules, Approaches to Software Design. ***Function-Oriented Software Design****:*Overview of SA/SD Methodology, Structured analysis, Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review, over view of Object-Oriented design. ***User Interface Design:*** Characteristics of Good User Interface, Basic Concepts, Types of User Interfaces, Fundamentals of component-based GUI Development, A User Interface Design Methodology.	10
Unit – 3: Coding and Testing	
Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing.	10
Unit – 4: Software Reliability and Quality Management	
Software Reliability: Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity Model. ***Computer Aided Software Engineering:*** Case and its Scope, Case Environment, Case Support in Software Life Cycle, Other Characteristics of Case tools, Towards Second Generation CASE Tool, Architecture of a Case Environment.	10
Unit – 5: Software Maintenance & Reuse	
Software maintenance: Maintenance Process Models, Maintenance Cost, Software Configuration Management. ***Software Reuse:*** what can be reused? Why almost No Reuse So Far? Basic Issues in Reuse Approach, Reuse at organization Level.	8

Text(T) / Reference(R) Books:	
T1	Software engineering A practitioner's Approach, Roger S. Pressman, Seventh Edition McGrawHill International Edition.
T2	Fundamentals of Software Engineering, Third Edition, Rajib Mall, PHI.
T3	Software Engineering, Ian Sommerville, Ninth edition, Pearson education
T4	Software Engineering, Concepts and Practices, Ugrasen Suman, Cengage Learning
R1	Software Engineering A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
R2	Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
R3	Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press
R4	Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
R5	Software Engineering concepts, R. Fairley, TMH.
W1	https://www.edx.org/learn/software-engineering
W2	https://www.coursera.org/courses?query=software%20engineering

INTRODUCTION TO CYBER SECURITY			
Subject Code	21CICIT5020	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

- The Cyber security Course will provide the students with foundational Cyber Security principles,Security architecture, risk management, attacks, incidents, and emerging IT and IS technologies.
- Students will gain insight into the importance of Cyber Security and the integral role of CyberSecurity professionals.

Unit -1 : Introduction to Cybercrime	Hours
Introduction, Cybercrime, Definition and Origins of the Word, Cybercrime and Information Security ,Who are Cybercriminals? Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.	10
Unit -2: Cyber offenses	
How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.	10
Unit – 3: Cybercrime Mobile and Wireless Devices	
Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, OrganizationalMeasures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.	10
Unit – 4 : Tools and Methods Used in Cybercrime	
Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection,Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft)	10
Unit – 5 : Cyber crimes and Cyber security	
Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Information Security Planning and Governance, Information Security Policy Standards, Practices, The information Security Blueprint, Security education, Training and awareness program, Continuing Strategies.	8

Text Books/ Reference Books:	
T1	Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, SunitBelapure, Wiley.
T2	Principles of Information Security, MichealE.Whitman and Herbert J.Mattord, Cengage Learning.
R1	Information Security, Mark Rhodes, Ousley, MGH

COMPUTER NETWORKS			
Subject Code	21CICIT5030	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			
Unit -1: Introduction			**Hours**
Network Topologies, WAN, LAN, MAN. OSI Reference Model, TCP/IP Reference Model, Multiplexing (Frequency Division, Wavelength Division, Synchronous Time Division and Statistical Time Division Multiplexing Techniques), Switching Techniques (Circuit-switching, Datagram, Virtual Circuit Networks).			**10**
Unit -2: The Data Link Layer			
Design Issues, Services Provided to the Network Layer, Framing, Error Control, Flow Control, Error Detection and Correction, Error Correcting Codes, Error Detecting Codes, A Simplex Stop and Wait Protocol for an Error free channel, A Simplex Stop and Wait Protocol for a Noisy Channel, Sliding Window Protocols (A One Bit Sliding Window Protocol-A Protocol Using Go-Back-NA Protocol Using Selective Repeat), Data Link Layer in HDLC: Configuration and transmission modes, frames, control fields.			**10**
Unit – 3: The Medium Access Control Sub layer			
The Channel Allocation Problem, Static Channel Allocation, Assumptions for Dynamic Channel Allocation, Multiple Access Protocols (Aloha, Carrier Sense Multiple Access Protocols, Collision-Free Protocols, Limited Contention Protocols, Wireless LAN Protocols).			**10**
Unit – 4: Routing Algorithms			
Routing Algorithms- Shortest-Path Routing, Flooding, Hierarchical routing, Broadcast, Multicast and Distance Vector Routing. Congestion Control Algorithms, Approaches to Congestion Control-Traffic Aware Routing-Admission Control-Traffic Throttling-Load Shedding, IP Addressing, Classless and Class full Addressing, Sub-netting.			**10**
Unit – 5: Application Layer			
Application Layer: The Domain Name System- The DNS Name Space, Resource Records, Name Servers, Electronic Mail Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery.			08

Text(T) / Reference(R) Books:	
T1	Computer Networks, 5th Edition, Tanenbaum and David J Wetherall, Pearson Edu, 2010.
T2	Computer Networks: A Top Down Approach, Behrouz A. Forouzan, FirouzMosharraf, McGraw Hill Education.
R1	Computer Networks, Mayank Dave, CENGAGE
R2	Data and Computer Communications, Fifth Edition, William Stallings, PHI, 2005.
R3	Computer Networks, A Systems Approach, Fifth Edition, Peterson & Davie, Harcourt, 2011.
R4	Network Management Standards, Second Edition, Ulysses Black, McGraw Hill, 1994
W1	https://swayam.gov.in/courses/5172-computer-networks
W2	https://www.coursera.org/courses?query=computer%20network

SOFTWARE ENGINEERING LAB			
Subject Code	21CICIL5060	IA Marks	15
Number of Tutorial Hours/Week	03(P)	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03
Credits – 1.5			

List of Experiments

Exercise 1
Do the Requirement Analysis and Prepare SRS

Exercise 2
Using COCOMO model estimate effort.

Exercise 3
Calculate effort using FP oriented estimation model.

Exercise 4
Analyze the Risk related to the project and prepare RMMM plan.

Exercise 5
DevelopTime-line chart and project table using PERT or CPM project scheduling methods.

Exercise 6
Draw E-R diagrams, DFD, CFD and structured charts for the project.

Exercise 7
Design of Test cases based on requirements and design.

Exercise 8
Prepare FTR

Exercise 9
Prepare Version control and change control for software configuration items.

Exercise 10
DesignSoftware interface

Exercise 11
Mini Project

Cyber security Lab			
Subject Code	21CICIL5070	IA Marks	15
Number of Tutorial Hours/Week	03(P)	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03
Credits – 1.5			

Course Objectives:

- Student to get the knowledge about audit and information security m anagement,which makes the student to get the real world experience.
- To learn and implement Data leakage in a website database

List of Experiments

Exercise – 1:
Audit security policy implementation in windows environment.

Exercise – 2:
Create a Demilitarized zone creation in Network environment for information security.

Exercise – 3:
Implement Resource harvesting attack and mitigation.

Exercise – 4:
Implement Window Patch management policy.

Exercise – 5:
Knowing the Behavior of Trojans and mitigation strategies.

Exercise- 6
Create a metasploit and make it to implement.

Exercise-7
Access control list creation and content filtering limiting the traffic.

Exercise-8
Data leakage in a website database and preventive measures.

Exercise-9
Password policy implementations and verification.

Exercise-10
Patch management implementation using MBSA tool on windows machine

Exercise-11
Audit Policy management for users and computers log analysis.

Exercise-12
Media handling policy implementation and event log analysis.

Exercise-13
Installation of Trojan and study of different options.

Exercise-14
Network DOS attack and proof of bandwidth utilization and preventive steps.

Soft Skills & Aptitude Builder - 1			
Subject Code	21CICIS5080	**IA Marks**	**15+15**
Number of Lecture Hours/Week	1T+2P	**Exam Marks**	**35+35**
Total Number of Lecture Hours	32	**Exam Hours**	**3**
Credits – 2			
Section A,Soft Skills			
Unit – 1: Intrapersonal Communication			**Hours**
Introduction to Soft Skills and its Significance Personal Effectiveness: Who am I and What am I; My Strengths and Weaknesses; SWOT Analysis; SMART Goal Setting; Being Proactive Principles of Personal Vision: Beginning with the End in Mind; Time Management: Understanding Priorities; Put First-Things-First Activity: Psychometric Tests and SWOT Analysis, SMART Goal Setting			6
Unit 2: Interpersonal Communication			
Principles of Creative Cooperation and Organisation Skills: Think Win-Win; Seek First to Understand then to be Understood; Synergize; Life-Long Learning **Emotional Intelligence**: Self-Awareness, Self-Regulation, Empathy, Assertiveness, Adoptability, Managing Emotions **Activity**: Resolving a Conflict with your Friend/Colleague/Family Member; Group Discussions & Debates			6
Unit – 3: 21st Century Skills			
What are 21st Century Skills? Learning Skills- Digital Literacy- Life Skills **Critical Thinking**: Active Listening, Observation, Introspection, Analytical Thinking, Open Mindedness **Problem Solving**: Understanding the Complexity of the Problem, Defining the Problem, Cause and Effect Analysis, Exploring Possible Solutions, Planning Actions, Analysing Results of your Actions, Getting Feedback, Redefining the Problem, The Problem Solving Cycle **Decision Making**: Managing Conflict, Conflict Resolution, Methods of Decision Making, Effective Decision Making in Teams – Methods & Styles **Activity**: Case Study			6
Section B,Aptitude Builder			
Unit – 4: Ratios & Percentages			
Definition of Ratio, Properties of Ratios, Comparison of Ratios, Problems on Ratios, Compound Ratio, Problems on Proportion, Mean Proportional and Continued Proportion. **Partnership:** Introduction, Relation between Capitals, Period of Investments and Shares **Number System:** Classification of Numbers, Divisibility Rules, Finding the Units Digit, Finding Remainders in Divisions Involving Higher Powers, LCM and HCF Models **Percentages:** Introduction, Converting a Percentage into Decimals, Converting a Decimal into Percentage, Percentage Equivalent of Fractions, Problems on Percentages **Profit And Loss:** Problems on Profit and Loss Percentage, Relation between Cost Price and Selling Price, Discount and Marked Price, Two Different Articles Sold at Same Cost Price, Two Different Articles Sold at Same Selling Price Gain% / Loss% on Selling Price **Problems on Ages:** Introduction, Problems based on Ages **Averages:** Definition of Average, Rules of Average, Problems on Average , Problems on Weighted Average, Finding Average using Assumed Mean Method **Alligation and Mixture:** Problems on Mixtures, Alligation Rule, Problems on Alligation			7

Unit – 5: Mental Ability	
Difference Series, Product Series, Squares Series, Cubes Series, Alternate Series Combination Series, Miscellaneous Series, Place Values of Letters **Number and Letter Analogies:** Definition of Analogy, Problems on Number Analogy, Problems on Letter Analogy, Problems on Verbal Analogy Odd **Man Out:** Problems on Number Odd Man Out, Problems on Letter Odd Man Out, Problems on Verbal Odd Man Out **Coding and Decoding:** Coding using Same Set of Letter, Coding using Different Set of Letters, Coding into a Number, Problems on R-Model **Blood relations:** Defining the Various Relations among the Members of a Family, Solving Blood Relation Puzzles, Solving the Problems on Blood Relations using Symbols and Notations **Direction Sense:** Solving Problems by Drawing the Paths, Finding the Net Distance Travelled, Finding the Direction, Problems on Clocks ,Problems on Shadows	7

Section-A: Text (T) / Reference (R) Books:	
For Units 1, 2, & 3	
T1	English and Soft Skills, Dr. S. P. Dhanvel, Orient Blackswan, 2011
R1	Seven Habits of Highly Effective People, Stephen R Covey
R2	Emotional Intelligence, Daniel Goleman, Bantom Book, 2006
R3	21st Century Skills: Learning for Life in our Times, Bernie Trilling, Charles Fadel; John Wiley & Sons
For Units 4&5	
T1	R S Agarwal, S Chand, 'Quantitative Aptitude'
T2	R S Agarwal, S.Chand , 'A Modern Approach to Logical Reasoning'
R1	Quantitative Aptitude for CAT By Arun Sharma
R2	GL Barrons, McGraw Hills, Thorpe's Verbal Reasoning, LSAT Materials
Course Outcomes: On completion of this course, students can	
Section A: Soft Skills	
CO 1	re-engineer attitude and understand its influence on behaviour
CO 2	develop interpersonal skills and be an effective goal oriented team player
CO 3	develop holistic personality with a mature outlook to function effectively in different circumstances
Section B: Aptitude Builder	
CO 4	solve the real-time problems for performing job functions easily
CO 5	analyse the problems logically and critically

BIOLOGY FOR ENGINEERS			
Subject Code	21CICIN5100	IA Marks	30
Number of Lecture Hours/Week	2	Exam Marks	70
Total Number of Lecture Hours	30	Exam Hours	03
Credits – 00			

Unit -1: Introduction	**Hours**
Bring out the fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Mention the most exciting aspect of biology as an independent scientific discipline. Why we need to study biology. How biological observations of 18th Century that lead to major discoveries. Examples from Brownian motion and the origin of thermodynamics by referring to the original observation of Robert Brown and Julius Mayor.	06
Unit -2:Classification	
Plant Hierarchy of life forms at phenomenological level- classification based on (a) cellularity - Unicellular or multicellular (b) ultra-structure- prokaryotes or eukaryotes. (c) energy and Carbon utilization -Autotrophs, heterotrophy, lithotrophs (d) Ammonia excretion – ammoniotelic, uricotelic, ureotelic (e) Habitats- aquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. Model organisms for the study of biology come from different groups. E. coli, S.cerevisiae, D. Melanogaster, C. elegance, A. Thaliana, M. Musculus	05
Unit – 3: Genetics & Biomolecules	
Mendel's laws, Concept of segregation and independent assortment. Concept of allele. Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis be taught as a part of genetics. Emphasis to be give not to the mechanics of cell division nor the phases but how genetic material passes from parent to offspring. Concepts of recessiveness and dominance. Concept of mapping of phenotype to genes. Discuss about the single gene disorders in humans. Discuss the concept of complementation using human genetics.	06
Unit – 4: Enzymes & Proteins	
Enzymology: How to monitor enzyme catalyzed reactions. How does an enzyme catalyze reactions - Enzyme classification. Mechanism of enzyme action. -examples. Enzyme kinetics and kinetic parameters. Why should we know these parameters to understand biology? RNA catalysis. **Proteins**- structure and function. Hierarch in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.	07
Unit – 5: Microbiology & Metabolism	
Thermodynamics as applied to biological systems - Exothermic and endothermic versus undergone and exergoinc reactions. Concept of K_{eq} and its relation to standard free energy - Spontaneity - ATP as an energy currency. This should include the breakdown of glucose to CO_2 + H_2O (Glycolysis and Krebs cycle) and synthesis of glucose from CO_2 and H_2O (Photosynthesis). Energy yielding and energy consuming reactions. Concept of Energy charge.	06

Text(T) / Reference(R) Books:	
T1	Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd
T2	Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons
T3	Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers
R1	Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
R2	Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
W1	https://ocw.mit.edu/courses/biological-engineering/
W2	https://onlinecourses.nptel.ac.in/noc16_ge03/preview

Professinal Elective-I

DATA WAREHOUSING & MINING			
Subject Code	21CICIP504A	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			
Unit -1: Introduction			**Hours**
Data Warehousing and Business Analysis: - Data warehousing OLAP & OLTP Components –Building a Data warehouse –Data Warehouse Architecture. Why Data Mining? What Is Data Mining? What Kinds of Data Can Be Mined? What Kinds of Patterns Can Be Mined? Which Technologies Are Used? Which Kinds of Applications Are Targeted? Major Issues in Data Mining. Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity and Dissimilarity.			**10**
Unit -2: Data Pre-processing			
Data Pre-processing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization			**10**
Unit – 3: Classification			
Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction. Bayes' Theorem, Naïve Bayesian Classification, Bayesian Belief Networks			**10**
Unit – 4: Association Analysis			
Problem Defecation, Frequent Item Set generation, Rule generation, compact representation of frequent item sets, FP-Growth Algorithm.			**10**
Unit – 5: Cluster Analysis			
What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bisecting K-means, Strengths and Weaknesses; Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm DBSCAN: Traditional Density Centre-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses.			**08**

Text(T) / Reference(R) Books:	
T1	Introduction to Data Mining: Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson.
T2	Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier
R1	Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning.
R2	Data Mining: Vikram Pudi and P. Radha Krishna, Oxford.
R3	Data Mining and Analysis - Fundamental Concepts and Algorithms; Mohammed J. Zaki, Wagner Meira, Jr, Oxford
R4	Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.
R5	Data Mining: Introductory and Advanced Topics: Dunham, Pearson.
W1	https://www.edx.org/learn/data-mining
W2	https://www.coursera.org/specializations/data-mining
W3	https://www.coursera.org/courses?query=data%20warehouse

WIRELESS AD-HOC NETWORKS			
Subject Code	21CICIP504B	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

- Explain fundamental principles of Ad-hoc Networks
- Discuss a comprehensive understanding of Ad-hoc network protocols
- Outline current and emerging trends in Ad-hoc Wireless Networks.
- Analyze energy management in ad-hoc wireless networks.

Unit -1	Hours
Ad-hoc Wireless Networks Introduction, Issues in Ad-hoc Wireless Networks, Ad-hoc Wireless Internet; MAC Protocols for Ad-hoc Wireless Networks: Introduction, Issues in Designing a MAC Protocol, Design Goals of MAC Protocols, Classification of MAC protocols, Contention-Based Protocols, Contention-Based Protocols with Reservation Mechanisms, Contention-Based Protocols with Scheduling Mechanisms,MAC Protocols that Use Directional Antennas.	**10**
Unit -2	
Routing Protocols for Ad-hoc Wireless Networks Introduction, Issues in Designing a Routing Protocol for Ad-hoc Wireless Networks; Classification of Routing Protocols; Table Driven Routing Protocols; On-Demand Routing Protocols, Hybrid Routing Protocols, Hierarchical Routing Protocols and Power-Aware Routing Protocols.	**10**
Unit – 3	
Multicast Routing in Ad-hoc Wireless Networks Introduction, Issues in Designing a Multicast Routing Protocol, Operation of Multicast Routing Protocols, An Architecture Reference Model for Multicast Routing Protocols, Classifications of Multicast Routing Protocols, Tree-Based Multicast Routing Protocols and Mesh-Based Multicast Routing Protocols.	**10**
Unit – 4	
Transport Layer and Security Protocols for Ad-hoc Networks: Introduction, Issues in Designing a Transport Layer Protocol; Design Goals of a Transport Layer Protocol; Classification of Transport Layer Solutions; TCP over Transport Layer Solutions; Other Transport Layer Protocols for Ad-hoc Networks; Security in Ad-hoc Wireless Networks, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management and Secure Touting Ad-hoc Wireless Networks.	**10**
Unit – 5	
Quality of Service and Energy Management in Ad-hoc Wireless Networks: Introduction, Issues andChallenges in Providing QoS in Ad-hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions, Network Layer Solutions; Energy Management in Ad-hoc Wireless Networks: Introduction, Need for Energy Management in Ad-hoc Wireless Networks, Classification of Energy Management Schemes, Battery Management Schemes, Transmission Management Schemes, System Power Management Schemes.	**08**

Text Books	
T1	C. Siva Ram Murthy & B. S. Manoj: Ad-hoc Wireless Networks, 2nd Edition, Pearson Education,2011

Reference Books:	
R1	Ozan K. Tonguz and Gianguigi Ferrari: Ad-hoc Wireless Networks, John Wiley, 2007.
R2	Xiuzhen Cheng, Xiao Hung, Ding-Zhu Du: Ad-hoc Wireless Networking, Kluwer AcademicPublishers, 2004.
R3	C.K. Toh: Ad-hoc Mobile Wireless Networks- Protocols and Systems, Pearson Education, 2002

COMPUTER GRAPHICS			
Subject Code	21CICIP504C	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

- Understand the fundamental concepts and theory of computer graphics
- Understand modelling, and interactive control of 3D computer graphics applications
- The underlying parametric surface concepts be understood
- Learn multimedia authoring tools.

Unit -1: INTRODUCTION	**Hours**
Application areas of computer graphics, overview of graphic system, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices.	10
Unit -2: OUTPUT PRIMITIVES	
Points and lines, line drawing algorithms, mid-point circle algorithm, Filled area primitives: scan-line polygon fill algorithm, boundary-fill and flood-fill algorithm. 2-D GEOMETRICAL TRANSFORMATIONS: Translation, scaling, rotation, reflection and shear transformation matrix representations and homogeneous co-ordinates, composite transformations, transformations between coordinates	10
Unit – 3 : 2-D VIEWING	
The viewing pipe-line, viewing coordinat4 reference frame, window to view-port coordinate transformations, viewing function, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland Hodge man polygon clipping algorithm.	10
Unit – 4 : 3-D OBJECT REPRESENTATION	
spline representation, Hermit curve, Bezier curve and B-spline curve, Polygon surfaces, quadric surfaces, , Solid modeling Schalars – wire frame, CSG, B-rep. Bezier and B-spline surfaces, Basic illumination models, shading algorithms	10
Unit – 5 : 3-D GEOMETRIC TRANSFORMATIONS	
Translation, rotation, scaling, reflection and shear transformation and composite transformations. Visible surface detection methods: Classification, backface detection, depth buffer, scan-line, depth sorting COMPUTER ANIMATION: Design of animation sequence, general computer animation functions, raster animation, computer animation language, key frame system, motion specification	08

Text Books	
T1	Computer Graphics C version/ Donald Hearn and M. Pauline Baker/Pearson/PHI
T2	Computer Graphics Principles & practice-second edition in C/ Foley, Van Dam, Feiner and Hughes

Reference Books:	
R1	Computer Graphics Second edition/ Zhigandxiang, Roy Plastock, Schaum's outlines/Tata Mc-Graw hill
R2	Procedural elements for Computer Graphics/David F Rogers/Tata Mc Graw hill, 2nd edition.
R3	Principles of Interactive Computer Graphics/ Neuman and Sproul/TMH.
R4	Computer Graphics/ Steven Harrington/TMH

Semester VI (Third year III-II)

S.No	Category	Code	Course Title	Hours			Credits
				L	T	P	
1	PC	21CICIT6010	Privacy and Security in IOT	3	0	0	3
2	PC	21CICIT6020	Cryptography &Network Security	3	0	0	3
3	PC	21CICIT6030	Block chain Technologies	3	0	0	3
4	PE	21CICIP604X	Professional Elective -II	3	0	0	3
5	PE	21CICIP605X	Professional Elective - III				
6	OE	21CIXXO606X	Open Elective - II	3	0	0	3
7	PC	21CICIL6070	Cryptography &Network Security Lab	0	0	3	1.5
8	SOC	21CMASH6080	Soft Skills & Aptitude Builder - 2	0	0	3	2
9	PR	21CICIR6090	Research Internship				
10	MC	21CICIN6100	Essence Of Indian Traditional Knowledge	2	0	0	0
				Total credits			**21.5**

Category	CREDITS
Professional core Courses	10.5
Open Electives	3
Professional Electives	6
Skill oriented course	2
Research Internship	
TOTAL CREDITS	**21.5**

Professional Elective - II	
Code	**Course Title**
21CICIP604A	Software Project Management
21CICIP604B	Mining massive datasets
21CICIP604C	Intrusion Detection Systems

Professional Elective - III	
Code	**Course Title**
21CICIP605A	Software Quality Assurance
21CICIP605B	Machine Learning
21CICIP605C	Mobile Application Development

DETAILED SYLLABUS

SEMESTER-VI

PRIVACY AND SECURITY IN IoT			
Subject Code	21CICIT6010	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

- Ability to understand the Security requirements in IoT.
- Understand the cryptographic fundamentals for IoT
- Ability to understand the authentication credentials and access control
- Understand the various types Trust models and Cloud Security.

Unit -1: INTRODUCTION: SECURING THE INTERNET OF THINGS	**Hours**
Security Requirements in IoT Architecture - Security in Enabling Technologies - Security Concerns in IoTApplications. Security Architecture in the Internet of Things - Security Requirements in IoT - Insufficient Authentication/Authorization - Insecure Access Control - Threats to Access Control, Privacy, and Availability - Attacks Specific to IoT. Vulnerabilities – Secrecy and Secret-Key Capacity - Authentication/Authorization for Smart Devices - Transport Encryption – Attack & Fault trees.	10
Unit -2: CRYPTOGRAPHIC FUNDAMENTALS FOR IOT	
Cryptographic primitives and its role in IoT – Encryption and Decryption – Hashes – Digital Signatures – Random number generation – Cipher suites – key management fundamentals – cryptographic controlsbuilt into IoT messaging and communication protocols – IoT Node Authentication	10
Unit – 3 : IDENTITY & ACCESS MANAGEMENT SOLUTIONS FOR IOT	
Identity lifecycle – authentication credentials – IoT IAM infrastructure – Authorization with Publish / Subscribe schemes – access control	10
Unit – 4 : PRIVACY PRESERVATION AND TRUST MODELS FOR IOT	
Concerns in data dissemination – Lightweight and robust schemes for Privacy protection – Trust and Trust models for IoT – self-organizing Things - Preventing unauthorized access.	10
Unit – 5 : CLOUD SECURITY FOR IOT	
Cloud services and IoT – offerings related to IoT from cloud service providers – CloudIoT security controls – An enterprise IoT cloud security architecture – New directions in cloud enabled IoT computing.	8

Text Books/ Reference Books:	
T1	Practical Internet of Things Security (Kindle Edition) by Brian Russell, Drew Van Duren
T2	Securing the Internet of Things Elsevier
T3	Security and Privacy in Internet of Things (IoTs): Models, Algorithms, and Implementations

Cryptography &Network Security			
Subject Code	21CICIT6020	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

- The concepts of classical encryption techniques and concepts of finite fields and number theory
- Working principles and utilities of various cryptographic algorithms including secret keycryptography, hashes and message digests, and public key algorithms
- Design issues and working principles of various authentication protocols, PKI standards
- Various secure communication standards including Kerberos, IPsec, and SSL/TLS and email
- Concepts of cryptographic utilities and authentication mechanisms to design secure applications

Unit -1	**Hours**
Classical Encryption Techniques: Security Attacks, Services & Mechanisms, Symmetric Cipher Model. Cyber Threats, Phishing Attack, Web Based Attacks, SQL Injection Attacks, Buffer Overflow& Format String Vulnerabilities, TCP session hijacking, UDP Session Hijacking. Block Ciphers: Traditional Block Cipher Structure, Block Cipher Design Principles.	10
Unit -2	
Symmetric Key Cryptography: Data Encryption Standard (DES), Advanced Encryption Standard (AES), Blowfish, IDEA, Block Cipher Modes of Operations. Number Theory: Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorems, The Chinese Remainder Theorem, Discrete Logarithms.	10
Unit – 3	
Public Key Cryptography: Principles, Public Key Cryptography Algorithms, RSA Algorithm, Diffie Hellman Key Exchange, Elliptic Curve Cryptography. Cryptographic Hash Functions: Application of Cryptographic Hash Functions, Requirements & Security, Secure Hash Algorithm, Message Authentication Functions, Requirements & Security, HMAC & CMAC. Digital Signatures: NIST Digital Signature Algorithm, Key Management and Distribution	10
Unit – 4	
User Authentication: Remote User Authentication Principles, Kerberos. Electronic Mail Security: PrettyGood Privacy (PGP) And S/MIME. IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.	10
Unit – 5	
Transport Level Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Shell (SSH) Firewalls: Characteristics, Types of Firewalls, Placement of Firewalls, Firewall Configuration, Trusted Systems.	8

Text Books/ Reference Books:	
T1	Cryptography and Network Security- William Stallings, Pearson Education, 7th Edition.
T2	Cryptography, Network Security and Cyber Laws – Bernard Menezes, CengageLearning, 2010 edition.
R1	Cryptography and Network Security- Behrouz A Forouzan, Debdeep Mukhopadhyaya, Mc-GrawHill, 3rd Edition, 2015.
R2	Network Security Illustrated, Jason Albanese and Wes Sonnenreich, MGH Publishers, **2003**

BLOCKCHAIN TECHNOLOGIES			
Subject Code	21CICIT6030	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

- Understand how block chain systems (mainly Bit coin and Ethereum) work and to securely interactwith them,
- Design, build, and deploy smart contracts and distributed applications,
- Integrate ideas from block chain technology into their own projects.

Unit -1	**Hours**
Introduction, Scenarios, Challenges Articulated, Block chain, Block chain Characteristics, Opportunities Using Block chain, History of Block chain. Evolution of Block chain : Evolution of Computer Applications, Centralized Applications, Decentralized Applications, Stages in Block chain Evolution, Consortia, Forks, Public Block chain Environments, Type of Players in Block chain Ecosystem, Players in Market.	10
Unit -2	
Block chain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on block chain, data storage on block chain, wallets, coding on block chain: smart contracts, peer-to-peer network, types of block chain nodes, risk associated with block chain solutions, life cycle of block chain transaction.	10
Unit – 3	
Architecting Block chain solutions: Introduction, Obstacles for Use of Block chain, Block chain Relevance Evaluation Framework, Block chain Solutions Reference Architecture, Types of Block chain Applications. Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Block chain Solutions, Architecture Considerations, Architecture with Block chain Platforms, Approach for Designing Block chain Applications.	10
Unit – 4	
Ethereum Block chain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts,My Ether Wallet, Ethereum Networks/Environments, Infura, Ether scan, Ethereum Clients, Decentralized Application, Meta mask, Tuna Fish Use Case Implementation, Open Zeppelin Contracts	10
Unit – 5	
Hyper ledger Block chain Implementation, Introduction, Use Case – Car Ownership Tracking, Hyper ledger Fabric, Hyper ledger Fabric Transaction Flow, Fab Car Use Case Implementation, Invoking Chain code Functions Using Client Application. Advanced Concepts in Block chain: Introduction, Inter Planetary File System (IPFS), Zero-Knowledge Proofs, Oracles, Self-Sovereign Identity, Block chain with IoT and AI/ML Quantum Computing and Blockchain, Initial Coin Offering, Block chain Cloud Offerings, Block chain and its Future Potential.	8

Text Books/ Reference Books:	
T1	Ambadas, Arshad Sarfarz Ariff, Sham “Block chain for Enterprise Application Developers”, Wiley
T2	Andreas M. Antonpoulos, “Mastering Bitcoin: Programming the Open Block chain” , O’Reilly
R1	Block chain: A Practical Guide to Developing Business, Law, and Technology Solutions, JosephBambara, Paul R. Allen, Mc Graw Hill.
R2	Block chain: Blueprint for a New Economy, Melanie Swan, O’Reilly

Cryptography & Network Security Lab			
Subject Code	21CICIL6070	IA Marks	15
Number of Tutorial Hours/Week	03(P)	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03
Credits – 1.5			

Course Objectives:

- To provide deeper understanding into cryptography, its application to network security,threats/vulnerabilities to networks and countermeasures.
- To explain various approaches to Encryption techniques, strengths of Traffic Confidentiality,Message Authentication Codes.
- To familiarize symmetric and asymmetric cryptography

Experiments:

- Lab 1: Implementation of Caesar Cipher technique
- Lab 2: Implement the Play fair Cipher
- Lab 3: Implement the Pure Transposition Cipher
- Lab 4: Implement DES Encryption and Decryption
- Lab 5: Implement the AES Encryption and decryption
- Lab 6: Implement RSA Encryption Algorithm
- Lab 7: Implementation of Hash Functions

Soft Skills & Aptitude Builder - 2			
Subject Code	21CMASH6080	IA Marks	15+15
Number of Lecture Hours/Week	1T+2P	Exam Marks	35+35
Total Number of Lecture Hours	30	Exam Hours	3
Credits - 2			
Section A, Soft Skills			
Unit – 1: Communicative Competence			**Hours**
Verbal Reasoning: Reading Comprehension-Text Completion- Sentence Equivalence Spotting Errors, Sequencing of Sentences, Parallelism in Structure E-Mail Etiquette, Reporting News Activity: Completing Exercises			**6**
Unit 2: Career and Employability Skills			
What is a Career: Career vs Job, Career Values & Grid, Skills vs Strengths, Spotting Skills/Reflection of Present Skills, Meeting the Expectation of your Employer, Matching your Skills with the Required Skills, Preparing Resume, Preparing for Interviews & Structuring Answers Activity: Resume Building, Interviews			**6**
Section B, Aptitude Builder			
Unit – 3: Time and Work			
Pipes and Cisterns: Problems on Unitary method, Relation between Men, Days, Hours and Work, Problems on Man-Day-Hours Method, Problems on Alternate Days, Problems on Pipes and Cisterns. **Time, Distance and Speed, Problems on Trains, Boats and Streams:** Relation between Speed, Distance and Time, Converting km/h into m/s and vice versa , Problems on Average Speed, Problems on Relative Speed, Problems on Circular Tracks, Problems on Races **Problems on Trains:** Two Trains Moving in Opposite Direction, Two Trains Moving in same Direction, A Train Crossing a Stationary Object of a Given Length like a Platform or Bridge, A Train Crossing a Stationary Object like a Pole or a Man **Boats and Streams:** Time Based, which can be considered as a Point Object Speed Based, Distance Based, Average Speed Based			**6**
Unit – 4: Logical and Analytical Reasoning			
Seating Arrangement: Linear Arrangement, Circular Arrangement, Tabler, Triangular Arrangement, Complex Arrangement**.** **Clocks :** Finding the Angle When the Time is Given, Finding the Time When the Angle is Known, Relation between Angles, Minutes and Hours, Position of Hands of the Clock, Time Gained or Lost by the Clock, Mirror /Water Image-based Time. **Calendars :** Definition of a Leap Year, Finding the Number of Odd Days, Framing the Year Code for Centuries, Finding the Day of any Random Calendar Date **Syllogisms:** Finding the Conclusions using Venn Diagram Method, Finding the Conclusions using Syllogism Method **Simple Interest:** Definitions, Problems on Interest and Amount, Problems when Rate of Interest and Time Period are Numerically Equal **Compound Interest:** Definition and Formula for Amount in Compound Interest, Difference between Simple Interest and Compound Interest for 2 Years on the Same Principle and Time Period.			**7**
Unit – 5: Permutations, Probability, Areas and Volumes			
Definition of permutation, Problems on Permutations, Definition of Combinations, problems on Combinations **Probability:** Definition of Probability, Problems on Coins, Problems on Dice, Problems on Deck of Cards, Problems on Years **Mensuration - 2D:** Formulas for Areas, Formulas for Volumes of Different Solids, Problems on Areas **Mensuration - 3D:** Problems on Volumes, Problems on Surface Areas			**7**

Text (T) / Reference (R) Books:	
For Units 1 & 2	
T1	Enhance Your Employability Skills, David Winter and Laura Brammar, University of London
T2	R.S. Agarwal, Verbal & Non-Verbal Reasoning, S. Chand & Co., Latest ed. 2003
R2	How to Prepare for Verbal Ability and Reading Comprehension, Arun Sharma, Meenakshi Upadhay, Mc Graw Hill
For Units 3, 4, & 5	
T1	R S Agarwal, S Chand, 'Quantitative Aptitude'
T2	R S Agarwal, S.Chand , 'A modern approach to Logical reasoning'
R1	Quantitative Aptitude for CAT By Arun sharma
R2	GL Barrons, Mc Graw Hills, Thorpe's verbal reasoning, LSAT Materials
Course Outcomes: On completion of this course, students can	
Section A: Soft Skills	
CO 1	learn and practice effective communication skills
CO 2	develop broad career plans, evaluate the employment market, and become industry ready
Section B: Aptitude Builder	
CO 3	develop accuracy on time and distance and units related solutions
CO 4	solve the real-time problems for performing job functions easily
CO 5	solve problems related to permutations and combinations, probability, areas and volumes

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE Mandatory Course			
Subject Code	21CICIN6100	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

- The course aims at imparting basic principles of thought process, reasoning and inferencing. Sustainability is at the core of Indian Traditional Knowledge Systems connecting society and nature.
- Holistic life style of Yogic-science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions.
- The course focuses on introduction to Indian Knowledge System, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care system

Unit -1: Introduction to Traditional Knowledge	**Hours**
Define Traditional Knowledge- Nature and Characteristics- Scope and Importance- kinds of Traditional Knowledge- The historical impact of social change on Traditional Knowledge Systems- Value of Traditional knowledge in global economy	10
Unit -2: Basic structure of Indian Knowledge System	
AstadashVidya- 4 Ved - 4 Upaved (Ayurved, Dhanurved, GandharvaVed & SthapthyaAdi), 6vedanga (Shisha, Kalppa, Nirukha,Vykaran,J yothisha & Chand), 4upanga (Dharmashastra, Meemamsa, purana & Tharka Shastra).	10
Unit – 3: Modern Science and Indian Knowledge System	
Indigenous Knowledge, Characteristics- Yoga and Holistic Health care-cases studies.	10
Unit – 4: Protection of Traditional Knowledge	
The need for protecting traditional knowledge - Significance of Traditional knowledge Protection-Role of government to harness Traditional Knowledge.	10
Unit – 5: Impact of Traditions	
Philosophical Tradition (Sarvadarshan) Nyaya, Vyshepec, Sankhya, Yog, Meemamsa, Vedantha, Chavanka, Jain &Boudh - Indian Artistic Tradition - Chitrakala, Moorthikala, Vasthukala , Sthapthya, Sangeetha, NruthyaYevamSahithya	8

Text(T) / Reference® Books:	
R1	Traditional Knowledge System in India, by AmitJha, 2009.
R2	Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, PratibhaPrakashan 2012.
R3	Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, BharatiyaVidya
R4	Swami Jitatmanand, Holistic Science and Vedant, BharatiyaVidyaBhavan
R5	Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkata.
R6	Pramod Chandra, India Arts, Howard Univ. Press, 1983.
R7	Krishna Chaitanya, Arts of India, Abhinav Publications, 1987
W1	https://www.wipo.int/wipo_magazine/en/2017/01/article_0004.html

Professnal Elective-II

SOFTWARE PROJECT MANAGEMENT (PROFESSIONAL ELECTIVE - II)			
Subject Code	21CICIP604A	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			
Unit -1: Introduction			**Hours**
Project, Management, Software Project Management activities, Challenges in software projects, stake holders, objectives & goals. Project Planning: Step-wise planning, Project scope, Project products & deliverables, Project activities, Effort estimation, Infrastructure. Project Approach: Life cycle models, choosing technology, prototyping, life cycle phases, process artefacts, process work flows.			10
Unit -2: Effort estimation & Activity Planning			
Estimation techniques, Function point analysis, SLOC, COCOMO, Usecase-based estimation, Activity identification approaches, network planning models, critical path analysis.			10
Unit – 3: Risk management			
Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach.			10
Unit – 4: Project Management and Control			
Creating framework for monitoring and control, progress monitoring, Cost monitoring, Earned value analysis, defects tracking, issues tracking, status reports, Types of resources, Identifying resource requirements, Resource scheduling.			10
Unit – 5: Software Quality			
Planning quality, defining quality – ISO 9016, Quality measures, quantitative quality management planning, product quality & process quality metrics, statistical process control capability maturity model, enhancing software quality.			8

Text(T) / Reference(R) Books:	
T1	Software Project Management, Bob Hughes & Mike Cotterell, TATA McGraw-Hill
T2	Software Project Management, Walker Royce: Pearson Education, 2005
T3	Software Project Management in practice, Pankaj Jalote, Pearson
R1	Software Project Management, Joel Henry, Pearson Education

MINING MASSIVE DATASETS			
Subject Code	21CICIP604B	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03

Credits– 03

Course Objective:

The course will discuss data mining and machine learning algorithms for analyzing very large amounts of data.

Unit -1: Introduction	Hours
Data Mining: Introduction, Statistical Modeling, Machine Learning, Computational Approaches to Modeling, Feature Extraction, Statistical Limits on Data Mining, Hash Functions, Indexes, Natural Logarithms, Power Laws.	**10**
Unit-2: Map Reduce and the New Software Stack	
Distributed File Systems, Map Reduce, Algorithms Using MapReduce, Extensions to MapReduce, Complexity Theory for MapReduce.	**10**
Unit–3: Mining Data Streams	
The Stream Data Model, Sampling Data in a Stream, Filtering Streams, Counting Distinct Elements in a Stream, Counting Ones in a Window, Decaying Windows.	**10**
Unit–4: Frequent Item sets	
The Market-Basket Model, Market Baskets and the A-Priori Algorithm, Handling Larger Datasets in Main Memory, Limited-Pass Algorithms, Counting Frequent Items in a Stream.	**10**
Unit–5: Clustering and Dimensionality Reduction	
Introduction to Clustering Techniques, Hierarchical Clustering, K-means Algorithms, The CURE Algorithm, Clustering in Non-Euclidean Spaces, and Clustering for Streams and Parallelism. Dimensionality Reduction: Eigen values and Eigenvectors of Symmetric Matrices, Principal-Component Analysis, Singular-Value Decomposition, CUR Decomposition	**08**

Text(T) / Reference(R) Books:	
1	1.Mining of Massive Datasets - Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman"

INTRUSION DETECTION SYSTEMS			
Subject Code	21CICIP604C	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

- Understand when, where, how, and why to apply Intrusion Detection tools and techniques in orderto improve the security posture of an enterprise.
- Apply knowledge of the fundamentals and history of Intrusion Detection in order to avoid commonpitfalls in the creation and evaluation of new Intrusion Detection Systems
- Analyze intrusion detection alerts and logs to distinguish attack types from false alarms

Unit -1	**Hours**
History of Intrusion detection, Audit, Concept and definition , Internal and external threats to data, attacks, Need and types of IDS, Information sources Host based information sources, Network based information sources.	10
Unit -2	
Intrusion Prevention Systems, Network IDs protocol based IDs ,Hybrid IDs, Analysis schemes, thinking about intrusion. A model for intrusion analysis , techniques Responses requirement of responses, types of responses mapping responses to policy Vulnerability analysis, credential analysis non credential analysis.	10
Unit – 3	
Introduction to Snort, Snort Installation Scenarios, Installing Snort, Running Snort on Multiple Network Interfaces, Snort Command Line Options. Step-By-Step Procedure to Compile and Install Snort Locationof Snort Files, Snort Modes Snort Alert Modes.	10
Unit – 4	
Working with Snort Rules, Rule Headers, Rule Options, The Snort Configuration File etc. Plugins,Preprocessors and Output Modules, Using Snort with MySQL	10
Unit – 5	
Using ACID and Snort Snarf with Snort, Agent development for intrusion detection, Architecture modelsof IDs and IPs.	8

Text Books	
T1	Rafeeq Rehman : " Intrusion Detection with SNORT, Apache, MySQL, PHP and ACID," 1st Edition,Prentice Hall , 2003.

Reference Books:	
R1	Christopher Kruegel,Fredrik Valeur, Giovanni Vigna: "Intrusion Detection and Correlation Challengesand Solutions", 1st Edition,Springer, 2005.
R2	Carl Endorf, Eugene Schultz and Jim Mellander " Intrusion Detection & Prevention", 1st Edition, TataMcGraw-Hill, 2004.
R3	Stephen Northcutt, Judy Novak : "Network Intrusion Detection", 3rd Edition, New Riders Publishing,2002.
R4	T. Fahringer, R. Prodan, "A Text book on Grid Application Development and ComputingEnvironment". 6th Edition, KhannaPublihsers, 2012.

Professinal elective-III

SOFTWARE QUALITY ASSURANCE (PROFESSIONAL ELECTIVE – III)			
Subject Code	21CICIP605A	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			
Unit -1: FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE			**Hours**
The Role of SQA, SQA Plan, SQA considerations, SQA people, Quality, Management, Software Configuration Management.			10
Unit -2: MANAGING SOFTWARE QUALITY			
Managing Software Organizations, Managing Software Quality, Defect Prevention, Software Quality Assurance Management.			10
Unit – 3: SOFTWARE QUALITY ASSURANCE METRICS			
Software Quality, Total Quality Management (TQM), Quality Metrics, Software Quality Metrics Analysis.			10
Unit – 4: SOFTWARE QUALITY PROGRAM			
Software Quality Program Concepts,Establishment of Software Quality Program, Software Quality Assurance Planning, An Overview, Purpose & Scope.			10
Unit – 5: SOFTWARE QUALITY ASSURANCE STANDARDIZATION			
Software Standards–ISO 9000 Quality System Standards, Capability Maturity Model and the Role of SQA in Software Development Maturity, SEI CMM Level 5, Comparison of ISO 9000 Model with SEI's CMM.			8

Text(T) / Reference(R) Books:	
T1	Software Quality, Mordechai Ben-Menachem / Garry S Marliss, Vikas Publishing House, Pvt, Ltd., New Delhi.
T2	Managing the Software Process, Watts S Humphrey, Pearson Education Inc.
R1	Handbook of Software Quality Assurance, Gordon G Schulmeyer, Third Edition, Artech House Publishers 2007
R2	Software Quality Assurance: Principles and Practice, Nina S Godbole, Alpha Science International, Ltd, 2004
W1	https://www.udemy.com/software-quality-assurance/
W2	https://www.coursera.org/courses?query=quality%20assurance

MACHINE LEARNING			
Subject Code	21CICIP605B	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

The learning objectives of this course are:

1. Familiarity with a set of well-known supervised, unsupervised and semi-supervised learning algorithms.
2. The ability to implement some basic machine learning algorithms.
3. Understanding of how machine learning algorithms are evaluated.

Unit -1: Introduction	**Hours**
Artificial Intelligence, Machine Learning, Deep learning, Types of Machine Learning Systems, Main Challenges of Machine Learning. **Statistical Learning:** Introduction, Supervised and Unsupervised Learning, Training and Test Loss, Tradeoffs in Statistical Learning, Estimating Risk Statistics, Sampling distribution of an estimator, Empirical Risk Minimization.	**10**
Unit -2: Supervised Learning (Regression/Classification)	
Basic Methods: Distance based Methods, Nearest Neighbours, Decision Trees, Naive Bayes, Linear Models: Linear Regression, Logistic Regression, Generalized Linear Models, Support Vector Machines, Binary Classification: Multiclass/Structured outputs, MNIST, Ranking.	**10**
Unit – 3: Ensemble Learning and Random Forests	
Introduction, Voting Classifiers, Bagging and Pasting,Random Forests, Boosting, Stacking. **Support Vector Machine:** Linear SVM Classification, Nonlinear SVM Classification SVM Regression, Naïve Bayes Classifiers.	**10**
Unit – 4: Unsupervised Learning Techniques	
Clustering, K-Means, Limits of K-Means, Using Clustering for Image Segmentation, Using Clustering for Preprocessing, Using Clustering for SemiSupervised Learning, DBSCAN, Gaussian Mixtures. Dimensionality Reduction: The Curse of Dimensionality, Main Approaches for Dimensionality Reduction, PCA, Using Scikit-Learn, Randomized PCA, Kernel PCA.	**10**
Unit – 5: Neural Networks and Deep Learning	
Introduction to Artificial Neural Networks with Keras, Implementing MLPs with Keras, Installing TensorFlow 2, Loading and Preprocessing Data with TensorFlow.	**08**

Text(T) / Reference® Books:	
T1	Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, 2nd Edition, O'Reilly Publications, 2019
T2	Data Science and Machine Learning Mathematical and Statistical Methods,Dirk P. Kroese, Zdravko I. Botev, Thomas Taimre, Radislav Vaisman,25th November 2020
R1	Understanding Machine Learning: From Theory to algorithms, Shai Shalev-Shwartz, Shai Ben-David, Cambridge.
R2	Machine Learning Probabilistic Approach, Kevin P. Murphy, MIT Press, 2012
W1	https://www.tutorialspoint.com/what-is-machine-learning
W2	https://www.analyticsvidhya.com/machine-learning/
W3	https://www.youtube.com/watch?v=eq7KF7JTinU

MOBILE APPLICATION DEVELOPMENT			
Subject Code	21CICIP605C	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

The learning objectives of this course are:

1. Provide knowledge on tools required for Mobile Application Development using Android.
2. Discuss android User Interface using Views.
3. Impart Android User Interface for pictures and menus.
4. Introduce knowledge on android databases.

Unit -1: Started with Android and Android Studio	**Hours**
What Is Android, Required Tools, Launching First Android Application, Exploring the IDE, Debugging Applications, and Publishing Applications.	10
Unit -2: Android User Interface	
Understanding the Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Creating the User Interface Programmatically, Basic Views, Picker Views, List Views	10
Unit – 3: Activities, Fragments, and Intents	
Understanding Activities, Linking Activities Using Intents, Fragments, Displaying Notifications.	10
Unit – 4: Data Persistence	
Saving and Loading User Preferences, Persisting Data to Files, Creating and Using Databases.	10
Unit – 5: Messaging and Location-Based Services	
SMS Messaging, Sending Email, Displaying Maps, Getting Location Data, Monitoring a Location.	8

Text(T) / Reference® Books:	
T1	Beginning Android® Programming with Android Studio, J..F.. DiMarzio, John Wiley & Sons, Inc. (Wrox)
T2	Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox)
R1	Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox)
R2	Android Programming: The Big Nerd Ranch Guide, Bill Phillips, Chris Stewart and Kristin Marsicano, Big Nerd Ranch, LLC.
W1	https://developer.android.com/
W2	https://www.coursera.org/courses?query=mobile%20app%20development

Semester VII (Fourth year IV-I)

S.No	Category	Code	Course Title	Hours			Credits
				L	T	P	
1	PC	21CICIT7010	Cyber Crime Investigation and DigitalForensics	3	0	0	3
2	HS	21CMMST7020	Management Science	3	0	0	3
3	PE	21CICIP703X	Professional Elective - IV	3	0	0	3
4	PE	21CICIP704X	Professional Elective - V	3	0	0	3
5	OE	21CIXXO705X	Open Elective - III	3	0	0	3
6	OE	21CIXXO706X	Open Elective - IV	3	0	0	3
7	SOC	21CICIS7070	IoT Lab	2	0	0	2
8	PR		Industrial/ Research internship 2 months(Mandatory) after III year (to be evaluated during VII Semester)	0	0	0	0
						Total credits	23

Category	CREDITS
Professional core Courses	6
Open Electives	6
Professional Electives	6
Skill oriented course	2
Research Internship	3
TOTAL CREDITS	**23**

Professional Elective - IV	
Code	**Course Title**
21CICIP703A	Software Testing
21CICIP703B	Deep Learning
21CICIP703C	Cloud Computing

Professional Elective - V	
Code	**Course Title**
21CICIP704A	Agile Software Development
21CICIP704B	Articial Intelligence
21CICIP704C	Data Science

DETAILED SYLLABUS

SEMESTER-VII

CYBER CRIME INVESTIGATION AND DIGITAL FORENSICS			
Subject Code	21CICIT7010	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

1. Able to identify security risks and take preventive steps
2. To understand the forensics fundamentals.
3. To understand the evidence capturing process.
4. To understand the preservation of digital evidence.

Unit -1	**Hours**
Introduction: Introduction and Overview of Cyber Crime, Nature and Scope of Cyber Crime, Types of Cyber Crime: Social Engineering, Categories of Cyber Crime, Property Cyber Crime.	10
Unit -2	
Cyber Crime Issues: Unauthorized Access to Computers, Computer Intrusions, White collar Crimes, Viruses and Malicious Code, Internet Hacking and Cracking, Virus Attacks, Pornography, Software Piracy, Intellectual Property, Mail Bombs, Exploitation, Stalking and Obscenity in Internet, Digital lawsand legislation, Law Enforcement Roles and Responses.	10
Unit – 3	
Investigation: Introduction to Cyber Crime Investigation, Investigation Tools, e-Discovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E- Mail Recovery, Hands on Case Studies. Encryption and Decryption Methods, Search and Seizure of Computers, Recovering Deleted Evidences, Password Cracking.	10
Unit – 4	
Digital Forensics: Introduction to Digital Forensics, Forensic Software and Hardware, Analysis and Advanced Tools, Forensic Technology and Practices, Forensic Ballistics and Photography, Face, Irisand Fingerprint Recognition, Audio Video Analysis, Windows System Forensics, Linux System Forensics, Network Forensics.	10
Unit – 5	
Role of CRET-In Cyber Security: Computer Security Incident Response (Reactive) – Computer Security Incident Prevention (Proactive) – Security Quality Management Services, CERT-In Security Guidelines- Web server, database server, Intrusion Detection system, Routers, Standard alone system, networked System, IT Security polices for government and critical sector organizations.	8

Text Books	
T1	Nihad A. Hassan, ―Digital Forensics Basics: A Practical Guide Using Windows OS Paperback‖,February 26, 2019.

	Reference Books:
R1	Nelson Phillips and Enfinger Steuart, -Computer Forensics and Investigationsl, Cengage Learning, New Delhi, 2009.
R2	Kevin Mandia, Chris Prosise, Matt Pepe, -Incident Response and Computer Forensics-, Tata Mc Graw-Hill, New Delhi, 2006.
R3	Robert M Slade,‖ Software Forensics‖, Tata McGraw - Hill, New Delhi, 2005

MANAGEMENT SCIENCE			
Subject Code	21CMMST7020	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03

Credits – 03

Course objectives:

1. To understand the concept of Management its nature importance, Management theories, concept of decision making and organization principles and structures.
2. To understand the concept of production management in the organization. Workstudy, SQC, inventory management and its techniques.
3. To understand the concept of HRM and its functions, Marketing Management, Strategic management its components.
4. To understand the concept of project management PERT, CPM and Project Crashing.
5. To understand the concepts of recent trends in management

Unit -I: Introduction to Management	Hours
Concept –nature and importance of Management – Functions of Management – Evaluation of Management thought- Theories of Motivation– Decision-making process – DesigningorganizationStructure- Principles of organization - Types of organization structure.	**10**
Unit -II: Operations Management	
Nature &Objectives of OM-Production Methods-Plant Location & LayoutStudy &its significance – Work study- Statistical Quality Control-Control charts (P-chart, R-chart, and C chart). Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis(HML,SDE, VED, and FSN analysis).	**10**
Unit-III: Functional Management & Strategic Management	
Functional Management: Concept of HRM, HRD and PMIR- Functions of HRM - Marketing Management- Functions of Marketing, Marketing strategies based on product Life Cycle, Channels of distributions. **Strategic Management**: Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis-Steps in Strategy Formulation and Implementation, Generic Strategy alternatives	**10**
Unit –IV: Project Management: (PERT/CPM)	
Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems).	**10**
Unit-V: Contemporary Management Practices	
Basic concepts of MIS, MRP, Justin- Time (JIT) system, Total Quality Management (TQM), Six sigma , Supply Chain Management, Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.	**10**

Text(T) / Reference(R) Books:	
T1	Dr. P. Vijaya Kumar & Dr. N. Appa Rao, '*Management Science'*Cengage, Delhi, 2012.
T2	Dr. A. R. Aryasri, *Management Science'* TMH 2011.
R1	Koontz &Weihrich: 'Essentials of Management' TMH 2011
R2	Seth & Rastogi: Global Management Systems, Cengage Learning, Delhi, 2011.
R3	Robbins: Organizational Behaviors, Pearson Publications, 2011
R4	Kanishka Bedi: Production & Operational Management, Oxford Publications, 2011.
R5	Manjunath: Management Science, Pearson Publications, 2013.
R6	Biswajit Patnaik: Human Resource Management, PHI, 2011.
R7	Hitt and Vijaya Kumar: Strategic Management, Cengage Learning.

IoT Lab			
Subject Code	21CICIS7070	IA Marks	0
Number of Tutorial Hours/Week	1T+2P	Exam Marks	50
Total Number of Practice Hours	36	Exam Hours	03
Credits – 1.5			

List of Experiments

1. Start Raspberry Pi and try various Linix commands in command terminal window: ls, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc.

2. Run some python programs on Pi like:
Read your name and print Hello message with name
Read two numbers and print their sum, difference, product and division.
Word and character count of a given string
Area of a given shape (rectangle, triangle and circle) reading shape and appropriate values from standard input
Print a name 'n' times, where name and n are read from standard input, using for and while loops.
Handle Divided by Zero Exception.
Print current time for 10 times with an interval of 10 seconds.
Read a file line by line and print the word count of each line.

3. Light an LED through Python program.

4. Get input from two switches and switch on corresponding LEDs

5. Flash an LED at a given on time and off time cycle, where the two times are taken from a file.

6. Flash an LED based on cron output (acts as an alarm).

7. Switch on a relay at a given time using cron, where the relay's contact terminals are connected to a load.

8. Get the status of a bulb at a remote place (on the LAN) through web.
The student should have hands on experience in using various sensors like temperature, Humidity, smoke, light, etc. and should be able to use control web camera, network, and Relays connected to the Pi

Professinal elective-IV

SOFTWARE TESTING (PROFESSIONAL ELECTIVE-I)			
Subject Code	**21CICIP703A**	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			
Unit -1			**Hours**
Introduction: Purpose of Testing, Dichotomies, Model for Testing, Levels of Testing, Basic definitions, Software Testing Principles, The Tester‘s Role in a Software Development, Consequences of Bugs, Taxonomy of Bugs. **Flow graphs and Path testing:** Basics Concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Applications of Path Testing.			10
Unit -2			
Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques. **Dataflow testing:** Basics of Data flow Testing, Strategies in Data flow Testing, Application of Data flow Testing			10
Unit – 3			
Paths and Regular expressions: Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection. **Syntax Testing:** Grammar for formats, Test Case Generation, Implementation and Application and Testability Tips			10
Unit – 4			
Logic Based Testing: Overview, Decision Tables, KV Charts, and Specifications **State, State Graphs and Transition Testing:** State Graphs, Good & Bad State Graphs, State Testing, and Testability Tips. **Graph Matrices and Application: -** Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm.			10
Unit – 5			
Software Testing Tools: Introduction to Testing, Automated Testing, Concepts of Test Automation, skills needed for automation, scope of automation, challenges in automation, Introduction to testing tools like Win runner, Load Runner, Selenium and working with selenium			8

Text(T) / Reference(R) Books:	
T1	"Software testing techniques"–BorisBeizer, Dreamtech, second edition.
T2	"Software Testing"- Yogesh Singh, Camebridge
R1	"The Craft of software testing" - Brian Marick, Pearson Education.
R2	"Software Testing", N.Chauhan, Oxford University Press.
R3	"Introduction to Software Testing", P.Ammann &J.Offutt, Cambridge Univ.Press.
R4	"Effective methods of Software Testing", Perry, John Wiley, 2nd Edition, 1999.
R5	"Foundations of Software Testing", D.Graham, CengageLearning
W1	https://www.coursera.org/courses?query=software%20testing
W2	https://www.edx.org/course/software-testing-fundamentals-usmx-umuc-stv1-1x-4

DEEP LEARNING			
Subject Code	**21CICIP703B**	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

The learning objectives of this course are:

1. Learn deep learning methods for working with sequential data.
2. Learn deep recurrent and memory networks.
3. Learn deep Turing machines.
4. Apply such deep learning mechanisms to various learning problems.
5. Know the open issues in deep learning, and have a grasp of the current research directions.

Unit -1: Fundamentals of Deep Learning	**Hours**
Artificial Intelligence, History of Machine learning: Probabilistic Modeling, Early Neural Networks, Kernel Methods, Decision Trees, Random forests and Gradient Boosting Machines, Fundamentals of Machine Learning: Four Branches of Machine Learning, Evaluating Machine learning Models, Overfitting and Underfitting.	10
Unit -2: Introducing Deep Learning	
Biological and Machine Vision, Human and Machine Language, Artificial Neural Networks, Training Deep Networks, Improving Deep Networks.	10
Unit – 3: Neural Networks	
Anatomy of Neural Network, Introduction to Keras: Keras, TensorFlow, Theano and CNTK, Setting up Deep Learning Workstation, Classifying Movie Reviews: Binary Classification, Classifying newswires: Multiclass Classification.	10
Unit – 4: Convolutional Neural Networks	
Nerual Network and Representation Learing, Convolutional Layers, Multichannel Convolution Operation, Recurrent Neural Networks: Introduction to RNN, RNN Code, PyTorch Tensors: Deep Learning with PyTorch, CNN in PyTorch.	10
Unit – 5: Interactive Applications of Deep Learning	
Machine Vision, Natural Language processing, Generative Adversial Networks, Deep Reinforcement Learning. **Deep Learning Research**: Autoencoders, Deep Generative Models: Boltzmann Machines Restricted Boltzmann Machines, Deep Belief Networks.	8

Text(T) / Reference(R) Books:	
T1	Deep Learning- Ian Goodfellow, Yoshua Bengio and Aaron Courvile, MIT Press, 2016
T2	Deep Learning with Python - Francois Chollet, Released December 2017, Publisher(s): Manning Publications, ISBN: 9781617294433
T3	Deep Learning Illustrated: A Visual, Interactive Guide to Artificial Intelligence - Jon Krohn, Grant Beyleveld, Aglaé Bassens, Released September 2019, Publisher(s): Addison-Wesley Professional, ISBN: 9780135116821
T4	Deep Learning from Scratch - Seth Weidman, Released September 2019, Publisher(s): O'Reilly Media, Inc., ISBN: 9781492041412
R1	Artificial Neural Networks, Yegnanarayana, B., PHI Learning Pvt. Ltd, 2009.
R2	Matrix Computations, Golub, G.,H., and Van Loan,C.,F, JHU Press,2013.
R3	Neural Networks: A Classroom Approach, Satish Kumar, Tata McGraw-Hill Education, 2004.
W1	Swayam NPTEL: Deep Learning: https://onlinecourses.nptel.ac.in/noc22_cs22/preview

CLOUD COMPUTING			
Subject Code	**21CICIP703C**	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

The learning objectives of this course are:

1. To explain the evolving computer model caned cloud computing.
2. To introduce the various levels of services that can be achieved by the cloud.
3. To describe the security aspects of the cloud.
4. To motivate students to do programming and experiment with the various cloud computing environments.

Unit -1: Systems Modeling, Clustering and Virtualization	**Hours**
Scalable Computing over the Internet-The Age of Internet Computing, Scalable computing over the Internet, Technologies for Network-Based Systems, System models for Distributed and Cloud Computing, Performance, Security and Energy Efficiency	**10**
Unit -2: Virtual Machines and Virtualization of Clusters and Data Centers	
Implementation Levels of Virtualization, Virtualization Structures/ Tools and Mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data-Center Automation.	**10**
Unit – 3: Cloud Platform Architecture	
Cloud Computing and Service Models, Public Cloud Platforms, Service Oriented Architecture, Programming on Amazon AWS and Microsoft Azure	**10**
Unit – 4: Cloud Resource Management and Scheduling	
Policies and Mechanisms for Resource Management, Applications of Control Theory to Task Scheduling on a Cloud, Stability of a Two-Level Resource Allocation Architecture, and Feedback Control Based on Dynamic Thresholds. Coordination of Specialized Autonomic Performance Managers, Resource Bundling, Scheduling Algorithms for Computing Clouds-Fair Queuing, Start Time Fair Queuing.	**10**
Unit – 5: Storage Systems	
Evolution of storage technology, storage models, file systems and database, distributed file systems, and general parallel file systems. Google file system.	**08**

Text(T) / Reference(R) Books:	
T1	Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. Dongarra MK Elsevier.
T2	Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
R1	Cloud Computing, A Hands-on approach, Arshadeep Bahga, Vijay Madisetti, University Press
R2	Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
R3	Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH

Professinal Elective-V

AGILE SOFTWARE DEVELOPMENT (PROFESSIONAL ELECTIVE-V)			
Subject Code	**21CICIP704A**	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Unit -1: INTRODUCTION	**Hours**
Introduction: Need of Agile software development, agile context– Manifesto, Principles, Methods, Values, Roles, Artifacts, Stakeholders, and challenges. Business benefits of software agility	**10**
Unit -2: PROJECT PLANNING	
Project Planning: Recognizing the structure of an agile team–Programmers, Managers, Customers. User stories–Definition, Characteristics and content. Estimation– Planning poker, Prioritizing, and selecting user stories with the customer, projecting team velocity for releases and iterations	**10**
Unit – 3: PROJECT DESIGN	
Project Design: Fundamentals, Design principles–Single responsibility, Open-closed, Liskov substitution, Dependency-inversion, Interface-segregation.	**10**
Unit – 4: DESIGN METHODOLOGIES	
Design Methodologies: Need of scrum, Scrum practices –Working of scrum, Project velocity, Burn down chart, Sprint backlog, Sprint planning and retrospective, Daily scrum, Scrum roles– Product Owner, Scrum Master, Scrum Team. Extreme Programming- Core principles, values, and practices. Kanban, Feature-driven development, Lean software development.	**10**
Unit – 5: TESTING	
Testing: The Agile lifecycle and its impact on testing, Test driven development– Acceptance tests and verifying stories, writing a user acceptance test, Developing effective test suites, Continuous integration, Code refactoring. Risk based testing, Regression tests, Test automation.	**08**

Text(T) / Reference(R) Books:	
T1	Ken Schawber, Mike Beedle, “Agile Software Development with Scrum”, International Edition, Pearson.
T2	Robert C. Martin, “Agile Software Development, Principles, Patterns and Practices”, First International Edition, Prentice Hall.
T3	Pedro M. Santos, Marco Consolaro, and Alessandro Di Gioia, “Agile Technical Practices Distilled: A learning journey in technical practices and principles of software design”, First edition, Packt Publisher.
R1	Lisa Crispin, Janet Gregory, “Agile Testing: A Practical Guide for Testers and Agile Teams, International edition, Addison Wesley.
R2	Alistair Cockburn, “Agile Software Development: The Cooperative Game”, 2nd Edition, Addison-Wesley

W1	“Agile Software Development”, https://www.edx.org/course/agile-software-development Accessed on August 27, 2021.
W2	“Agile Software Development”, https://www.coursera.org/learn/agile-software-development Accessed on August 27, 2021

ARTIFICIAL INTELLIGENCE			
Subject Code	**21CICIP704B**	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits – 03			

Course Objectives:

The learning objectives of this course are:

1. To provide a strong foundation of fundamental concepts in Artificial Intelligence.
2. To provide a basic exposition to the goals and methods of Artificial Intelligence.
3. To apply the techniques in applications which involve perception, reasoning and learning.

Unit -1: Introduction to Artificial Intelligence	**Hours**
What Is AI?, The Foundations of Artificial Intelligence, The History of Artificial Intelligence, The State of the Art, Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.	**10**
Unit -2: Problem solving	
Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Local Search Algorithms and Optimization Problems, Searching with Nondeterministic Actions.	**10**
Unit – 3: Knowledge Representation	
Knowledge-Based Agents, Logic, Propositional Logic: A Very Simple Logic, Ontological Engineering, Categories and Objects, Events, Mental Events and Mental Objects, Reasoning Systems for Categories, The Internet Shopping World	**10**
Unit – 4: Uncertain Knowledge and Reasoning	
Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use, Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks.	**10**
Unit – 5: AI present and Future	
Weak AI: Can Machines Act Intelligently? Strong AI: Can Machines Really Think?, The Ethics and Risks of Developing Artificial Intelligence, Agent Components, Agent Architectures, Are We Going in the Right Direction?, What If AI Does Succeed?.	**08**

Data

Text(T) / Reference(R) Books:	
T1	Stuart Russell and Peter Norvig, “Artificial Intelligence: A Modern Approach” , 3rd Edition, Pearson.
T2	Elaine Rich and Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill
R1	SarojKaushik, “Artificial Intelligence”, Cengage Learning India, 2011
R2	David Poole and Alan Mackworth, “Artificial Intelligence: Foundations for Computational Agents”, Cambridge University Press 2010.
R3	Trivedi, M.C., “A Classical Approach to Artifical Intelligence”, Khanna Publishing House, Delhi.
W1	https://nptel.ac.in/courses/106105077 https://nptel.ac.in/courses/10610612
W2	https://aima.cs.berkeley.edu https://ai.berkeley,edu/project_overview.htm

DATA SCIENCE			
Subject Code	**21CICIP704C**	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
Credits–03			
Unit-1: Introduction to Data Science			**Hours**
Introduction to Data Science: Introduction, Terminology, data science process, Types of data classification-data science algorithms (Linear Regression, K-means, support vector machines, ANN, RNN, Appriori), Example Applications			10
Unit-2: Data Collection and Management			
Data collection and management: Introduction, Data collection methods, Data Collection and APIs, API Categories, Exploring and fixing data, Data storage and management, Using multiple data sources			10
Unit–3: Data Analysis			
Data analysis: Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance, Distribution properties and arithmetic, Samples/CLT, Basic machine learning algorithms, Linear regression, SVM, Naïve Bayes.			10
Unit–4: Data Visualization			
Data visualization: Introduction, Types of data visualization, Data for visualization: Datatypes, Data encodings, Retinal variables, mapping variables to encodings, Visual encodings. Introduction to matplotlib.			10
Unit–5: Applications and Recent Trends in Data Science			
Applications and recent trends of Data Science: Applications of data science, Technologies for visualization, Bokeh(Python), Recent trends in various data collection and analysis techniques, various visualization techniques, application Development methods of used in data science			8

Text(T) /Reference(R)Books:	
T1	Rachel Schutt & O'neil, "Doing Data Science", O'REILLY, ISBN:978-1-449-35865-5, 1st edition, October 2013.
T2	Jure Leskovek, Anand Rajaram anand Jeffrey Ullman. Mining of Massive Datasets.v2.1, Cambridge University Press
R1	Joel Grus, "Data Science from Scratch: First Principles with Python", O'Reilly media, 2015
R2	Matt Harrison, "Learning the Pandas Library: Python Tools for Data Mining, Analysis, and Visualization, O'Reilly,2016

Semester VIII (Fourth year IV-II)

S.No	Category	Code	Course Title	Hours			Credits
				L	T	P	
1	PR	21CICIR8010	Major Project Work	0	0	24	12
						Total credits	**12**

Category	CREDITS
Project	12
TOTAL CREDITS	**12**