ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABI A20 Regulation

FOR

B.Tech - CSE I to IV Year

(Applicable for the Batches admitted in the year 2020-2021)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY
(An Autonomous Institution approved by UGC and affiliated to JNTUH)
Yamnampet, Ghatkesar, Hyderabad - 501 301

July, 2020

B.Tech (Computer Science and Engineering)

Program objective:

B. Tech in Computer Science and Engineering program emphasizes the use of computer as a sophisticated problem solving tool.

The first two years of this program begins with a set of introductory courses, like Mathematics, physics, English, computer languages (C,C++,Java), Database Management Systems, which provide students with a firm foundation in mathematics, computer science, as well as communication skills. These courses include weekly labs in which students use state-of-the art software development techniques to create solutions to interesting problems.

The last two years of study focuses on the concepts and techniques used in the design and development of advanced software systems. In addition, students choose from a rich set of electives, which covers skills in demand. These advanced courses give broad opening for research and help them to choose specialization in their higher studies. A generous allotment of open electives allows students to learn foreign languages like French, German, Spanish; and it includes computing with a business focus.

Students in this program pursue an inter-disciplinary course of study that combines strong foundation in computer science with a focus on interdisciplinary areas. This program is designed for students who seek to blend their computer science abilities with skills in demand and skills specific to another domain to solve problems in that domain.

Having completed this course, a student is prepared to work independently within a well structured design frame work in the job and for higher studies.

Vision of the Department of Computer Science and Engineering

To emerge as a leading department in Technical Education and Research in India in Computer Science and Engineering with focus to produce professionally competent and socially sensitive engineers capable of working in global environment.

Mission of the Department of Computer Science and Engineering

1. To prepare Computer Science and Engineering graduates to be a lifelong learner with competence in basic science & engineering and professional core, multidisciplinary areas , with continuous update of the syllabus, so that they can succeed in industry as an individual and as a team or to pursue higher studies or to become an entrepreneur.

2. To enable the graduates to use modern tools, design and create novelty based products required for the society and communicate effectively with professional ethics.

3. To continuously engage in research and projects development with financial management to promote scientific temper in the graduates and attain sustainability.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs) – B.Tech(Computer Science and Engineering)

I Graduates will have a strong foundation in fundamentals of mathematics, basic, engineering and computer sciences with abilities to analyze engineering problems, design and develop optimal solutions to be professionally competent.

II Apply knowledge of disruptive areas of computer science using modern tools to find solutions for the societal and complex problems with sensitivity towards health, safety, legal, environmental and sustainable issues which help them to be globally employable.

III Work effectively as an individual/lead a team with good communication skills, ethical ideologies and knowledge in project and financial managerial skills to become an entrepreneur.

IV Acquire research temperament to pursue higher studies in reputed national and international institutes and become life-long learners.

PROGRAM OUTCOMES (POs)- B.Tech(Computer Science and Engineering)

With the rapid change in technology and changes in expectations from technocrats, ABET, NBA, CSAB, Washington Accord advocate the Outcome Based Evaluation for Graduates in technical profession. There are twelve graduate attributes which are internationally accepted. All graduates of any higher education programs are expected to have identified technical/ functional, generic and managerial competencies. The competencies that a graduate of a program should have are called Graduate Attributes. The Attributes a graduating engineer should have are generally identified by the Accreditation agency for Engineering and Technical Education, namely, National Board of Accreditation (NBA) in India. The Graduate Attributes as stated by NBA are in the spirit of Program Outcomes as stated in Washington Accord (Graduate Attributes are referred to as Program Outcomes by Washington Accord)

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.

Correlation between the PEOs and the POs

PEOs	Program Outcomes (POs 1-12)											
	1	2	3	4	5	6	7	8	9	10	11	12
I	H	M	M			L						
II				H	H	H	M					
III								H	H	H	M	
IV				L								H

PROGRAM SPECIFIC OUTCOMES (PSOs)- B.Tech(Computer Science and Engineering)

Program Specific Outcomes (PSOs) are statements that describe what the graduates of a specific engineering program should be able to do. On completion of the B.Tech.(Computer Science & Engineering) program the graduates will be able to

1. Apply the knowledge of Computer Science and Engineering courses such as computer architecture, software development life cycle, networking and database concepts, etc., with emphasis on data structures and algorithms to analyze the engineering problems.
2. Design and develop programs and projects using software engineering practices, mathematical models, data mining techniques and algorithms to solve the societal problems with modern tools, web technologies and appropriate programming languages.
3. Solve complex engineering problems using disruptive technologies like Cloud Computing, Internet of Things (IoT), Data Science, Artificial Intelligence, Machine Learning, Cyber Security and Blockchain.

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ACADEMIC REGULATIONS
FOR B.TECH REGULAR STUDENTS
WITH EFFECT FROM
THE ACADEMIC YEAR 2020-21
(A-20)

1.0 Under-Graduate Degree Programme in Engineering & Technology (E&T)

1.1 SNIST offers a 4-year (8 semesters) **Bachelor of Technology** (B. Tech.) degree programme, under Choice Based Credit System (CBCS) with effect from the academic year 2020-21 in the following branches of Engineering.

Sl. No.	Branch
1.	Civil Engineering
2.	Electrical and Electronics Engineering
3.	Mechanical Engineering
4.	Electronics and Communication Engineering
5.	Computer Science and Engineering
6.	Information Technology
7.	Electronics and Computer Engineering

1.2. Credits (Semester system for B. Tech courses)

The existing credit system of giving one credit for a lecture hour/ tutorial hour per week and giving 0.5 credit for every hour of practical and drawing shall be continued in these regulations also.

2.0 Eligibility for admission

2.1 Admission to the Under Graduate courses shall be made either on the basis of the rank of the candidate in entrance test conducted by the Telangana State Government (EAMCET) or on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the Government from time to time. However, admissions under Management / NRI Category shall be made on the relevant orders issued by the Govt. of Telangana from time to time.

2.2 The medium of instruction for the entire Under Graduate programme of study in E&T will be **English** only.

3.0 B. Tech. Programme structure

3.1 A student after securing admission shall pursue the Under Graduate programme in B. Tech. in a minimum period of **four** academic years (8 semesters), and a maximum period of **eight** academic years (16 semesters) starting from the date of commencement of first year first semester, failing which student shall forfeit seat in B. Tech course. However, the student can take two more years for appearing the examinations to clear the backlog subjects.

In the First year it is structured to provide **45 credits** and the credits in II , III and IV years should not exceed **119 credits** as per AICTE model curriculum for the B. Tech. programme. Each student shall secure **164 credits** (with CGPA ≥5) required for the completion of the Under Graduate programme and Award of B. Tech degree.

Each student shall secure **164 total credits** (with CGPA ≥ 5) for the completion of the Under Graduate programme for the award of the B.Tech degree. However, any revision made in this regard and approved by the Academic Council of the college and by Parent University shall be implemented from the date of the revision.

3.2 **UGC/AICTE** specified definitions/ descriptions are adopted appropriately for various terms and abbreviations stated below.

3.2.1 Semester scheme

Each Under Graduate programme is of 4 academic years (8 semesters) with the academic year being divided into two semesters of 22 weeks (90 instructional days) each, each semester having - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'.

Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated curriculum / course structure as suggested by AICTE are followed.

3.2.2 Credit courses

- A student in a semester has to earn credits which shall be assigned to each subject/ course in an L: T: P: C (lecture periods: tutorial periods: practical periods: credits) structure based on the following general pattern.
- One credit for one hour/ week offered in the entire semester for theory lecture (L) / Tutorial (T) courses.
- One credit for two hours/ week offered in the entire semester for laboratory/ practical (P) courses.
- The orientation course recommended by AICTE in the model curriculum is offered for 3 weeks and Cyber Security in III year as mandatory course.
- Environmental Engineering is offered mandatory course for B. Tech Mechanical Engineering and ECE students in II year.
- However, these courses will be reflected in the Memo of Marks, the grading will be awarded below, with some total of 100 marks with CIE for 30 marks and SEE for 70 marks.

% of Marks Secured in a Subject/Course	Letter Grade
Greater than or equal to 90%	O (Outstanding)
80 and less than 90%	A+ (Excellent)
70 and less than 80%	A (Very Good)
60 and less than 70%	B+(Good)
50 and less than 60%	B (Average)
40 and less than 50%	C (Pass)
Below 40%	F (FAIL)
Absent	Ab

- For mandatory courses i.e. ., **Orientation Course** for B. Tech I year students to be taught for one week in I semester with Two Units and remaining Four Units in B. Tech. I year II semester and **Cyber Security** is offered as mandatory course for all the students of Civil, ME, EEE and will not have credits, but evaluation will be done as per the above table. A student cannot obtain degree unless he / she completes all the mandatory courses.

3.2.3 Subject Course Classification

All subjects / courses offered for the Under Graduate programme in E&T (B. Tech. Degree programmes) are broadly classified as follows. The Institution has followed all the guidelines issued by AICTE/UGC.

The groups of the subjects shall be as given in the table here under along with the credits suggested by AICTE. Efforts are made by individual departments to make up the total credits equal to 164.

Sl. No.	Category	Suggested Breakup of Credits (Total 160)	CSE/ AICTE	ECE	CED	EEE	ME	IT	ECM
1	Humanities and social sciences including Management courses	12*	14/12	14	11	13	13	14	13
2	Basic Science including Mathematics courses	25*	22/24	23	29	30	24	22	26
3	Engineering Science courses including workshop, drawing, basic electrical /electronics mechanical course as well as various computer courses offered for Non – IT branches	24*	28/29	28	31	25	28	29	28
4	Professional core courses	48*	67/49	59	51	61	62	59	59
5	Professional Elective courses (five courses)relevant to chosen specialization / branch	18*	15/18	15	15	15	15	15	15
6	Open Electives(3 courses) offered by	18*	6/12	6	6	6	6	6	6

	any other departments / MBA department **								
7	Project work, seminar and internship in industry or elsewhere	15*	12/15	19	21	14	16	19	17
8	Mandatory courses (Environmental Sciences, Induction training, Indian constitution, Essence of Indian Traditional Knowledge)	(Non-credit)	(Non-credit)	(Non-credit)	(Non-credit)	(Non-credit)	(Non-credit)	(Non-credit)	(Non-credit)
	Total	160*	164/159	164	164	164	164	164	**164**

The Joint Board of Studies and Academic Council of the institution has approved the total number of credits to be 164. The various groups of subjects mentioned above shall have credits suggested above with minor variations.

4.0 Course registration

4.1 A 'faculty advisor or counselor' shall be assigned to a group of 20 students, who will advise student about the under graduate programme, its course structure and curriculum, choice/option for Professional and open Electives based on their employment potential / further studies.

4.2 The student will progress semester after semester as the Institute is following cohort system to satisfying the conditions of promotion to the next semester.

4.3 **In the present system there shall be five subjects in each professional elective stream and three subjects in open elective stream.** A student can opt for a stream of professional/ open electives which should be submitted to the faculty Advisor/ Counselor and copy of it to the Examination Section through the Head of the department. A copy of it will be retained with the Head of the department/ faculty Advisor/ Counselor and the student.

4.4. **The student can take one extra subject in each semester and can complete the program in 3 ½ years but original degree will be issued along with his / her batch mates after 4 years.**

4.5. **If a student acquires 20 credits extra than the required credits as per the regulations he will be awarded honors.**

4.6 The purpose of offering Elective Streams in both Professional and Open Electives is to facilitate the students to have a minor specialization based on their interest, so that they will have multi disciplinary exposure. Hence, a student is to take a stream of Electives in either in Professional / Open Elective. He shall not be permitted to opt for other elective subjects in other streams in subsequent semesters.

4.7 Dropping of Electives may be permitted, only after obtaining prior approval from the faculty advisor / counselor, '**within a period of 15 days** from the beginning of the current semester.

5.0 Subjects / courses to be offered

5.1 A typical section (or class) nominal strength for each semester shall be 60.

5.2 A subject / course may be offered to the students, **only if** a minimum of **30 students** opt for it. The maximum strength of a section is limited to 80.

6.0 Attendance requirements:

6.1 A student shall be eligible to appear for the semester end examinations, if student acquires a minimum of 75% of attendance in aggregate of all the subjects / courses (excluding attendance in mandatory courses, Internship during II year, NCC / NSO and NSS) for that semester.

6.2 Shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be condoned by the college academic committee on genuine and valid grounds, based on the student's representation with supporting evidence.

6.3 A stipulated fee shall be payable towards condoning of shortage of attendance as decided by finance committee of SNIST from time to time.

6.4 Shortage of attendance below 65% in aggregate shall in **NO CASE** be condoned.

6.5 **Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations of that semester.**

They get detained and their admission for that semester shall stand cancelled.

They will not be promoted to the next semester. They may seek re-admission for all those subjects registered in that semester in which student was detained, by seeking re-admission into that semester as and when offered; in case if there are any professional electives and / or open electives, the same may also be re-registered if offered. However, if those electives are not offered in later semesters, then alternate electives may be chosen from the **same** set of elective subjects offered under that category. He will be governed by the new regulations in which he takes re-admission.

6.6 A student fulfilling the attendance requirement in the present semester shall not be eligible for readmission into the same semester.

7.0 Academic requirements

The following academic requirements have to be satisfied, in addition to the attendance requirements mentioned in item no.6.

7.1 **A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject / course, if student secures not less than 35% marks (24 out of 70 marks) in the semester end examination, and a minimum of 40% of marks in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of letter grades, this implies securing 'C' grade or above in that subject / course.**

7.2 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to group projects, seminar, comprehensive test, viva-voce and major project. If a student secures not less than 40% marks (i.e. 40 out of 100 allotted marks) in each of them.

The student would be treated as failed, if student

(i) Does not complete all the mandatory courses offered during the course
(ii) Does not submit a report on internship, group project, major project, or does not make a presentation of the same before the evaluation committee as per schedule, or
(iii) Does not present the seminar as required in the I year and II year or
(iv) Secures less than 40% marks in comprehensive test and seminar/ comprehensive test and viva-voce / group project/major project evaluations.

Student may reappear once for each of the above evaluations, when they are scheduled again; if student fails in such 'one re-appearance' evaluation also, student has to reappear for the same in the next subsequent semester, as and when it is scheduled.

7.3 Promotion Rules based upon credits

S. No.	Promotion	Conditions to be fulfilled
1	First year First Semester to Second Semester	Regular course of study of first year first semester and should have satisfied the minimum requirement of attendance to appear I year I semester.
2	First year to second year first semester	i. Regular course of study of first year First and second semesters. ii. Must have secured at least 50% of credits (22) upto first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3.	II Year I Semester to II Semester	Regular course of study of second year first semester.
4	Second year to third year first semester	i. Regular course of study of First and second semesters of second year. ii. Must have secured at least 60% of credits (54) upto second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Third year first semester to second semester	Regular course of study of third year first semester.
6	Third year second semester to fourth year first semester	i. Regular course of study of third year second semester. ii. Must have secured 60% of credits (79) up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
7	Fourth year	Regular course of study of fourth year first semester.

	first semester to fourth year second semester	

7.4 A student (i) shall attend for all courses / subjects covering 164 credits as specified and listed in the course structure, (ii) fulfils all the attendance and academic requirements for 164 credits, (iii) earn all 164 credits by securing SGPA $\geq$ 5.0 (in each semester), and CGPA (at the end of each successive semester) $\geq$ 5.0, (iv) **passes all the mandatory courses,** to successfully complete the under graduate programme. The performance of the student in these 164 credits shall be taken into account for the calculation of 'the final CGPA (at the end of under graduate programme), and shall be indicated in the grade card of IV year II semester.

7.5 If a student registers for some more '**extra subjects'** (in the parent department or other departments / branches of engineering) other than those listed subjects as specified in the course structure of his Department, the performances in those ' **extra subjects**' will not be taken into account while calculating the SGPA and CGPA. For such '**extra subjects'** registered, Percentage (%) of marks and letter grade alone will be indicated in the grade card as a performance measure, subject to completion of the attendance and academic requirements as stated in the regulations 6 and 7.1 to 7.4 above.

7.6 A student eligible to appear in the semester end examination for any subject / course, but absent from it or failed (thereby failing to secure **'C'** grade or above) has to reappear for that subject/ course in the supplementary examination as and when conducted. In such cases, CIE assessed earlier for that subject / course will be carried over, and added to the marks obtained in the supplementary examination for evaluating performance in that subject.

7.7 A student **detained in a semester due to shortage of attendance, may be re-admitted when the same semester is offered in the subsequent academic years for the fulfillment of academic requirements**.
The academic regulations under which student has been readmitted shall be applicable. However, no grade allotments or SGPA / CGPA calculations will be done for the entire semester in which student has been detained.

7.8 A student detained **due to lack of credits, will be promoted to the next academic year only after acquiring the required credits as per academic regulations.**

The academic regulations shall be applicable to a student whatever they are in force at the time of re-admission.

8.0 Evaluation - Distribution and weightage of marks

8.1 The performance of a student in each semester shall be evaluated subject-wise for a maximum of 100 marks for a theory and 100 marks for every practical subject with 30 marks Continuous Internal Evaluations (CIE) and 70 marks for Semester End Examinations (SEE)

Summer Break: Internship-I and Internship-II will be organized during summer vacation of II-II and III-II and evaluation of the same will be carried out during lab examinations of III-I and IV-I.

In addition, there will be Group Project-I in III year I semester, Group Project-II in III year II semester, and Group Project-III in IV year I semester, Major project in IV year II semester will be evaluated for 100 marks.

The pattern of continuous internal evaluation for Internship Project and Group Project is given below:

Sl. No	Description	Marks
1	Abstract, Design, implementation and Presentation in front of Project Review Committee consisting of HoD, Senior faculty and Internal guides (Average)	15 marks
2	Report	05 marks
3	Evaluation by Internal Guide	10 marks
	Total sessional marks	**30 marks**

Semester end examination - 70 marks

Pattern of external evaluation for Internship Project and Group Project.

Sl. No	Description	Marks
1	Final report	10 marks
2	Presentation	10 marks
3	Demonstration/ defense of project	50 marks
	Total sessional marks	**70 marks**

Pattern of continuous internal evaluation for Major Project in IV year II semester is as follows:

Sl. No	Description	Marks
1	Progress of Project work and the corresponding interim report as evaluated by Project Review Committee at the end of 6 weeks	5 marks
2	Seminar at the end of 6 weeks	5 marks
3	Progress of Project work as evaluated by Project Review Committee at the end of 11 weeks	5 marks
4	Seminar at the end of 11 weeks	5 marks
5	Evaluation by Project Review Committee at the end of 15 weeks and Final Project Report	5 marks
6	Final presentation and defense of project	5 marks
	Total	**30 marks**

Pattern of External Evaluation for Major project - 70 Marks

Sl. No	Description	Marks
1	Final Project Report	10 marks
2	Presentation	20 marks
3	Demonstration / Defense of Project before committee	40 marks
4	**TOTAL**	**70 marks**

8.2 For all the other theory and lab subjects the distribution of marks shall be 30 for Continuous Internal Evaluation (CIE) and 70 for the Semester End-Examination (SEE).

8.3 <u>Theory Subjects</u>

8.3.1 Pattern for Continuous Internal Evaluation (CIE) 30 marks

The following procedure is to be adopted for awarding internal marks of 30 for all the B. Tech. students from the **<u>Academic Year 2020-2021</u>**

The distribution of marks for continuous internal evaluation (30 marks) is shown below. Average of two Mid Tests will be taken for final award of marks.

a)	**Part – A** of Mid Test will have 10 questions	5 marks
b)	**Part – B** of Mid Test will have 4 questions (1 from each unit and 4th question from any one unit or combination) and student has to answer 3 questions	15 marks
c)	**Part – C** Mid Test Question Paper Will have 3 questions – One from each unit taken from assignment questions. Student has to answer 1 question out of 3 questions	3 marks
d)	**Assignment– I** three questions from each unit (1,2,3 unit) – total of 9 questions to be submitted before first mid test. **Similarly assignment – II**: will have three questions from each unit (4, 5, 6 units) total of 9 questions will be submitted before Mid Test II and average of two assignments will be considered.	2 marks
e)	Attendance *	3 marks
f)	Class notes	2 marks
	Total	**30 marks**

* Three marks are awarded for each theory subject for the students who put in attendance in a graded manner as given below:

S. No.	Attendance Range	Marks Awarded
1.	65 % and above but less than 75%	1
2.	75% and above and less than 85%	2
3.	85% and above	3

Marks for attendance shall be added to each subject based on average of attendance of all subjects put together.

If any candidate is absent in any subject or mid-term examination, this student wishes to improve performance, a **third mid-test** will be conducted for that student by the Institution in the entire syllabus, on the same day of Semester End Examination (SEE) for $2^1/_2$ hours. That result will be treated as III mid test and average of better two of (mid test I, II, III) will be considered. III mid test will have Part-A (compulsory) and Part-B with essay type questions and three out of four questions are to be answered.

b) <u>Pattern for External Examinations - (70 marks)</u>

- There shall be external examination in every theory course and consists of two parts (Part-A & Part-B). The total time duration for this semester end examination will be 3 hours.

- **Part-A** shall have 20 marks, which is compulsory. It will have 10 short questions set with 2 marks each. There shall be atleast one question to each of the six units and two questions from units 1, 2, 3 and two questions from unit 4, 5, 6 and number of questions from any unit shall not exceed two.

- **Part-B** of the question paper shall have essay type questions for 50 marks and shall have 8 questions out of which any 5 are to be answered. At least one question must appear from each Unit. Seventh question must have 2 to 3 bits taken from 1st, 2nd, and 3rd units and 8th question also with 2 to 3 bits taken from 4th, 5th and 6th units, such that not more than 2 questions shall be from any one unit. All the questions carry equal marks.

8.4 Pattern of Evaluation for Lab subjects - (100 marks)

8.4.1 For practical subjects there shall be a continuous evaluation during the semester for 30 sessional marks and 70 marks for semester end examination. Out of the 30 marks for Continuous Internal Evaluation, the distribution of marks is as follows

S. No	Item	Marks
1.	Day to Day work	05 marks
2.	Final Record and viva	09 marks
3.	Average of two tests including viva	05 marks
4.	Lab Based Project Report viva and demo	08 marks
5.	Attendance	03 marks
	Total	**30 marks**

8.4.2 The semester end examination for 70 marks for the lab subjects shall be conducted by an external examiner and an internal examiner appointed by the Chief Superintendent of Examinations of the college. The marks are distributed as follows:

S. No	Item	Marks
1.	Procedure to experiment and Tabulation	10 marks
2.	Conduct of experiment, observation, Calculation	30 marks
3.	Results including graphs, discussions and conclusion	20 marks
4.	Viva voce and Record	10 marks
	Total	70 marks

8.4.3 Incase computer based examinations

S. No	Item	Marks
1.	Flow chart and algorithms	10 marks
2.	Program writing and execution	30 marks
3.	Result and conclusions	20 marks
4.	Viva voce and Record	10 marks
	Total	70 marks

8.5 **For the subject having design and / or drawing, (such as Engineering Drawing and Machine Drawing), the distribution shall be 30 marks for internal evaluation (10 marks for day-to-day work including drawing,3 marks for home assignment work, 12 marks for average of two internal tests and 2 marks for class notes 3 marks for attendance) and 70 marks for end semester end examination.**

There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests.

Third test facility can be availed as mentioned above (8.3.1 (i) (a) and (b)

8.6. Technical Seminar

There shall be a technical seminar evaluated for 100 marks from I year I semester to II year II Semester. The evaluation is purely internal and will be conducted as follows:

Sl.No	Description	Marks
1	Literature survey, topic and content	10
2	Presentation including PPT	10
3	Seminar Notes	05
4	Interaction with audience after presentation	05
5	Final Report 3 copies	10
6	Class room participation	05
7	Punctuality in giving seminar as per Scheduled time and date	10
8	Mid Semester Viva (on the seminar topics completed up to the end of 9^{th} week	15
9	End Semester Viva	30
	Total	**100 Marks**

Student must secure 40% i.e. 40 marks to be successful in sum total (Hundred Marks) in Technical Seminar.

8.7 Comprehensive Test and Viva-voce:

Comprehensive test and Viva Voce	The subjects studied in the Semester concerned related to branches concerned and for placements
B.Tech I year I semester	I semester
B.Tech I year II semester	I and II semester
B.Tech II year I semester	I, II and III semester
B.Tech II year II semester	I, II, III and IV semester

Two Mid tests, Two mid Viva voce, one External Comprehensive Test and one External Comprehensive Viva Voce.

Allocation of marks :

*Comprehensive Test : 70 marks
**Viva Voce : 30 marks
Total : 100 marks

*Average of two best Mid Tests of Mid Test – I, Mid Test – II and Mid Test - III will be taken for 30 marks.

Total marks for Comprehensive Test will be 70.

The total sessional marks in this subject of Comprehensive Test and Viva Voce will be : 30 for sessionals and 70 for End Semester examination.
The grand total of marks for the subject of Comprehensive Test and Viva Voce will be 100. The student has to secure 40% of marks i.e. 40 marks in sum total of 100 marks to be successful in the subject.

There shall be a Comprehensive Viva Voce in III year IIsem

8.8 The laboratory records and internal test papers shall be preserved in the respective departments as per the college norms and shall be produced to the Committee of the college or any external agency like AICTE, NAAC, JNTUH, NBA etc., as and when the same are called for.

8.9. There shall be a Internship 1 and Internship 2, in an Industry of their specialization. Students will register for this immediately after II year II semester end examination and III year II semester examinations and pursue it during summer vacation. Internship 1 and Internship 2 shall be submitted as a project report and presented before the committee in III year I semester and IV year I semester along with lab examination. This project report will be evaluated for 30 internal marks and 70 external marks. The committee consists of an external examiner, Head of the Department, Supervisor of the Internship project and Senior Faculty Member of the Department.

8.10 The laboratory marks and the internal marks awarded by the college are subject to scrutiny and scaled down by the Departmental committees wherever necessary. In such cases, the internal and laboratory marks awarded by the department will be referred to a committee. The committee will arrive at a scaling factor and the marks will be scaled accordingly. The recommendation of the committee is final and binding. The laboratory records and internal test papers shall be preserved in the respective departments as per the college rules and produced before the visiting committees as and when they are asked for.

8.11. For mandatory courses like orientation course, cyber security, a student has to secure 40 marks out of 100 marks (i.e. 40% of the marks allotted) in sum total of continuous internal evaluation and external examination for passing the subject / course. These marks will be graded as per table given in 3.2.2.

9.0 Grading procedure

9.1 Marks will be awarded to indicate the performance of student in each theory subject, laboratory / practical's, seminar, Group Project 1, 2, 3, in the Major project and Comprehensive Test and Viva.

Based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken together) as specified in item 8 above, a corresponding letter grade shall be given.

9.2 As a measure of the performance of student, a 10-point absolute grading system using the following letter grades (as per UGC / AICTE guidelines) and corresponding percentage of marks shall be followed:

% of Marks Secured in a Subject / Course (Class Intervals)	Letter Grade (UGC Guidelines)	Grade Points (GP)
Greater than or equal to 90%	O (Outstanding)	10
80% and less than 90%	A+ (Excellent)	9
70% and less than 80%	A (Very Good)	8
60% and less than 70%	B+ (Good)	7
50% and less than 60%	B (Average)	6
40% and less than 50%	C (Pass)	5
Below 40%	F (FAIL)	0
Absent	Ab	0

9.3 A student obtaining '**F**' grade in any subject shall be deemed to have '**failed**' and is required to reappear as a 'supplementary student' in the semester end examination, as and when offered. In such cases, internal marks in those subjects will remain the same as those obtained earlier.

9.4 A student who has not appeared for examination in any subject, '**Ab**' grade will be allocated in that subject, and student shall be considered '**failed**'. Student will be required to reappear as a 'supplementary student' in the semester end examination, as and when offered.

9.5 A letter grade does not indicate any specific percentage of marks secured by the student, but it indicates only the range of percentage of marks.

9.6 A student earns grade point (GP) in each subject / course, on the basis of the letter grade secured in that subject / course. The corresponding 'credit points' (CP) are computed by multiplying the grade point with credits for that particular subject/ course.

Credit points (CP) = grade point (GP) x credits …. For a course

9.7 The student passes the subject / course only when **GP is not less than 5 (i.e. 'C' grade or above)**

9.8 The Semester Grade Point Average (SGPA) is calculated by dividing the sum of credit points (CP) secured from all subjects / courses registered in a semester, by the total number of credits registered during that semester. SGPA is rounded off to two decimal places. SGPA is thus computed as

$SGPA = \{ \sum_{i=1}^{N} C_i G_i \} / \{ \sum_{i=1}^{N} C_i \}$ …. For each semester

(i.e., upto and inclusive of S semesters, S 2),

where '**N'** is the **total** number of subjects (as specifically required and listed under the course structure of the parent department) the student has '**registered'** i.e., from the 1st semester onwards upto and inclusive of the 8th semester, 'j' is the subject indicator index (takes into account the subjects from 1 to 8 semesters), C_J is the number of credits allotted to the Jth subjects and G_j represents the grade points (GP) corresponding to the letter grade awarded for that Jth subject.

After registration and completion of the first year first semester, SGPA of that semester itself may be taken as the CGPA, as there are no cumulative effects.

Illustration of calculation of SGPA

Course / Subject	Credits	Letter Grade	Grade Points	Credit Points
Course 1	4	A	8	4 x 8 = 32
Course 2	4	O	10	4 x 10 = 40
Course 3	4	C	5	4 x 5 = 20
Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	3	C	5	3 x 5 = 15
	21			152

SGPA = 152/21 = 7.24

Illustration of calculation of CGPA:

Course / Subject	Credits	Letter Grade	Grade Points	Credit points Points
I				
Course 1	4	A	8	4 x 8 = 32
Course 2	4	A	9	4 x 9 = 36
Course 3	4	B	6	4 x 6 = 24
Course 4	3	O	10	3 x 10 = 30
Course 5	3	B	7	3 x 7 = 21
Course 6	3	A	8	3 x 8 = 24
I				
Course 7	4	B	7	4 x 7 = 28
Course 8	4	O	10	4 x 10 = 40
Course 9	4	A	8	4 x 8 = 32
Course 10	3	B	6	3 x 6 = 18
Course 11	3	C	5	3 x 5 = 15
Course 12	3	A	9	3 x 9 = 27
Total Credits	= 42			Total Credit Points =327

CGPA = 327/42 = 7.79

9.9 For merit ranking or comparison purposes or any other listing, **only** the '**rounded off'** values of the CGPAs will be used.

9.10 For calculations listed in regulations 9.6 to 9.9, performance in failed subjects/ courses (securing **F** grade) will also be taken into account, and the credits of such subjects/courses will also be included in the multiplications and summations.

After passing the failed subject(s) newly secured letter grades will be taken into account for calculation of SGPA and CGPA.

However, mandatory courses will not be taken into consideration.

10.0 Passing standards

10.1 A student shall be declared successful or 'passed' in a semester, if student secures a GP $\geq$ 5 ('C' grade or above) in every subject/course in that semester (i.e. when student gets SGPA 5.00 at the end of that particular semester); and a student shall be declared successful or 'passed' in the entire under graduate programme, only when gets a CGPA 5.00 for the award of the degree as required.

10.2 After the completion of each semester, a grade card or grade sheet (or transcript) shall be issued to all the registered students of that semester, indicating the letter grades and credits earned. It will show the details of the courses registered (course code, title, no. of credits, and grade earned etc.), credits earned, SGPA, and CGPA.

11.0 Declaration of results

11.1 Computation of SGPA and CGPA are done using the procedure listed in 9.6 to 9.9.

11.2 For final percentage of formula may be used.

12.0 Award of degree marks equivalent to the computed final CGPA, the following
% of Marks = (final CGPA – 0.5) x 10

12.1 A student who registers for all the specified subjects/ courses as listed in the course structure and secures the total number of credits (with CGPA $\geq$5.0), within 8 academic years from the date of commencement of the first academic year, shall be declared to have '**qualified'** for the award of the B.Tech degree in the chosen branch of Engineering as selected at the time of admission.

12.2 A student who qualifies for the award of the degree as listed in item 12.1 shall be placed in the following classes.

12.3 Students with final CGPA (at the end of the under graduate programme) 8.00 and above, and fulfilling the following conditions -

(i) Should have passed all the subjects/courses in '**first appearance'** within the first 4 academic years (or 8 sequential semesters) from the date of commencement of first year first semester.

(ii) Should have secured a CGPA > 8.00, at the end of each of semesters, starting from first year first semester onwards.

(iii) Should not have been detained or prevented from writing the end semester examinations in any semester due to shortage of attendance or any other reason, shall be placed in **'FIRST CLASS WITH DISTINCTION'**, otherwise **FIRST CLASS** only.

12.4 Students with final CGPA (at the end of the under graduate programme) ≥ 6.5 but < 8.00, shall be placed in '**FIRST CLASS'**.

12.5 Students with final CGPA (at the end of the under graduate programme) ≥ 5.5 but < 6.5, shall be placed in '**SECOND CLASS'**.

12.6 All other students who qualify for the award of the degree (as per item 12.1), with final CGPA (at the end of the under graduate programme) ≥ 5 but < 5.5, shall be placed in '**pass class**'.

12.7 A student with final CGPA (at the end of the under graduate programme) < 5.00 will not be eligible for the award of the degree.

12.8 Students fulfilling the conditions listed under item 12.3 alone will be eligible for award of '**university rank**' and '**gold medal**'.

13.0 Withholding of results

13.1 If the student has not paid the fees to the university / college at any stage, or has dues pending due to any reason whatsoever, or if any case of indiscipline is pending, the result of the student may be withheld, and student will not be allowed to go into the next higher semester. The award or issue of the degree may also be withheld in such cases.

14.0 Transitory regulations

14.1 A student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the degree programme, may be considered eligible for readmission to the same subjects / courses (or equivalent subjects/ courses, as the case may be), and same professional electives / open electives (or from set/category of electives or equivalents suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the date of commencement of student's first year first semester).

A student admitted in one academic regulation and he is getting readmission in some other academic regulations, the college has to offer substitute / additional subjects based on the comparison of two academic regulations. The details of substitute / additional subjects offered with the recommendations of board of studies of the concerned branch have to be given from time to time. The student will be governed by the academic regulations at the time of re-admission.

15.0 Student transfers

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

15.2 The students seeking transfer to Sreenidhi Institute of Science and Technology (SNIST) from various other Universities / institutions have to pass the failed subjects

which are equivalent to the subjects of SNIST, and also pass the subjects of SNIST which the students have not studied at the earlier institution.

Further, though the students have passed some of the subjects at the earlier semesters of SNIST, the students have to study substitute subjects in SNIST and get sessional marks by attending 3rd mid test and paying requisite fee as per the rules.

15.3 The transferred students from other Universities/ institutions to SNIST who are on rolls to be provided one chance to write the CIE (internal marks) in the failed subjects and /or subjects not studied as per the clearance letter issued by the Institution.

15.4 The autonomous affiliated colleges have to provide one chance to write the internal examinations in the failed subjects and /or subjects not studied, to the students transferred from other universities / institutions to SNIST who are on rolls, as per the clearance (equivalence) letter issued by the University.

16.0 Scope

16.1 The academic regulations should be read as a whole, for the purpose of any interpretation.

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

16.3 The Institution may change or amend the academic regulations, course structure or syllabi at any time, and the changes or amendments made shall be applicable to all students with effect from the date notified by the Institution.

Academic Regulations for B.Tech

(LATERAL ENTRY SCHEME)

w.e.f the AY 2021-22

1. Eligibility for award of B. Tech. Degree (LES)

The Lateral Entry Scheme (LES) students after securing admission shall pursue a course of study for not less than three academic years and not more than six academic years failing which he will forfeit the seat.

2. The student shall register and secure for all the credits with CGPA ≥ 5 from II year to IV year B.Tech programme (LES) as per the regulations for the award of B.Tech degree. **Out of the total credits secured, the student can avail exemption up to 6 credits**, that is, one open elective subject and one professional elective subject or two professional elective subjects for B.Tech programme to improve the performance of the Grade point average.

3. The students, who fail to fulfill the requirement for the award of the degree in six academic years from the year of admission, shall forfeit their seat in B.Tech. However, the student can take **two more** years for appearing the examinations.

4. The attendance requirements of B. Tech. (Regular) shall be applicable to B.Tech (LES).

5. <u>Promotion rules based on credits</u>

Sl.No	Promotion	Conditions to be fulfilled
1	Second year first semester to second year	Regular course of study of second year first semester.
2	Second year second semester to third year first semester	(i) Regular course of study of second year second semester. (ii) Must have secured at least 27 credits out of 45 credits i.e., 60% of credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Third year first semester to third year second	Regular course of study of third year first semester.
4	Third year second semester to fourth year first semester	(i) Regular course of study of third year second semester. (ii) Must have secured at least 52 credits out of 87 credits i.e., 60% of credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

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

MALPRACTICE RULES
DISCIPLINARY ACTION FOR MIS-CONDUCT OF STUDENTS DURING EXAMINATIONS

	Nature of Malpractice/ Misconduct of the conduct	**Punishment**
If the student:		
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 student is appearing but has not made use of (material shall include any marks on the body of the student which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other student orally or by any other body language methods or communicates through cell phones with any student or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the students 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 student is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The hall ticket of the student is to be cancelled and sent to the university.

3.	Impersonates any other student in connection with the examination.	The student who has impersonated shall be expelled from examination hall. The student is also debarred and forfeits the seat. The performance of the original student, who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and UG major project) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the student 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 student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the student 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 student(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The students also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case 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 student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the student 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 student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred and forfeits the seat.

9.	If student of the college, who is not a student 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 student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student 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 student has already appeared including practical examinations and UG major project 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 student has appeared including practical examinations and UG major project 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 punishment award suitable.

Malpractices identified by squad or special invigilators

1. Punishments to the students as per the above guidelines.

2. Punishment for institutions: (if the squad reports that the college is encouraging malpractices)

   a. A show cause notice shall be issued to the college.
   b. Impose a suitable fine on the college.
   c. Shifting the examination centre from the college to another college for a specific period of not less than one year.

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B. Tech (CSE) Course S**tructure Regulation: A20**

B. Tech. (CSE) I Year I Semester

SNo.	Course Category	K / S / V	Dept Course	Course Code	Course	L	T	P	C	Max. Marks	
										CIE	SEE
1	BS	K	S&H	8HC04	Engineering Chemistry	4	0	0	4	30	70
2	ES	K	IT	8FC01	Problem Solving using C	3	0	0	3	30	70
3	BS	K	S&H	8HC10	Linear Algebra and Calculus	2	1	0	3	30	70
4	ES	K	S&H	8BC01	Workshop/Manufacturing Processes	1	0	0	1	30	70
5	HS	S	S&H	8HC01	Oral Communication Skills	1	0	0	1	30	70
6	BS	S	S&H	8HC08	Basic Mathematics, Analysis and Reasoning	2	1	0	3	30	70
7	BS	S	S&H	8HC64	Engineering Chemistry Lab	0	0	2	1	30	70
8	ES	S	IT	8FC61	Problem Solving using C Lab	0	0	2	1	30	70
9	ES	S	S&H	8BC61	Workshop/Manufacturing Processes Lab	0	0	2	1	30	70
10	HS	S	S&H	8HC61	Oral Communication Skills Lab	0	0	2	1	30	70
11	ES	K	CSE	8E176	Comprehensive Test and Viva –Voce – I(2 Mids(Viva) and End Semester(Test and Viva) = 30+70)	1	0	0	1	30	70
12	PS	S	CSE	8E184	Technical Seminar - I	0	0	2	1	100	--
13	HS	V	S&H	8HC18	Orientation Course*	1	0	0	0	Marks and Grade will be given at the end of I year II semester	
		5/6/2			**Total :**	**15**	**2**	**10**	**21**	**430**	**770**

HS- Humanities and Social Sciences
BS- Basic Science courses
ES- Engineering Science courses
PC- Professional core courses
PE- Professional Elective courses
OE- Open Electives
PS- Project work, seminar and internship
MC- Mandatory Courses

K/ S /V - Knowledge Course/ Skill Based Course/ Value Added Course
CIE - Continuous Internal Evaluation
SEE - Semester End Evaluation
L - Theory
T – Tutorial
P/D – Practical/Drawing
C - Credits

* a) Orientation Course for B. Tech I year I semester Students take place for 3 weeks duration covering the first Two Units
b) Orientation Course for B. Tech I year II semester Students take place for covering the remaining Four Units (Units III, IV, V, and VI).

B. Tech. (CSE) I Year II Semester

SNo.	Course Category	K / S / V	Dept Course	Course Code	Course	L	T	P	C	Max. Marks	
										CIE	SEE
1	BS	K	S&H	8HC07	Engineering Physics	3	1	0	4	30	70
2	ES	K	CSE	8EC01	Data Structures and C++	3	0	0	3	30	70
3	BS	K	S&H	8HC13	Differential Calculus and Numerical Methods	2	1	0	3	30	70
4	ES	S	S&H	8BC02	Engineering Graphics	1	0	4	3	30	70
5	HS	S	S&H	8HC02	Written Communication Skills	1	0	0	1	30	70
6	PC	K	IT	8FC02	Python Programming	2	1	0	3	30	70
7	PC	S	IT	8F262	IT Workshop and Python Programming Lab	0	0	4	2	30	70
8	BS	S	S&H	8HC66	Engineering Physics Lab	0	0	2	1	30	70
9	ES	S	CSE	8EC61	Data Structures (C/C++) Lab	0	0	2	1	30	70
10	HS	S	S&H	8HC62	Written Communication Skills Lab	0	0	2	1	30	70
11	ES	K	CSE	8E277	Comprehensive Test and Viva –Voce – II(2 Mids(Viva) and End Semester(Test and Viva) = 30+70)	1	0	0	1	30	70
12	PS	S	CSE	8E285	Technical Seminar - II	0	0	2	1	100	--
13	HS	V	S&H	8HC18	Orientation Course*	2	0	0	0	30	70
										Grade evaluation	
		5/7/1			**Total :**	**15**	**3**	**16**	**24**	**460**	**840**

* a) Orientation Course for B. Tech I year I semester Students take place for 3 weeks duration covering the first Two Units
  b) Orientation Course for B. Tech I year II semester Students take place for covering the remaining Four Units (Units III, IV, V, and VI).

B.Tech. (CSE) II Year I Semester

Sl. No	Course Category	K / S / V	Dept Course	Course Code	Course	L	T	P/D	C	Max. Marks	
										CIE	SEE
1	ES	K	EEE	8AC41	Basic Electrical Engineering	3	0	0	3	30	70
2	ES	K	ECE	8CC54	Analog Electronic Circuits	2	0	0	2	30	70
3	PC	K	CSE	8EC02	Object Oriented Programming through Java	2	1	0	3	30	70
4	ES	K	IT	8F303	Discrete Mathematics	2	0	0	2	30	70
5	ES	K	ECE	8DC12	Computer Organization	2	0	0	2	30	70
6	HS	S	S&H	8HC03	Soft Skills	1	0	2	2	30	70
7	HS	V	S&H	8HC17	Universal Human Values	2	1	0	3	30	70
8	PC	S	CSE	8EC62	Object oriented programming through Java Lab	0	0	2	1	30	70
9	ES	S	EEE & ECE	8AC91	Basic Electrical Engineering and Analog Electronics Circuits Lab	0	0	2	1	30	70
10	ES	S	ECE	8DC62	Computer Organization Lab	0	0	2	1	30	70
11	PC	K	CSE	8E378	Comprehensive Test and Viva –Voce – III(2 Mids(Viva) and End Semester(Test and Viva) = 30+70)	1	0	0	1	30	70
12	PS	S	CSE	8E386	Technical Seminar - III	0	0	2	1	100	--
		6/4/1			**Total :**	**15**	**2**	**10**	**22**	**430**	**770**

B. Tech. (CSE) II Year II Semester

Sl. No	Course Category	K / S / V	Dept Course	Course Code	Course	L	T	P/D	C	Max. Marks	
										CIE	SEE
1	BS	K	S&H	8HC16	Probability and Statistics	2	1	0	3	30	70
2	ES	K	ECE	8CC55	Digital Electronics	2	0	0	2	30	70
3	PC	K	IT	8FC05	Design and Analysis of Algorithms	2	1	0	3	30	70
4	PC	K	CSE	8EC03	Database Management Systems	2	1	0	3	30	70
5	PC	K	IT	8F404	Software Engineering and OOAD	3	0	0	3	30	70
6	HS	K	MBA	8ZC01	Economics, Accountancy and Management Science	2	0	0	2	30	70
7	HS	V	S&H	8HC05	Environmental Science and Ecology	2	0	0	2	30	70
8	PC	S	CSE	8EC63	Database Management Systems Lab	0	0	2	1	30	70
9	PC	S	IT	8F463	Computer Aided Software Engineering (CASE) Tools Lab	0	0	2	1	30	70
10	PC	S	IT	8FC64	Design and Analysis of Algorithms Lab	0	0	2	1	30	70
11	PC	K	CSE	8E479	Comprehensive Test and Viva –Voce – IV(2 Mids(Viva) and End Semester(Test and Viva) = 30+70)	1	0	0	1	30	70
12	PS	S	CSE	8E487	Technical Seminar - IV	0	0	2	1	100	--
13	PS		CSE	8E491	Summer Industry Internship–I (4 weeks) : Evaluation will be done along with 3-1 courses						
		7/4/1			**Total :**	**16**	**3**	**8**	**23**	**430**	**770**

B. Tech. (CSE) III Year I Semester

Sl. No	Course Category	K / S / V	Dept Course	Course Code	Course	L	T	P/D	C	Max. Marks	
										CIE	SEE
1	OE	K			Open Elective-I	2	0	0	2	30	70
2	PE	K	CSE		Professional Elective - I	3	0	0	3	30	70
3	PC	K	IT	8FC06	Information Security	3	0	0	3	30	70
4	PC	K	CSE	8EC04	Data Warehousing and Data Mining	2	1	0	3	30	70
5	PC	K	CSE	8EC05	Data Communications and Networks	3	0	0	3	30	70
6	PC	S	CSE	8EC64	Data Warehousing and Data Mining Lab	0	0	4	2	30	70
7	PC	S	CSE	8EC65	Computer Networks Lab	0	0	2	1	30	70
8	PC	S	IT	8FC65	Information Security Lab	0	0	2	1	30	70
9	HS	V	BT	8GC49	Intellectual Property Rights	1	0	0	1	30	70
10	PS	S	CSE	8E491	Summer Industry - Internship-I	0	0	0	1	30	70
		5/4/1			**Total :**	**14**	**1**	**8**	**20**	**300**	**700**

B.Tech. (CSE) III Year II Semester

Sl. No	Course Category	K / S / V	Dept Course	Course Code	Course	L	T	P/D	C	Max. Marks	
										CIE	SEE
1	OE	K			Open Elective - II	2	0	0	2	30	70
2	PE	K	CSE		Professional Elective – II	3	0	0	3	30	70
3	PC	K	IT	8FC07	Automata Theory and Compiler Design	2	1	0	3	30	70
4	PC	K	CSE	8EC06	Operating Systems	2	1	0	3	30	70
5	PC	K	CSE	8EC07	Web Technologies	2	1	0	3	30	70
6	PC	K	IT	8FC08	Cyber Security and Cyber Laws	3	0	0	3	30	70
7	PC	S	IT	8FC66	Compiler Design Lab	0	0	2	1	30	70
8	PC	S	CSE	8EC66	Operating Systems Lab	0	0	2	1	30	70
9	PC	S	CSE	8EC67	Web Technologies Lab	0	0	2	1	30	70
10	PS	S	CSE	8E694	Group Project	0	0	2	1	30	70
11	PC	K	CSE	8E681	Comprehensive Viva Voce	1	0	0	1	30	70
12	PS		CSE	8E692	Summer Industry Internship - II: Evaluation will be done along with 4-1 courses						
		7/4/-			**Total :**	**15**	**3**	**8**	**22**	**330**	**770**

B.Tech. (CSE) IV Year I Semester

Sl. No	Course Category	K / S / V	Dept Course	Course Code	Course	L	T	P/D	C	Max. Marks	
										CIE	SEE
1.	PE	K	CSE		Professional Elective – III	3	0	0	3	30	70
2.	PE	K	CSE		Professional Elective-IV	3	0	0	3	30	70
3.	PC	K	IT	8F711	Software Automation and Testing	2	1	0	3	30	70
4.	PC	K	CSE	8EC08	Artificial Intelligence and Deep Learning	2	1	0	3	30	70
5.	PC	K	IT	8F710	Linux Programming	3	0	0	3	30	70
6.	PC	S	IT	8F769	Software Automation and Testing Lab	0	0	4	2	30	70
7.	PC	S	CSE	8EC68	Data Analytics Lab	0	0	4	2	30	70
8.	PC	S	IT	8FC68	Linux Programming Lab	0	0	4	2	30	70
9.	PS	S	CSE	8E692	Summer Industry Internship – II	0	0	0	1	30	70
		5/4/-			**Total :**	**13**	**2**	**12**	**22**	**270**	**630**

B.Tech. (CSE) IV Year II Semester

Sl. No	Cour se Cate gory	K / S / V	Dept Cours e	Course Code	Course	L	T	P/ D	C	Max. Marks	
										CI E	SEE
1	OE	K			Open Elective- III	2	0	0	2	30	70
2	PE	K	CSE		Professional Elective – V	3	0	0	3	30	70
3	PS	S	CSE	8E896	Major Project	-	-	10	5	30	70
		2/1/-			**Total :**	**5**	**0**	**10**	**10**	**90**	**210**

Note: All End Examinations (Theory and Practical) are of Three hours duration.
T – Tutorial L - Theory P/D – Practical/Drawing C - Credits Int. - Internal Exam Ext. - External Exam CIE: Continuous Internal Evaluation SEE: Semester End Evaluation

Course code

BS- Basic Science Courses
ES- Engineering Science Courses

HS- Humanities and Social Sciences including Management courses
PC-CSE Professional core courses
PE -CSE Professional Elective courses
OE-OE Open Elective courses
PS- Summer Industry Internship, Projects, Comprehensive Viva Voce, Technical Seminars

Professional Electives

Professional Elective Streams	**Professional Elective (PE)**									
	Code	**PE– I (3-1)**	**Code**	**PE – II (3-2)**	**Code**	**PE – III (4-1)**	**Code**	**PE – IV (4-1)**	**Code**	**PE – V (4-2)**
Network Security (CSE Board)	8EC11	Semantic Web & Social Networks	8EC12/ 8EC22	Advanced Computer Networks/ Digital Forensics	8EC13/ 8EC21	Block Chain Technologies/ Database Security	8EC14	Information Security. Management and Standards	8EC15	Mobile Computing
Software Engineering (IT Board)	8FC12	Software Architecture and Design Patterns	8FC13	Software Project Management	8FC14	Software Requirements and Estimation	8FC15	Agile Software Development	8FC16	Advanced Software Engineering
Data Science (CSE Board)	8EC16	Introduction to Data Science	8EC17	Machine Learning	8EC18	Big Data Analytics	8EC19	Business Intelligence	8EC20	Cloud Computing
Advanced Technologies (IT board)	8FC17	Computer Graphics	8FC18/ 8FC26	Image Processing / C# and .NET	8FC19	Computer Vision	8FC20	Augmented and Virtual Reality	8DC44	Internet of Things

Open Electives

Open Elective Streams	Open Elective (OE)					
	Code	**OE – I (3-1)**	**Code**	**OE – II (3-2)**	**Code**	**OE – III (4-2)**
Entrepreneurship Stream	8ZC22	Basics of Entrepreneurship	8ZC23	Advanced Entrepreneurship	8ZC24	Product and Services
Social Sciences Stream	8ZC25	Basics of Indian Economy	8ZC26	Basics of Polity and Ecology	8ZC27	Indian History, Culture and Geography.
Finance Stream	8ZC05	Banking Operations, Insurance and Risk Management	8ZC19	Entrepreneurship Project Management and Structured Finance	8ZC15	Financial Institutions, Markets and Services
Mechanical	8BC51	Introduction to Additive Manufacturing Process	8BC52	Principles of Operations Research	8BC53	Principals of Automation and Robotics
Electrical	8AC46	Control System Engineering	8AC44	Fundamentals of Measurements and Instrumentation	8AC45	Fundamentals of Renewable Energy Sources
Electronics	8DC42	Embedded Systems	8DC43	Introduction To VLSI Design	8CC44	Electronics Circuit Design and Analysis
Innovation and Design Thinking	8ZC08	Design Literacy and Design Thinking	8ZC09	Co-Creation and Product Design	8ZC10	Entrepreneurship & Business Design

Course Categories Credit Analysis of Undergraduate Engineering program:
AICTE vs. B.Tech (CSE)-SNIST - A20 Regulation

S. No.	Category		AICTE Suggested Breakup of Credits(Total 159) In UG program in Engg & Tech-CSE	A20- B.Tech. (CSE), SNIST
1	Humanities and Social Sciences including Management courses	HS	12*	14
2	Basic Science courses	BS	24*	22
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	ES	29*	28
4	Professional core courses	PC	49*	67
5	Professional Elective courses relevant to chosen specialization/branch	PE	18*	15
6	Open subjects – Electives from other technical and /or emerging subjects	OE	12*	6
7	Project work, seminar and internship in industry or elsewhere	PS	15*	12
8	Mandatory Courses [Environmental Sciences**, Induction training, Indian Constitution, Essence of Indian Knowledge Tradition]	MC	(non-credit)	
	Total		**159***	**164**

*Minor variation is allowed as per need of the respective disciplines.
** Environmental Science and Ecology is credit course and Hence, Environmental Sciences course is removed

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M				M	M					

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester

Computer Science and Engineering

Engineering Chemistry

L	T	P/D	C
4	0	0	4

Code: 8HC04

Prerequisite: NIL

Course Objectives:

1. To understand microscopic chemistry in terms of atomic and molecular orbital's
2. To learn the preparation and applications of commercial polymers and lubricant materials
3. To learn the industrial problems caused by water and municipal water treatment
4. To acquire knowledge about different types of batteries and their working mechanism
5. To develop the concepts and types of corrosion, control methods and protective coatings
6. To learn the chemical reactions that are used in the synthesis of drug molecules

Course Outcomes:

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

1. Understand and analyze microscopic chemistry in terms of atomic orbital's, molecular orbital's and intermolecular forces.
2. Identify and differentiate polymers, thermoplastic, thermosetting plastics and various lubricants.
3. Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods.
4. Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries.
5. Differentiate the types of corrosion and methods used to prevent the corrosion, surface coating techniques
6. Understand the synthesis of drug molecules and learn fundamentals of analytical techniques like electronic, vibrational and rotational spectroscopy.

UNIT - I

Atomic and molecular structure (6L)

Molecular orbital's of diatomic molecules and plots of the multicentre orbital's. Equations for atomic and molecular orbital's. Energy level diagrams of diatomics (F_2, Cl_2CO, NO). Pi-molecular orbital's of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

UNIT - II

Plastics and Lubricants (8L)

Plastics: Polymerization-Addition and Condensation polymerization, Plastics – Thermosetting and Thermoplastics, preparation, properties and **engineering applications of plastics:** PVC, Teflon, Bakelite. Fibers: Nylon 6,6 and Dacron.

Rubbers – natural and artificial rubber, vulcanization of natural rubber, Buna-S, Buna-N and their **engineering applications.** Fabricated Reinforcing Polymers- **engineering applications**

Lubricants: Definition, classification and function of lubricants, Types of lubrication and mechanisms – Thick Film or Hydrodynamic Lubrication, Thin Film or Boundary Lubrication, Extreme Pressure Lubrication. Classification and properties of lubricants – Viscosity, flash and fire point, cloud and pour point and acid value. **Engineering applications.**

UNIT - III

Water Technology (8L)

(a) Introduction: - Hardness of water – types of hardness (temporary and permanent), calculation of hardness- Numerical problems. Estimation of hardness of water by EDTA Method.

(b) Water for Industrial purpose: Food, sugar, textile, paper and pharma industries, water for steam making characteristics of boiler feed water, boiler troubles- scale and sludge & Carry over (priming &foaming), boiler corrosion, caustic embrittlement.

(c) Water Treatment: Internal conditioning- phosphate, carbonate & calgon conditioning. External Treatment: Ion-exchange process. Desalination-reverse osmosis. Municipal water treatment-sedimentation, coagulation, filtration, disinfection-chlorination, ozonization. **Engineering applications: Methodology and working of mineral water plant for drinking purpose.**

UNIT - IV

Electrochemistry (8L)

Conductance – conductors (metallic and electrolytic), types of conductance – specific, equivalent and molar conductance – effect of dilution on conductance.

Free energy and emf, cell potentials, electrode potential (oxidation and reduction). Types of electrodes - redox electrode (quinhydrode electrode), metal – metal insoluble salt electrode and Ion selective electrode. Cell notation and cell reaction –Nernst equation and applications.

Engineering Applications.

Batteries : Types of batteries

(a) Primary batteries – Lechalanche cell (dry cell), Lithium cell

(b) Secondary batteries(Accumulators) – Lead acid battery, Lithium-ion battery

(c) Fuel cells- $H_2 – O_2$ fuel cell and MeOH-O_2 fuel cell-advantages and applications.

Engineering applications – future water powered car, Hydrogen production and storage.

UNIT - V

Corrosion and Surface treatment (8L)

Corrosion – basic concepts –types of corrosion, chemical, electrochemical corrosion (absorption of O_2 and evolution of H_2) -factors affecting the rate of corrosion.

Cathodic protection – sacrificial anodic protection and impressed current cathodic protection method.

Surface treatment

Mechanical surface treatment and coatings, casehardening and surface coating, thermal spraying, vapour deposition, Ion implantation, Diffusion coating.

Methods of metallic coatings-hot dipping (tinning and galvanizing), metal cladding (Al cladding), electroplating (copper plating) and electroless plating (nickel plating), electroforming, ceramic, organic and diamond coating

UNIT-VI

Organic reactions and drug molecules (5L)

Introduction: reactions involving substitution (S_N1, S_N2) addition to double bond(C=C), elimination (E^1 and E^2), oxidation (using $KMnO_4$, CrO_3), reduction (Hydrogenation by Ni/H_2, Pd/C)

Drugs: Definition, classification structure and applications of commonly used drug molecules- paracetamol, aspirin, ibuprofen and diphenhydramine (Benadryl)

Principles of spectroscopy and selection rules: Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules- **Applications**.

TEXT BOOKS:

1. Engineering Chemistry: PK Jain & MK Jain, Dhanapathrai Publications (2018)

REFERENCE BOOKS:

1. Engineering Chemistry: by Thirumala Chary Laxminarayana& Shashikala, Pearson Publications (2020)
2. Textbook of Engineering Chemistry: Jaya Shree Anireddy, Wiley Publications (2019)
3. Engineering Chemistry: by &B.Rama Devi, Prsanta Rath & Ch. Venkata Ramana Reddy, Cengage Publications (2018)
4. Engineering Chemistry: Shashi Chawla, Dhanapathrai Publications (2019)
5. Textbook of Engineering Chemistry: SS Dara, SS Umare S. Chand Publications (2004)

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	H	L		M							M

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester
Computer Science and Engineering
Problem Solving using C

	L	T	P/D	C
Code: 8FC01	**3**	**0**	**0**	**3**

Prerequisite: NIL

Course Objectives

1. To acquire problem solving skills
2. To be able to develop flowcharts
3. To understand structured programming concepts
4. To be able to write programs in C Language

Course Outcomes:

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

1. Formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs(in C language)
2. Execute and test the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion
3. Distinguish a problem into functions and synthesize a complete program using divide and conquer approach.
4. Understand arrays, pointers and structures to formulate algorithms and programs.
5. Analyse programming to solve matrix addition and multiplication problems and searching and sorting problems.
6. Understand programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.

UNIT I

Introduction to Programming: Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)

Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples.

From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code

UNIT II

History of C language, Characteristics of C language, Structure of C Language, C Tokens

Arithmetic expressions, Operator Precedence & Associativity

Conditional Branching and Loops

Writing and evaluation of conditionals and consequent branching and **Jumping Constructs**

Pretest and Post test, Iteration and loops (3 lectures)

UNIT III

Function: Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference, **Storage Classes**

Recursion: Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc.

Macros – Definition, comparison with functions.

UNIT IV

Arrays: Arrays (1-D, 2-D), Character arrays **Ragged Arrays and Dynamic Arrays**

Basic Algorithms Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required) Quick sort or Merge sort.

UNIT V

Pointers Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notation of linked list (no implementation) **Dynamic Memory allocation Functions**.

Strings: String Handling Functions.

UNIT VI

Structure: Structures, Defining structures and Array of Structures,

Nested Structures enum, typedef

File handling (only if time is available, otherwise should be done as part of the lab)

File Handling Functions, File Modes, File Operations

Text Books:

(i) Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

(ii) E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill Suggested

Reference Books:

(i) Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M	H									

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester

Computer Science and Engineering

Linear Algebra and Calculus

(Common to CSE, IT, ECM)

	L	T	P/D	C
Code: 8HC10	**2**	1	**0**	**3**

Prerequisites: Mathematics Knowledge at Pre-University Level.

Course Objectives:

1. Understand and expected to learn basic operation of matrices and about the linear system and some analytical methods for solution.
2. Using the concept of Eigen value and Eigen vector- properties solve equations of applications for orthogonal transformation.
3. Solve the dependence and independence of vectors, basis, linear transformation.
4. Elaborate the basic concepts of Inner product spaces.
5. Analyze the mean value theorems and solve their applications to the given functions, series expansions of a function using Taylor's theorem.
6. Apply the knowledge of special functions such as Beta & Gamma functions and their properties to solve improper integrals and the applications of definite integrals.

Course Outcomes:

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

1. Compare the consistency or inconsistency of a linear system and also solve real time problems.
2. Calculate the Eigen values and Eigen vectors of a matrix and their application for orthogonal transformation.
3. Identify the dependence and independence of vectors and solve the problems on basis.
4. Solve problems on Inner product spaces.
5. Illustrate the mean value theorems and also express the given function in series form using Taylor's theorem.
6. Solve the problems using special functions; evaluate surface areas and volumes of revolutions.

UNIT- I: Matrices-1

Symmetric, skew-symmetric and orthogonal matrices. Inverse of a matrix by Gauss Jordan method, rank of a matrix: System of linear equations- Rank method/ Gauss Elimination method.

UNIT- II: Matries-2

Hermitian and Skew- Hermitian, Unitary matrices. Eigen values, Eigenvectors, Cayley - Hamilton Theorem (without proof) and its applications in finding higher powers of a matrix and inverse, Diagonalization of a matrix.

UNIT- III: Vector spaces

Vector Space, linear dependence/Independence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, rank-nullity theorem (without proof).

UNIT-IV: Inner product spaces:
Inner product spaces (Definition and Examples), Gram-Schmidt orthogonalization process (without proof) and finding orthonormal basis, orthogonal complements.

UNIT - V: Calculu1s-1
Rolle's Theorem and Mean value theorems (Statements and Geometrical Interpretations without proofs); Taylor's and Maclaurin's theorems (without proof) and its applications in evaluating definite integrals.

UNIT - VI: Calculus-2
Beta and Gamma functions and their properties; Evaluation of improper integrals, Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Text Books:
1. P.Sivaramakrishna Das and C.Vijayakumari, Mathematics-I (calculus, Differential Equations and Linear Algebra), Pearson Publications

Reference Books

1. Engineering Mathematics, Srimanta Pal, OXFORD university press
2. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
5. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.
6. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M		L		M				M			L

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester
Computer Science and Engineering
Workshop/Manufacturing Processes

	L	T	P/D	C
Code: 8BC01	**1**	**0**	**0**	**1**

Prerequisite: NIL

Course Objectives:
The students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

COURSE OUTCOMES:
After completion of the course, the student will be able to:

1. Understand various basic tools to perform simple joints using metal and wood.
2. Classify various electrical and electronic appliances and their applications.
3. Determine the appropriate carpenter tools for the timber and wood furniture
4. Understand the operation of basic as well as advanced machines used for fabrication of Plastics and Glass
5. Describe the manufacturing process of welding, casting and tin smithy and their applications.
6. Demonstrate the various types of machine tools and their significance in manufacturing process

Unit-I

Fitting & Power Tools : Fitting Tools- Marking and Measuring tools, Cutting tool, Finishing tools-etc- basic Fitting operations, Safe working practices Introduction to power tools- Power Hacksaw, Drill, Grinder ,etc.

Unit-II

Electrical & Electronics Appliances: Introduction, wires and wires sizes, wiring boards, common house wiring methods, symbols and house hold electrical apliances.

Unit-III

Carpentry: Introduction-Timber, Wood joints- Lap, dovetail, Tools- Marking tools, Cutting tool, Finishing tools-etc- basic carpentry operations, Wood turning lathe

Unit-IV

Plastic molding & Glass Cutting: Types of Plastics, Processing of Plastics: Injection moulding and Blow moulding. Introduction to Glass materials and physical properties -Cutting tools.

Unit-V

- Casting: Importance, Advantages and limitations, Patterns, Moulding and Moulding materials, Sand Casting – Casting terms, Procedure, Applications, Die Casting– Types, Principle and Applications,
- Metal joining - Various methods of Joining, Welding - Types of Welding - Weld

joints, Electric Arc welding – Principle, Coated electrode, arc welding equipment, Applications, Resistance Spot welding, Soldering and Brazing

- Metal forming – Advantages, Rolling- Principle, Rolling products, Forging- principle and applications, hand forging operations, Extrusion - basic principle and applications,
- Sheet Metal Operations - Punching, Blanking, Bending and Drawing

Unit-VI

Machining: meaning, Advantages and Drawbacks, Basic concepts of machine tool, chips and cutting tool, Principle and simple Construction of Lathe, Drilling, and Grinding, CNC machine tools - Advantages, parts of a CNC system, Advanced manufacturing methods – Need for icromachining, principle and applications of ECM and EDM, Additive manufacturing – Need, Principles of SLS, FDM methods

Text Books:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

Reference Books

1. Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level								M	M	H		

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester

Computer Science and Engineering

Oral Communication Skills

	L	T	P/D	C
Code: 8HC01	**1**	**0**	**0**	**1**

Prerequisite: NIL

Course Objectives:

1. To enable students to enhance oral communication skills
2. Develop the skill of speaking effectively
3. Get introduced basics of soft skills and enhance their confidence levels and etiquette
4. Learn to make formal presentations both online and offline.
5. Improve their reading skills by applying different strategies of reading
6. Understand the nuances and learn the art of group discussion

Course Outcomes:

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

1. Understand, Analyse and respond to the audience by listening effectively
2. Practice effectively the speaking skills with the apt body language
3. Develop strategies to improve speaking skills
4. Plan, prepare and present effectively to meet the standards of corporate and real world in a group
5. Analyse the reading skills through note taking and other study skills
6. Express the opinions effectively on the given topic through role play and situational dialogues in group discussions

Unit I

Introduction to Oral Communication Skills

1.1. Importance and need for general and technical Communication
1.2 Barriers to effective communication
1.3 Self introduction, introducing and greeting others
1.4 Techniques to enrich vocabulary power

Unit II

Effective Speaking Skills

2.1 Use of cohesive devices
2.2 Achieving confidence, clarity and fluency in speaking
2.3 Body language: eye contact, facial expression, gestures, posture and body movements
2.4 Speech etiquette

Unit III

Activities on listening and speaking

3.1 Soft Skills
3.2 Listening to structured talks
3.3 Strategies to improve speaking skills

3.4 JAM sessions

Unit IV
Presentation Skills

4.1 Nature and importance of presentation skills
4.2 Planning, preparing and organizing a presentation
4.3 Making an effective online presentation
4.4 Storytelling: Nuances of delivery

Unit V
Reading Comprehension

5.1 Reading comprehension Techniques
5.2 Study Skills
5.3 Note making
5.4 Reading passages from a book for practice

Unit VI
Group Discussion

6.1 Importance of Group Discussion
6.2 Characteristics of successful group discussions
6.3 Techniques for individual contribution in a group discussion
6.4 Group discussions for practice

Text Books:

1. Compiled by the faculty of Sreenidhi (for internal circulation only)

Reference Books:

1. SPOKEN ENGLISH A Self-Learning Guide to Conversation Practice by V Sasikumar P. V. Dhamija
2. English for Professionals by S.S.Prabhakar Rao
3. English for Business Communication by Dr.T.Farhathullah
4. Professional Communication by Alok Jain, Pravin S.R.Bhatia and A.M.Sheikh
5. Objective English : Pearson's Publications
6. Word Power Made Easy: Norman Lewis
7. Business Communication Strategies: Monipally.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M									

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester

Computer Science and Engineering

BASIC MATHEMATICS, ANALYSIS AND REASONING

(Common to All Branches)

	L	T	P/D	C
Code: 8HC08	**2**	**1**	**0**	**3**

Pre Requisites: Nil

Course objectives:

By learning Quantitative Aptitude and Logical Reasoning, a student can answer general problems in his everyday life within a short time with the help of quicker methods. Also it improves the certain skills of a student such as numerical and logical ability, mental capacity and also in sharpening minds. This course is very much useful for competitive examinations.

Course Outcomes:

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

1. Solve the problems given on testing divisibility, HCF and LCM, averages,
2. Evaluate the problems on Percentage, profit and loss, ratio and proportion simple and compound interest, time and work, time and distance etc.
3. Find the appropriate solution to the problems based on mensuration
4. Solve the problems given on series completion and analogy, odd one out and coding and decoding,
5. Determine the solutions for the problems based on blood relations, directions and Arithmetical reasoning,
6. Interpret the Venn diagrams and solve the questions related to cubes, dice, clocks and calendar.

Unit I:

Number System: Test for Divisibility, Test of prime number, Division and Remainders – HCF and LCM of Numbers – Fractions and Decimals-Vedic Mathematics-Average-Problems on Ages- Problems on Numbers- Ratio and Proportion.

Unit II:

Percentage – Profit, Loss and Discount – Partnership and Share-Simple Interest - Compound Interest. Time and Work- Pipes and Cisterns-Time and Distance- Problems on Trains- Boats and Streams, Allegation or Mixtures.

Unit III:

Mensuration: Area of Plane Figures, Volume and Surface Area of Solid Figures.

Data Interpretation: Tabulation, Bar Graphs, Pie Charts, Line Graphs-Logarithms-Permutation and Combination-Probability-Linear Equations-Quadratic Equations-Surds and Indices-Coordinate geometry.

Unit–IV:

Series Completion: Number Series, Alphabet Series, Alpha – Numeric Series.

Analogy: Completing the Analogous Pair, Simple Analogy, Choosing the Analogous pair, Double Analogy, Word Analogy, and Number Analogy.
Classification: Word Classification, Number Classification and Letter Classification.
Coding & Decoding: Letter Coding, Number Coding, Matrix Coding, Substitution, Deciphering Message Word Codes, Jumbled Coding. Crypt arithmetic-Inequalities-Input Output Tracing

Unit–V:
Blood Relations– Direction sense test- Number, Ranking & Time Sequence Test – Mathematical Operations-Arithmetical Reasoning. Puzzle Test: Classification Type Questions, Seating Arrangements, Comparison Type Questions, Sequential Order of Things, Selection Based on Given Conditions, Family Based Puzzles, Jumbled Problems.

Unit –VI:
Logical Venn Diagrams –Cubes and Dice – Analytical Reasoning-Assertions and Reason– Logical Deductions-Syllogism -Statement and Arguments-Statement and Conclusions-Clocks & Calendar-Data Sufficiency.

Text Books:
1. Quantitative Aptitude by R.S.Agarwal
2. Verbal and Non Verbal Reasoning by R.S.Agarwal.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M					M	M		M			

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester
Computer Science and Engineering
Engineering Chemistry Lab

Code: 8HC64 **L T P/D C**
Prerequisite: NIL **0 0 2 1**

Course Objectives:

1. Preparation of Inorganic compounds
2. Determination surface tension of a liquid
3. Determination viscosity of lubricant
4. Determination acid value of an oil
5. Estimation hardness of water
6. Analysis the amount of chloride content
7. Determination of cell constant and conductance of solutions
8. Determination of redox potential and emf of solutions
9. Determination of the rate constant of acid
10. Synthesis of a polymer (Thiakol rubber / Urea-Farmaldehyde resin)
11. Synthesis of a drug- Aspirin
12. Estimation of Mn^{+7} by Colorimetry method

Course Outcomes:

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

1. Prepare the Inorganic compounds
2. Determine surface tension of a liquid, viscosity of lubricant, acid value of an oil
3. Estimate hardness of water
4. Analyze the amount of chloride content
5. Determine cell constant and conductance of solutions, redox potential and emf of solutions, the rate constant of acid
6. Synthesize a polymer (Thiakol rubber / Urea-Farmaldehyde resin), a drug- Aspirin
7. Estimate of Mn^{+7} by Colorimetry method

List of Experiments

1. Preparation of coordination complex NiDMG Complex
2. Determination of surface tension
3. Determination of viscosity
4. Saponification/acid value of an oil
5. Ion exchange column for removal of hardness of water / Estimation of Hardness of water by EDTA Method
6. Determination of chloride content of water
7. Determination of cell constant and conductance of solutions (HCl Vs NaOH / Mixture of acid Vs Strong base)
8. Potentiometry - determination of redox potential and emf ($FeSO_4$ Vs $KMNO_4$ / HCl Vs NaOH)
9. Determination of the rate constant of acid catalyzed hydrolysis of methylacetete
10. Synthesis of a polymer- Thiakol rubber / Urea-Farmaldehyde resin
11. Synthesis of a drug- Aspirin

12. Estimation of Mn^{+7} by Colorimetry method

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	L							M			H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester
Computer Science and Engineering
Problem Solving using C Lab

L	T	P/D	C
0	0	2	1

Code: 8FC61
Prerequisite: NIL

Course Objectives:

1. To be able to understand the fundamentals of programming in C Language
2. To be able to write, compile and debug programs in C
3. To be able to formulate problems and implement in C.
4. To be able to effectively choose programming components
5. To solve computing problems in real-world.

Course Outcomes:

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

1. Enumerate the algorithms for simple problems
2. Classify the given algorithms to a working and correct program
3. Correct the syntax errors as reported by the compilers
4. Identify and correct logical errors encountered at run time
5. Write iterative as well as recursive programs
6. Represent data in arrays, strings and structures and manipulate them through a program
7. Declare pointers of different types and use them in defining self referential structures.
8. Create, read and write to and from simple text files.

Unit I (Cycle 1)

1. Write an algorithm for converting a given Celsius temperature to its equivalent Fahrenheit temperature and draw a flowchart.
2. Write an algorithm to find the largest of three given numbers and draw a flowchart.
3. Write an algorithm and draw a flowchart for finding the roots and nature of roots of a quadratic equation, given its coefficients.
4. Write an algorithm and flowchart for finding the first n Fibonacci numbers, give n.

Unit II (Cycle 2)

1. Write an algorithm, flowchart, and C program for:
2. Finding the area and circumference of a circle of given radius.
3. Finding the volume of a sphere of given radius.
4. Finding the lateral surface area of a right circular cone of given base radius and height.
5. Finding selling price of an item, given its cost price and profit percent.
6. Finding the interest on a given principal for a given period of time at a given rate of per year.
7. Write a C program to display all the sizes of data types in C.
8. Write a C program to display a given decimal integer into an equivalent octal number

and hexadecimal number using %o and %x in printf function.

Unit II (Cycle 3)

1. Write a C program to find the roots and nature of the roots of a quadratic equation, given its coefficients.
2. Write a C program for finding the largest of three given numbers.
3. A salesman gets a commission of 5% on the sales he makes if his sales is below Rs.5000/- and a commission of 8% on the sales that exceeds Rs.5000/- together with Rs.250/-. Write an algorithm or a flowchart and develop C program for computing the commission of the salesman, given his sales.
4. Write a C Program to demonstrate Marcos.

Unit III (Cycle 4)

1. Write three C programs to print a multiplication table for a given number using while, do-while, and for loops.
2. Write a C program to compute the sum of:
3. $1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$, given x and n.
4. 1! + 2! + 3! + . . . + n!, given n.
5. $1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10! + \ldots$ to n terms where the n^{th} term becomes less than 0.0001.

Unit III (Cycle 5)

1. Write a C program in the menu driven style to perform the operations +, -, *, /, % between two given integers.
2. Write a C program to find the largest and the least of some numbers given by the user
3. Write a C program to find the sum of the digits of a positive integer.

Unit III (Cycle 6)

a. Write C functions for the following:

a) A function that takes an integer n as argument and returns 1 if it is a prime number and 0 otherwise.
b) A function that takes a real number x and a positive integer n as arguments and returns x^n.
c) A function that takes a positive integer n as an argument and returns the n^{th} Fibonacci number.

b. Using recursion write C functions for the following:

a) Factorial of a non-negative integer n.
b) Number of combinations of n things taken r at a time.
c) Greatest Common Divisor of two integers.
d) Least Common Multiple of two integers.

Unit III (Cycle 7)

1. Write a menu driven style program to compute the above functions (cycle 6) on the choice of the function given by the user.
2. Define macros for the following and use them to find sum of the squares of the minimum and maximum of two given numbers.
   a) Larger of two numbers.
   b) Smaller of two numbers.
   c) Sum of the squares of two numbers.

3. Write a program to generate Pascal's triangle.
4. Write a program to count the number of letters, words, and lines in a given text.

Unit IV (Cycle 8)

1. Write a program to store the numbers given by the user in an array, and then to find the mean, deviations of the given values from the mean, and variance.
2. Write a C program to initially store user given numbers in an array, display them and then to insert a given number at a given location and to delete a number at a given location.
3. Write a program to store user given numbers in an array and find the locations of minimum and maximum values in the array and swap them and display the resulting array.

Unit IV (Cycle 9)

4. Write a C program to implement the operations of matrices – addition, subtraction,
5. multiplication.
6. Write a program to find whether a given matrix is symmetric, lower triangular, upper triangular, diagonal, scalar, or unit matrix.

Unit V (Cycle 10)

1. Write a function to swap two numbers.
2. Write a function to compute area and circumference of a circle, having area and
3. circumference as pointer arguments and radius as an ordinary argument.

Unit VI (Cycle 11)

1. Define a structure for complex number. Write functions on complex numbers (addition, subtraction, absolute value, multiplication, division, complex conjugate) and implement them in a menu driven style.
2. Define a structure point. Write a program to find the distance between two points.
3. Define a structure student having members roll no., name, class, section, marks. Create an array of 10 students give the data and find the average marks, section-wise.

Unit VI (Cycle 12)

Write a program to:

4. Create a file by the name given by the user or by command line argument and add the text given by the user to that file.
5. Open the file created above and display the contents of the file.
6. Copy a file into some other file, file names given by the user or by command line arguments.
7. Append a user mentioned file to another file.
8. Reverse the first n characters of a file.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M		L		M				M			L

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester
Computer Science and Engineering
Workshop/Manufacturing Practices Lab

	L	T	P/D	C
Code: 8BC61	**0**	**0**	**2**	**1**

Prerequisite: NIL

Course Objectives:

1. To know the different popular manufacturing process
2. To gain a good basic working knowledge required for the production of various engineering products
3. To provide hands on experience about use of different engineering materials, tools, equipment's and processes those are common in the engineering field
4. To identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances

Course Outcomes:

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

1. Understand various types of conventional manufacturing Processes
2. Describe Manufacturing components from wood, MS flat, GI Sheet etc. – hands on experience
3. Illustrate Manufacturing of components by machining like shafts, holes & threaded holes, surface finishing of components etc.
4. Produce small devices / products /appliances by assembling different components

LIST OF EXPERIMENTS:

S.No	Trades	List of Experiments
1	Fitting Shop	**1**. Preparation of T-Shape Work piece **2.** Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.
2	Carpentry	3.Practice of Cross Half lap joint 4. Practice of Half lap Dovetail joint
3	Electrical & Electronics	5. One lamp one switch Practice 6. Stair case wiring: Practice
4	Welding (Arc& Gas) & Soldering shop	Demonstration of Gas and Resistance welding 7. Practice of Lap and Butt joint using Arc welding
5	Casting	8.Preparation of mould by using split pattern 9. Mould preparation and pouring of molten metal.
6	Tin Smithy	10. Preparation of Rectangular Tray & Square box
7	Machine Shop	11. Demonstration of Turning, Drilling and grinding operations on Lathe, Drilling and grinding machines

8	Plastic molding & Glass Cutting	12 a) Demonstration of Injection Moulding b) Demonstration of Glass Cutting with hand tools
9	Domestic Appliances	13.Demonstration of assembly components of Fans, Mixers, Air blower, Iron box, Rice cooker, Emergency light
10	Lab project	14. Making various components and / or assembling the components which can be useful in domestic / engineering applications

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level								M	M	H		

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester
Computer Science and Engineering
Oral Communication Skills Lab

	L	T	P/D	C
Code: 8HC61	**0**	**0**	**2**	**1**

Prerequisite: NIL

Course Objectives:

1. To enable students to enhance oral communication skills
2. Develop the skill of speaking effectively
3. Get introduced basics of soft skills and enhance their confidence levels and etiquette
4. Learn to make formal presentations both online and offline.
5. Improve their reading skills by applying different strategies of reading
6. Understand the nuances and learn the art of group discussion

Course Outcomes:

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

1. Understand, Analyse and respond to the audience by listening effectively
2. Practice effectively the speaking skills with the apt body language
3. Develop strategies to improve speaking skills
4. Plan, prepare and present effectively to meet the standards of corporate and real world in a group
5. Comprehend the reading skills through note taking and other study skills
6. Express the opinions effectively on the given topic through role play and situational dialogues in group discussions

Practice sessions on

1. Self-introduction, introducing others and greetings
2. Sharing experiences, anecdotes and story telling
3. Confidence boosting
4. Asking for and Giving Directions
5. Discussions and Role Plays on different types of Etiquette
6. Situational Dialogues
7. JAM/Extempore/ Impromptu
8. Formal Presentations
9. Reading comprehension
10. Reading from simple and difficult passages from articles and books
11. Group Discussion

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H	H	M					M			H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester
Computer Science and Engineering
Comprehensive Test and Viva Voce - I

	L	T	P/D	C
Code: 8E176	**1**	**0**	**0**	**1**

Prerequisite: NIL

Course Objective:
Evaluate, Comprehend and Assess the concepts and knowledge gained in the Core Courses of 1st year 1st Semester

Course Outcomes:
At the end of this course the student will be
Asses the knowledge of Core and Elective subjects that they have studied till the completion of that academic year.

Two Mid tests, Two mid Viva voce, one External Comprehensive Test and one External Comprehensive Viva Voce.

Comprehensive Test and Viva Voce	The subjects studied in the Semester concerned related to branches concerned and for placements
B.Tech I year I semester	I semester
B.Tech I year II semester	I and II semester
B.Tech II year I semester	I, II and III semester
B.Tech II year II semester	I, II, III and IV semester

Allocation of marks:

*Comprehensive Test	: 70 marks
**Viva Voce	: 30 marks
Total	: 100 marks

*Average of two best Mid Tests of Mid Test – I, Mid Test – II and Mid Test - III will be taken for 20 marks.
End Semester Examination for Comprehensive Test will be taken for 50 marks.
Total marks for Comprehensive Test will be 70.

**Average of best two of Mid Tests of Mid – I, Mid – II and Mid - III for Viva Voce will be taken for 10 marks.
End Semester Examination for Comprehensive Viva Voce shall be evaluated for 20 marks.
The total for Viva Voce will be 30.

Thus the total sessional marks in this subject of Comprehensive Test and Viva Voce will be : 30 for sessionals and 70 for End Semester examination.The grand total of marks for the subject of Comprehensive Test and Viva Voce will be 100. The student has to secure 40% of marks i.e. 40 marks in sum total of 100 marks to be successful in the subject.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	L				H	L		M	H		H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester
Computer Science and Engineering
Technical Seminar - I

	L	T	P/D	C
Code: 8E184	**0**	**0**	**2**	**1**

Prerequisite: NIL

Course Objective:
Develop ability to be a public speaker. Learn the importance of delivering seminars for demonstrating oratory and develop interview facing skills.

Course Outcomes:
After completing this course, the student will be able to

1. Identify topics related to Computer Scienec and Engineering domain
2. Collect, survey and organize content in PPT form
3. Present seminar in an effective manner

Procedure :

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot/week.
5. Progress of the seminars need to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for technical seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

There shall be a technical seminar evaluated for 100 marks each from I year I Semester to II year II Semester. The evaluation is purely internal and will be as follows:

S.No	Description	Marks
1	Literature survey, topic and content	10
2	Presentation including PPT	10
3	Seminar Notes	05
4	Interaction with audience after presentation	05
5	Final Report 3 copies	10
6	Class room participation	05
7	Punctuality in giving seminar as per Scheduled time and date	10
8	Mid Semester Viva (on the seminar topics completed up to the end of 9^{th} week	15
9	End Semester Viva	30
	Total	**100 Marks**

Student must secure 40% i.e. 40 marks to be successful in sum total (Hundred Marks) in Technical Seminar.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level						M		H		M		H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year I Semester
Computer Science and Engineering
Orientation Course
(Mandatory course)

L	T	P/D	C
1	0	0	0

Code: 8HC18
Prerequisite: NIL

Course Objectives:

1. To help the students appreciate the essential 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.
2. 2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. 3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature. Thus, this course is intended to provide a much needed orientational input in value education to the young enquiring minds.

Course Outcomes:

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

1. Understands human values and purpose of education
2. Understands the importance of different harmony levels needed. Understand Self and being in the current moment are the sources of happiness.
3. Improves Learning capabilities and communication skills.
4. Improves Personality Development and Life Skills
5. Understands and appreciate the importance of personality development and yoga for a holistic life.
6. Understands the essence and Values and Social responsibilities for successful life.

Unit - I
Universal Human Values
Introduction -Self – Exploration, Basic human aspirations, Need for a holistic perspective, Role of Education, Understanding Happiness, Understanding the human being – Self and Body.

Unit - II
Universal Human Values
Relationships-Understanding Relationship –Trust and Respect. Harmony in the Society, Natural Environment, Participation in nature Harmony in nature/existence.

Unit - III
Improving Learning Capabilities-Basic Skills of Learning

Principles of Learning, Study Skills & E-Learning, Listening Skills, Effective Reading and Reviewing, Reading Comprehension, Textbook Reading Strategies, Test taking strategies, Introduction to Soft Skills and Employability Skills, Interpersonal skills.

Unit - IV

Improving Learning Capabilities-Personality Development and Life Skills

Goal Setting, Motivation, Time Management, Positive Attitude, Decision Making, Building Self-confidence, Attributes of a Good Personality, Memory Management, Characteristics of a successful student, Responsibilities of Students in shaping themselves, Morals, Ethics & Values, Difference between Studying in a Professional College and High School / Junior College

Unit - V

Literature, Proficiency Modules(PM) in English, Health, Yoga & Diet, Co-Curricular & Extracurricular activities

Literature -History of human civilization, Indian civilization, Indus valley civilization and culture, history of religions, the basic tenets of Christianity, Islam, Hinduism, Buddhism, Jainism, Sikkim and Judaism, Indian culture and values.

Proficiency Modules in English - Strategies to improve proficiency in English skills(L/S/R/W), Exercises based on Remedial grammar, Exercises on Remedial Vocabulary

Health- Dimensions of Health, Basic activities of daily living, Instrumental activities of daily living, Types of Health, Factors affecting health

Yoga - Introduction to Yoga, Kinds of Yoga, Pranayama and Dhyana (Meditation)

Diet- Balanced Diet, Components of Diet, Health Eating Pyramid.

Co-curricular and Extra Curricular activities

Unit - VI

Lectures by Eminent Persons, Research, Innovation & Patents and Local Visit

Lectures by Eminent Persons on Science, Technology & Environment,

Innovations R&D and Entrepreneurship-Sreenidhi HUB, Basics of Innovation, Entrepreneurship and Intellectual Property Rights (IPR)

Local Visit to Village and City including Hi-tech City.

Feedback on last but one day of Orientation Course

Text Books:

1. RR Gaur, R Sangal, GP Bangaria, 2009, A Foundation Course in Value Education (English).

Reference Books:

1. Yoga, Food and Health (by Swami Guru Premananda Saraswati)

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M					M	L					

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
Engineering Physics

	L	T	P/D	C
Code: 8HC07	**3**	**1**	**0**	**4**

Prerequisite: NIL

Course Objectives:

1. Explain about the Quantum Mechanics to understand wave particle duality, necessity of quantum mechanics to explore the behavior of subatomic particles. Schroedinger's Time Independent Wave Equation, Physical Significance of the Wave Function – Application of Schroedinger wave equation.
2. To understand the basic concepts of normal light, Laser and its applications and to know about the fiber optics, principle (TIR), Numerical Aperture, Types of optical Fibers, Step index and graded index Fibers, attenuation in optical fibers. Applications: optical fiber communication system, fiber optic sensors, medical endoscopy.
3. To study the concepts of magnetism and superconductivity, Bohr magneton, Hysteresis nature, domain structure, Meissner effect, types of superconductors, BCS theory and applications of superconductors.
4. To understand the concepts of dielectrics, polarizations and its types, internal fields, Clausius-Mossitti equation, Frequency and temperature effect on dielectrics and its applications – Piezo-electricity, Pyro-electricity and ferro-electricity.
5. To know about the semiconductors, types, carrier concentration, Thermistor, Hall effect and also to understand the concept of PN-junction, I-V Characteristics, LED, Solar Cell and Photo diode.
6. To discuss about the nano-technology, preparation techniques and characterization (XRD, SEM & TEM), CNTs and to know about the fundamentals of radioactivity and its applications.

Course Outcomes:

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

1. Differentiate the wave and particle, de-Broglie matter waves-its experimental evidence, Schroedinger's wave concept and its application for a particle in one dimension box.
2. Explain about emission, its types, laser principle, types, working and its applications and to reveals about TIR principle, optical fiber-types and signal propagation, attenuation, communication system and applications of optical fibers (sensors and medical endoscopy)
3. Classify magnetism types, Hysteresis, domain theory, Anti-ferro and ferri-magnetism, Superconductivity, experimental facts, theoretical analysis, types of superconductors and its applications.
4. Explain the basic concepts of dielectric materials, polarization and its types, local fields, frequency and temperature effect on dielectrics and their applications (piezo, ferro and Pyro electricity).
5. Elaborate semiconductor behavior, types, carrier concentration, Hall effect, Thermistor, demonstrate and analyze semiconductor devices like a PN-junction, I-V characteristics, LED, solar cell, photo diode and their applications.

6. Summarize nano & bulk concepts, surface to volume ratio, quantum confinement, CNTs and preparation methods (physical & chemical), analysis the techniques like XRD, SEM, TEM and also to understand the radioactivity, fusion & fission, alpha, beta and gamma rays decay and its applications.

UNIT- I

Wave nature of particles, Schroedinger equation and its application

Waves and Particles, de Broglie Hypothesis, Matter waves, Davisson and Germer's Experiment, G.P. Thomson Experiment, Heisenberg's Uncertainty Principle, Schroedinger's Time Independent Wave Equation – Physical Significance of the Wave Function – Application of Schroedinger wave equation - Particle in One Dimensional Potential Box.

UNIT- II

Lasers and Fiber Optics

Lasers:

Characteristics of LASER, Spontaneous and Stimulated Emission of Radiation, Einstein's Coefficients and their significance. Meta-stable State, Pumping, Population Inversion. Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers.

Fiber optics:

Principle and construction of optical fiber, Acceptance Angle and Numerical Aperture. Based on refractive index profile classification of Optical Fibers: Single mode & Multimode mode Step index fibers, Single mode & Multimode mode graded index fibers. Attenuation in Optical Fibers (scattering, absorption and bending losses) Applications: Optical Fiber communication system, Fiber Optic Sensors and Medical Endoscopy.

UNIT - III

Magnetic and Superconducting materials

Magnetic Materials:

Permeability, Field Intensity, Magnetic Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton. Hysteresis behavior of Ferro Magnetic materials based on Domain theory. Hard and Soft Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their applications,

Super conducting Materials:

Effect of Magnetic Field, Critical current density, Meissner effect, Type-I and Type-II superconductors, BCStheory, applications of superconductors.

UNIT - IV

Dielectric materials

Electric Dipole, Dipole Moment, Dielectric Constant, Electric Susceptibility, Electronic and Ionic polarizability (Quantitative) Orientation Polarization (Qualitative), Internal fields in Solids, Clausius - Mossotti equation, Frequency and temperature effect on Dielectrics (Qualitative), Applications - Piezo-electricity, Pyro-electricity and Ferro-electricity.

UNIT- V

Semiconductors and Semiconductor devices

Semiconductors:

Fermi Level in Intrinsic and Extrinsic Semiconductors. Carrier concentration of Intrinsic Semiconductor. Carrier concentration of Extrinsic Semiconductor (qualitative). Direct & Indirect Band Gap Semiconductors: Thermistor and Hall Effect in semiconductors.

Semiconductor devices:

Formation of a PN Junction and working of a PN Junction diode, Energy band Diagram of open circuited PN Diode, I-V Characteristics of PN Junction diode. Applications: LED, Solar Cell and Photo diode.

UNIT - VI

Nanotechnology and Nuclear Energy

Nanotechnology:

Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication, Sol-gel, Precipitation, Chemical vapor Deposition (CVD); Top-down Fabrication; Thermal evaporation, Ball Milling, Characterization of Nano materials (XRD & TEM), carbon nano tubes (CNTs), Applications of Nano Materials.

Nuclear Energy:

Mass Defect, binding energy, Nuclear fission, Nuclear fusion. Radioactivity: □, β, γ rays decay, Geiger-Muller counter. Introduction of nuclear power plant.

Text Books:

1. B.K. Pandey & S. Chaturvedi Engineering Physics, Cengage Learning

Reference Books:

1. P K Palanisamy, Engineering Physics, Sitech Publications
2. Charles Kittel, Introduction to Solid State Physics, John Wiley Publisher
3. A.S. Vasudeva , Modern engineering Physics, S Chand
4. Dekker, Solid State Physics
5. Dr.M.N. Avadhanulu, Engineering Physics, S Chand
6. Dekker, Solid State Physics
7. Halliday and Resnick, Physics
8. S.O. Pillai, Solid State Physics
9. A. Ghatak - Optics

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M	M									H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
DATA STRUCTURES and C++
(Common to all Branches)

L	T	P/D	C
3	0	0	3

Code: 8EC01
Prerequisite: Problem Solving using C

Course Objectives:

1. To make the students to understand and expected to learn the applications of Abstract data Type, linear data structures such as stacks, queues and lists
2. Comprehend different nonlinear data structures such as trees and graphs and analyze their efficiency trade off using time complexities
3. Explore the concepts of object-oriented programming and advanced C++ concepts and be able to write programs with C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, Templates etc.

Course Outcomes:

After completion of this course student will be able to:

1. Demonstrate the concepts of Abstract data type and also applications of stack and Queues
2. Select the data structure that efficiently model the information in a problem
3. Design programs using variety of data structures including Trees, AVL Trees and Graphs and their applications.
4 Solve problems and also assess efficiency trade off among searching and sorting using time complexity of each algorithm and also the applications of hashing and hash tables.
5. Describe the concepts of OOPs and implement programs using objects, classes, constructors and destructors.
6 Apply concepts of OOPs to write program on over loading functions and concepts of Inheritance.

UNIT I:

Introduction to data structures: Abstract data type (ADT), Stacks, Queues and Circular queues and their implementation with arrays.
Applications of Stack: infix to post fix conversion, postfix expression evaluation. Applications of Queues.

UNIT II:

Singly linked lists, Advantages of Linked lists over Arrays, Doubly linked lists, Circular list and their operations, representing stacks and queues with Linked lists.

UNIT III:
Trees- Binary trees, terminology, representation, traversals. AVL trees, AVL tree operations: Insertion, deletion and searching. Graphs- terminology, representation, graph traversals (DFS and BFS).

UNIT IV:
Searching –Searching: Linear and binary search methods. Sorting: Quick sort, Merge sort. Performance analysis of Searching and Sorting Algorithms. Heaps: Introduction, Min Heap, Max Heap, Operations on Heaps, Heap Sort. Hashing: Hash Table, Hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing.

UNIT V:
Introduction to C++ programming-object oriented programming concepts, Structured Vs OOP. Classes and objects-class definition, Objects, class scope and accessing members, Constructors-default constructor, parameterized constructor, copy constructor. Destructor.

UNIT VI:
Static class members, this pointer, friend functions, Dynamic memory management with operators new and delete. Overloading-function overloading, Operator overloading, restrictions on operator overloading, overloading unary and binary operators, templates, inheritance: single, multiple and multi level inheritance.

TEXT BOOKS:
1. Data Structures and C++ by Reema Thareja
2. Data Structure through C by YashavantKanetkar. The complete reference C++ By HerbSchildt.

REFERENCES BOOKS:

1. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft. Data Structures and Algorithms. Addison Wesley,1983.
2. Data Structures using c Aaron M.Tenenbaum , YedidyahLangsam,MosheJAugenstein.
3. Introduction to Data Structures in C ByKamtane
4. Data Structures, A pseudocode Approach with C by Richard F. Gilberg and Behrouz A. Forouzan.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H	M									

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
Differential Calculus and Numerical Methods
(Common to CSE, IT, ECM)

	L	T	P/D	C
Code: 8HC13	**2**	**1**	**0**	**3**

Prerequisites: Linear Algebra and Calculus

Courses Objectives:

1. Various analytical methods to solve first order first degree ordinary differential equations.
2. Methods to solve higher order ordinary differential equations.
3. Concepts of Maxima and Minima of functions of two variables and Gradient, divergence and Curl.
4. Methods to solve algebraic and transcendental equations with the help of numerical methods also some numerical integration methods.
5. Finite differences, interpolating methods.
6. Numerical methods to find the solution of first order differential equations.

Course outcomes:

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

1. Find the solutions of first order first degree and not of first degree differential equations and their applications such as Newton's law of cooling, Natural growth and decay.
2. Identify and solve higher order ordinary differential equations with constant coefficients using some standard methods and also their applications in LCR circuits.
3. Evaluate the maxima and minima of functions of two variables and find the Gradient, Divergence and Curl.
4. Calculate algebraic and transcendental equations with the help of numerical methods also able to solve problems using numerical integration methods.
5. Compute problems using Finite differences and interpolating methods.
6. Solve first order differential equations using numerical methods.

UNIT I:

First order ordinary differential equations: (8 L)

Exact, equations reduced to exact; linear and Bernoulli's equations, Newton's Law of Cooling, Law of natural Growth/Decay.

UNIT II:

Ordinary Differential equations of higher order: (10 L)

Higher order linear differential equations with constant coefficients-Standard types of finding P.I, method of variation of parameters, Cauchy-Euler equation.

UNIT III:

Multi Variable Calculus: (10 L)

Limit, Continuity and Partial Differentiation, Jacobian, Functional Dependence, Maxima and minima, Lagrange method of multipliers; Gradient, directional derivatives; Concepts of divergence and curl with physical significance

UNIT IV:

Solutions of Algebraic and Transcendental Equations & Numerical Integration: (10 L)

Solution of Algebraic and Transcendental equations- Bisection method, Newton-Raphson Method. Newton-Cotes Quadrature Formula, Trapezoidal rule – Simpson's 1/3 rule – Simpson's 3/8 rule.

UNIT V:

Interpolation: (10 L)

Finite differences- Numerical Differentiation - Newton's formulae for interpolation (without proofs)– Gauss Central Difference Formulae (without proofs), Lagrange's Interpolation formula for unevenly spaced points.

UNIT VI:

Numerical Solutions of Ordinary Differential Equations: (10 L)

Numerical solutions to first order ordinary differential equations – Taylor's series method, Euler's method, Modified Euler's Method, Picard's method, Runge-Kutta method of fourth order.

Text Books

1. Advanced Engineering Mathematics, S.R.K. Iyengar and R.K.Jain, Narosa Publication.

Reference Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000
2. S. S. Sastry, Introductory methods of numerical analysis. PHI, 4th Edition, 2005.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
5. Engineering Mathematics, Ravish R. Singh, McGraw Hill Education

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	L	M		H			M	M			

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
Engineering Graphics

	L	T	P/D	C
Code: 8BC02	**1**	**0**	**4**	**3**

Prerequisite: NIL

Course objectives:

1. To teach students the basic principles of Engineering graphics and instruments used
2. To introduce the concept of projections in drawing and its applications for simple drawing entities
3. To impart the knowledge of various types of solids and their projections in different position wrt principle planes
4. To teach the concept of sections of solids and their applications
5. To develop a clear understanding of the basic principles involved in three dimensional Engineering drawings.
6. To train the students for the extraction of multiple views from a solid model using AutoCAD

Course outcomes:

After completing this course, the student will able to:

1. Understand the instruments to solve the engineering problem and draw various type of curves used in engineering
2. Implement Orthographic projections and draw projections of simple drawing entities such as points Lines, and Planes
3. Draw projections of different types of regular solids in various positions wrt principal planes of projection
4. Draw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections.
5. Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views
6. Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software

UNIT – I

Introduction to Engineering Drawing: Drawing Instruments and their uses, types of lines, Lettering, Dimensioning-Terms & notations, placing of dimensions, general rules of dimensioning.

Curves used in Engineering Practice and their Constructions:

Conic Sections including Rectangular Hyperbola - General method, Cycloid and Involutes of circles

Scales: Reducing, Enlarging and Full Scales, types of scales, Construction of plain scales and diagonal scales only-simple problems

UNIT – II

Orthographic Projection: Principles of Projection – Methods of projection, First angle and third angle projections, Projections of Points, Projections of straight lines –line inclined to one plane and line inclined to both reference planes

UNIT –III

Projections of regular Planes: types of planes, plane inclined to one reference plane, Oblique planes

Projections of regular Solids: types of solids, Projections of: Prisms, Cylinders, Pyramids, Cones – simple position and axis inclined to one plane only

UNIT –IV

Sections and sectional views of Solids: Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

Development of Surfaces: Methods of development, Development of lateral Surfaces of Right Regular Solids – Prisms, Cylinders, Pyramids, Cones and their sections.

UNIT – V

Isometric Projection: Meaning, Isometric axes, lines and planes, Isometric Scale – Isometric drawing or View – Isometric drawing of planes and simple solids such as prisms, pyramids, cylinder, cone

UNIT –VI

Conversion of isometric views to orthographic views of simple objects.

(Demonstration only) Overview of Computer Graphics : Demonstrating features of the CAD software - The Menu System, Toolbars, , Dialog boxes and windows, Drawing entities - lines, circles, arcs etc and editing commands, Dimensioning of objects, 2 D drawings-simple exercises , 3D wire-frame and shaded solids- Commands, Boolean operations.

Text Books:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House (In First-angle Projection Method)

Reference Books:

1. Shah, M.B. &Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
2. Agrawal B. &Agrawal C. M. (2012), Engineering Graphics, TMH Publication
3. AUTOCAD Software Theory and User Manuals

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level								M	M	H		

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
Written Communication Skills

L	T	P/D	C
1	0	0	1

Code: 8HC02
Prerequisite: NIL

Course Objectives:

1. To enable students to upgrade their knowledge of basic writing skills, writing cohesive paragraphs and effective letter writing skills
2. Understand the nuances of technical communication and apply it in their academic and professional career.
3. Acquaint themselves with the concept of soft skills, having the right attitude towards their education, career and life in general and learn the importance of building a strong resume.

Course Outcomes:

After completing this course, the student will able to:

1. Differentiate between confusing words, learn correct spellings and have a sound grip over the use of phrasal verbs
2. Upgrade their knowledge of basic writing skills, writing cohesive paragraphs and effective letters
3. Upgrade their knowledge of basic reading skills using different techniques
4. Improve the technical report writing skills
5. Learn the importance of building a strong resume
6. Acquaint themselves with the concept of soft skills, having the right attitude towards their education, career and life in general.

UNIT I
Elements of effective writing skills

1.1 Use of appropriate words and phrases
1.2 Sentence structures
1.3 Vocabulary: Synonyms – Antonyms
Homophones, Homonyms, Homographs, words often confused, One - word substitutes, Idioms and Phrases
1.4 Avoid discriminatory writing

UNIT II
Professional writing skills

2.1 Paragraph writing
2.2 Letter writing (language to be used in a formal letter)
2.3 Leave letter, letter of apology, complaint letters, enquiry letters with replies
2.4 e-correspondence

UNIT III

Reading Comprehension

3.1 Prediction techniques, Skimming and Scanning
3.2 Literal Comprehension
3.3 Evaluative Comprehension
3.4 Inferential Comprehension

UNIT IV

Report Writing

4.1 Significance, types, steps, formats of a report
4.2 Detailed analysis of manuscript of a report
4.3 Language and structure to be used in a formal report
4.4 model reports – assignments

UNIT V

Resume Writing & Cover Letter

5.1 Types, purpose and design of Résumé
5.2 Differences among Bio-data, Curriculum Vitaé and Résumé
5.3 Methods to build a winning Résumé
5.4 Writing an effective Cover Letter

UNIT VI

Technical Communication and Soft Skills

6.1 Technical vocabulary
6.2 Review of technical articles
6.3 Technical research paper writing
6.4 Attitude Vs Behavior in professional circles

Text books:

1. Compiled by the faculty of English (for internal circulation only).

Reference books:

1. English for Professionals by S.S.Prabhakar Rao
2. English for Technical Communication by K.R.Lakshminarayana
3. English for Business Communication by Dr.T.Farhathullah
4. Professional Communication by Alok Jain, Pravin S.R.Bhatia and A.M.Sheikh
5. Business Communication, Principles to Practice- Monipally.
6. Advanced Technical Communication: Kavita Tyagi and Padma Mistri

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	H	M		H							H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
Python Programming

	L	T	P/D	C
Code: 8FC02	**2**	**1**	**0**	**3**

Prerequisite: Problem Solving using C Lab

Course Objectives:

Use Python interactively, execute a Python script at the shell prompt, use Python types, expressions, and None, use string literals and string type, use Python statements (if...elif..else, for, pass, continue, . . .), understand the difference between expressions and statements, understand assignment semantics, write and call a simple function., utilize high-level data types such as lists and dictionaries, understand the difference between mutable and immutable types, write a simple class and access methods and attributes, import and utilize a module, read from and write to a text file.

Course Outcomes:

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

1. Select Python versions and mention their specifications.
2. Build programs using primitive data types.
3. Design applications that include functions, modules, packages along with respective exceptional handling mechanism.
4. Design applications using OO features of Python
5. Relate applications using Files.
6. Apply the use of NumPy/Tkinter/Plotpy modules in applicaitons.

UNIT -I :

Introduction to Python: History, Features, Modes of Execution, Setting up path, working with Python Basic Syntax, Variable and Data Types, Operators. Conditional Statements (If, If- else, Nested if-else) Looping (for, While Nested loops) Control Statements (Break, Continue, Pass).

Input-Output: Printing on screen, Reading data from keyboard, Opening and closing file

UNIT-II:

Functions: Defining a function, calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables

String Manipulation: Accessing Strings, Basic Operations, String slices, Function and Methods

Lists: Accessing list, Operations, Working with lists Function and Methods

Tuple: Accessing tuples, Operations, Working.

Dictionaries: Accessing values in dictionaries, working with dictionaries, Properties Functions and Methods.

UNIT-III:

Modules: Importing module, Math module, Random module, Packages

Exception Handling: Exception, Exception Handling, Except clause, Try? Finally clause User Defined Exceptions

UNIT-IV:
Python- OOPs concept: Class and object, Attributes, Inheritance, Overloading Overriding, Data hiding.
Regular expressions: Match function, Search function, Matching VS Searching, Modifiers Patterns.

UNIT -V:
Introduction to Files, File Handling, Working with File Structure, Directories, Handling Directories

UNIT -VI:
Case Study with NumPy/PlotPy/SciPy/GUI Programming, Introduction, Tkinter programming, Tkinter widgets

TEXT BOOK:
1. [Apress]-Beginning Python. From Novice to Professional, 2nd ed. - [Hetland] (2008)

REFERENCE BOOKS:
1. Introduction to Computation and Programming using Python, Revised and Expanded Edition, John V. Guttag, The MIT Press.
2. Programming Python, Fourth Edition by Mark Lutz, O'Relly
3. Python Programming using problem solving approach, Reema Thareja, Oxford Higher Education.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M						M			H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
IT Workshop and Python Programming Lab

	L	T	P/D	C
Code: 8F262	**0**	**0**	**4**	**2**

Prerequisite: Problem Solving using C Lab

Course Objectives:

1. Understand basics of Python programming, Decision Making and Functions in Python, Object Oriented Programming using Python.
2. To introduce to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers.

Course outcomes:

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

1. Identify various hardware components of a system, Assemble the computer and Use various Microsoft tools
2. To acquire programming skills in core Python looping, control statements, string manipulations and sequence types, Functions and sequence types.
3. To learn and know the concepts of Modules and Exceptional Handling and files.
4. Develop the applications on OOPS concepts and construct various Regular Expressions Patterns.
5. Design & develop applications using NumPy/PlotPy/SciPy/GUI Programming, Tkinter programming.

IT Workshop

Week 1:

Introduction to Computer: Identify the peripherals of a computer, components/peripherals in a CPU & its functions. Introduction to the types of Operating System, Assembling and disassembling demonstration.

Week 2:

Install computer with dual boot operating system (Windows, Linux with PowerPoint presentation). Comparison of types of OS in different platform

Week3:

Introduction to S/W's, difference b/w hardware and software. Introduction to MS-Office and its importance.

Ms Word

Ms Power Point Presentation

Week4:

Introduction to Excel

Features: Accessing, Overview at toolbars, saving excel files, Gridlines, Format cells, Summation, Auto fill, formatting text.
Formula in excel – Average, Standard Deviation, Charts, Roaming & Inserting worksheets, Hyper linking, count function, lookup / Vlookup, sorting, Conditional formatting.

Python Programming Lab

Week -1:

1. Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.
2. Start the Python interpreter and type help() to start the online help utility.
3. Start Python interpreter and use it as Calculator.

Week -2:

4. If you run a 10 kilometer race in 43 minutes 30 seconds, what is your average time per mile? What is your average speed in miles per hour? (Hint: there are 1.61 kilometers in a mile).
5. The volume of a sphere with radius r is 5? (Use Sphere volume formula)
6. Suppose the cover price of a book is $24.95, but bookstores get a 40% discount. Shipping costs $3 for the first copy and 75 cents for each additional copy. What is the total wholesale cost for 60 copies?

Week -3:

7. A function object is a value you can assign to a variable or pass as an argument. For example, do_twice is a function that takes a function object as an argument and calls it twice:

```
def do_twice(f):
f()
f()
```

Here's an example that uses do_twice to call a function named print_spam twice.

```
def print_spam():
print 'spam'
do_twice(print_spam)
```

a. Type this example into a script and test it.
b. Modify do_twice so that it takes two arguments, a function object and a value, and calls the function twice, passing the value as an argument.
c. Write a more general version of print_spam, called print_twice, that takes a string as a parameter and prints it twice.
d. Use the modified version of do_twice to call print_twice twice, passing 'spam' as an argument.

8. Write a function that draws a grid like the following:

```
+ - - - - + - - - - +
|         |         |
|         |         |
|         |         |
+ - - - - + - - - - +
|         |         |
|         |         |
|         |         |
|         |         |
```

+ - - - - + - - - - +

Hint: to print more than one value on a line, you can print a comma-separated sequence.

9. Write a function called gcd that takes parameters a and b and returns their greatest common divisor.
10. Write a function called is_palindrome that takes a string argument and returns True if it is a palindrome and False otherwise. Remember that you can use the built-in function len to check the length of a string.

Week-4:

11. Write a function called is_sorted that takes a list as a parameter and returns True if the list is sorted in ascending order and False otherwise.
12. Write a function called has_duplicates that takes a list and returns True if there is any element that appears more than once. It should not modify the original list.

i. Write a function called remove_duplicates that takes a list and returns a new list with only the unique elements from the original. Hint: they don't have to be in the same order.
ii. The wordlist I provided, words.txt, doesn't contain single letter words. So you might want to add "I", "a", and the empty string.
iii. Write a python code to read a dictionary values from the user. Construct a function to invert its content. i.e., keys should be values and values should be keys.

Week-5:

2. If there are 23 students in your class, what are the chances that two of you have the same birthday? You can estimate this probability by generating random samples of 23 birthdays and checking for matches.

   Hint: you can generate random birthdays with the randint function in the random module.
3. How does a module source code file become a module object?
4. Why might you have to set your PYTHONPATH environment variable?
5. What is a namespace, and what does a module's namespace contain?
6. How do you make a module? Give an example of construction of a module using different geometrical shapes and operations on them as its functions.
7. What is the purpose of a _ _init_ _.py file in a module package directory? Explain with a suitable example.
8. Use the structure of exception handling all general purpose exceptions.

Week-6:

9. a. Write a function called draw_rectangle that takes a Canvas and a Rectangle as arguments and draws a representation of the Rectangle on the Canvas.

   b. Add an attribute named color to your Rectangle objects and modify draw_rectangle so that it uses the color attribute as the fill color.

   c. Write a function called draw_point that takes a Canvas and a Point as arguments and draws a representation of the Point on the Canvas.

   d. Define a new class called Circle with appropriate attributes and instantiate a few Circle objects. Write a function called draw_circle that draws circles on the canvas.

10. Write a Python program to demonstrate the usage of MRO in multiple levels of Inheritances.
11. Write a python code to read a phone number and email-id from the user and validate it for correctness.

Week-7:

12. Write a Python code to merge two given file contents into third file.
13. Write a Python code to open a given file and construct a function to check for given words present in it and display on found.

Week-8:

14. Import numpy, Plotpy and Scipy and explore their functionalities.
15. Write a GUI program to create a window wizard having two text labels, two text fields and two buttons as Submit and Reset.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M					M	L		M			

H: High, M: High, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
Engineering Physics Lab

	L	T	P/D	C
Code: 8HC66	**0**	**0**	**2**	**1**

Course Objectives

1. Understand the concept of photo electric effect using photo voltaic cell.
2. Discuss the dispersive power of prism-minimum deviation method.
3. Discussion of diffraction pattern using the grating – LASER.
4. To study the concepts (numerical aperture) of an optical fiber.
5. To explain about magnetic induction, Biot-Savart principle.
6. Study the frequency of AC mains using Sonometer.
7. Explaining about the electrical resonance by using the LCR circuit.
8. To understand the rigidity modulus, periodicity.
9. To discuss the energy gap (E_g) of a semiconductor diode.
10. To study the LED characteristics and forward resistance.
11. To know the time constant of RC circuit.
12. To understand about the ionizing radiation by using the Geiger–Muller counter.

Course Outcomes

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

1. Understand the concepts of photo electric effect, importance, photo current, colour filters, optical sensors.
2. Know about the light properties-dispersion, prism, spectrometer and minimum deviation arrangement.
3. Recognize the difference between the interference and diffraction, grating, laser characteristics.
4. Analyze the concepts of fiber optics, fundamentals, numerical aperture its importance, attenuation in fiber and applications.
5. Understand and search to apply the fundamentals of magnetic induction, Ampere's law, Oersted's law and the Biot-Savart law.
6. Know the difference between AC and DC fundamentals, Magnetostriction, resonance, air column vibrations.
7. Analyze the LCR circuit combination, parallel, series electrical resonance, inductance, reactance, capacitance and electrical and electronic fundamentals.
8. Summarize the fundamentals of modulus-types, stress, strain, elasticity, plasticity and Hook's law.
9. Analyze the concept a semiconductors, types, calculation of energy gap of a semiconductor diode and importance.
10. Analyze the difference between normal diode, LED, forward bias, reverse bias, I-V characteristics, direct and indirect band gap semiconductors.
11. Characterize the RC network, time constant, capacitor functioning and its application.
12. Understand the concept of radiation, ionizing radiation, radiological protection and inverse square law.

List of Experiments

1. **Photo voltaic cell:**
   -Determination of Planck's constant by using photo voltaic cell.
2. **Dispersive power:**
   -Calculation of dispersive power of a given material of prism by using Spectrometer.
3. **Diffraction Grating:**
   -Determination of wavelength of a given laser source of light by using diffraction grating.
4. **Numerical Aperture:**
   -Determination of a Numerical Aperture (NA) of an optical fiber.
5. **Stewart-Gee's Experiment:**
   -Determination of magnetic induction flux density along the axis of a current carrying circular coil using Stewart and Gee's experiment.
6. **Sonometer:**
   -Calculating the frequency of AC supply by using the Sonometer.
7. **LCR Circuit:**
   -Study of series and parallel resonance of an LCR circuit – Electrical devices.
8. **Torsional pendulum:**
   -Determination of rigidity modulus of a given wire material using the Torsional pendulum.
9. **Energy Gap:**
   -Determination of the energy gap (E_g) of a given semiconductor.
10. **Light Emitting Diode:**
    -Studying the LED characteristics and calculating the forward resistance of it.
11. **RC Circuit:**
    -Determination of time constant of an RC-circuit.
12. **Geiger-Muller Counter:**
    -Studying the characteristics of Geiger–Muller counter and verifying the inverse square law - Nuclear physics

NOTE: Any **TEN** of the above experiments are to be conducted.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M	M					H			M

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
DATA STRUCTURES (C/C++) LAB
(Common to all Branches)

	L	T	P/D	C
Code: 8EC61				
Prerequisite: Problem Solving using C Lab	**0**	**0**	**2**	**1**

Course objective:
Understand the data structures: simple and complex and use them to write the programs for implementing searching, sorting, expression evaluations. Understand the applications that use the particular data structure and its significance in the development of operating systems and the softwares. Understand the object-oriented programming concepts of C++.

Course Outcomes:
After completion of the course, the student will be able to
1.Implement Stacks, Queues and circular queues.
2.Write programs using tree traversals. Inorder, preorder and postorder.
3.Program searching, sorting and hashing operations.
4.Write programs on Binary trees
5.Implement classes and operator overloading.

UNIT –I:
1. **1.**Write a C program that implement stack and its operations using arrays
2. Write a C program that implement Queue and its operations using arrays.
3. Write a C program that implement Circular Queue and its operations using arrays.
4. Write a C program that uses Stack operations to perform the following
   i) Converting infix expression into postfix expression
   ii) Evaluating the postfix expression

UNIT –II:
1. Write a C program that uses functions to perform the following operations on singly linked list:
   i) Creation ii) Insertion iii) Deletion iv) Traversal

2. Write a C program using functions to perform the following operations on circular singly linked list:
   i) Creation ii) Insertion iii) Deletion iv) Traversal

3. Write a C program that uses functions to perform the following operations on doubly linked list:
   i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways

4. Write a C program to implement operations on the following Data Structures Using Singly linked list:
   i) Stack ii)Queue

UNIT- III

5. Write a C program that uses functions to perform the following:
   i) Creating a Binary Tree of integers
   ii) Traversing the above binary tree in preorder, in order and post order.

UNIT- IV

6. Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:
   i) Linear Search ii) Binary Search

7. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
   i) Bubble Sort ii) Insertion Sort iii) Selection Sort

8. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
   i) Quick sort ii) Merge sort iii) Heap Sort

9. Write a C Program to implement Separate Chaining using Hashing. Include Insertion, Deletion and Display of the Elements.

UNIT –V

10. Write a C++ program to read and display the details of student class with data members as name, rollno and 3 subject's marks.

11. Write a C++ program to implement all types of constructors.

UNIT VI

12. Write a C++ program to implement operator overloading for addition of two complex numbers.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level									M	H		

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
Written Communication Skills Lab

	L	T	P/D	C
Code: 8HC62				
Prerequisite: NIL	**0**	**0**	**2**	**1**

Course Objectives:

1. To enable students to upgrade their knowledge of basic writing skills, writing cohesive paragraphs and effective letter writing skills
2. Understand the nuances of technical communication and apply it in their academic and professional career.
3. Acquaint themselves with the concept of soft skills, having the right attitude towards their education, career and life in general and learn the importance of building a strong resume.

Course Outcomes:

After completing this course, the student will able to:

1. Differentiate between confusing words, learn correct spellings and have a sound grip over the use of phrasal verbs
2. Upgrade their knowledge of basic writing skills, writing cohesive paragraphs and effective letters
3. Upgrade their knowledge of basic reading skills using different techniques
4. Understand the nuances of technical communication and apply it in their academic and professional career.
5. Learn the importance of building a strong resume
6. Acquaint themselves with the concept of soft skills, having the right attitude towards their education, career and life in general.

Unit I:

Exercises on

- Words often Confused
- Synonyms – Antonyms
- Identifying Homophones, Homonyms, Homographs
- words often confused
- One - word substitutes
- Idioms and Phrases

Unit II:

Practice exercises on

- Paragraph Writing using hints/guided Paragraphs
- Writing different types of letters
- Learning e-correspondence

Unit III

Practice sessions on

- Using passages for skimming and scanning
- Reading Comprehension using different techniques

Unit IV:

- Practice Writing reports and reviewing technical Articles
- formal expressions, technical vocabulary, active voice and passive voice, introduction, body and conclusion of a report

Unit V:

Practice exercises on

- Resume Building
- Drafting cover letters

Unit VI:

Practice exercises on

- Technical vocabulary
- Writing articles and research papers
- Activities based on Soft skills
- Developing attitude and behavior

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H	H	M					M			H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
Comprehensive Test and Viva-Voce -II

L T P/D C

Code: 8E277
Prerequisite: NIL **1 0 0 1**

Course Objective:
Evaluate, Comprehend and Assess the concepts and knowledge gained in the Core Courses of 1st year.

Course Outcomes:
At the end of this course the student will be
1. Assessed the knowledge of the students in the Core and Elective subjects that they have studied till the completion of that academic year.

Two Mid tests, Two mid Viva voce, one External Comprehensive Test and one External Comprehensive Viva Voce.

Comprehensive Test and Viva Voce	The subjects studied in the Semester concerned related to branches concerned and for placements
B.Tech I year I semester	I semester
B.Tech I year II semester	I and II semester
B.Tech II year I semester	I, II and III semester
B.Tech II year II semester	I, II, III and IV semester

Allocation of marks:

*Comprehensive Test : 70 marks
**Viva Voce : 30 marks
Total : 100 marks

*Average of two best Mid Tests of Mid Test – I, Mid Test – II and Mid Test - III will be taken for 20 marks.
End Semester Examination for Comprehensive Test will be taken for 50 marks.
Total marks for Comprehensive Test will be 70.

**Average of best two of Mid Tests of Mid – I, Mid – II and Mid - III for Viva Voce will be taken for 10 marks.

End Semester Examination for Comprehensive Viva Voce shall be evaluated for 20 marks.
The total for Viva Voce will be 30.

Thus the total sessional marks in this subject of Comprehensive Test and Viva Voce will be : 30 for sessionals and 70 for End Semester examination.

The grand total of marks for the subject of Comprehensive Test and Viva Voce will be 100. The student has to secure 40% of marks i.e. 40 marks in sum total of 100 marks to be successful in the subject.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	L				H	L		M	H		H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
Technical Seminar - II

	L	T	P/D	C
Code: 8E285				
Prerequisite: NIL	**0**	**0**	**2**	**1**

Course Objective:
Develop ability to be a public speaker. Learn the importance of delivering seminars for demonstrating oratory and develop interview facing skills.

Course Outcomes: After completing this course, the student will be able to
1. Identify topics related to Computer Scienec and Engineering domain
2. Collect, survey and organise content in PPT form
3. Present seminar in an effective manner

Procedure
1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot/week.
5. Progress of the seminars need to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for technical seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

There shall be a technical seminar evaluated for 100 marks each from I year I Semester to II year II Semester. The evaluation is purely internal and will be as follows:

Sl.No	Description	Marks
1	Literature survey, topic and content	10
2	Presentation including PPT	10
3	Seminar Notes	05
4	Interaction with audience after presentation	05
5	Final Report 3 copies	10
6	Class room participation	05
7	Punctuality in giving seminar as per Scheduled time and date	10
8	Mid Semester Viva (on the seminar topics completed up to the end of 9^{th} week	15
9	End Semester Viva	30
	Total	**100 Marks**

Student must secure 40% i.e. 40 marks to be successful in sum total (Hundred Marks) in TechnicalSeminar.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level						M		H		M		H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech I year II Semester
Computer Science and Engineering
Orientation Course
(Mandatory course)

L	T	P/D	C
2	0	0	0

Code: 8HC18
Prerequisite: NIL

Course Objectives:

1. To help the students appreciate the essential 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.
2. 2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. 3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature. Thus, this course is intended to provide a much needed orientational input in value education to the young enquiring minds.

Course Outcomes:

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

1. Learns Being a human, understands human values and purpose of education
2. Understands the importance of different harmony levels needed. Understand Self and being in the current moment are the sources of happiness.
3. Improves Learning capabilities and communication skills.
4. Improves Personality Development and Life Skills
5. Understands and appreciate the importance of personality development and yoga for a holistic life.
6. Understands the essence and Values and Social responsibilities for successful life.

Unit - I
Universal Human Values
Introduction -Self – Exploration, Basic human aspirations, Need for a holistic perspective, Role of Education, Understanding Happiness, Understanding the human being – Self and Body.

Unit - II
Universal Human Values
Relationships- Understanding Relationship –Trust and Respect. Harmony in the Society, Natural Environment, Participation in nature Harmony in nature/existence.

Unit - III
Improving Learning Capabilities-Basic Skills of Learning

Principles of Learning, Study Skills & E-Learning, Listening Skills, Effective Reading and Reviewing, Reading Comprehension, Textbook Reading Strategies, Test taking strategies, Introduction to Soft Skills and Employability Skills, Interpersonal skills.

Unit - IV

Improving Learning Capabilities-Personality Development and Life Skills

Goal Setting, Motivation, Time Management, Positive Attitude, Decision Making, Building Self-confidence, Attributes of a Good Personality, Memory Management, Characteristics of a successful student, Responsibilities of Students in shaping themselves, Morals, Ethics & Values, Difference between Studying in a Professional College and High School / Junior College

Unit - V

Literature , Proficiency Modules(PM) in English, Health, Yoga & Diet, Co-Curricular & Extracurricular activities

Literature -History of human civilization, Indian civilization, Indus valley civilization and culture, history of religions, the basic tenets of Christianity, Islam, Hinduism, Buddhism, Jainism, Sikkim and Judaism, Indian culture and values.

Proficiency Modules in English - Strategies to improve proficiency in English skills(L/S/R/W), Exercises based on Remedial grammar, Exercises on Remedial Vocabulary

Health- Dimensions of Health, Basic activities of daily living, Instrumental activities of daily living, Types of Health, Factors affecting health

Yoga - Introduction to Yoga, Kinds of Yoga, Pranayama and Dhyana (Meditation)

Diet- Balanced Diet, Components of Diet, Health Eating Pyramid.

Co-curricular andExtra Curricular activities

Unit - VI

Lectures by Eminent Persons, Research, Innovation & Patents and Local Visit

Lectures by Eminent Persons on Science, Technology & Environment,

Innovations R&D and Entrepreneurship-Sreenidhi HUB, Basics of Innovation, Entrepreneurship and Intellectual Property Rights (IPR)

Local Visit to Village and City including Hi-tech City.

Feedback on last but one day of Orientation Course

Text Books:

1. RR Gaur, R Sangal, GP Bangaria, 2009, A Foundation Course in Value Education (English).

Reference Books:

1. Yoga, Food and Health (by Swami GurupremanandaSaraswati)

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M					L	L					

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year I Semester
Computer Science and Engineering
Basic Electrical Engineering
(Common to CSE & IT)

L	T	P/D	C
3	0	0	3

Code: 8AC41
Prerequisite: NIL

Course Objective:
To understand the basics of Electrical engineering concepts and applications

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

1. Understand and apply the principles of electrical engineering to solve basic equations.
2. Apply the knowledge gained to explain the principles of single and three phase AC circuits.
3. Apply the knowledge gained to explain the principle and operation of DC machine along with its applications.
4. Use the principles of single phase transformer along with its applications and solve the equations.
5. Realize the principle and operation of three phase induction motor with its applications.
6. Understand the operation of different measuring instruments along with its applications.

UNIT – I:
Introduction to Electrical Engineering:
Ohm's Law, Basic circuit components, Kirchhoff's Laws, Types of sources, Source transformation, V- I relationship for passive elements. Series parallel circuits, Star - delta and delta - star transformations, mesh and nodal analysis. Networm theorems – superposition, thevenin's theorem & maximum power transfer theorem, simple problems.

UNIT – II:
Fundamentals of Single phase and three phase AC circuits:
Principle of AC voltage, wave forms & basic definitions, R.M.S. and Average values of alternating currents and voltage, Form factor and Peak factor, Phasor representation of alternating quantities, the 'j' operator and phasor algebra, Analysis of ac circuits with single basic network elements, Single phase series circuits. Faraday's laws of electro - magnetic induction, concept of self and mutual inductances.

UNIT – III:
D.C Machines:
Principle of operation of D.C generators, Types of D.C generators, E.M.F equation, Principle of operation of D.C motors, Types of D.C motors, Torque equation, Losses and efficiency calculation in D.C Generators and D.C motors.

UNIT – IV:

Single Phase Transformers:

Principle of operation, Constructional Details, Ideal Transformer and Practical Transformer, equivalent circuit, Losses, OC and SC Test, Efficiency and Regulation Calculations, Elementary treatment & Simple problems.

UNIT – V:

Three phase circuits and induction motors:

Three phase circuits – phase sequence, Star and delta connection, Relation between line and phase voltages and currents in a balanced system.

Three phase induction motor: Principle of operation, Construction, Types, Problems on slip, rotor frequency, rotor EMF and torque.

UNIT – VI:

Basic Instruments:

Introduction, classification of instruments, operating principles, essential features of measuring instruments, permanent magnet moving coil (PMMC) instruments, moving iron (MI) instruments, extension of ammeter and voltmeter ranges.

TEXT BOOKS:

1. Basic Electrical Engineering –T.K. Nagesarkar and M.S. Sukhja- Oxford University Press, 2nd edition.
2. Basic electrical Engineering – M.S. Naidu and S. Kamakshiah – TataMcGraw-Hill, 2005 edition.

REFERENCES BOOKS:

1. Theory and problems of Basic electrical Engineering- D.P.Kotahari&I.J.Nagrath PHI.
2. Principles of Electrical Engineering - V.K. Mehta, S. Chand, Publications, 2nd Edition.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M										

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year I Semester
Computer Science and Engineering
Analog Electronic Circuits

	L	T	P/D	C
Code: 8CC54				
Prerequisite: NIL	**2**	**0**	**0**	**2**

COURSE OBJECTIVES:
The objective of this course is to provide the learners with a comprehensive understanding of electronic devices, circuits and their applications

COURSE OUTCOMES:
After completion of the course, the student will be able to:
1. Understand the Fundamentals of diode & BJT operation, Characteristics, diode application as rectifiers
2. Comprehend different biasing circuits of BJT amplifiers
3. Analyze small signal model of BJT with h-parameters
4. Describe the working and construction of FETs and characteristics & biasing of FET and Analyze the small signal model of FET
5. Understand the fundamentals of JFET and its operation and characteristics
6. Determine the feedback and analysis of oscillators

UNIT-I
PN JUNCTION DIODE: working of P-N junction diode, its characteristics and Zener Diode Characteristics.
Diode applications: Half wave Rectifier, Full wave Rectifier, Bridge Rectifier: construction, Working, Ripple factor, form factor & amp; Efficiency calculations.

UNIT- II
BIPOLAR JUNCTION TRANSISTOR: Definition of Emitter, Base and collector. Basic operation of BJT and current flow. I/P and O/P Characteristics of CE, CB and CC configurations. Transistor as a switch. Switching characteristics (Rise time, Fall time, Delay Time and Storage time), BJT Biasing Methods & Amplification; Stabilization - Fixed Bias, self-Bias and Problems, Concept of Thermal runway in BJTs.

UNIT-III
Small signal analysis of BJT: Small signal Model of BJT, h-parameter representation – Exact analysis of CE Amplifier-Approximate analysis of CE and CB Amplifiers - Problems. Frequency response of single stage RC coupled Amplifier.

UNIT-IV
FIELD EFFECT TRANSISTOR: Construction & Working of JFET, JFET characteristics, FET Parameters, Construction & Working of MOSFET, MOSFET characteristics (Enhancement and depletion mode), Comparison of JFET & MOSFET.

UNIT-V

Biasing and Small Signal Analysis of JFET: Biasing of JFET - Self bias and fixed bias. Small signal Analysis of common source, common drain and common gate amplifier configurations.

UNIT-VI

Oscillators: Concept of feedback, Classification of Oscillators. Condition for Oscillations. RC Phase Shift Oscillator, Colpitts Oscillator, Hartley Oscillator and Quartz Crystal Oscillator.

TEXTBOOKS:

1. Electronic Devices and Crcuits- J. Millman, C. C. Halkias and satyabrathajit, Tata McGraw Hill, 2 Ed. 2007
2. Electronic devices and Circuit Theory-Robert L. Boylstead, Louis Nashelsky, 9ht ed., 2008, PE
3. Integrated electronics-J.Milliman and C.C.Halkias, MC Graw –Hill-1972

REFERENCEBOOKS:

1. Electronic circuit analysis -K. Lal Kisshore, 2004, BSP.
2. Electronic Devices: Systems and Applications – Robert Diffenderter, 2nd Indian Reprint., 2010
3. Electronic Devices and Crcuits by Sanjeev Guptha, Dhapat Rai Publications.
4. Electronic Devices and Circuits by S.Salivahanan and N.Suresh Kumar, Tata Mc Graw Hill Publications.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	L									H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year I Semester
Computer Science and Engineering
OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Common to CSE, IT and ECM)

Code: 8EC02	**L**	**T**	**P/D**	**C**
Prerequisite: Problem Solving using C	**2**	**1**	**0**	**3**

Course Objective:

Understand the concepts of Object oriented programming principles of Java. Write the programs and execute using OOP Principles such as garbage collection, overloading methods, constructors, recursion, string handling, String Tokenizer, inheritance and its types, packages, multithreading and threads.

Course Outcomes:

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

1 Comprehend the fundamentals of Java, Classes, Objects and design the java programs using constructors and String handling methods.
2 Design the programs using inheritance, polymorphism and interface.
3 Develop programs using Packages, I/O Streams and collections.
4 Apply the concepts of Exception handling and Multithreading for various scenarios.
5 Create programs using AWT, Swings and develop applications using event handling.
6 Develop applications using Applets and client server programs using networking concepts.

UNIT I

History of Java, Java buzzwords, datatypes, variables, simple java program, scope and life time of variables, operators, expressions, control statements, type conversion and costing, arrays,, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, recursion, string handling,StringTokenizer.

Applications: Basic operations on the bank account of a customer.

UNIT II

Inheritance –Definition, single inheritance, benefits of inheritance, Member access rules, super class, polymorphism- method overriding, Dynamic method dispatch, using final with inheritance, abstract classes, Base classobject.

Interfaces: definition, variables and methods in interfaces, differences between classes and interfaces, usage of implements and extends keyword, interfaces, uses of interfaces, packages Applications: Extending the banking operations to the loan applicants.

UNIT III

Packages: Definition, types of packages, Creating and importing a user defined package. Introduction to I/O programming: DataInputStream, DataOutputStream, FileInputStream,FileOutputStream, BufferedReader.
Collections: interfaces, Implementation classes, and Algorithms (such as sorting and searching).
Applications: Searching for a string in the text. PNR status check, students' result sorting.

UNIT IV

Exception handling -exception definition, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.
Multi-Threading: Thread definition, types of multitasking, uses of multitasking, thread life cycle, creating threads using Thread class and Runnable interface, synchronizing threads, daemon thread.
Applications: Illegal entry handling in the registration form. (Example: entering incorrect intermediate hall-ticket number in EAMCET Registration form)

UNIT V

Advantages of GUI over CUI ,The AWT class hierarchy, Introduction to Swings, Swings Elements:- JComponent, JFrame, user interface components- JLabels, JButton, JScrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, menubar, graphics, layout, managers –boarder, grid, flow, card and grid bag.
Event handling: Delegation event model, closing a Frame, mouse and keyboard events, Adapter classes.
Applications: developing calculator, developing feedback form, developing bio data.

UNIT VI

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.
Applications: Developing of simple advertisements.
Networking – Basics of network programming, addresses, ports, sockets, simple client server program, multiple clients, sending file from server to client.
Applications: One to one Chat application

TEXT BOOKS:

1. Java; the complete reference, 6th edition, Herbert Schildt,TMH.
2. Introduction to Java programming 6th edition, Y. Daniel Liang, Pearsoneducation.

REFERENCES:

1. Core Java 2, Vol 1, Fundamentals, Cay. S. Horstmann and Gary Cornell, seventh Edition, PearsonEducation.
2. Core Java 2, Vol 2, Advanced Features, Cay. S. Horstmann and Gary Cornell, Seventh Edition, PearsonEducation

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M										

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year I Semester
Computer Science and Engineering
Discrete Mathematics

Code: 8F303

L	T	P/D	C
2	0	0	2

Prerequisites: Linear Algebra and Calculus, Differential Calculus and Numerical Methods

Course Objectives:

1. Define the syntax and semantics of propositional logic.
2. Translate statements from a natural language into its symbolic structures in logic.
3. Prove elementary properties of modular arithmetic and explain their applications in Computer Science, for example, in cryptography and hashing algorithms.
4. Apply the notion of relations on some finite structures, like strings and databases.
5. Analyze algorithms using the concept of functions and function complexity.
6. Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling.

Course Outcomes:

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

1. Evaluate elementary mathematical arguments and identify fallacious reasoning (not just fallacious conclusions).

2. Reasoning about arguments represented in Predicate logic.

3. Perform operations on sets, functions, relations.

4.Solve problems that involve: computing permutations and combinations, Binomial and Multinomial theorems

5. Analyze and deduce problems involving recurrence relations and generating functions

6. Apply graph theory Spanning trees, planar graphs, Isomorphism and connectivity

UNIT – I

Propositional Logic: Statement and notations, Connectives, Well formed Formulas, Truth Tables, Tautology, Equivalence, Implication, Rules of inference, Arguments, Proof by contradiction, Conditional Proof Normal forms, Automatic theorem proving.

Objective: student will be able to understand statements, ,their truth value, constructing truth tables and will be able to prove them using different laws such as associative and commutative etc…

UNIT-II

First order logic: Predicates, Quantifiers, Free and Bound variables, Rules of inference, Consistency, Automatic Theorem Proving.

Objective: student will be able to use universal and existential quantifiers to describe predicates and effectively use automatic theorem proving

UNIT – III

Relations: Properties of Binary Relations, Equivalence, transitive closure, Compatibility & Partial Ordering Relations, Hasse Diagrams, Lattice and its properties.

Algebraic structures: Algebraic systems, Examples and general properties, Semi groups and Monoids. Groups, Subgroups, Homomorphisms, Isomorphisms

Objective: student will be able to learn different relations and their properties. use of different algebraic structures and their use in mathematics.

UNIT –IV

Elementary Combinatorics:

Basics of counting, Combinations & Permutations with and without repetitions, Constrained repetitions. Binomial coefficients, Binomial and Multinomial theorems, Euler function, Derangemants, Principle of inclusion and exclusion, Pigeon hole principle and its applications.

Objective: student will be able to apply permutations and combinations to solve problems. use of pigeonhole principle and inclusion exclusion principles to solve problems.

UNIT V

Recurrence relations: Generating functions. Function of sequences, Calculating the coefficient of generating functions. Recurrence relations, Solving recurrence relations by substitution and generating functions. Characteristic roots. Solution of Inhomogeneous recurrence relations.

Objective: student will learn to solve various recurrence relations by using different techniques.

Unit VI

Graph Theory: Basic concepts**,** Representation of Graph, DFS, BFS, Spanning trees, Planar graphs, coloring, Isomorphism and subgraphs, Multi graphs and Euler Circuits, Hamiltonian graphs, Chromatic numbers, connectivity, cut vertices, cut edges, Matching and coverings, independent sets.

Objective: student will learn the basics of graph theory, different ways of traversing the graph and different types of graphs and circuits which has important applications in further subjects.

TEXT BOOKS:

1. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, PHI.
2. Discrete mathematics with applications to computer science, J.P.Tremblay and R.Manohar, TMH
3. Elements of Discrete mathematics – A computer Oriented Approach- C L Liu, D P Mohapatra. Third Edition, Tata MacGraw Hill.

REFERENCES BOOKS:

1. Discrete and Combinational Mathematics- An Applied Introduction-5th Edition – Ralph. P.Grimaldi.Pearson Education.
2. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition.TMH.
3. Discrete Mathematical structures Theory and application-Malik & Sen, Cengage.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M									

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year I Semester
Computer Science and Engineering
Computer Organization
(Common to CSE & IT)

L	T	P/D	C
2	0	0	2

Code: 8DC12
Prerequisite: NIL

COURSE OBJECTIVES

Learn about basic structure of computer, different data representations and Instruction sets; 8086 architecture, addressing modes and instruction set also write efficient programs to interface devices with 8086 processor.

COURSE OUTCOMES:

After completing this course, student should be able to

1. Perceive basic operational concept of computer and data processing.
2. Use data types with instruction set of specified architecture
3. Justify different control unit design and algorithms for various operations.
4. Elaborate basic architecture of 8086 processor
5. Write assembly language programming and debug to 8086
6. Interface devices to 8086 processor.

UNIT-I

Basic Structure of Computer: Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers.
Data Representation: Fixed Point and Floating – Point Representation

UNIT-II

Register Transfer Language and Micro-operations: Register Transfer language. Arithmetic Micro-operations, logic micro-operations, shift micro operations, Arithmetic logic shift unit. Instruction codes. Computer instructions – Instruction cycle. Memory – Reference instructions. Input – Output and Interrupt; STACK organization; Instruction formats.

UNIT-III

Control Unit Design: Control memory, Address sequencing, micro-program example, design of control unit-Hard wired control, Micro-programmed control.
Computer Arithmetic Operations: Addition and subtraction, multiplication Algorithms, Division Algorithms, Fixed point Arithmetic operations.

UNIT-IV

Architecture of 8086 Microprocessor. Special functions of General purpose registers. 8086 flag register and function of 8086 Flags, Addressing modes of 8086, Instruction set of 8086.

UNIT-V

Assembler directives, simple programs, procedures, and macros. Assembly language programs involving logical, Branch & Call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

UNIT-VI

Pin diagram of 8086-Minimum mode and maximum mode of operation. Timing diagram. Memory interfacing to 8086 (Static RAM&EPROM). 8255 PPI-Various modes of operation and interfacing to 8086. Stepper motor Interface to 8086. Interrupt structure of 8086. Vector interrupt table. Interrupt service routines.

TEXT BOOKS:

1. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson
2. Microprocessors and interfacing – Douglas V.Hall, TMH, 2nd Edition, 1999.

REFERENCES:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson
2. Micro computer systems, The 8086/8088 Family Architecture, Programming and Design – Y.Liu and G.A. Gibson, PHI, 2nd Edition.
3. Advanced microprocessor and Peripherals – A.K.Ray and K.M.Bhurchandi, TMH, 2000.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level						M	L	L	M	H		H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year I Semester
Computer Science and Engineering
Soft Skills
(Common to CSE, ECE, CIVIL)

	L	T	P/D	C
Code: 8HC03	**1**	**0**	**2**	**2**

Prerequisite: NIL

Course objectives:

1. To enable students to make self-assessment and know the importance of certain soft skills and team spirit
2. Know their emotional quotient which guides their thinking, behavior and helps them manage stress efficiently.
3. Equip themselves with the prerequisites, and relevant techniques to effectively attend corporate interviews.

Course Outcomes:

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

1. Assess themselves using SWOT analysis.
2. Appraise the importance of certain soft skills like time management and goal setting.
3. Improve their verbal ability to handle the competitive exams.
4. Enhance their team skills and design thinking capabilities for effective problem solving and decision making.
5. Know their emotional quotient which guides their thinking, behavior and helps them manage stress efficiently.
6. Equip themselves with the prerequisites, and relevant techniques to effectively attend corporate interviews.

Units	Tutorial (1 per week)	No. of Periods	Lab (2 per week)	No. of Periods
1.Know Yourself	1.1 Importance of knowing yourself 1.2 SWOT / SWOC Analysis 1.3 SWOT / SWOC Grid	**1** **1**	Practice exercises on • Self-Analysis • Questionnaire, • SWOT Practice	**4**
2.Organizing Oneself	2.1 Developing positive outlook towards life 2.2 Time management 2.3 Goal Setting	**1** **1**	Practice activities on • Managing time • Goal Setting	**4**

3.Verbal Aptitude	3.1 Reading Comprehension: Strategies to comprehend difficult passages from a book; SQ3R (survey, question, read, recite, and review) 3.2 Word Analogies 3.3 Spotting Errors	**1** **1** **1** **1**	Practice exercises on • Reading from difficult passages from books • Word analogies • Spotting Errors • Sentence Completion / Sentence Equivalence	**8**
4.Skills to Excel	4.1 Team work and Team Dynamics - Collaboration and Leadership 4.2 Decision Making, Design Thinking 4.3 Critical thinking and Creative Problem Solving.	**1** **1** **1**	Practice activities on • Team building activities • Practice Activities, Case Studies and Group Discussions on decision making and problem solving, creativity and innovation.	**6**
5.Self Management Skills	5.1 Emotional Intelligence 5.2 Stress Management	**1** **1**	Practice activities on • Case Studies and Group Discussions on managing stress and enhancing emotional intelligence.	**4**
6.Interview Skills	6.1 Interview Skills: Meaning and Purpose of an Interview 6.2 Types of interviews; Interview Preparation techniques	**1** **1** **1**	Mock Interviews	**6**

Text Book: SOFT SKILLS – Dr. K. Alex, S. Chand publications

Suggested Readings: * SOFT SKILLS – Meenakshi Raman ; * Word Power made Easy – Norman Lewis ; * Objective English - Pearson's Publications ; * Skill Sutras- Jayashree Mohanraj * The Power of Soft Skills – Robert A. Johnson ; * Soft Skills for Everyone – Jeff Butterfield

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level						H	L	H	L	L		H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year I Semester
Computer Science and Engineering
Universal Human Values

L	T	P/D	C
2	1	0	3

Code: 8HC17
Prerequisite: NIL

COURSE OBJECTIVE:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

COURSE OUTCOMES:

1. This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values
2. Understanding Harmony is designed which may be covered in their III or IV semester. During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.

COURSE TOPICS: The course has 28 lectures and 14 practice sessions in 6 modules:

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
2. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
8. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
10. Understanding the characteristics and activities of 'I' and harmony in 'I'
11. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
12. Programs to ensureSanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.

Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

13. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
14. Understanding the meaning of Trust; Difference between intention and competence
15. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
16. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
17. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.

Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

18. Understanding the harmony in the Nature
19. Interconnectedness and mutual fulfillment among the four orders of nature-recyclability and self-regulation in nature
20. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space
21. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Module 5: Implications of the above Holistic Understanding

22. Natural acceptance of human values
23. Definitiveness of Ethical Human Conduct
24. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

Module 6: Harmony on Professional Ethics

25. Competence in professional ethics:
a. Ability to utilize the professional competence for augmenting universal human order
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
26. Case studies of typical holistic technologies, management models and production systems
27. Strategy for transition from the present state to Universal Human Order:
a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers
b. At the level of society: as mutually enriching institutions and organizations
28. Sum up.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. to discuss the conduct as an engineer or scientist etc.

Text Book

1.Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010 3.

Reference Books

1.Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2.Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004. 3.The Story of Stuff (Book).
4.The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5.Small is Beautiful - E. F Schumacher.
6.Slow is Beautiful - Cecile Andrews
7.Economy of Permanence - J C Kumarappa
8.Bharat Mein Angreji Raj - PanditSunderlal
9.Rediscovering India - by Dharampal
10.Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11.India Wins Freedom - Maulana Abdul Kalam Azad
12.Vivekananda - Romain Rolland (English)
13.Gandhi - Romain Rolland (English)

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M						M			H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year I Semester
Computer Science and Engineering
OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB
(Common to CSE, IT and ECM)

	L	T	P/D	C
Code: 8EC62	**0**	**0**	**2**	**1**

Prerequisite: Problem Solving using C Lab

Course objective:
Understand, design and execute the programs involving concepts of Java and object-oriented programming principles.

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

1 Evaluate programs to generate Prime numbers, Roots of quadratic equation and Fibonacci series.
2 Implement small application such as banking system.
3 Compare programs on operator, function overloading and dynamic method dispatch.
4 Evaluate programs to implement interface and packages.
5 Explain and write programs to implement threads.
6 Illustrate programs to implement applets and event handling.
7 Illustrate an application to implement client and server scenario.

List of Programs:

1. A) Write a program to print prime numbers up to a given number.
   B) Write a program to print roots of a quadratic equationax2+bx+c=0.
   C) Write a program to print Fibonacci sequence up to a given number.

2. A) Define a class to represent a bank account and include the following members
   Instance variables:

   (i) Name of depositor (ii) Account No (iii)Type of account
   (iv) Balance amount in the account

Instance Methods:
To assign instance variables (Constructors-Zero argument and parameterized)
1. To deposit an amount
2. To withdraw amount after checking the balance
   To display name and address
   Define Execute Account class in which define main method to test above class.

B) In the above account class, maintain the total no. of account holders present in the bank and also define a method to display it. Change the main method appropriately.
C) In main method of Execute Account class, define an array to handle five accounts.
D) In Account class constructor, demonstrate the use of "this" keyword.
E) Modify the constructor to read data from keyboard.
F) Overload the method deposit() method (one with argument and another without argument)
G) In Account class, define set and get methods for each instance variable.

Example:

For account no variable, define the methods get Account No() and set Account No (int accno) In each and every method of Account class, reading data from and writing data to instance variables should be done through these variables.

3. A) Define Resister class in which we define the following members: Instance variables: resistance Instance Methods: give Data():To assign data to the resistance variable display Data(): To display data in the resistance variable constructors

Define subclasses for the Resistor class called Series Circuit and Parallel Circuit in which define methods: calculate Series Resistance ( ) and calculate Parallel Resistance () respectively. Both the methods should take two Resistor objects as arguments and return Resistor object as result. In main method, define another class called Resistor Execute to test the above class.

B) Modify the above two methods which should accept array of Resistor objects as argument and return Resistor object as result.

4. A) Write a program to demonstrate method overriding.
B) Write a program to demonstrate the uses of "super" keyword (three uses)
C) Write a program to demonstrate dynamic method dispatch (i.e .Dynamic polymorphism).

5. A) Write a program to check whether the given string is palindrome or not.
B) Write a program for sorting a given list of names in ascending order.
C) Write a program to count the no. of words in a given text.

6. A) Define an interface "Geomtric Shape" with methods area( ) and perimeter( ) (Both method's return type and parameter list should be void and empty respectively.

Define classes like Triangle, Rectangle and Circle implementing the "Geometric Shape" interface and also define "Execute Main" class in which include main method to test the above class

B) Define a package with name "sortapp" in which declare an interface "Sort Interface" with method sort( ) whose return type and parameter list should be void and empty. Define "subsortapp" as subpackage of "sortapp" package in which define class "SortImpl" implementing "SortInterface" in which sort() method should print a message linear sort is used. Define a package "searchingapp" in which declare an interface "SearchInterface" with search( ) method whose return

type and parameter list should be void and empty respectively. Define "searching impl" package in which define a "SearchImpl" class implementing "Search Interface" defined in "searching app" package in which define a search( ) method which should print a message linear search is used.

Define a class ExecutePackage with main method using the above packages(classes and its methods).

Use Array List class of Collections Framework to and use algorithms to search and sort the element of an array.

7) Modify the withdraw() method of Account class such that this method should throw "Insufficient Fund Exception" if the account holder tries to withdraw an amount that leads to condition where current balance becomes less than minimum balance otherwise allow the account holder to withdraw and update the balance accordingly.

8.A) Define two threads such that one thread should print even numbers and another thread should print odd numbers.

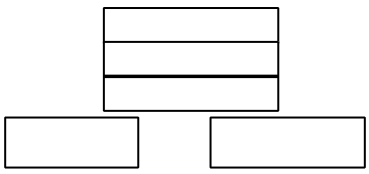
B) Modify the Account class to implement thread synchronization concept.

C) Define two threads such that one thread should read a line of text from text file and another thread should write that line of text to another file. (Thread communication example).

D) Write a program to implement thread priority.

9) Design the user screen as follows and handle the events appropriately.

Add Window
First Number
Second Number
Result



9) Write a program to simulate a calculator

10) Write a Java program for handling mouse events and keyevents.

11) a) Write a program for handling windowevents.
b) Develop an applet that displays a simple message.

12) Develop a client that sends data to the server and also develop a server that sends data to the client (two-way communication)

13) Develop a client/server application in which client read a file name from keyboard and send the file name to the server, and server will read the file name from client and send the file contents to the client.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M				L			M			

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year I Semester
Computer Science and Engineering
Basic Electrical Engineering and Analog Electronics Circuits Lab
(Common to CSE and IT)

L	T	P/D	C
0	0	2	1

Code: 8AC91
Prerequisite: NIL

COURSEOBJECTIVES*:*
Understand the nature and scope of modern electronics, describe physical models of basic components, design and construct simple electronic circuits to accomplish a specific function, e.g., designing amplifiers and understand their capabilities and limitations and make decisions regarding their best utilization in a specific situation.

COURSE OUTCOMES:
After completing this course, the student will be able to:
1 Understand the working of single-phase transformer under different conditions, the performance of three phase induction motor, different speed control methods of DC motor with and without loading with its performance.
2 Understand the applications of Thevenin's Theorem in circuit analysis.
3 Identify, Specify and test R, L, C Components (Colour Codes), Potentiometers, Switches, Coils, Relays.
4 Identify, Specify and test Active Devices, Diodes, BJTs, Low power JFETs.
5 Explain and demonstrate working of PN Junction and Zener diode.
6 Explain and demonstrate working Half and Full wave Rectifier without filters.
7 Demonstrate working of CE characteristics and its application as an amplifier.

PART A: Electrical experiments
1. OC & SC tests on Single – Phase transformer (Predetermination of efficiency and regulation at given power factors).
2. Brake test on 3-phase induction motor (performance characteristics).
3. Speed control of DC shunt motor by
   a) Armature Voltage Control
   b) Field flux control method.
4. Brake test on DC shunt motor.
5. Swinburn's test on DC shunt machine.
6. Verification of Thevenin's Theorem.

PART B: (Analog Electronics Laboratory experiments)
1. Identification of various electronic components and Devices
   a) Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Bread Boards.
   b) Identification and Specifications of Active Devices like Diodes, BJTs, JFET etc.
   c) Study and operation of
      - Digital Multimeters
      - Function Generator

- Regulated Power Supplies

a) Study and Operation of CRO: Measurement of amplitude and frequency. Time Period measurement

2. PN Junction and Zener diode characteristics A. Forward bias B. Reverse bias.
3. Half wave and Full wave Rectifiers.
4. Transistor CE characteristics (Input and Output)
5. FET characteristics
6. CE Amplifier

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M	M						M			

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year I Semester
Computer Science and Engineering
Computer Organization Lab

Code: 8DC62 **L T P/D C**
Prerequisite: NIL **0 0 2 1**

Course Objectives:

1. Analyze and apply working of 8086.
2. Compare the various interface techniques. Analyze and apply the working of 8255, 8279 ICs and design and develop the programs.
3. Learning the Communication Standards.

Course Outcomes:

At the end of this course, the student will be able

1. Familiarize the architecture of 8086 processor, assembling language programming and interfacing with various modules.
2. Experiment with Arithmetic operations of binary number system.
3. Simulate any type of VLSI, embedded systems, industrial and real time applications by knowing the concepts of Microprocessor and Microcontrollers.

PART – A

Introduction to MASM/TASM Assembler

Familiarization with 8086 Kit

Experiment I, II

Write ALP and execute the program to

1. Add two 8-bit numbers
2. Add two 16-bit numbers
3. Add two 32-bit numbers
4. Subtract two 8-bit numbers
5. Subtract two 16-bit numbers
6. Subtract two 32-bit numbers
7. Multiply two 8-bit numbers
8. Multiply two 16-bit numbers
9. Perform 8-bit division
10. Perform 16-bit division
11. Find square of a number
12. Find cube of a number
13. Exchange two numbers
14. Find factorial of a given number

Experiment III

Write ALP and execute the program to

15. Add a given series of numbers
16. Find average of a given series of numbers
17. Find sum of squares of a given series of numbers
18. Find sum of cubes of a given series of numbers

Experiment IV

Write ALP and execute the program to

19. Find largest number from a given series of numbers
20. Find smallest number from a given series of numbers
21. Sort a series of given numbers in ascending order
22. Sort a series of given numbers in descending order

Experiment V

Write ALP and execute the program to

23. Display Fibonacci series
24. Move a string of data bytes from one location to another
25. Concatenate two strings
26. Reverse a given string

Experiment V1

Write ALP and execute the program to

27. Compare two strings
28. Find length of a given string
29. Find whether the given byte is in the string or not

PART-B

Write ALP and interface with 8086

1. Interface a stepper motor
2. Generate a triangular wave, square wave and saw tooth waves,
3. Interface keyboard

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H	H	M					M			H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year I Semester
Computer Science and Engineering
Comprehensive Test and Viva- Voce- III

	L	T	P/D	C
Code: 8E378	**1**	**0**	**0**	**1**

Prerequisite: NIL

Course Objective:
Evaluate, Comprehend and Assess the concepts and knowledge gained in the Core Courses of 1st year and 2nd year 1st Semester.

Course Outcomes:
At the end of this course the student will be
1. Assessed the knowledge of the students in the Core and Elective subjects that they have studied till the completion of that academic year.

Two Mid tests, Two mid Viva voce, one External Comprehensive Test and one External Comprehensive Viva Voce.

Comprehensive Test and Viva Voce	The subjects studied in the Semester concerned related to branches concerned and for placements
B.Tech I year I semester	I semester
B.Tech I year II semester	I and II semester
B.Tech II year I semester	I, II and III semester
B.Tech II year II semester	I, II, III and IV semester

Allocation of marks :
*Comprehensive Test : 70 marks
**Viva Voce : 30 marks
Total : 100 marks

*Average of two best Mid Tests of Mid Test – I, Mid Test – II and Mid Test - III will be taken for 20 marks.
End Semester Examination for Comprehensive Test will be taken for 50 marks.
Total marks for Comprehensive Test will be 70.

**Average of best two of Mid Tests of Mid – I, Mid – II and Mid - III for Viva Voce will be taken for 10 marks.

End Semester Examination for Comprehensive Viva Voce shall be evaluated for 20 marks.
The total for Viva Voce will be 30.

Thus the total sessional marks in this subject of Comprehensive Test and Viva Voce will be : 30 for sessionals and 70 for End Semester examination.

The grand total of marks for the subject of Comprehensive Test and Viva Voce will be 100. The student has to secure 40% of marks i.e. 40 marks in sum total of 100 marks to be successful in the subject.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M				H	L		M	H		H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year I Semester
Computer Science and Engineering
Technical Seminar - III

	L	T	P/D	C
Code: 8E386	**0**	**0**	**2**	**1**

Prerequisite: NIL

Course objective:
Develop an ability to understand and present the latest technological developments in computer science. Identify one of them, understand its impact on the event/method/society as a whole and present the seminar on the same which enhances oratory and interview facing skills.

Course Outcomes:
At the end of this course, the student will be able to
1. Identify topics related to Computer Scienec and Engineering domain
2. Collect, survey and organize content in PPT form
3. Present seminar in an effective manner

Procedure:
Seminar in-charges shall highlight the significance of Technical Seminar in the first two sessions and enlighten the students on the utility of these seminars.
1. The slots, titles shall be decided upfront and seminar In-charge shall take signatures from students.
2. The same sheet shall be affixed in the respective classrooms and seminar register.
3. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot / week.
4. Progress of the seminars needs to be reviewed by the concerned HOD once in 15 days.
5. The evaluation for Technical Seminars has to be informed to students and displayed in the classrooms.
6. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

There shall be a technical seminar evaluated for 100 marks each from I year I Semester to II year II Semester. The evaluation is purely internal and will be as follows:

Sl.No	Description	Marks
1	Literature survey, topic and content	10
2	Presentation including PPT	10
3	Seminar Notes	05
4	Interaction with audience after presentation	05
5	Final Report 3 copies	10
6	Class room participation	05
7	Punctuality in giving seminar as per Scheduled time and date	10

8	Mid Semester Viva (on the seminar topics completed up to the end of 9th week	15
9	End Semester Viva	30
	Total	**100 Marks**

Student must secure 40% i.e. 40 marks to be successful in sum total (Hundred Marks) in Technical Seminar.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H	M									

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year II Semester
Computer Science and Engineering
Probability and Statistics
(Common to CSE, IT, ECM & EEE)

	L	T	P/D	C
Code: 8HC16	**2**	**1**	**0**	**3**

Prerequisites: Mathematics Knowledge at Pre-University Level

Course Objectives:

1. Concepts of the probability, types of random variables and probability distributions.
2. Sampling distributions and their properties, concepts on estimation.
3. Concepts on testing the hypothesis concerning to large samples.
4. Different kinds of tests related to small samples and tests concerned to small size samples and goodness of fit and independence of attributes using chi-square distribution.
5. Preliminaries of basic statistics also correlation.
6. Method of least squares and regression.

Course Outcomes:

After completion of the course, the students will able to:

1. Solve the random variable problems and probability distributions.
2. Estimate the parameters and solve the problems using central limit theorem.
3. Test the hypothesis related to samples concerning to the means and proportions of large size samples.
4. Apply and solve the problems using t-test, Chi-square test also testing the hypothesis problems on small size samples, goodness of fit and independence of attributes.
5. Solve the problems on measures of central tendency, Correlation
6. Classify and differentiate various regression models

UNIT-I:

Random Variables and Probability Distributions:

Conditional probability, Multiplication theorem, Baye's Theorem (without Proof). Random variables – Discrete and Continuous,Probability Mass and Density functions, Expectation and Variance. Probability Distributions: Binomial, Poisson and Normal Distributions.

UNIT-II:

Sampling Distributions and Estimation:

Populations and Samples, Sampling distribution of the Mean (σ - known and unknown), Sums and Differences, Central limit theorem. Estimation: Point Estimation and Interval Estimation concerning Means for Large Samples.

UNIT-III:

Tests of Hypothesis for Large Samples:

Tests of Hypothesis, Type–I and Type-II Errors, Hypothesis testing concerning one mean and two means and test of hypothesis concerning to one Proportion and difference of proportions.

UNIT-IV:

Tests of Hypothesis for Small Samples:

Student t-test, Hypothesis testing concerning one mean and two Means, F-test and χ^2 test-Goodness of fit, Independence of Attributes.

UNIT-V:

Basic Statistics and Correlation: (10L)

Measures of Central tendency: Moments, skewness and kurtosis – Types of correlation, coefficient of correlation, Properties. Methods of finding the coefficient of correlation, Scatter diagram, direct method, Spearman's rank correlation, Karl Pearson's formula.

UNIT-VI:

Curve fitting and Regression: (10L)

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Types of Regression, linear regression, multiple regressions.

Text Books:

1. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations.
2. SCHAUM'S outlines: Probability and Statistics, Murray R. Spiegel, John Schiller, R. Alu Srinivasan, Mc Graw Hill publishers.

Reference Books:

1. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
2. Probability and Statistics, T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham, M.V.S.S.N. Prasad, S. Chand Publications.
3. A.Ross, A First Course in Probability, 6th Ed., Peasrson Education India, 2002.
4. Ronald E. Walpole,Raymond H. Myers,Sharon L. Myers,Keying Ye, Probability & Statistics For Engineers & Scientists, 9th Ed. Pearson Publishers.
3. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	L	M									

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year II Semester
Computer Science and Engineering
Digital Electronics
(Common to CSE/IT)

	L	T	P/D	C
Code: 8CC55	**2**	**0**	**0**	**2**

Prerequisite: NIL

COURSE OBJECTIVES:
To learn the concepts of various number systems, design of Combinational and Sequential Circuits using Logic gates and PLDs.

COURSE OUTCOMES:
After completing of the course, the students will be able to:
1. Apply the rules of Boolean algebra to simplify Boolean expressions.
2. Simplify of Boolean expressions using K-map.
3. Design MSI combinational circuits such as full adders, multiplexers, decoders, encoders. Code converters.
4. Design basic memory units (latches and flip-flops) and sequential circuits such as counters and registers
5. Create digital design using PLD's such as ROM's, PLA's, PAL s.
6. Design the digital controllers using Algorithmic State Machine Charts.

UNIT – I
Fundamentals of Digital Systems and logic families
Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, signed binary, octal, hexadecimal number, number conversion. Characteristics of digital lCs, Error detecting and correcting codes.

UNIT – II
Boolean algebra
Boolean algebra, Postulates and theorems, Standard representation for logic functions, K-map representation, and simplification of logic functions using K-map, Boolean function minimization using Quine-Mclusky method.

UNIT - III
Design of combinational circuits
Design of Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, digital comparator, parity checker /generator, code converters, ALU Design.

UNIT - IV
Sequential circuits-I
A 1-bit memory, the circuit properties of Bistable latch, the clocked SR flip flop, J- K, T and D-types flipflops, triggering mechanism of flip-flops, flip-flop conversion.

UNIT - V

Sequential circuits-II

Applications of flip-flops: Ripple (Asynchronous) counters, synchronous counters, counters design using flip flops, asynchronous sequential counters, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter.

UNIT - VI

Semiconductor memories and Programmable logic devices

Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), Programmable logic devices: PROM, PLD and PAL.

Text Books:

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.
3. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.

References Books:

1. ZviKohavi and Niraj K Jha -Switching & Finite Automata theory – Cambridge, 3rd Edition.
2. SubrataGhoshal, Digital Electronics,2012, Cengage Learning
3. Fletcher -An Engineering Approach to Digital Design – PHI.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H	M	M								

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year II Semester
Computer Science and Engineering
Design and Analysis of Algorithms

	L	T	P/D	C
Code : 8FC05	**2**	**1**	**0**	**3**

Prerequisite : Data Structures and C++

Course Objectives:

1. To provide a solid foundation in algorithm design and analysis**,** specifically, the student learning outcomes include: Basic knowledge of graph and matching algorithms.
2. Ability to understand and design algorithms using greedy strategy, divide and conquer approach, dynamic programming, backtracking and branch and bound.

Course Outcomes:

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

1. Analyze worst-case running times of algorithms using asymptotic analysis.
2. Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
3. Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
4. Comprehend the concept of dynamic programming algorithms, their applications and analyze them.
5. Analyze the Backtracking and Branch and Bound algorithms and also identify the scenarios for its applicability.
6. Comprehend the concept of P and NP Problems and its usage in the applications.

UNIT I

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.
Applications: Designing optimal solution with respect to time for a problem.

UNIT II

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.
Applications:PNR number Search, sorting the google search results.

UNIT III

Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.
Applications: Allocation of funds/resources based on the priority in the computer systems.

UNIT IV

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales

personproblem,Reliabilitydesign.
Applications: Routing Algorithms in the computer networking

UNIT V

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring,Hamiltoniancycles.
Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.
Applications: Undo in MS-Word, Games

UNIT VI

Introduction to NP-Hard and NP-Complete problems: Basic concepts of non deterministic algorithms, Definitions of NP-Hard and NP-Complete classes, Modular Arithmetic.
Applications: Performance evaluation in the dynamic systems.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz,SatrajSahni and Rajasekharam,Galgotiapublicationspvt.Ltd.

2. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, Johnwiley and sons.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H	M	M								

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year II
Semester Computer Science and Engineering
DATABASE MANAGEMENT SYSTEMS
(Common to CSE, IT & ECM)

	L	T	P/D	C
Code: 8EC03	**2**	**1**	**0**	**3**

Prerequisite: NIL

Course Objectives:

To understand the different issues involved in the design and implementation of a database system. Study the physical and logical database designs, database modeling, relational, hierarchical, and network models and to understand and use data manipulation language to query, update, and manage a database. Develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency and design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

Course Outcomes:

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

1. Analyze importance and significance of models, Database languages, architecture and design of Data Base Systems.
2. Understand Relational Model – Integrity Constraints, Logic
3. Analyse data base Design and Views of databases, queries using Relational Algebra and Relational Calculus.
4. Solve Queries with Comparison Operators, Aggregative Operators and nested queries. Queries with joins.
5. Apply Schema refinement through all forms of Normalization to eliminate database redundancy.
6. Apply ACID properties in transaction. Ensuring serializability in concurrent transactions. Concurrent control methods and recovery of transaction.
7. Analyze External Storage Organization mechanisms and apply Indexing in databases for query optimization to enhance system performance.

UNIT I

Data Base Systems: Data Vs Information, Data base System Applications, data base System VS file System – View of Data – Data Abstraction –Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor.

Data base design and ER diagrams – Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Data Modeling checklist.

Application- ER diagram for a college

UNITII

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views.

Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus.

Application - Student database design.

UNIT III

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers, Embedded SQL.

Application - working with Aviation company database.

UNIT IV

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Multi valued Dependencies – FORTH Normal Form.

Application - Faculty Evaluation Report.

UNIT V

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity, Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of non-volatile storage.

Application - Production Management System.

UNIT VI

Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

Application – Creating B+ tree on Instructor File.

TEXT BOOKS:

1. Data base System Concepts, Silberschatz, Korth, McGraw hill, Vedition.
2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATAMcGrawHill 3rdEdition
3. Database Management Systems, Peter Rob, A.AnandaRao,Carlos Coronel ,CENGAGE Learning

REFERENCE BOOKS:

1. Data base Systems design, Implementation, and Management, Peter Rob and Carlos Coronel 7thEdition.
2. Fundamentals of Database Systems, ElmasriNavratePearsonEducation
3. Introduction to Database Systems, C.J.DatePearsonEducation

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	L	M	M	H	H	M	M	M	H	M	H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year II Semester
Computer Science and Engineering
Software Engineering and OOAD

	L	T	P/D	C
Code: 8F404	**3**	**0**	**0**	**3**

Prerequisite: Object Oriented Programming through Java

Course Objectives

1. To understand the importance of software engineering lifecycle models in the development of software
2. To understand the various design principles in modeling a software
3. To develop a software which adheres to the standard benchmarks
4. To undergo the technical, known in the process of software testing
5. To understand the object-oriented principles and tools.

Course Outcomes:

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

1. Identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish lifecycles for developing software product.
2. Describe the importance and principles of Unified Modeling Language, its building blocks and to relate UML paradigm for problem solving.
3. Define and design models for the requirements stated in the software project.
4. Comprehend what and how to gather the requirements for a project.
5. Design class, object and interactive diagrams and know their significance of an application.
6. Design advanced behavioral and architectural modeling and work on case studies.

UNIT I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths.

A Generic view of Process: Software engineering- A layered technology, a Process framework. The Capability Maturity Model – Integrated (CMM-I)

UNIT II

Introduction to UML: Importance of Modeling, Principles of Modeling, Conceptual model of the UML, Architecture, Software Development Life Cycle.

Basic Structural Modeling: Classes, Relationships, Common Mechanisms and Diagrams,

UNIT III

Process Models: The waterfall model, Incremental Process models, Evolutionary Process models.

Software Requirements: Functional and Non-functional Requirements, User Requirements, System Requirements, Interface specification, the Software Requirements Document.

UNIT IV

Basic Structural Modeling: Class Diagrams. Modeling techniques for Class Diagrams. Forward and Reverse engineering.

Advanced Structural Modeling: Advanced classes, Advanced Relationships, Interfaces, Types and Roles, Packages. Object Diagrams:Terms, concepts, modeling techniques for Object Diagrams.

UNIT V

Basic Behavioral Modeling: Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams.

UNIT VI

Advanced Behavioral Modeling: Events and Signals, State machines, State chart diagrams.

Architectural Modeling: Components, Deployment, Component Diagrams and Deployment Diagrams.

CASE STUDY on Unified Library Application.

TEXT BOOKS:

1. Software Engineering, A Practitioner's Approach- Roger S. Pressman, 6th edition. McGrawHill International Edition.
2. Grady Booch, James Rumbaung, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education.

REFERENCE BOOKS:

1. Software Engineering- Sommerville, 7th edition, Pearson education.
2. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
3. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
4. Systems Analysis and Design- Shely Cashman Rosenblatt,Thomson Publications.
5. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies
6. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
7. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
8. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
9. Mark Priestley: Practical Object-Oriented Design with UML,TATA McGrawHill
10. Craig Larman Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Pearson Education
11. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level						M		L	L		M	L

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year II Semester
Computer Science and Engineering
Economics, Accountancy and Management Science

	L	T	P/D	C
Code: 8ZC01	**2**	**0**	**0**	**2**

Prerequisite: NIL

Course Objective:
To make the students understand the concepts and principles of Economics at micro level and basic principles of Financial Accounting and Analysis, andalso functions of Management with Organizational Behavior which facilitate them in making better planning and decisions.

Course Outcomes:
At the end of this course, the student will be able to
1. Acquire the basics of Managerial Economics at Micro level, Demand analysis and production analysis in particular.
2. Expose on Cost concept, Revenues and Market structure and describe the concepts.
3. Understand the basic concepts of Accounting, Double entry system and Bookkeeping.
4. Interpret the concepts of Capital expenditure, Revenue expenditure and Final accounts ad their significance.
5. Identify knowledge and elaborate the basics of Management, its principles and various functions performed in organization.
6. Recognize various personality traits, perception, attitudes of individuals working in organization.

UNIT-1 INTRODUCTION TO MANAGERIAL ECONOMICS:
Definition, Nature and scope of Managerial Economics, Macro Economics consumer's Equilibrium. Theory of Demand, Demand function, Determinants, exceptions - Price Elasticity of Demand and Demand forecasting. Theory of supply, Production function and Economies of scale.

UNIT- 2 INTRODUCTION TO COST, REVENUE AND MARKET STRUCTURE:
Cost Analysis, types of costs, Revenue Analysis, Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems). Market structures: Types of competition, Features of Perfect competition, Monopoly, Monopolistic Competition and oligopolistic competition.

UNIT-3 INTRODUCTIONT O FINANCIAL ACCOUNTING:
Meaning and Definition of Accounting, principles of Accounting, Double-Entry system of Accounting, Book Keeping, introduction to Journal, Ledger and its types, Introduction to Trial balance, problems and solutions of trial balance.

UNIT-4 INTRODUCTION TO FINAL ACCOUNTS:
Introduction to Final Accounts, Concepts of classifications of Revenue and Capital expenditures, Final accounts: Trading account, Profit and Loss Account, Balance sheet, Problems and solutions of Final accounts with adjustments.

UNIT-5 INTRODUCTION TO MANAGEMENT:

Management- Definitions, Fayol's principles of Management, Levels of Management, functions of management. Planning: types of planning, planning process; Organizing: Organizational Design and structure, staffing; Directing;, Controlling: Basic control process.

UNIT-6 INTRODUCTION TO ORGANIZATIONAL BEHAVIOR:

Definition, Nature and Scope, Perception – Perceptual selectivity and organization, **-,** Perceptual Distortions Attribution analysis Attribution theories, Johari Window and Transactional Analysis Personality and Attitudes, Determinants of personality Formation of Attitudes.

TEXTBOOKS:

1. A R Aryasri: Managerial Economics, Tata Mc Graw Hill
2. A R Aryasri: Management Science, Tata Mc Graw Hill

REFERENCE BOOKS:

1. S A Siddiqui & A S Siddiqui, Managerial Economics & Financial Analysis, New Age
2. Accountancy – I Tulasian Tata Mcgraw Hill Co
3. Koontz &Weihrich: Essentials of Management, 6/e, TMH, 2005

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H					M	H	M				M

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year II Semester
Computer Science and Engineering
Environmental Science and Ecology
II B. Tech I Sem (for EEE, ME, IT and ECM)
II B. Tech II Sem (for CSE, ECE and CE)

Code: 8HC05	**L**	**T**	**P/D**	**C**
Prerequisite: NIL	**2**	**0**	**0**	**2**

Course Objectives:

1. To understand structure and function of ecosystem
2. To learn classification and uses of natural resources
3. To learn about Understanding the impacts of developmental activities and mitigation measures.
4. To know the source, causes and preventive methods of pollution
5. To understand the importance of ecological balance for sustainable development.
6. To understand the environmental policies and regulations

Course Outcomes

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

1. Understand about ecosystem and energy flow among the organisms.
2. Know the resources available, use of them and overexploitation of the resources in the nature.
3. Learn the value, use and value of biodiversity.
4. Understand the causes and effect of pollution and implement measures in control of pollution.
5. Understand the sustainable development and implement green technology for sustainable development.
6. Learn and implement policy to protect the environment.

UNIT-I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy source.

UNIT-III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic

and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT-IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants. Acid rain-Threshold limit values of chemicals present in environment, Global warming, Ozone layer depletion, Water pollution: Sources and types of pollution. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Sewage water Treatment, Kyoto protocol, and Montréal Protocol.

UNIT-V

Sustainable development and Green Technology: Concept of sustainable development, threats to sustainability population and its explosion, Crazy consumerism, over- exploitation of resources, strategies for achieving sustainable development environmental education, conservation of resources, urban sprawl sustainable cities and sustainable communities, human health , role of IT in Environment, Environmental Ethics, Environmental Economic – Concept of Green Building, Clean Development Mechanism (CDM).

UNIT-VI

Environmental Policy, Legislation & Environment Impact Assessment: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).

TEXT BOOKS:

1. Perspectives in **Environmental Studies**: **Kaushik** A. and **Kaushik**, C.P. New Age International (P) Ltd. (2008)

REFERENCE BOOKS:

1. Environmental Studies by ErachBharucha, 2005 University Press.
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
5. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
6. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	L	L		L	M	L			M			M

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year II Semester
Computer Science and Engineering
DATABASE MANAGEMENT SYSTEMS LAB

Code: 8EC63	**L**	**T**	**P/D**	**C**
Prerequisite: NIL	**0**	**0**	**2**	**1**

Course objectives:
Design the optimal queries using structured and unstructured query languages like SQL and PL/SQL by making use of control structures, cursors, triggers and functions/procedures.

Course Outcomes:
At the end of this course, the student will be able to:
1. Understand how to create tables for a database and apply Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
2. Explore Queries using Aggregate functions such as [COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING], Conversion functions and use string functions for a given application
3. Learn and demonstrate write programs using PL/SQL programs using exceptions, COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block
4. Gain knowledge in implementing programs using WHILE LOOPS, FOR LOOPS, nested loops using BUILT– IN Exceptions and Implement Procedures.
5. Understand Programs for stored functions invoke functions in SQL Statement and Implement programs for packages specification.
6. Know the significance and Implement programs using features of CURSORs and its variables and develop Programs implementing Triggers.

Exercises:
1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.

   Example: - Select the roll number and name of the student who secured fourth rank in the class.
3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping ofViews.
4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char,to_date)

5.i)Creation of simple PL/SQL program which includes declaration section, executable Section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
ii) Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in

PL/SQLblock.

5. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
6. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE-APPLICATION ERROR.
7. Programs development using creation of procedures, passing parameters IN and OUT Of PROCEDURES.
8. Program development using creation of stored functions, invoke functions in SQL Statement and write complex functions.
9. Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.
10. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.
12. Queries using SQL-INJECTION:AND/OR Attack,Comments Attack,String Concatenation Attack, UNION Injection Attack

TEXT BOOKS:

1) ORACLE PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3Edition
2) ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, Tata Mc-Graw Hill.
3) SQL and PL/SQL for Oracle 10g, Black Book, Dr. P. S.Deshpande.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	H	H	M	H	H	M	H	M	M	M	H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year II Semester
Computer Science and Engineering
Computer Aided Software Engineering (CASE) Tools Lab

Code: 8F463 **L T P/D C**
Prerequisite: NIL

0 0 2 1

Course Objectives:

1. Learns different views of software process and process models.
2. Understanding how a software design may be represented as a set of interacting
3. Objects that manage their own state and operations.
4. Allows the students to understand the design concepts of SDLC
5. Helps the students to design the models in real market.
6. Learns various conceptual models relating to UML.
7. Overall understanding of the designing process in software engineering using UML concepts.
8. Clear understanding about the common modeling techniques in UML.

Course Outcomes:

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

1. Identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish life cycles for developing software product.
2. Understand the importance and principles of Unified Modeling Language, its building blocks and to relate UML paradigm for problem solving.
3. Define and design models for the requirements stated in the software project.
4. Design class, object and interactive diagrams and know their significance.
5. Design advanced behavioral and architectural modeling and work on case studies.

a. The student should take up the case study of Unified Library application which is mentioned in the theory, and Model it in different views i.e. Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.

b. The student takes up the case studies mentioned below, and model it in different views i.e. Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.

Case Studies

1. Automatic Teller Machine
2. Library Management System
3. Railway Reservation System
4. Online Book Shopping System
5. Student Admission System

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M	M	L	M	H	M		M			H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year II Semester
Computer Science and Engineering
Design and Analysis of Algorithms Lab

Code: 8FC64 **L T P/D C**

Prerequisite: Data Structures (C/C++) Lab

0 0 2 1

Course Objectives:

1. To write programs in java to solve problems using divide and conquer strategy.
2. To write programs in java to solve problems using backtracking strategy.
3. To write programs in java to solve problems using greedy and dynamic programming techniques.

Course Outcomes:

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

1. Implement Merge sort algorithm for sorting a list of integers in ascending order, Dijkstra's algorithm for the single source shortest path problem.
2. Implement Prim's algorithm to generate minimum cost spanning tree.
3. Solve the job sequencing with deadlines problem using greedy algorithm.
4. Design the solution for the 0/1 knapsack problem using implement Dynamic Programming and implement.
5. Using Dynamic programming approach solve the Optimal Binary search Tree problem.
6. Design and implement n-queens problem using backtracking approach.

List of Programs for Lab

1. Write a C program to implement Merge sort algorithm for sorting a list of integers in Ascending order.
2. Write a C program to implement Character sorting.
3. Write a C program to implement Dijkstra's algorithm for the single source shortest path problem.
4. Write a C program that implements Prim's algorithm to generate minimum cost spanning tree.
5. Write a C program to implement greedy algorithm for job sequencing with deadlines.
6. Write a C program to implement Dynamic Programming algorithm for the0/1 Knapsack problem.
7. Write a C program to implement Dynamic programming algorithm for the Optimal Binary search Tree problem.
8. Write a C program to implement backtracking algorithm for n-queens problems.

Other Practice Programs:

1. Write a C program to implement Quick Sort algorithm for sorting a list of integers in ascending order.
2. Write a C program to implement the DFS algorithm for a Graph.
3. Write a C program to implement the BFS algorithm for a graph.
4. Write a C program that implements kruskal's algorithm to generate minimum cost spanning

tree.

5. Write a C program to implement Floyd's algorithm for all pairs shortest path problem.
6. Write a C program to implement the backtracking algorithm for the Hamiltonian circuit's problem.
7. Write a C program to implement backtracking algorithm for the sum of subsets problem.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H	H	M					M			H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year II Semester
Computer Science and Engineering
Comprehensive Test and Viva Voce - IV

L	T	P/D	C
1	0	0	1

Code: 8E479
Prerequisite: NIL

Course Objective:
Evaluate, Comprehend and Assess the concepts and knowledge gained in the Core Courses of 1st year and 2nd year.

Course Outcomes:
At the end of this course the student will be
1. Asses the knowledge of the students in the Core and Elective subjects that they have studied till the completion of that academic year.

Two Mid tests, Two mid Viva voce, one External Comprehensive Test and one External Comprehensive Viva Voce.

Comprehensive Test and Viva Voce	The subjects studied in the Semester concerned related to branches concerned and for placements
B.Tech I year I semester	I semester
B.Tech I year II semester	I and II semester
B.Tech II year I semester	I, II and III semester
B.Tech II year II semester	I, II, III and IV semester

Allocation of marks:
*Comprehensive Test : 70 marks
**Viva Voce : 30 marks
Total : 100 marks

*Average of two best Mid Tests of Mid Test – I, Mid Test – II and Mid Test - III will be taken for 20 marks.

End Semester Examination for Comprehensive Test will be taken for 50 marks.
Total marks for Comprehensive Test will be 70.

**Average of best two of Mid Tests of Mid – I, Mid – II and Mid - III for Viva Voce will be taken for 10 marks.

End Semester Examination for Comprehensive Viva Voce shall be evaluated for 20 marks.
The total for Viva Voce will be 30.

Thus the total sessional marks in this subject of Comprehensive Test and Viva Voce will be : 30 for sessionals and 70 for End Semester examination.

The grand total of marks for the subject of Comprehensive Test and Viva Voce will be 100. The student has to secure 40% of marks i.e. 40 marks in sum total of 100 marks to be successful in the subject.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M				H	L		M	H		H

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech II year II Semester
Computer Science and Engineering
Technical Seminar – IV

L	T	P/D	C
0	0	2	1

Code: 8E487
Prerequisite: NIL

Course objective
Develop an ability to understand and present the latest technological developments in computer science. Identify one of them, understand its impact on the event/method/society as a whole and present the seminar on the same which enhances oratory and interview facing skills.

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

1. Identify topics related to Computer Scienec and Engineering domain or disruptive technologies
2. Collect, survey and organize content in PPT form
3. Present seminar in an effective manner

Procedure:

1. Seminar in-charges shall highlight the significance of Technical Seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar In-charge shall take signatures from students.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot / week.
5. Progress of the seminars needs to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for Technical Seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

There shall be a technical seminar evaluated for 100 marks eachfrom I year I Semester to II year II Semester. The evaluation is purely internal and will be as follows:

Sl.No	Description	Marks
1	Literature survey, topic and content	10
2	Presentation including PPT	10
3	Seminar Notes	05
4	Interaction with audience after presentation	05
5	Final Report 3 copies	10
6	Class room participation	05
7	Punctuality in giving seminar as per Scheduled time and	10

	date	
8	Mid Semester Viva (on the seminar topics completed up to the end of 9^{th} week	15
9	End Semester Viva	30
	Total	**100 Marks**

Student must secure 40% i.e. 40 marks to be successful in sum total (Hundred Marks) in Technical Seminar.

Syllabus for B.Tech II year II Semester
Computer Science and Engineering
Summer Break Internship - I

Code: 8E491
Prerequisite: NIL

(4 weeks) : Evaluation will be done along with 3-1 courses (2 Internal Reviews (30 M) and External Evaluation (70M) in 3 – I)

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H				M	L	L				M	M

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
BASICS OF ENTREPRENEURSHIP
(Open Elective –I)

L	T	P	C
2	-	-	2

Code: 8ZC22
Prerequisite: Economics, Accountancy and Management Science

COURSE OBJECTIVES:
The objective of the course is to make students understand the nature of Entrepreneurship, and its importance to business to the engineering students, which will allow them to get the required intuition and interest in starting their own start-up's

COURSE OUTCOMES:
At the end of this course, the students will be able to
1. The students will acquire basic knowledge on Skills of Entrepreneurship.
2. The students will understand the techniques of selecting the customers through the process of customer segmentation and Targeting
3. Business Models and their validity are understood by the students.
4. The basic cost structure, Revenue Streams and the pricing strategies are understood by the students.
5. The students will acquire knowledge about the project management and its techniques.
6. The students get exposure on marketing strategies and business regulations for the Start up.

Unit – I: Introduction to Entrepreneurship & Self Discovery: - Define Entrepreneurship, Entrepreneurship as a Career option, Find your Flow, Stock of Your Means, Characteristics, Qualities and Skills of Entrepreneurship, Effectuation, Principles of Effectuation, Life as an Entrepreneur, Stories of Successful Entrepreneurs.

Unit – II: Opportunity & Customer Analysis: - Identify your Entrepreneurial Style, Methods of finding and understanding Customer Problems, Run Problem Interview, Process of Design Thinking, Identify Potential Problems worth Solving, Customer Segmentation, Niche Marketing and Targeting, Craft your Values Proportions, Customer-driven Innovation.

Unit – III: Business Model & Validation: - Introduction to Business Models, Lean approach to Business Model Canvas, Blue and Red Ocean Strategies, the Problem-Solution Fit, Build your Solution Demo, Solution Interview Method, Identify Minimum Viable Product (MVP), Product-Market fit test.

Unit – IV: Economics & Financial Analysis: - Revenue Analysis, Identify different Revenue Streams and Costs Analysis – Startup Cost, Fixed Cost and Variable Cost, Break Even Analysis, Profit Analysis, Introduction to Pricing, different Pricing Strategies, Sources of Finance, Bootstrapping and Initial Financing, Practice pitching to Investors and Corporate.
Unit – V: Team Building & Project Management: - Leadership Styles, Shared Leadership Model, Team Building in Venture, Roles and Responsibilities of team in venture, Explore

collaboration tools and techniques, Brainstorming, Introduction to Project Management, Project Life Cycle, Create a Project Plan.

Unit – VI: Marketing & Business Regulations: - Positioning, Positioning Strategies, Branding, Branding Strategies, Selecting and Measuring Channels , Customer Acquisition, Selling Process, Selling Skills, Sales Plans. Business regulations – List of Required Registrations, Compliance Check List, Business Structures and Legal Entities.

References:

1. Robert D Hisrich, Michael P Peters, Dean A Shepherd, Entrepreneurship, Sixth Edition, New Delhi, 2006.
2. Thomas W. Zimmerer, Norman M. Scarborough, Essentials of Entrepreneurship And Small Business Management, Fourth Edition, Pearson, New Delhi, 2006
3. Alfred E. Osborne, Entrepreneur's Toolkit, Harvard Business Essentials, HBS Press, USA, 2005.
4. MadhurimaLall, ShikhaSahai, Entrepreneurship, Excel Books, First Edition, New Delhi, 2006.
5. S.S. Khanka, Entrepreneurial Development, S. Chand and Company Limited, New Delhi, 2007.
6. H. Nandan, Fundamentals of Entrepreneurship, Prentice Hall of India, First Edition, New Delhi, 2007.
7. S.R. Bhowmik, M. Bhowmik, Entrepreneurship-A tool for Economic Growth And A key to Business Success, New Age International Publishers, First Edition, (formerly Wiley Eastern Limited), New Delhi, 2007.
8. https://www.wfglobal.org/
9. https://www.learnwise.org/#/IN/en/home/login,

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level						M	L	L			L	L

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
BASICS OF INDIAN ECONOMY
(Open Elective –I)

L	T	P	C
2	-	-	2

Code: 8ZC25
Prerequisite: NIL

COURSE OBJECTIVES :
To provide basic knowledge relating to the Indian Economy thus making the students aware of the current aspects taking place in the Indian and world economy.

COURSE OUTCOMES :
At the end of this course, the students will be able to

1. Gain knowledge relating to Economics, various sectors and its growth
2. Will gain knowledge relating to various concepts of National income and related aggregates
3. Students will learn about Indian Industrial policy and benefits of LPG to India
4. Comprehend knowledge relating to Fiscal policy & Taxation system in India
5. Learn about inflation & business cycles.
6. Know about the BoP and its influence on economy.

Unit 1:Introduction to Economics: Definition, Economics and economy, back ground of economy, sectors of the economy, types of economy, growth of economy, primary moving force of Economic growth in India, mixed economy.

Unit 2: National Income and related aggregates: Aggregates related to National Income: Gross National Product (GNP), Net National Product (NNP), Gross and Net Domestic Product (GDP and NDP) - at market price, at factor cost; National Disposable Income (gross and net), Private Income, Personal Income and Personal Disposable Income; Real and Nominal GDP.

Unit 3: Industrial policy & Liberalization of Economy: Industrial policy in India, its objectives, Review of Industrial policies up to 1986, Industrial policy 1991 - causes of its implementation, benefits of Liberalization, privatization & Globalization to the Indian economy.

Unit 4: Fiscal policy & Taxation system: Fiscal policy- Definition, objectives, importance, setbacks, recent fiscal policy of India, Reforms to strengthen the fiscal policy in India. Taxation system in India, methods of taxation, a good tax system, VAT, GST, Reforms in taxation.

Unit 5: Inflation & Business Cycles: Inflation – Definition, types, effects of inflation on various segments of the population and sectors of the economy, measures to control inflation, Business cycles: Introduction, Depression, Recovery, Boom, and Recession.
Unit 6: Balance of Payments: Balance of payments account - meaning and components; balance of payments deficit-meaning. Foreign exchange rate - meaning of fixed and flexible rates and managed floating. Determination of exchange rate in a free market

Reference Books:

1. Indian Economy, Datt& Mahajan, 70th Edition, Sultan Chand publishers.
2. Indian Economy, Misra&Puri, 33rd Edition, Himalaya publishing house.
3. Latest Budget document by Ministry of Finance
4. Latest Economic survey
5. 12th Five year plan
6. News articles in The Hindu, The Business Line

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level						M	M	L	M		M	L

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
BANKING OPERATIONS, INSURANCE AND RISK MANAGEMENT
(Open Elective –I)

	L	T	P	C
Code: 8ZC05	**2**	**-**	**-**	**2**

Prerequisite: NIL

COURSE OBJECTIVES :
To make the students understand the concepts and principles of Indian Banking Business, Insurance Business and Capital market business products and services, which facilitate them to understand the nature of market.

COURSE OUTCOMES :
At the end of this course, the students will be able to

1. Describe the new dimensions and products served by the banking system in INDIA.
2. Explain the credit control system and create awareness on NPA's
3. Apply the knowledge of Insurance concepts in real life scenarios
4. Recognize the importance of regulatory and legal frame work of IRDA
5. Identify the risk management process and methods.
6. Calculate the diversity of risk and return

Unit 1 INTRODUCTION TO BANKING BUSINESS: Introduction to financial services - History of banking business in India, Structure of Indian banking system: Types of accounts, advances and deposits in a bank. KYC norms, New Dimensions and products- E-Banking: Mobile-Banking, Net Banking, Digital Banking, Negotiable Instruments: Cheque system.

Unit 2 BANKING SYSTEMS AND ITS REGULATION: Banking Systems: Branch Banking, Unit Banking, Correspondent Banking, Group Banking, Deposit Banking, Mixed Banking and Investment Banking - Banking Sector Reforms with special reference to Prudential Norms, Capital Adequacy Norms, Classification of Assets and NPA's, Functions of RBI, Role of RBI in regulating Indian Banking. Banking Ombudsman scheme.

Unit 3 INTRODUCTION TO INSURANCE: Introduction to insurance, Need and importance of Insurance, principles of Insurance, characteristics of insurance contract, branches of insurance and types of insurance: Life insurance and its products, General Insurance and its variants.

Unit 4 INSURANCE BUSINESS ENVIRONMENT: Procedure for issuing an insurance policy –Nomination - Surrender Value - Policy Loans – Assignment - Revivals and Claim Settlement; Insurance as a tax mitigation tool, Role of IRDA in Insurance Regulation.

Unit 5 FINANCIAL MARKETS AND RISK MANAGEMENT: Introduction to Financial Markets: Money Market – Capital market; Introduction to Risk Management, meaning and classification of risks, Risk management process, Risk Management Approaches and Techniques.

Unit 6 DERIVATIVES AS A RISK MANAGEMENT TOOL: Introduction to Financial Derivatives, Advantages of Derivatives - types of Derivative Contracts - Forwards, Futures, Options and Swaps - Differences among Forwards, Futures and Option Contracts.

Reference Books:

1. Varshney, P.N., Banking Law and Practice, Sultan Chand & Sons, New Delhi.
2. General Principles of Insurance Harding and Evantly
3. Mark S. Dorfman: Risk Management and Insurance, Pearson, 2009.
4. Scott E. Harringam Gregory R. Nichanus: Risk Management & Insurance, TMH, 2009.
5. Geroge E. Rejda: Principles of risk Management & Insurance, 9/e, pearson Education. 2009.
6. G. Koteshwar: Risk Management Insurance and Derivatives, Himalaya, 2008.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H			M	L							

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
INTRODUCTION TO ADDITIVE MANUFACTURING PROCESS
(Open Elective –I)

Code: 8BC51
Prerequisite: NIL

L	T	P	C
2	-	-	2

COURSE OBJECTIVES:
To teach students the fundamental concepts of Additive Manufacturing, techniques involved and their advantages and limitations and various applications of these technologies in relevant fields such as mechanical, Bio-medical, Aerospace, electronics etc.

COURSE OUTCOMES:
1. Understand the Additive manufacturing processes and their relationship with subtractive manufacturing.
2. Demonstrate comprehensive knowledge of the broad range of liquid based rapid prototype processes, devices, capabilities and materials that are available.
3. Apply the principles of casting in Additive manufacturing processes
4. Articulate the various tradeoffs of Additive manufacturing software's/data format that must be made in selecting advanced/additive manufacturing processes, devices and materials to suit particular product requirements.
5. Learn various applications of additive manufacturing, such as in architecture art, health care direct part production and mass customization.

UNIT-I
Introduction:
Development of AM, Fundamentals of AM, Classification of AMS, Advantages, Standards on AM, Commonly used terms, AM process chain

UNIT-II Liquid-based Additive manufacturing Systems: Stereo lithography Apparatus (SLA), process, working principle, photopolymers, photo polymerization, Layering technology, laser and laser scanning, Applications, Advantages and Disadvantages, 3D bioprinting **Solid-based Additive manufacturing Systems:**, Laminated Object Manufacturing (LOM): process, working principle, Applications, Advantages and Disadvantages, Fused Deposition Modeling (FDM): working principle, Applications, Advantages and Disadvantages

UNIT-III
Powder Based Additive manufacturing Systems: Selective laser sintering (SLS): working principle, Applications, Advantages and Disadvantages, Color Jet printing, working principle, Applications, Advantages and Disadvantages, **Build time calculations –** SLA, FDM**,** Problems

UNIT-IV
Additive manufacturing Data Formats: STL Format, STL File Problems, Consequence of Building Valid and Invalid Tessellated Models, STL file Repairs: Generic Solution, Features of various AM software's like Magics, Mimics, Solid View, View Expert, 3 D View, Velocity 2,

Rhino, STL View 3 Data Expert and 3 D doctor. **Design for AM** – Basic Principles and Practices

UNIT-V

Rapid Tooling: Introduction to Rapid Tooling (RT), Conventional Tooling Vs RT, Need for RT. Rapid Tooling Classification, Spray Metal Deposition, Silicone rubber molds, , Casting-Sand Casting ,Investment Casting, evaporative Casting

Reverse engineering – what is RE, Why use RE, RE Generic process, Overview of RE-Software and Hardware, CMMs-applications and types

UNIT-VI

Applications and examples : Application - Material Relationship, Application in Design, Application in Engineering, Analysis and Planning, Aerospace Industry, Automotive Industry, Jewelry Industry, Coin Industry, Arts and Architecture. Medical and Bioengineering Applications: Planning and simulation of complex surgery, Customized Implants and Prosthesis, Design and Production of Medical Devices, Bionic ear, dentistry

Text Books:

1.Chua C.K., Leong K.F. and LIM C.S, Rapid prototyping; Principles and Applications, World Scientific Publications , Third Edition, 2010.

2. Reverse Engineering: An Industrial Perspective, Springer- Verlag, 2008. ISBN: 978-1-84628-855-5

3. Ian_Gibson_· David_Rosen, Brent_Stucker, AdditiveManufacturingTechnologies3D Printing, Rapid Prototyping, and Direct Digital Manufacturing,Springer

4.PaulF.Jacobs, Rapid Prototyping and Manufacturing ASME Press, 1996.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H										

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
CONTROL SYSTEM ENGINEERING
(Open Elective –I)

Code: 8AC46
Prerequisite: NIL

L	T	P	C
2	-	-	2

COURSE OBJECTIVES :

Course Objective is to Study the principles of system modeling, system analysis and feedback control and use them to design and evaluate feedback control systems with desired performance;

COURSE OUTCOMES :

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

1. Understand basic concepts of control systems.
2. Study about time response analysis.
3. Understand basic concepts of stability and root locus method.
4. Study about frequency response analysis.
5. Learn basic concepts stability analysis in frequency domain.
6. Outline fundamentals of state space analysis.

UNIT – I INTRODUCTION: Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions – Translational and Rotational mechanical systems

Transfer function representation: Transfer Function of Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using Mason's gain formula.

UNIT-II TIME RESPONSE ANALYSIS: Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems, PID controllers.

UNIT – III STABILITY ANALYSIS IN S-DOMAIN: The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability.

Root Locus Technique: The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT – IV FREQUENCY RESPONSE ANALYSIS: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT – V STABILITY ANALYSIS IN FREQUENCY DOMAIN: Polar Plots-Nyquist Plots-Stability Analysis.
CLASSICAL CONTROL DESIGN TECHNIQUES: Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain.

UNIT – VI STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS: Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and its Properties.

TEXT BOOKS:
1. Automatic Control Systems 8th edition –B. C. Kuo 2003– John wiley and sons.
2. Control Systems Engineering – I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.

REFERENCES:
1. Modern Control Engineering – Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
2. Control Systems – N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
3. Control Systems Engg. – NISE 3rd Edition – John wiley.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M			L						

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
EMBEDDED SYSTEMS
(Open Elective –I)

	L	T	P	C
Code: 8DC42	**2**	**-**	**-**	**2**

Prerequisite: Computer Organisation

COURSE OBJECTIVES :
The constraints and challenges of an Embedded System design The 8051 Architecture, Assembly Language Programming , Interfacing and Interrupt handling mechanism Modern Embedded System Design case studies

COURSE OUTCOMES :
At the end of this course, the students will be able to

1. Classify embedded systems and their applications
2. Write ALP for 8051 architecture
3. Implement interfaces for Embedded System using various protocols and hardware modules.
4. Understand the principles of Communication Interface, Wireless and Mobile Systems Protocols
5. Design the interrupt routines for variois OS concepts and Memory Management techniques in an RTOS Environment
6. Recognize the issues and design of basic Real-Time Operating System principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations.

UNIT – I: Introduction to Embedded Systems: Embedded Systems, Comparing Embedded and General Computing, Complex System Design and Processors, Classification of Embedded Systems, Embedded System Design Process, Formalization of System Design, Embedded SOC and VLSI Circuit Technology, Application examples of Embedded Systems.

UNIT – II: 8051 Architecture, Memory Organization and Programming: 8051 Architecture, features, Addressing modes, Instruction set, Input/output Ports and Circuits, External Memory, Counter and Timers, Serial data, Input/Output, Interrupts; The Assembly Language programming Process, Programming the 8051, Data Transfer and Logical Instructions. Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, use of C programming for 8051.

UNIT – III: 8051 Real World Interfacing: Part A - Real World Interfacing, Performance metrics, Memory map, Processor and Memory selection, Part B - IO Subsystem, Sensors and Actuators, LED and LCD Interfacing, Keyboard Interfacing, Stepper Motor Interfacing, DC motor Interfacing Using PWM

UNIT – IV: Embedded Communication Interface: Serial and Parallel Communication, Timer and Counting Devices, Watchdog Timer, Real Time Clock, I^2C, SPI protocol, ISA , PCI, Internet Enabled Systems, Wireless and Mobile Systems Protocols

UNIT – V: Introduction to Real - Time Operating Systems: Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment. (Chapter 6 and 7 from Text Book 3, SImon).

UNIT – VI: Basic Design Using a Real-Time Operating System: Principles, Semaphores and Queues, Hard Real-Tjme Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); **Embedded Software Development Tools**: Host and Target machines, Linker! Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging **Techniques:** Testing on Host Machine, Using Laboratory Tools, An Example System. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

TEXT BOOKS:

1. Embedded Systems- Architecture, Programming and Design 2E, Raj Kamal, TMH
2. Introduction to Embedded Systems, K.Shibu, Tata McGraw-Hill
3. The 8051 Microcontroller and Embedded Systems Using Assembly and C – Mazidi, Pearson Education India, 2nd edition, 2008.
4. An Embedded Software Primer, David E. Simon, Pearson Education

REFERENCES:

1. An Embedded Software Primer, David E. Simon, Pearson Education.
2. Computers and Components: principles of embedded computing system design, Wayne Wolf, Elsevier.
3. 8051 Application Notes by Atmel.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level			M			L	L					

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Design Literacy and Design Thinking
(Open Elective –I)

L	T	P	C
2	-	-	2

Code: 8ZC08
Prerequisite: NIL

Course Objective:
The objective of the course is to make students understand the fundamental concepts of design thinking, and to familiarize with product design process and to motivate the students to ideate new products and services.

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

1. Gain the knowledge on the inputs required for design thinking and also gain familiarity on concepts related to design thinking.
2. Understand the techniques of idea generation
3. Classify different phases of design thinking
4. Realize the product design process.
5. Understand design thinking for service design.
6. Gain knowledge on various cases related to design thinking.

Unit – I: Design Thinking – Introduction to Design thinking, Principles of design thinking, Benefits of design thinking, Applications of Design thinking, Social Innovation, Impact of Design thinking, Design thinking tools and techniques. Innovation and Design thinking.

Unit – II: Idea Generation: New Idea generation methods - Principles of Idea Generation, Techniques, Creativity thinking techniques and tools, types of creative thinking, select ideas from ideation methods.

Unit – III: Design Thinking Foundations: The Design Double Diamond: Discover-Define-Develop-Deliver, User-centric design approaches: Importance of user-centricity for design, Empathisation, Empathy Maps, Data collection from users and for users, Data Validation Responsible Innovation and Ethical Design:

Unit – IV: Product Design Process: Identification of opportunities, Problem Statement, Product planning, Characteristics of Successful product Development, New product development process, Stanford design thinking iterative model

Unit – V: Design Thinking for Service Design: Attributes of a good service design, service design tools – blueprint, customer journey mapping Identifying the user needs in a service-driven economy; Process Flows and Customer Experience considerations for designing and improving services; 5 Why‟s; Service Delivery Pathways

Unit – VI: Case Studies on Design thinking: Case 1: Arcturus IV by John E.Arnold, Case – 2: How can we make AI to make things better for humans. Case – 3: User Centered Helmet

Design by Prof. B.K. Chakravarthy- Part 1 and Part 2; Case – 4: Challenges of Reaching a Million Users by Prof. Chetan Solanki and Prof Jayendran V.

Text Books:

1. Brown, T. (2008). Design thinking. *Harvard business review*, *86*(6), 84.
2. "Innovation by Design", Gerald H. (Gus) Gaynor, AMACOM {American Management Association), NYC, 2002
3. Ansell, C., & Torfing, J. (2014). Collaboration and design: new tools for public innovation. In *Public innovation through collaboration and design* (pp. 19-36). Routledge.
4. Lewrick, M., & Link, P. (2015). Design thinking tools: Early insights accelerate marketers' success. *Marketing Review St. Gallen*, *32*(1), 40-51.

References Books:

1. Mæhlum, A. R. (2017). *Extending the TILES Toolkit-from Ideation to Prototyping* (Master's thesis, NTNU).
2. Norman, D. (2013). *The design of everyday things: Revised and expanded edition*. Basic books.
3. Design Thinking – A primer, Prof: Dr. Bala Ramadurai, Indian Institute of Technology, Madras.

Websites:

1. **www.smashingmagazine .com**
2. **www.IDEO.com**

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	L	L		M							

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
SEMANTIC WEB & SOCIAL NETWORKS
(Professional Elective –I)

L	T	P	C
3	0	0	3

Code: 8EC11
Prerequisite: Nil

Course Objectives:
Understand Web Intelligence and Ontology. Learn basics of Semantic web, its representation issues and Social Network Analysis.

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

1. Appraise the role of the Web, its need and Intelligence.
2. Outline the concepts of Machine Intelligence Ontology, Inference engines, Software Agents, Berners-Lee www and Semantic Road Map.
3. Conceptualize Knowledge Representation for the Semantic Web with Resource Description Framework (RDF) / RDF Schema, Ontology Web Language (OWL), UML and XML Schema.
4. Apply Ontology Engineering using Ontology Development Tools/ Methods, Ontology Libraries, Ontology Mapping, Logic and Inference Engines.
5. Illustrate Semantic Web Applications, Services and Technology.
6. Apply Social Network Analysis, Semantic web networks analysis and describe Building of Semantic Web Applications with social network features.

UNIT I Web Intelligence: Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web

UNIT II Machine Intelligence: Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

UNIT III Knowledge Representation for the Semantic Web: Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework (RDF) / RDF Schema, Ontology Web Language (OWL), UML, XML/XML Schema.

UNIT IV Ontology Engineering: Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

UNIT V Semantic Web Applications, Services and Technology: Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

UNIT VI Social Network Analysis and Semantic web: Development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks, Building Semantic Web Applications with social network features.

TEXT BOOKS:

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

REFERENCES:

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, RudiStuder,PaulWarren,JohnWiley&Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers (Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T. Segaran, C. Evans, J. Taylor, O'Reilly, SPD.
5. A Semantic Web Primer, G. Antoniou and V. Harmelen, PHI.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	H	M	M	H	H	H	M	M	H	L	H

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
SOFTWARE ARCHITECTURE AND DESIGN PATTERNS
(Professional Elective –I)

Code: 8FC12 **L T P C**
Prerequisite : Software Engineering and OOAD **3 - - 3**

Course Objectives:
The main objective is to introduce the student to architecture of software and design Patterns. Upon completion of this course the student will get an idea on envisioning architecture, creating architecture, analyzing architecture.

1. Understand the creational and structural patterns.
2. Be capable of applying his knowledge to create an architecture for given application.
3. Be able to explain the role of analyzing architectures.
4. Be able to identify different structural patterns.

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

1. Explain Architecture Business Cycle, Architectural patterns, reference models, reference architectures, and architecture structures.
2. Describe architecture, Quality Attributes, styles, patterns and design of Architecture along with the Documentation of architecture.
3. Discuss Software Architecture evaluation, Architecture design decision making, SAAM, ATAM and CBAM. And plan software architecture in future.
4. Plan and use Creational patterns and Structural patterns application development.
5. Solving problems using Induction learning, Decision Tree, Statistical learning methods, learning with hidden variables, EM algorithm, Instance based learning and Neural Networks.
6. Explain Behavioral patterns using Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template method and Visitor.

UNIT I
Envisioning Architecture
The Architecture Business Cycle, What is Software Architecture? , Architectural patterns, reference models, reference architectures, architecture structures and views.

UNIT II
Creating an Architecture
Quality Attributes, Architectural styles and patterns, designing the Architecture, Documenting the architecture, Reconstructing Software Architecture.

UNIT III
Analyzing Software Architecture
Architecture evaluation, SAAM, ATAM, CBAM.
Moving from Architecture to Systems

Software Product Lines, Building systems from off the shelf components, Software architecture in future.

UNIT IV

Design Patterns

What is pattern? Pattern Description, Organizing catalogs, Role in solving problems, Selection, usage.

UNIT V

Creational patterns: Abstract factory, Builder, Factory method, prototype, singleton.

Structural patterns: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy.

UNIT VI

Behavioral patterns: Chain of responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template method, Visitor.

Case Studies

The World Wide Web - a case study in interoperability, Flight Simulation- A Case Study in an Architecture for Integrability.

TEXT BOOKS:

1 Software Architecture in Practice, 2nd Edition by Len Bass, Paul Clements, Rick Kazman, published by Pearson Edition

2. Design Patterns, by Erich Gamma, Pearson Education

REFERENCES:

1. Beyond Software Architecture, Luke Hohmann, Addison Wesley, 2003.
2. Software Architecture, David M Dikel, David kane and James R Wilson, Prentice Hall PTR, 2001.
3. Pattern Oriented Software Architecture, F Buschmann&others, John Wiley&Sons.
4. Head First Design patterns, Erec Freeman & Elisabeth Freeman, O'REILLY, 2007.
5. Design pattern in java, Steven John Metsker&William C. Wake, Pearson Education, 2006.
6. Design patterns in C#, Steven John Metsker, Pearson Education, 2004.
7. J2EE Pattens, Deepak Alur, John Crupi&Dan Malks, Pearson Education, 2003.
8. Software Design, David Budgen, Second edition, Pearson Education, 2003.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	L	L	H							H

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
INTRODUCTION TO DATA SCIENCE
(Professional Elective- I)

Code: 8EC16

L	T	P	C
3	0	0	3

Prerequisite: Python Programming, Probability and Statistics

COURSE OBJECTIVES:

1. Learn concepts, techniques and tools they need to deal with various facets of data science practice, including data collection and integration
2. Exploring data analysis, predictive modeling, descriptive modeling, data product creation, evaluation, and effective communication
3. Understand the basic knowledge of algorithms and reasonable programming experience and some familiarity with basic linear algebra and basic probability and statistics
4. Identify the importance of recommendation systems and data visualization techniques

COURSE OUTCOMES:

After completion of the course, the student should be able to

1. Understand basic terms related to Big Data, Data Science and Analysis of Data. Learn Statistical Inference, Probability Distributions and Fitting a model
2. Implement Data analysis techniques for solving practical problems.
3. Perform Data analysis on variety of data using R
4. Exercise appropriate manipulation techniques on lists and vectors using operators in R. Comprehend the significance and use the iterative programming and functions in R
5. Learn and describe the various Dimensionality Reduction techniques available
6. Apply the suitable visualization techniques to output analytical results.

UNIT-I: INTRODUCTION

Data Science Introduction - Big Data and Data Science hype – and getting past the hype - Datafication - Current landscape of perspectives - Statistical Inference - Populations and samples - Statistical modeling, probability distributions, fitting a model – Over fitting. (Text Book-1)

Basics of R: Introduction, R-Environment Setup, Programming with R, Basic Data Types (Text Book-4)

UNIT-II DATA TYPES & COLLECTION:

Types of Data: Attributes and Measurement, Attribute Definition, The Type of an Attribute, The Different Types of Attributes, Describing Attributes by the Number of Values, Asymmetric Attributes, Binary Attribute (Pg.No:22-29, Text Book-2), Nominal Attributes, Ordinal Attributes, Numeric Attributes, Discrete versus Continuous Attributes (Pg. No. 39-44, Ref Book-1)

Types of Data Sets, General Characteristics of Data Sets, Record Data, Transaction or Market Basket Data, The Data Matrix, The Sparse Data Matrix, Graph Based Data, Graph- Based Data, Ordered Data. Handling Non-Record Data, Data Quality, Measurement and Data Collection Issues, Precision, Bias and Accuracy. (Pg. No. 29-39, Text Book-2)

UNIT-III

Vectors: Creating and Naming Vectors, Vector Arithmetic, Vector Subsetting,

Matrices: Creating and Naming Matrices, Matrix Subsetting, Arrays, Class.

Factors and Data Frames: Introduction to Factors: Factor Levels, Summarizing a Factor, Ordered Factors, Comparing Ordered Factors, Introduction to Data Frame, Subsetting of Data Frames, Extending Data Frames, Sorting Data Frames.

Lists: Introduction, Creating a List: Creating a Named List, Accessing List Elements, Manipulating List Elements, Merging Lists, Converting Lists to Vectors (Text Book-4)

UNIT-IV

Conditionals and Control Flow: Relational Operators, Relational Operators and Vectors, Logical Operators, Logical Operators and Vectors, Conditional Statements.

Iterative Programming in R: Introduction, While Loop, For Loop, Looping Over List.

Functions in R: Introduction, Writing a Function in R, Nested Functions, Function Scoping, Recursion, Loading an R Package, Mathematical Functions in R. (Text Book -4)

UNIT-V:DIMENSIONALITY REDUCTION Eigenvalues and Eigenvectors of Symmetric Matrices, Definitions, Computing Eigenvalues and Eigenvectors, The Matrix of Eigenvectors, Principal-Component Analysis, An Illustrative Example, Using Eigenvectors for Dimensionality Reduction, Singular-Value Decomposition, Definition of SVD, Interpretation of SVD, Dimensionality Reduction Using SVD (Pg. No.405-422, Text Book-3)

UNIT-VI: DATA VISUALIZATION

Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations. (Pg. No. 56-64, Ref. Book -1)

Charts and Graphs: Introduction, Pie Chart: Chart Legend, Bar Chart, Box Plot, Histogram, Line Graph: Multiple Lines in Line Graph, Scatter Plot. (Text Book-4)

TEXT BOOKS:

1. Doing Data Science, Straight Talk From The Frontline. Cathy O'Neil and Rachel Schutt, O'Reilly, 2014

2. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Education Inc.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M	M		H						

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
COMPUTER GRAPHICS
(Professional Elective –I)

	L	T	P	C
Code: 8FC17	**3**	**-**	**-**	**3**

Course Objectives:

1. Various Input and Out Put devices and various Out Put Primitive Algorithms
2. Filled Area Primitive Algorithms and 2-D geometrical transformations
3. 2-D Viewing and clipping Algorithms
4. 3-D Object Representation and 3-D geometrical Transformations
5. 3-D Viewing and visible surface detection methods
6. Computer Animation languages

Course Outcomes:

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

1. Understand fundamental terms in Computer Graphics, various visible surface determination algorithms and midpoint and line segment analysis.
2. Explore 2D graphics and algorithms including: line drawing, polygon filling, clipping, and transformations.
3. Apply functions 2D viewing and apply clipping algorithms.
4. Understand the concepts and techniques used in 3D computer graphics, including viewing transformations, hierarchical modeling, color, lighting and texture mapping.
5. Apply single and multiple 3-D viewing techniques like viewing coordinates etc and also back-face detection, depth-buffer, and scan-line methods.
6. Analyze the animation production pipeline and Produce a short animation.

Unit-1

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices. Output primitives : Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms, Applications.

Unit-2

Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms 2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

Unit- 3

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm

UNIT-4

3-D Object Representation: Polygon surfaces, quadric surfaces, spline representation, Bezier curve and B-Spline curves, polygon rendering methods. 3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

UNIT-5

3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

UNIT-6

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications. (p.nos 604- 16 of text book -1, chapter 21 of text book-2).

TEXT BOOKS:

Text books:

1. "Computer Graphics C version", Donald Hearn and M.Pauline Baker, Pearson Education.
2. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

REFERENCE BOOKS:

1. "Computer Graphics", second Edition, Donald Hearn and M.Pauline Baker, PHI/Pearson Education.
2. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc- Graw hill edition.
3. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
4. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
5. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
6. Computer Graphics, Steven Harrington, TMH

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M				H		H				

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Information Security

L	T	P	C
3	0	0	3

Code : 8FC06
Prerequisite : Nil

Course Objectives:

1. To learn the fundamental concepts of security attacks, security services.
2. To apply conventional cryptographic techniques in order to do encryption.
3. To apply Public key cryptography techniques in order to do encryption.
4. To learn IP security Architecture and its role in security framework.
5. To apply SSL and TLS for Web Security. To design and develop Intrusion Detection Systems and Firewall.

Course Outcomes:

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

1. Understand the fundamental concepts of Security Attacks and security standards with the model for network Security.
2. Review and analyze conventional cryptographic techniques and authentication
3. Review and analyze public cryptographic techniques and outline the concepts of Kerberos and email privacy
4. Recognize architecture, key management and header formats of Ipsec
5. Outline the various web security threats and protocols
6. Understand Intrusion Detection System and Design principles of Firewalls

UNIT – I: Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs.

UNIT – II: Conventional Encryption Principles, Conventional encryption algorithms: DES, TDES, AES, cipher block modes of operation, location of encryption devices, key distribution, Approaches of Message Authentication, Secure Hash Functions: SHA1 and HMAC.

UNIT – III: Public key cryptography principles, public key cryptography algorithms: RSA, DIFFIE HELL MAN, digital signatures, digital Certificates, Certificate Authority and key management
Kerberos, X.509 Directory Authentication Service. Email privacy: Pretty Good Privacy (PGP) and S/MIME.

UNIT - IV

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT – V

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Intruders, Viruses and related threats
UNIT – VI: Firewall Design principles, Trusted Systems. Intrusion Detection Systems.

TEXT BOOKS:

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education, 4th Edition.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeh, wiley Dreamtech

REFERENCE BOOKS:

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson
4. Principles of Information Security, Whitman, Thomson.
5. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
6. Introduction to Cryptography, Buchmann, Springer.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H	M	H	M	M						H

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
DATA WAREHOUSING AND DATA MINING

Code: 8EC04 **L T P C**
Prerequisite: Database Management Systems **2 1 0 3**

Course Objectives:
To understand the principles of Data warehousing and Data Mining and understand types of data to improve the quality of data and efficiency using the mining process.

1. To be familiar with the Data warehouse architecture.
2. To understand applications of Association Rule Mining and algorithms to find them.
3. To perform classification and prediction of data.
4. To understand applications and algorithms for Clustering.
5. To introduce advanced topics in Data Mining.

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

1. Understand the fundamentals of Data Mining and Identify the techniques used in data preprocessing.
2. Understand the fundamentals of Data Warehousing and issues of mining with respect to architectures, technologies such as OLAP.
3. Learn insights of Data Mining Primitives and Infer the significance of Concept Description.
4. Apply the algorithms for mining association rules in large databases.
5. Discuss and apply the models of classification and use those models for the prediction of the new samples.
6. Apply various clustering techniques available for numerous applications. Identify the optimal clustering technique for a particular application

UNIT – I
Introduction: Fundamentals of data mining, KDD process, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task primitives, Integration of a Data mining System with a Database or a Data warehouse systems, Major issues in Data Mining.
Data Preprocessing: Needs for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation, Data Mining Primitives, Data Mining Query Languages, Architectures of Data Mining Systems.
UNIT – II
Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining.

UNIT – III
Mining Frequent, Associations and Correlations: Basic concepts, Frequent Itemset mining methods, Mining multilevel association rules from Transaction Databases, Mining

Multidimensional association rules from Relational databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

UNIT – IV

Classification and Prediction: Issues regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Support Vector Machines (SVMs),k-nearest neighbor classifier, Other Classification Methods. Prediction, Classifier Accuracy

UNIT – V

Cluster Analysis Introduction: Issues Regarding Classification and Prediction, Types of Data in Cluster Analysis, Major Clustering methods, Partitioning Methods, Density-Based methods, Grid-Based methods, Model-Based Clustering methods,Outlier Analysis.

UNIT – VI

Mining Complex Types of Data: Social Network Analysis, Spatial Data Mining, Multimedia Data Mining, Mining Time-Series data, Mining sequence Patterns in Transactional Databases, Text Mining, Mining the World Wide Web.

TEXT BOOKS:

1. Data mining: Concepts and Techniques, Jiawei Han and Micheline Kamber, 2nd Edition, Elsevier, 2006.

2. Data Mining Techniques – ARUN K PUJARI, University Press.

REFERENCE BOOKS:

1. Data Mining Introductory and advanced topics –MARGARET H DUNHAM, PEARSON EDUCATION
2. Data Mining Techniques – ARUN K PUJARI, University Press.
3. Data Warehousing in the Real World – SAM ANAHORY & DENNIS MURRAY. Pearson Edn Asia.
4. Data Warehousing Fundamentals – PAULRAJ PONNAIAH WILEY STUDENT EDITION.
5. The Data Warehouse Lifecycle Toolkit – RALPH KIMBALL WILEY STUDENT EDITION
6. Introduction to Data Mining - First Edition, by Pang-Ning Tan, Michael Steinbach and Vipin Kumar, ISBN-13: 978-0321321367

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	H	H	L								

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
DATA COMMUNICATIONS AND NETWORKS

L	T	P/D	C
3	0	0	3

Code: 8EC05
Prerequisite: NIL

Course Objectives:

1. To Study in detail about various analog and digital modulation and demodulation techniques.
2. To have a thorough knowledge of various multiplexing schemes and Data communication protocols,
3. To Learn flow control, error control and access control mechanisms.
4. To Learn routing and congestion control algorithms, internet protocols.
5. To Understand Transport layer entities such as DNS and HTTP.

Course Outcomes:

At the end of this course the student will be able to

1. Understand concepts of different networks, network models and transmission medias.
2. Classify various data conversion techniques and Multiplexing, Demultiplexing techniques.
3. Summarize the design issues of Datalink layer and solve problems on Error and Flow control.
4. Infer MAC layer protocols, various connecting devices, IP addressing concepts and design a network(using subnetting and supernetting techniques)
5. Analyze various routing algorithms and outline the concepts of Internet control protocols and congestion control techniques.
6. Recognize services and protocols of transport layer, application layer along with network security issues.

UNIT I

Introduction: Data Communications, Networks: Topologies, PAN,LAN,MAN,WAN. The Internet, Protocols and Standards. Network Models: The OSI Model, Layers in the OSI Model, TCP/IP Protocol Suite.

Physical layer & Media: Guided Media, Unguided Media.

UNIT II

Data and Signals: Analog and Digital, Digital Transmission: Digital-to-Digital Conversion, Analog-to-Digital Conversion, Analog Transmission, Digital-to-analog Conversion, Analog-to-analog Conversion. Bandwidth utilization: Multiplexing and Demultiplexing.

UNIT III

Switching: Circuit-Switched Networks, Packet Switching, Message Switching.
Data Link Layer: Services, Data Link Control, Framing, Flow and Error Control, Error Detection and Correction, CRC, Checksum, Hamming code , Sliding Window Protocols, HDLC, Point-to-Point Protocol.

UNIT-IV

MAC sub layer:MAC Address, Multiple AccessProtocol, Aloha, CSMA Protocols, IEEE Standards, Standard Ethernet, Fast Ethernet, Gigabit Ethernet, IEEE 802.11.
Connecting Devices: Repeaters, Hubs, Bridges, Switches, Routers, Gateways.
Network Layer: Logical Addressing, IPv4, IPv6,Subnetting and Supernetting, Internetworking.

UNIT V

Datagram and Virtual-Circuit Networks, Forwarding and Routing, Routing Protocols: Flooding, Shortest path routing technique, Distance Vector routing, Count to Infinity problem, Link State routing, Hierarchical routing technique, Multicasting, Broadcasting.
Internet control protocols: ICMP, ARP, RARP, DHCP
Congestion Control: Congestion Control in virtual –circuits and Datagram Subnets,
Traffic Shaping: Leaky-Bucket and Token-Bucket Algorithms.

UNIT VI

Transport Layer: Transport Services, Connection establishment, Connection release and TCP and UDP protocols.
Application Layer: Domain Name System, Electronic Mail and File Transfer Protocol, WWW and HTTP, Simple Network Management Protocol (SNMP)
Security and Privacy: Security attacks and services.

TEXT BOOKS:

1. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

REFERENCE BOOKS :

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition,Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson
3. Data Communications, William Stallings, Seventh edition.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H	M	H	H	H		M	H	H		H

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
DATA WAREHOUSING AND DATA MINING LAB

L	T	P/D	C
0	0	4	2

Code: 8EC64
Prerequisite: NIL

Course Objectives:
Learn how to build a data warehouse and query it. Learn to perform data mining tasks using a data mining toolkit. Understand the data sets and data preprocessing. Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression. Exercise the data mining techniques with varied input values for different parameters. To obtain Practical Experience Working with all real data sets. Emphasize hands-on experience working with all real data sets.

Course outcomes:
At the end of this course the student will be able to

1. Work with the ETL and Mining tools.
2. Demonstrate the classification, clustering techniques on the data sets.
3. Comprehend the results obtained in the clustering, Association and Classification techniques applied on the data sets with varied input parameters.
4. Ability to apply mining techniques for realistic data.

Exercises

1. Perform filter transformation for the employee database.
2. Add the commission of 1000 Rs in the Salary field of Employee table using Expression Transformation.
3. Use Aggregator transformation to display the average salary of employees in each department.
4. Use Joiner transformation to display the Sailor_Name form Sailors table and Boat_Name from Boats table in a new table.
5. Perform steps to load top 2 salaries for each department without using Rank Transformation and SQL queries in Source Qualifier.
6. Implement the following Multidimensional Data Models
   i.Star Schema
   ii.Snowflake Schema
   iii.Fact Constellation.
7. Compare the GRI and Apriori usage (Prepare a sample data set in Spread Sheet).
8. Determine the Drugs importance w.r.t. Age, Cholestrol and BP using C 5.0.
9. Predict the accuracy of the test data set using Neural Net model using a Case Study of Botanical data set.
10. Compare the C 5.0 and Neural Net using the sample data.
11. Using the BASKETS1n dataset, select the data as given below.
    a) Customer age < 35 and count the customers who buy dairy and VEG products

b) Find the AVG income of customers who buy at least 5 products

12. Using the BASKETS1n dataset, select the data as given below.

a) Derive the field whose home own is 'YES' and Age > 30 and sort data w.r.t. income in Ascending order, and output only the item fields.

b) Find the mean value of salary w.r.t age={Young, Middle, Senior}.

13) Demonstrate the Weka machine learning toolkit and perform the following exercises

- Determine the numbers of instances of each class are present in the data
- Load the weather dataset and remove all instances where the attribute ‘humidity’ has the value ‘high’?
- Load the iris dataset and view the Visualizer panel.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	H	L	H			L		M			H

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
COMPUTER NETWORKS LAB

L	T	P	C
0	0	2	1

Code: 8EC65
Prerequisite: Data Structures

Course Objectives:
To provide an understanding of the design concepts of framing Error Detection & correction, Routing, Congestion concepts and Network tools.

Course Outcomes:
At the end of this course the student will be able to
1. Implement and analyze framing methods of the data link layer.
2. Implement and analyze framing methods of the data link layer.
3. Illustrate and implement error detection & correction techniques.
4. Implement different Routing Algorithms.
5. Understand basic Network Commands.
6. Use of Wireshark and NS-2 tools

Computer Networks Lab Exercises:
1. Implement the data link layer framing methods such as
   a) Character / Byte stuffing
   b) Bit stuffing.
2. Implement on a data set of characters the three CRC polynomials
   a) CRC 12 b) CRC 16 c) CRC CCITT.
3. Implement Hamming code for error detection and error correction
4. Implement Dijkstra's algorithm to compute the shortest path through a graph.
5. Take an example subnet graph with weights indicating delay between nodes. Now obtain a Routing table for each node using a distance vector routing algorithm.
6. Implement Congestion control using Leaky-Bucket Algorithm
7. Execute the basic Networking Commands

i. Arp	ii. Hostname
iii. ipconfig	iv. ipconfig/all
v. Ipconfig/renew	vi. Ipconfig/release
vii. Ipconfig/flushdns	viii. Pathping
ix. Ping	x. Route
xi. tracert	

8. Demonstration of NS-2

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M			M	H		H				

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Information Security Lab

L	T	P	C
0	0	2	1

Code : 8FC65
Prerequisite : Nil

Course Objectives:

1. Learn the fundamental of information security principles and services offered to secure the data.
2. Apply conventional cryptographic techniques in order to do encryption.
3. Apply Public key cryptography techniques in order to do encryption.

Course Outcomes:

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

Understanding of Symmetric Encryption Algorithms, Asymmetric Encryption Algorithms, Hash and Key Exchange, Digital Signature and Digital Envelope, Demonstration of NS3 Tool

List of Programs

1. Implement Substitution Cipher.
2. Implement Transposition Cipher.
3. Implement DES
   (a) Generate Cipher text for the given Plaintext.
   (b) Retrieve the Plaintext from the given Cipher text.
4. Implement Diffie Hellman Algorithm and generate Secret Key.
5. Implement RSA algorithm
   (a) Generate Public key and Private key pair
   (b) Generate Cipher text for the Plaintext
   (c) Obtain the Plaintext from the Cipher text
6. Implement Hash Algorithm.
7. Generate Digital Signature
8. Implement Digital Envelope.
9. Installation of NS3.
10. Demonstration of NS3.
11. Executing simple projects in NS3.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M	M	H	M	H	M	H	M	H	H

Syllabus for B. Tech III Year I semester
Computer Science and Engineering
INTELLECTUAL PROPERTY RIGHTS

L	T	P	C
1	0	0	1

Code: 8EC49
Prerequisite : Nil

Course Objective:
This course is intended to impart awareness on intellectual property rights and various regulatory issues related to IPR

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

1. Demonstrate a breadth of knowledge in Intellectual property
2. Overview of Patents, Searching, filling and drafting of Patents
3. Overview of copyright & GI .
4. Overview of Trade Mark & Trade Secret,
5. Overview of Integrated Circuit and Industrial Design.
6. Knowledge about different national and international: Conventions and Treaties Governing the IPRs

UNIT I: Introduction to IPR: Discovery, Invention, Creativity, Innovation, History & Significance of IPR, Overview of IPR -Patent, Copyright, Trade Mark, Trade Secret , GI, Industrial Design & Integrated Circuit, Non-patentable criteria

UNIT II: Patents: Patents- Patentability Criteria, Types of Patents-Process, Product & Utility Models, Software Patenting and protection, Patent infringement- Case studies- Apple Vs Samsung, Enfish LLC Vs Microsoft, Overview of Patent search-Types of Searching, Public & Private Searching Databases, Basics of Patent Filing & Drafting, Indian Patents Law

UNIT III: Copyrights and Geographical Indications: Types of Copyrights, Procedure for filing, copyright infringement, Copyright Law, Geographical Indications –Tirupati Laddu , Darjeeling Tea, Basmati rice

UNIT IV: Trademark and Trade secrets: Trade Marks –Commercial importance, protection, registration, Case Studies- Sabena and Subena, Castrol Vs Pentagon, Trade Secrets- Case Studies-Kentucky Fried Chicken (KFC), Coca-Cola

UNIT V: Protection of Industrial Designs & Integrated Circuits: Industrial Designs – Scope, protection, filing, infringement; Integrated Circuits & Layout design, Semiconductors, Unfair competition, Designs Act.

UNIT VI: International Conventions & Treaties: Overview of WTO, GATT, TRIPS, WIPO, Berne Convention, Rome convention, Paris Convention, Patent Cooperation Treaty (PCT), Madrid Protocol, Budapest Treaty, Hague agreement

TEXT BOOKS:

1. Deborah E. Bouchoux, Intellectual Property for Paralegals – The law of Trademarks, Copyrights, Patents & Trade secrets, 3rd Edition, Cengage learning, 2012
2. N.S. Gopalakrishnan& T.G. Agitha, Principles of Intellectual Property, Eastern Book Company, Lucknow, 2009.

REFERENCE BOOKS:

1. M. M. S. Karki , Intellectual Property Rights: Basic Concepts, Atlantic Publishers, 2009
2. Neeraj Pandey &KhushdeepDharni, Intellectual Property Rights, Phi Learning Pvt. Ltd
3. AjitParulekar and Sarita D' Souza, Indian Patents Law – Legal & Business Implications; Macmillan India ltd, 2006.
4. B. L. Wadehra. Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications; Universal law Publishing Pvt. Ltd., India 2000.
5. P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi, 2010.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M	M	M	M	M	L	M	H	H	L	H

Syllabus for B.Tech III Year I semester
Computer Science and Engineering
SUMMER INDUSTRY INTERNSHIP-I

Code: 8E491 **L T P C**
0 0 0 1
Prerequisite: All Courses till this semester

Course Objectives:
To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

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

1. Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
2. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
3. Inculcate an enthusiasm to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole.
4. Improve their communicative skills and team skills.

A summer industry internship project shall be carried out by a group of students consisting of 2 to 3 in number during summer third year first semester at industries. This work shall be carried out under the guidance of the faculty assigned as internal guide as well as external guide at industry where students are carrying out summer industry internship projects. Project shall consist of design, fabrication, software development or building of prototype or application app. This can be of interdisciplinary nature also.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external
The **internal evaluation** shall consist of:

Day to day work (internal guide 10M external guide : 5M)	:	15 marks
Report	:	05 marks
Demonstration / presentation (internal presentation is evaluated by HOD, senior faculty and internal guide)	:	10 marks
		30 marks
End examination	:	70 Marks.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the internal guide.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level						M	L	L	M		M	M

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech III Year II semester
Computer Science and Engineering

ADVANCED ENTREPRENEURSHIP

(Open Elective –II)

Code: 8ZC23 **L T P C**
Prerequisite: Basics of Entrepreneurship **2 0 0 2**

COURSE OBJECTIVES:

The course is designed to impart the necessary managerial skills and tactics required for an emerging Entrepreneur for the Engineering students to enhance their prospects as an Entrepreneur.

COURSE OUTCOMES:

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

1. Gain knowledge on the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup.
2. Exposed to the various business models and critically evaluating the effectiveness of the business models and products
3. Understand the method of business traction, create roles and build their A- team
4. Understand the various channels of revenue building and exploration of new revenue avenues.
5. Understand the need of sales planning and people plan and also financial modeling
6. Exposed to the legal implications affecting the company's prospects and identifying right mentors and advisors to support startups

Unit – I: Fundamentals of Entrepreneurship & Refining Business Model and Product:
Fundamentals and key concepts of entrepreneurship, refining the business model, products and services, pivoting, types of business models, business model evolution, generating new business models, analyzing the business model, adding new customer segment, product manager, significance and role of product manager.

Unit – II: Business Planning & Exploring Revenue: Business plan, sales plan, hiring sale team, people plan, financial planning, financial forecasting, create a procurement plan, negotiating role play, understanding primary revenue sources, exploring customer lifecycle for growth customers, exploring and identify secondary sources of revenue,

Unit- III: Funding the Growth & Building the A-Team: Overview of funding, funding options for an entrepreneur, explore the right funding options, create funding plan, pitch deck, introduction to building A-Team, pitching to attract the talent, setting your team, defining roles, hiring the A-Team members.

Unit- IV: Brand and Channel Strategy & Leveraging Technologies: Introduction to branding, drawn the venture's golden circle, positioning and positioning statements, creating brand name, logo, social media handle, Identify right channels, leaping ahead with technology,

digital marketing for startups, plan a social media campaign, digital collaboration, store documents online, other technology platforms, make tech plan, platform wish list.

Unit V: Measuring Progress and Legal Matters: Metrics for customer acquisition (CAC, CLV, and ARPU), metrics for customer retention and satisfaction, find CAC, CLV and ARPU, key financial metrics, communicate metrics, new revenue stream through key financial metrics, re-forecasting of financial plan, identify professional help for legal and compliance requirements, searching of trademark and brand name and company name.

Unit –VI: Seeking Support and Final Project: Mentors help to create successful startups, identify mentors and advisors, importance of mentors and advisors, scout the board of directors, overview on final project, capstone project presentation, contents of capstone project.

TEXT BOOKS:

1. Entrepreneurship Rajeev Roy "" oxford ,2012
2. Entrepreneurship Development Khanka, ,S.Chand 2012

REFERENCES:

1. Small Scale industries and Entrepreneurship Vasanth Desai "Himalya publishing 2012
2. Robert Hisrich et al "enterpreneruship TMH 2012
3. Entrepreneurship Development Khanka, ,S.Chand 2012
4. Entrepreneurship Development B.Janikairam and M Rizwana
5. e-source: - www.learnwise.org

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level						M	M	M				

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
BASICS OF POLITY AND ECOLOGY
(Open Elective –II)

Code: 8ZC26
Prerequisite: NIL

L	T	P	C
2	-	-	2

COURSE OBJECTIVE :
To provide basic knowledge relating to the Indian Polity and Ecology, thus making the students appreciate the current aspects related to both polity and ecology.

COURSE OUTCOMES :
At the end of this course, the students will be able to

1. Outline knowledge relating to the Indian Constitution and the Preamble to the Constitution.
2. Relate to the fundamental rights and duties of the Indian citizens and the directive principles of state policy.
3. Identify about the federal structure and judiciary of India.
4. Understand knowledge relating to the conservation of the environment.
5. Analyse about bio-diversity and climatic changes occurring in the environment.
6. Discuss about the international treaties, conventions and organizations active in the field of environmental protection.

Unit 1: Introduction to Salient Features of Constitution Significance of the Constitution, Distinction between Written and Unwritten Constitution, Composition of the Constituent Assembly and the role and objectives of the Drafting Committee, Main features and the nature of the Constitution of India. Preamble to the Constitution and its relevance; Basic principles of Preamble and their reflection in the constitutional provisions.

Unit 2: Fundamental Rights, Duties and Directive Principles of State Policy Fundamental Rights and Duties of Citizens- Importance of Rights and Duties, Dignity of an individual, Safeguards against deprivation of life and personal liberty; Writs for the protection of Fundamental Rights; Meaning of Directive Principles of State Policy, Classification of the Directive Principles, Role of Directive Principles, Role of Directive Principles in the establishment of economic and social democracy.

Unit 3: Government and Judiciary Legislative, financial and judicial powers of the President; Appointment of Prime Minister and constitution of Council of Ministers; Powers and functions of Prime Minister; Individual and collective responsibility; Powers and discretionary powers of the Governor; Appointment of the Chief Minister, Formation of the Council of Ministers; Powers and jurisdiction of the Supreme Court and High Courts of India.

Unit 4: Ecology and Environment Environment-Origin, Evolution of Environment and its uses by Humans; Degradation of Natural Environment, Principles of Ecology; Composition and various types of Ecosystem; International Solar Alliance.

Unit 5: Bio-diversity and Climate Change Classification of Biodiversity, Biodiversity loss, Methods of biodiversity conservation, Conservation of Natural Resources such as Soil, Land, Water and Energy. Sustainable Development and Cleaner Technology. Green house effect and Global Warming, Strategies to cope with Green House Effect, Desertification, Depletion of ozone layer.

Unit 6: International Treaties, Conventions & Organizations: Indian Board for Wildlife (IBW). United Nations Environmental Programme (UNEP), United Nations Framework Convention for Climate Change (UNFCCC). International Union for conservation of Nature and National Resources (IUCN), World Wide Fund for Nature (WWF).Montreal Protocol (1987), Kyoto Protocol (1997), Paris Agreement (2016).

REFERENCE BOOKS:

1. Indian Polity - M. Laxmikanth, 5th Edition, McGraw Hill Education, Chennai
2. Environment And Ecology A Complete Guide for Civil Services Preliminary and Main Examinations – R. Rajgopalan, 2017, Oakbridge Publishing Pvt. Limited.
3. Introduction to Constitution of India – Dr. Durga Das Basu, 22nd Edition, 2015, LexisNexis
4. Our Constitution – Subhash C Kashyap, 5th Edition, 2015, National Book Trust, India
5. Environment and Ecology – Anil Kumar De and Arnab Kumar De, 2009, New Age International (P) Limited.
6. ICSE Environment Education for Class X – Dr. M.P. Mishra , 2009, S.Chand and Company

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level						L	L		L		M	

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering

ENTREPRENEURSHIP PROJECT MANAGEMENTAND STRUCTURED FINANCE
(Open Elective –II)

	L	T	P	C
Code: 8ZC19	**2**	**-**	**-**	**2**

Prerequisite: Basics of Entrepreneurship

COURSE OBJECTIVES :

Make students understand the nature of Entrepreneurship, its importance and to create an awareness regarding the systematic planning and implementation of projects; highlight the components of structured finance and establish a framework of CMBS with respect to Servicing Agreements

COURSE OUTCOMES :

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

1. Students will understand the nature of Entrepreneurship and its importance
2. Will gain knowledge regarding project, its life cycle and organization
3. Will gain knowledge relating to project formulation and implementation
4. Comprehend the components of structured finance
5. Establish a framework of CMBS
6. Students will gain knowledge relating to the CRE Servicing

UNIT I CONCEPTS OF ENTREPRENEURSHIP: Definition of Entrepreneurship, Evolution of Entrepreneurship, Classification of Entrepreneurs**,** Characteristics of Entrepreneur**,** Selection of Product and the means required for starting an enterprise, Financing and Financial incentives available, Success rate of entrepreneurs – a case study.

UNIT-II BASICS OF PROJECT MANAGEMENT: Concept and characteristics of a project - types of projects - Objectives of project management - Project Organizational structure - Project life cycle - Challenges and problems of project management - Qualities & functions of a project manager.

UNIT III PROJECT FORMULATION AND IMPLEMENTATION: Generation of Project Ideas; Monitoring the environment; Preliminary Screening of Projects; Feasibility study; Project Selection. Detailed Project Report: Market, Technical, Financial and Economic aspects. Pre-requisites for Successful Project Implementation; Control of in-progress Projects (Gantt chart, PERT, CPM); Project Risk Management Process, Post-audit; Abandonment Analysis

UNIT-IV INTRODUCTION TO STRUCTURED FINANCE: Term Loans, Bonds/Debentures, Types of debentures, Issue of debt instruments. Structured Finance: Evolution, Securitization process, characteristics, and structured finance products (ABS, CDO, MBS, CDS)

UNIT-V COMMERCIAL MORTAGAGE LOAN BASICS: Definition and characteristics of CMBS, CMBS Vs other Mortgage Backed Securities, CMBS three level perspective: property

level, loan level, bond level; Life cycle of commercial real estate loans – Loan cycle, Key players in loan cycle; Property types and characteristics, property performance.

UNIT-V1 BASICS OF CRE SERVICING: Introduction to servicing, Role of the Servicer, Servicing approaches, Influence of technology, Ethics in commercial servicing, Servicing – sources of income, Overview of servicing agreements, Pooling & Servicing agreement, Sub servicing agreement.

REFERENCE BOOKS:

1. H. Nandan, Fundamentals of Entrepreneurship, Prentice Hall of India, First Edition, New Delhi, 2007.
2. Jeffrey K. Pinto "Project Management", 2nd edition, Pearson
3. DhandapaniAlagiri "Structured Finance – Concepts & Perspectives", ICFAI University press.
4. Projects by Prasanna Chandra, McGraw-Hill Publishing Co. Ltd
5. Project Management: Systems approach to Planning Scheduling and Controlling, H. Kerzner.
6. The Complete Real Estate Documents by Mazyar M. Hedayat, John J. Oleary
7. The Fundamentals of Listing and Selling Commercial Real Estate - By Keim K. Loren (Author)

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M	M									

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
PRINCIPLES OF OPERATIONS RESEARCH
(Open Elective –II)

L	T	P	C
2	-	-	2

Code: 8BC52
Prerequisite : Linear Algebra and Calculus, Differential Calculus and Numerical Methods

Course Objectives:
The course aims at building capabilities in the students for analyzing different situations in the industrial/ business scenario involving limited resources and finding the optimal solution within constraints.

Course Outcomes:

1. Formulate and solve mathematical model (linear programming problem) for a physical situations like production, distribution of goods and economics.
2. Recognize and Solve the problem of transportation involving a large number of shipping routes with least transportation cost and generate optimal assignment strategy for different situations
3. Use Johnson's rule to create the optimal sequencing schedule for a sequencing problem and make decisions about replacing an item using replacement policy
4. Analyze the performance measures of Queing system and Calculate the EOQ for minimizing the total inventory cost
5. Apply simulation techniques for solving various types of problems and general idea development about Markov chains

UNIT – I

INTRODUCTION: Definition, Characteristics and Phases and Types of models, applications.

LINEAR PROGRAMMING PROBLEM- Formulation – Graphical solution, Simplex method-Types of variables, Unique and Multiple optimal solution, Redundancy & Degeneracy in LPP, Unbounded solution, Artificial variables techniques - Big-M method with feasible and infeasible solutions, Two–phase method, Primal to Dual formation with Duality Principle.

UNIT – II

TRANSPORTATION PROBLEM – Formulation – methods of finding initial solution (NW corner, VAM, Least cost Method) Optimal solution (Stepping stone Method, MODI method) Special cases in TP: unbalanced, Degeneracy, Restriction and maximization case.

ASSIGNMENT PROBLEM – Formulation – Optimal solution (Hungarian Method) - Variants of Assignment Problem-Unbalanced, Restriction, Maximization, Airlines layover case, Traveling Salesman problem.

UNIT – III

SEQUENCING – Introduction – Terminology, Assumptions, Johnson's procedure- Processing n jobs through two machines – Processing n jobs through three machines – Processing two jobs through 'm' machines (Gantt Chart).

REPLACEMENT: Introduction – Types of failure, Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, Group replacement.

UNIT – IV

THEORY OF GAMES: Introduction and Terminologies, Criterion and optimal strategy – Solution of games with saddle points: Mixed Strategies-Rectangular games without saddle points, Dominance principle, Average Relational Dominance, m X 2 & 2 X n games -Graphical method and Sub Game Method, Matrix Method, Application of LPP in game theory.

UNIT – V

WAITING LINES: Introduction, Terminology, Structure of a queue, calling population characteristics-size, behavior, pattern of arrivals, Kendall-Lee notation, Queuing Models: Single Channel: Poisson arrivals: exponential service times: with finite and infinite population, Multichannel: Poisson arrivals: exponential service times with infinite population

INVENTORY : Introduction, Inventory costs, Concept of EOQ, Single item Deterministic models with and without shortages, Single item inventory models with one price break and multiple price breaks, Stochastic models – Instantaneous demand and no set up cost.

UNIT – VI

SIMULATION: Definition – Types of simulation – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages

Markov chains: Introduction to Markov chains, Analysis Assumptions, Input output probabilities, Applications (Only basic understanding)

TEXT BOOKS:

1. Operations research / Hira & Gupta

2. Operation Research /J.K.Sharma/Macmillan Publishers.

REFERENCES:

1. Quantitative Techniques in Management: N D Vohra, TMH

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	L			L	L						

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
FUNDAMENTALS OF MEASUREMENTS AND INSTRUMENTATION
(Open Elective –II)

L	T	P	C
2	-	-	2

Code: 8AC44
Prerequisite: NIL

COURSE OBJECTIVES :
The basic principles of all measuring instruments and in measurement of electrical and non-electrical parameters viz., Resistance, Inductance, Capacitance, voltage, current Power factor, Power, Energy, Strain, Temperature, Torque, Displacement etc. and the different types of electrical and non electrical transducers. It introduces the different signal analyzers and oscilloscopes.

COURSE OUTCOMES :
At the end of this course, the students will be able to
1. Understand the principle of operation of different types of instruments viz., PMMC, moving iron type of instruments, the required characteristics of an instrument in general. The student demonstrates the ability to compensate for the errors in the instruments and to extend the range of the instruments.
2. Demonstrates the knowledge of Potential and Current transformers; the errors in them and the effect of having an open/short in the secondary circuits; Understand the principle of operation of Dynamometer and Moving-iron type of Power factor meters.
3. Understand the principle of operation of dynamometer type of Wattmeter and Induction type of Energy meter; use the wattmeter to measure the Active and Reactive power and demonstrates the ability to extend the range of them.
4. Identify and use different techniques of measurement of Resistance, Inductance and Capacitance values.
5. Understand the principle of operation of Different type of digital voltmeters, wave analyzers, spectrum analyzers and Cathode ray Oscilloscope.
6. Demonstrates the ability in characterizing the different types of transducers and uses them to measure Strain, Gauge Sensitivity, Displacement, Velocity, Acceleration, Force, Torque and Temperature.

UNIT-I MEASURING INSTRUMENTS- INSTRUMENT TRANSFORMERS: Significance of Measurement, static characteristic of system- Linearity, Sensitivity, Precision, Accuracy - Classification - Deflecting, Control and Damping torques, Ammeters and Voltmeters, PMMC, Moving iron type instruments, Expression for the Deflecting torque and Control torque, Errors and Compensations, Extension of range using Shunts and Series resistance.

UNIT –II: INSTRUMENT TRANSFORMERS Introduction, advantages, burden of instrument transformer, Current Transformer - errors in current transformer, Effect of secondary open circuit, Potential transformer- errors in potential transformer, Testing of current

transformers with silsbee's method. Power Factor Meters: Type of P.F. Meters, Dynamometer and Moving iron type, 1- ph and 3-ph meters.

UNIT –III MEASUREMENT OF POWER& ENERGY: Single phase dynamometer wattmeter-LPF and UPF-Double element and three element dynamometer wattmeter, Expression for deflecting and control torques, Extension of range of wattmeter using instrument transformers, Measurement of active and reactive powers in balanced and unbalanced systems, Single phase induction type energy meter, Driving and braking torques, Testing by phantom loading, Three phase energy meter .

UNIT - IV MEASUREMENT OF RESISTANCE - MAGNETIC MEASUREMENTS-A.C. BRIDGES: Principle and operation of D.C. Crompton's potentiometer, Standardization, Measurement of unknown resistance, current, voltage. Method of measuring low- Medium and High resistance, sensitivity of Wheatstone's bridge, Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, Measurement of high resistance, loss of charge method, Measurement of inductance, Quality Factor, Maxwell's bridge, Hay's bridge, Anderson's bridge, Owen's bridge. Measurement of capacitance and loss angle, Desauty Bridge, Wien's bridge, Schering Bridge.

UNIT-V DIGITAL VOLTMETERS- SIGNAL ANALYZERS- CRO: Digital voltmeters, Successive approximation, Ramp, Dual slope integration continuous balance type, Wave Analyzers, Frequency selective analyzers, Heterodyne, Application of Wave analyzers, Harmonic Analyzers, Total Harmonic distortion, spectrum analyzers, Basic spectrum analyzers, Spectral displays, Q meter and RMS voltmeters . CRO- Cathode Ray Tube (CRT), Screens, Probes, Applications of CRO, Measurement of frequency and phase using CRO, Block diagram.

UNIT-VI MEASUREMENT OF NON-ELECTRICAL QUANTITIES: Transducers - Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers, Principle operation of Resistor, Inductor, LVDT and Capacitor transducers, LVDT Applications, Strain gauge and its principle of operation, Guage factor- Thermistors, Thermocouples, Piezo electric transducers, Photovoltaic, Photo conductive cells. Measurement of strain, Gauge Sensitivity, Displacement, Velocity, Acceleration, Force, Torque, Measurement of Temperature.

TEXT BOOKS:

1. Electrical Measurements and measuring Instruments – E.W. Golding and F.C. Widdis, 5th Edition, Wheeler Publishing.
2. Transducers and Instrumentation– D.V.S Murthy, Prentice Hall of India, 2nd Edition.
3. A course in Electrical and Electronic Measurements and Instrumentation -A.K. Sawhney, Dhanpatrai & Co. 18th Edition.

REFERENCE BOOKS:

1. Measurements Systems, Applications and Design – D O Doeblin- Tata MC Graw-Hill.
2. Principles of Measurement and Instrumentation – A.S Morris, Pearson /Prentice Hall of India.
3. Electronic Instrumentation- H.S.Kalsi Tata MC Graw – Hill Edition, 3rd Edition.
4. Modern Electronic Instrumentation and Measurement techniques – A.D Helfrick and W.D.Cooper, Pearson/Prentice Hall of India.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	L	M									

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
INTRODUCTION TO VLSI DESIGN
(Open Elective –II)

L	T	P	C
2	-	-	2

Code: 8DC43
Prerequisite: Embedded Systems

COURSE OBJECTIVES:
IC fabrication process of various technologies and to understand the electrical properties of MOS transistor. Various Layers and layouts for a different technology design rules and how scaling impacts its performance.

COURSE OUTCOMES:
At the end of this course, the students will be able to

1. Identify the working principle of diffusion, ion implantation, metallization and other basic components.
2. Comprehend basic electrical properties of various types of mos transistors
3. Identify the significance of cmos logic gates and design the multiplexers.
4. Draw layouts for a cmos circuit and logic design and validate them.
5. Differentiate the various types of memories and clocking strategies
6. Design various combinational and sequential circuits

UNIT I
INTRODUCTION TO MOS AND IC FABRICATION TECHNOLOGY: MOS, PMOS, NMOS, CMOS & BiCMOS, VLSI Design Flow, Oxidation, Lithography, Diffusion, Ion Implantation, Metallization, Encapsulation, Probe testing, Integrated Resistors and Capacitors
Application – CMOS IC Manufacturing

UNIT II
BASIC ELECTRICAL PROPERTIES: Basic Electrical Properties of MOS and BiCMOS Circuits: V-I characteristics, Ids-Vds relationships, MOS transistor threshold Voltage, gm, gds, Figure of Merit (ω_o), Zpu/Zpd, Latch-Up in CMOS
INVERTERS: NMOS Inverter, Various Pull-Ups, CMOS Inverter Analysis & Design, Bi-CMOS Inverters

UNIT III
CIRCUIT DESIGN PROCESSES: MOS Layers, Stick Diagrams, Lamda-based CMOS Design rules for Wires, Contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling
GATES: CMOS Logic Gates and Structures, Switch logic, NAND, NOR, Compound gates, Multiplexers, Layout Diagrams Gates
Application – IC Physical Design – NAND and NOR

UNIT IV
PART A - CIRCUIT CHARACTERIZATION AND PERFORMANCE

Switching characteristics – fall time, Rise time, Delay time, CMOS Gate sizing, Power consumption (Static and Dynamic), Charge sharing

PART B – CMOS CIRCUIT AND LOGIC DESIGN

Logic structures / styles – Pseudo NMOS, Dynamic, Clock CMOS, Domino logic, CVSL, Modified domino logic, Pass transistor logic, transmission gate

UNIT V

MEMORY: Latches and Registers**,** Clocking strategies (Single Phase), Memory cells (SRAM & DRAM), Row decoders, Column decoders, Read/Write circuitry, LIFO

UNIT VI

SUBSYSTEM DESIGN: Adders, parity generators, comparators, binary counters, multipliers, Shifter, ALUs

TEXTBOOKS:

1. Principles of CMOS VLSI Design - Weste and Eshraghian, Pearson Education, 2nd Edition, 2009.
2. Digital Integrated Circuits: A Design Perspective - John M. Rabaey, 2nd Edition, 2002.

REFERENCE BOOKS:

1. Chip Design for Submicron VLSI: CMOS Layout & Simulation, - John P. Uyemura, Thomson Learning.
2. Introduction to VLSI Circuits and Systems - John .P. Uyemura, JohnWiley, 2003.
3. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition.
4. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.

VLSI Technology – S.M. SZE, 2nd Edition, TMH, 2003.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	L		M			M	L	L				

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
CO – CREATION AND PRODUCT DESIGN
(Open Elective –II)

L	T	P	C
2	-	-	2

Code: 8ZC09
Prerequisite:

Course Objective:
The objective of the course is to make students understand the fundamental concepts of design thinking, and to familiarize with product design process and to motivate the students to ideate new products and services.

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

1. Understand the inputs required for human centric design thinking the students learn the techniques of idea generation.
2. Explore the different phases of Ideation process.
3. Outline emerging technologies and understand 3d printing in manufacturing.
4. Indicate developments of prototypes.
5. Understand reverse engineering methods in product development.
6. Review the information on IPR, and patent application.

Unit – I: Human Centered Design: Understanding user and Customer perspectives, Identify insights and opportunities, Interviewing, User Experience design.Frame your design challenge**.** Empathy tools and techniques.

Unit – II: Ideation Process: Articulation of Problem Statement, Visualizing Ideas, Communicating ideas and compelling story telling, Brainstorming, Divergent thinking in exploring solutions, 3- box thinking, 3-box framework and Box-3 ideation.

Unit – III: Emerging Technologies and Design: Emerging technologies, utilization and growth, Automation through Industry 4.0, IOT for Network and Intelligent world, efficient and effective manufacturing aided by Robotics, Custom manufacturing by Additive / 3D printing, Augmented reality for product and process.

Unit – IV: Prototyping: Introduction to Prototype, types of prototype, prototyping strategies, Design consideration in the five stages of the product life cycle. Prototype building by different engineering disciplines. Testing Solution and taking the solution to the users. Create a pitch for your design.

Unit – V:Reverse engineering in product development: Reversing engineering methods, identifying the bad features in a product, reduction in size and weight, usage of new materials,importance of ergonomics in product development, environmental considerations in design, and safety considerations in design.

Unit – VI: Intellectual Property Rights: Introduction to IPR, Patents – Types of Patents, elements of patentability, Patents registration Procedure, Patent office and Appellate Board, Rights and Duties of Patentee, Restoration of Lapsed patents.

Text Books:

1. Philip Kosky, Robert T. Balmer, William D. Keat, George Wise, "Exploring Engineering: An Introduction to Engineering and Design", 4th edition, Elsevier, 2016.
2. David Ralzman, "History of Modern Design", 2nd edition, Laurence King Publishing Ltd., 2010 3. An AVA Book, "Design Thinking", AVA Publishing, 2010.
3. Ingle, B. R. (2013). Design thinking for entrepreneurs and small businesses: Putting the power of design to work. Apress.
4. Norman, D. A. (2016). Living with complexity. MIT press.
5. Chapman, J. (2017). Routledge handbook of sustainable product design. Taylor & Francis.
6. Nithyananda, K.V. (2019), IPR, protection and Management, India, Cengage learning India.

Reference Books:

1. G. Pahl, W.Beitz, J. Feldhusen, KH Grote, "Engineering Design: A Systematic Approach", 3rd edition, Springer, 2007. 2. Tom Kelley, Jonathan Littman, "Ten Faces in Innovation", Currency Books, 2006.
2. Kumar, V. (2012). 101 design methods: A structured approach for driving innovation in your organization. John Wiley & Sons.
3. Chapman, J. (2012). Designers Visionaries and Other Stories: A Collection of Sustainable Design Essays. Taylor & Francis.
4. Garrett, J. J. (2010). The elements of user experience: user-centered design for the web and beyond. Pearson Education.
5. Neeraj, P. &Khusdeep, D (2014), IPR, India, IN: PHI Learning.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M	L									

Syllabus for B. Tech III Year II semester
Computer Science and Engineering
ADVANCED COMPUTER NETWORKS
(Professional Elective –II)

L	T	P	C
3	0	0	3

Code: 8EC12
Prerequisite: Data Communications and Computer Networks

Course Objectives:
This course aims to provide advanced background on relevant computer networking topics to have a comprehensive and deep knowledge in computer networks.

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

1. Appraise networking and Internet concepts and be familiar with OSI Model and TCP/IP model.
2. Detect networking errors learn correction techniques
3. Infer the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack.
4. Differentiate Internet addressing IPv4 and IPv6 and Internet protocols
5. Conceptualize wireless networking and to Develop new protocols in networking
6. Design new virtual private networks

UNIT I Computer Networks and the Internet: Introduction to Internet and Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, History of Computer Networking and the Internet – **(Chapter 1) of T1.**

Foundation of Networking Models: 6-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM - **(Chapter 2) of T2**.

UNIT II The Link Layer and Local Area Networks: Link Layer: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, And Ethernet – **(Chapter 6) of T1**

Unit – III Routing and Internetworking: Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols, Congestion Control at Network Layer – **(Chapter 7) of T2**

UNIT IV Logical Addressing: IPv4 Addresses, IPv6 Addresses - **Internet Protocol:** Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6 – **(Chapter 19, 20) of T3**
Transport and End-to-End Protocols: Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control – **(Chapter 8) of T2**

Application Layer: Principles of Network Applications, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing – **(Chapter 2) of T1**

UNIT V Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs) - **Mobile Ad-Hoc Networks:** Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks – **Wireless Sensor Networks** and Protocol Structures - **(Chapter 6, 19, 20) of T2**

UNIT VI VPNs, Tunneling and Overlay Networks: Virtual Private Networks (VPNs), Multiprotocol Label Switching (MPLS), Overlay Networks – **VoIP and Multimedia Networking:** Overview of IP Telephony – **(Chapters 16, 18) of T2**

TEXT BOOKS:

1. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, Keith W.Ross, Third Edition, Pearson Education, 2007
2. Computer and Communication Networks, Nader F. Mir, Pearson Education, 2007

REFERENCES:

1. An Engineering Approach to Computer Networking , S.Keshav, Pearson Education, 1997
2. Computer Networks: Principles, Technologies And Protocols For Network Design, Natalia Olifer, Victor Olifer, Wiley India, 2006.
3. Computer Networks, Andrew S. Tanenbaum, Fourth Edition, Prentice Hall.
4. Fundamentals of Business Data Communications, Jerry FitzGerald and Alan Dennis, Tenth Edition, Wiley, 2009.
5. Campus Network Design Fundamentals, Diane Teare, Catherine Paquet, Pearson Education (CISCO Press)
6. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill, 2007

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M			M	M	M	M				

Syllabus for B. Tech III Year II semester
Computer Science and Engineering
DIGITAL FORENSICS
(Professional Elective –II)

L	T	P	C
3	0	0	3

Code: 8EC22
Prerequisite: Digital Electronics, Operating System, Computer Organization

Course Objectives:

1. To understand the basic digital forensics and techniques for conducting the forensic examination on different digital devices.
2. To understand how to examine digital evidences such as the data acquisition, identification analysis.

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

1. Outline Forensic science and Digital Forensic concepts
2. Comprehend the technical concepts involved in understanding the digital forensics.
3. Interpret the cyber pieces of evidence, Digital forensic process model.
4. Familiarize the computer operating system concepts involved in digital forensics.
5. Determine the legal aspects of Digital Forensics.
6. Demonstrate various forensic tools to investigate the cyber crime and to identify the digital pieces of evidence

UNIT I: Introduction:
Understanding of forensic science, digital forensic, The digital forensic process, Locard's Exchange principle, scientific models.

UNIT II: Understanding of the technical concepts:
Basic computer organization, File system, Memory organization concept, Data storage concepts

UNIT III: Digital Forensics Process Model:
Introduction to cyber crime scene, Documenting the scene and evidence, maintaining the Chain of custody, forensic cloning of evidence, Live and dead system forensic , Hashing concepts to maintain the integrity of evidence, Report drafting.

UNIT IV: Computer Operating System Artifacts:
Finding deleted data, hibernating files, examining window registry, recycle bin operation, understanding of metadata, Restore points and shadow copies

UNIT V: Legal aspects of digital forensics:
Understanding of legal aspects and their impact on digital forensics, Electronics discovery

UNIT VI: Understanding of digital Forensic tools
Quality assurance, Tool validation, Tool selection, Hardware and Software tools

Case Study:
Understanding of Internet resources, Web browser, Email header forensic, social Networking sites

Text Books:

1. ThebasicsofdigitalForensics(LatestEdition)– Theprimerforgettingstartedindigitalforensicsby John Sammons – Elsevier Syngress Imprint

References:

1. Cybersecurity– Understandingofcybercrimes,computerforensicsandLegalperspectivesbyNinaGodbole and Sunit Belapure – WileyIndia Publication
2. PracticalDigitalForensics– RichardBoddington[PACKT]Publication,Opensourcecommunity
3. https://nptel.ac.in/
4. https://www.coursera.org/
5. Ministry of Electronics and Information Technology (MeitY) – Govt of India – Information Security Project -https://www.infosecawareness.in/

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	H	M	M	H	M	M	M	H	M	H	M

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering

Software Project Management

(Professional Elective –II)

L	T	P	C
3	-	-	3

Code : 8FC13
Prerequisite : Software Engineering and OOAD

Course Objectives:
Software Project Management course aims to give the students an understanding of the building blocks of software projects and induces the essence of project management. The spectrum of topics covered in this subject including software lifecycle, software economics, artifacts, processes, workflows, architecture, planning etc help strengthen the fundamentals of the student enabling them to have a deeper understanding of software project management.

Course Outcomes:
At the end of this course the student will be able to
1. Explain primitives of Project Planning and evolution of software economics.
2. Describe software economics; reduce Software product size, improvement in software processes, improving team effectiveness, improving automation, Achieving quality.
3. Explain Life cycle phases and Artifacts of the process.
4. Describe Model based software architectures and Work Flows.
5. Apply Checkpoints for a process such as Major mile stones, Minor Milestones and apply work breakdown structures for a iterative process within cost and schedule. Describe Project Organizations and Responsibilities.
6. Describe Automation and Project Control and Process instrumentation and explain Future Software Project Management such as Modern Project Profiles and Next generation project management.

UNIT I: Concept of Management: Management Definition, Role and Responsibilities of Management, Management in Software Industry
Types of Software Organizations: Start-up companies, Independent Software Companies, Multi-National Software Companies.
Conventional Software Management: The waterfall model, conventional software Management performance.
Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

UNIT II: Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.
The old way and the new way: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT III: Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

UNIT IV: Model based software architectures: A Management perspective and technical perspective. **Work Flows of the process:** Software process workflows, Iteration workflows.

UNIT V: Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments. **Iterative Process Planning:** Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning. **Project Organizations and Responsibilities:** Line-of-Business Organizations, Project Organizations, evolution of Organizations.

UNIT VI: Process Automation: Automation Building blocks, The Project Environment.
Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations,
Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions.
Case study: The command center processing and display system – Replacement (CCPDS-R)

TEXTBOOKS:

1. Software Project Management, Walker Royce: Pearson Education, 2005.

REFERENCE BOOKS:

1. Management Concepts and Practices, Tim Hannagan, FT Prentice Hall, 5th Edition
2. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
3. Software Project Management, Joel Henry, Pearson Education.
4. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M	M	M	L						

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
MACHINE LEARNING
(Professional Elective –II)

L	T	P	C
3	0	0	3

Code: 8EC17
Prerequisite: Introduction to Data Science

Course Objectives:

1. To introduce students to the basic concepts and techniques of Machine Learning.
2. To have a thorough understanding of the Supervised and Unsupervised learning techniques
3. To study the various probability based learning techniques
4. To understand graphical models of machine learning algorithms

Course Outcomes:

At the end of this course, the student is able to

1. Understand the fundamental concepts of ML and Designing a Learning System.
2. Understand the basic concepts of MLP,RBF and SVM and their applications.
3. Understand the Probability models namely supervised, unsupervised,basic statistics analyze their analysis of algorithms along with their applications.
4. Understand various Dimensionality Reduction Techniques and Apply various Evolutionary Algorithms with models
5. Understand the Graphical models and their applications
6. Understanding Analytical Learning and Analyze KBANN Algorithm.

UNIT I: INTRODUCTION:

Learning (Book-1) – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Linear Discriminants: Definitions of Perceptron, Linear Separability Linear Regression.

Design a Learning System (Book-2) – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm.

UNIT II: LINEAR MODELS:

Multi-layer Perceptron(Book-1) – Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Interpolations and Basis Functions – Support Vector Machines

UNIT III: TREE AND PROBABILISTIC MODELS:

Learning with Trees (Book-1) – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms

UNIT IV: DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS:

Dimensionality Reduction(Book-1) – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example

UNIT V: GRAPHICAL MODELS:

Markov Chain Monte Carlo Methods (Book-1) – Sampling – Proposal Distribution – Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods

UNIT – VI ANALYTICAL LEARNING

Learning with perfect domain theory (Book-2) – Explanation based Learning – Inductive analytical approach to learning – KBANN algorithm

TEXT BOOKS:

1. Stephen Marsland, ―Machine Learning – An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
2. Tom M Mitchell, ―Machine Learning, First Edition, McGraw Hill Education, 2013.

REFERENCES:

1. Peter Flach, ―Machine Learning: The Art and Science of Algorithms that Make Sense of Data‖, First Edition, Cambridge University Press, 2012.
2. Jason Bell, ―Machine learning – Hands on for Developers and Technical Professionals‖, First Edition, Wiley, 2014
3. Ethem Alpaydin, ―Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press, 2014.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	H	L		H							

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
Image Processing
(Professional Elective –II)

L	T	P	C
3	-	-	3

Code: 8FC18
Prerequisite : Computer Graphics

Course Objectives:
Make decisions from image data, online inspection and face recognition

Course Outcomes:
At the end of this course the student will be able to
1. Analyze general terminology of image processing.
2. Examine various types of images, intensity transformations and spatial filtering.
3. Develop Fourier transform for image processing in frequency domain.
4. Evaluate the methodologies for image segmentation, restoration etc.
5. Implement image process and analysis algorithms.
6. Apply image processing algorithms in practical applications.

UNIT – I
Introduction: Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system.. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels

UNIT – II
Image enhancement in the spatial domain: Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods

UNIT – III
Image restoration: A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner filtering, constrained least squares filtering, geometric transforms; Introduction to the Fourier transform and the frequency domain, estimating the degradation function

UNIT– IV
Color Image Processing: Color fundamentals, color models, pseudo color image processing, basics of full–color image processing, color transforms, smoothing and sharpening, color segmentation.

UNIT – V
Image Compression and Morphology: Fundamentals, image compression models, error-free compression, lossy predictive coding, image compression standards, Morphological Image Processing: Preliminaries, dilation, erosion, open and closing, hit or miss transformation

UNIT – VI

Image Segmentation and Recognition: Detection of discontinuous, edge linking and boundary detection, thresholding, region–based segmentation, Patterns and patterns classes, recognition based on decision–theoretic methods, matching, optimum statistical classifiers

Text Books:

1. Digital Image Processing, Rafeal C.Gonzalez, Richard E.Woods, Third Edition, Pearson Education/PHI.

REFERENCE BOOKS:

1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
3. Computer Vision and Image Processing, Adrian Low, Second Edition, B.S.Publications
4. Digital Image Processing, William K. Prat, Wily Third Edition
5. Digital Image Processing and Analysis, B. Chanda, D. Datta Majumder, Prentice Hall of India, 2003

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M	H	H							H

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
C# AND .NET FRAMEWORK
(Professional Elective-II)

L	T	P	C
3	0	0	3

Code: 8FC26

Prerequisite: Object Oriented Programming through Java

COURSE OBJECTIVES:

Understand .NET Interoperation services. Learn Client side programming and Server side architectures and programming technologies, .NET Remoting. Understand the significance of Web services and web service security, the importance of RESTful, SOAP, DISCO, and UDDI and Web Services.

COURSE OUTCOMES:

At the end of this course, students will able to

1. Introducing .Net Architecture and learn basic programming in C# and the object oriented programming concepts.
2. Explain advance features and enhance skills in writing windows applications, ADO.NET and ASP.NET.
3. Discuss various class libraries for different applications and data manipulation functions.
4. Understand the advanced concepts in data connectivity, WPF, WCF and WWF with C# and .NET 4.5.
5. Develop distributed applications using .NET Framework.
6. Create mobile applications using .NET compact Framework.

UNIT I: INTRODUCTION TO C#

Introducing C#, Understanding .NET, overview of C#, Literals, Variables, Data Types, Operators, checked and unchecked operators, Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, Arrays, Array Class, Array List, String, String Builder, Structure, Enumerations, boxing and unboxing.

UNIT II :OBJECT ORIENTED ASPECTS OF C#

Class, Objects, Constructors and its types, inheritance, properties, indexers, index overloading, polymorphism, sealed class and methods, interface, abstract class, abstract and interface, operator overloading, delegates, events, errors and exception, Threading.

UNIT III : APPLICATION DEVELOPMENT ON .NET

Building windows application, Creating our own window forms with events and controls, menu creation, inheriting window forms, SDI and MDI application, Dialog Box(Modal and Modeless), accessing data with ADO.NET, Dataset, typed dataset, Data Adapter, updating database using stored procedures, SQL Server with ADO.NET, handling exceptions, validating controls, windows application configuration.

UNITIV: WEB BASED APPLICATION DEVELOPMENT ON .NET

Programming web application with web forms, ASP.NET introduction, working with XML and

.NET, Creating Virtual Directory and Web Application, session management techniques, web. config, web services.

UNIT V: SQL Connection: Passing datasets, returning datasets from web services, handling transaction, handling exceptions, returning exceptions from SQL Server.

UNIT VI : CLR AND .NET FRAMEWORK Assemblies, Versoning, Attributes, reflection, viewing meta data, type discovery, reflection on type, marshalling, remoting, security.

TEXT BOOKS:

1. Herbert Schildt, "The Complete Reference: C# 4.0", Tata McGraw Hill, 2012.
2. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", Wiley India, 2012.

REFERENCES BOOKS:

1. Andrew Troelsen , "Pro C# 2010 and the .NET 4 Platform, Fifth edition, A Press, 2010.
2. Ian Griffiths, Matthew Adams, Jesse Liberty, "Programming C# 4.0", Sixth Edition, O"Reilly, 2010.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	L	M	M								

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering

Automata Theory and Compiler Design

L	T	P	C
2	1	0	3

Code : 8FC07
Prerequisite : Nil

Course Objectives:

1. Learn principles of Finite state machine, finite automation models, and transition diagrams.
2. Understand regular languages and expressions for writing grammars.
3. Understand context free grammars useful in designing compilers.
4. Study the design and working of a complier .
5. Study the role of grammars in compiler design.
6. Learn a various parsing techniques for design of compilers.

Course Outcomes:

At the end of this course the student will be able to

1. Design the finite automata different Languages
2. Construct finite Automata for a given regular expressions, and derive strings with suitable examples. Conceptualize context free grammars and normal forms.
3. Design the push down automata and Turing Machine for complex languages.
4. Understand LEX tool and relate parsing techniques,
5. Demonstrate and solve problems on SLR, CLR, LALR, operator precedence parser, LR (O), LR(1), LR(K) grammar and use YACC tool.
6. Understand Semantic Analysis concepts to design compiler: and describe Intermediate code generation such as 3-address code form.

UNIT-I: Strings, Alphabet, Language, Operations, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, Equivalence between NFA to DFA conversion.

UNIT-II: Regular Languages, Regular sets, regular expressions, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Closure properties of regular sets (proofs not required).
Context Free Grammars: Context free grammar, derivation trees, Right most and leftmost derivation of strings. Ambiguity in context free grammars. Minimization of Context Free Grammars. Chomsky normal form, Greiback normal form,

UNIT-III: Push down automata: definition, model, acceptance of CFL, Introduction to DCFL and DPDA.
Turing Machine: Turing Machine, definition, model, design of TM, recursively enumerable languages. Chomsky hierarchy of languages

UNIT IV: Overview of compiler – Environment, pass, phase, phases of compiler, LEX tool,

Top Down Parsing: Top down parsing technique, Recursive decent parsing with back tracking, Ambiguous grammar, Elimination of left recursion, Left factoring, Predictive parsing, LL (1).

UNIT V Bottom up parsing: shift reduce parser SLR, CLR, LALR, operator precedence parser, LR (O), LR(1), LR(K) grammar, YACC tool.

UNIT VI: Semantic Analysis: Syntax directed translation, S- Attributed, L Attributed definition, Type checker, Intermediate code generation: 3-address code form, DAG. Code optimization: Optimization, loop optimization, peep-hole optimization, Symbol table format

TEXTBOOKS:

1. Introduction to Automata Theory Languages and Computation. Hopcroft H.E. and Ullman J. D. Pearson Education
2. Introduction to Theory of Computation? Sipser 2nd edition Thomson
3. Compilers Principles, Techniques and Tools Aho, Ullman, Ravisethi, Pearson Education

REFERENCES:

1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
2. Introduction to languages and the Theory of Computation ,John C Martin, TMH
3. Elements of Theory of Computation?, Lewis H.P. & Papadimition C.H. Pearson /PHI.
4. Theory of Computer Science Automata languages and computation -Mishra and Chandrashekaran, 2nd edition, PHI Course Requirements.
5. Modern Compiler Construction in C , Andrew W.Appel Cambridge University Press.
6. Compiler Construction, LOUDEN, Thomson

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M										

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
OPERATING SYSTEMS

Code: 8EC06
Prerequisite: Computer Organization

L	T	P	C
2	1	0	3

COURSE OBJECTIVES:

Learn basics of operating Systems. Understand the process management and synchronization that take place in the operating system. Learn the principles of memory, I/O and file management in a secured environment.

COURSE OUTCOMES:

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

1. Understand the functional architecture of an Operating System with usage of system calls.
2. Analyze various process scheduling algorithms & pragmatics of scheduling algorithms used by various Operating Systems.
3. Solve issues related to process synchronization and Deadlocks in the Operating System.
4. Illustrate the concepts of Memory Management.
5. Outline the directory structure & analyze disk scheduling algorithms.
6. Summarize the aspects of Protection and Security, and understand the concepts of I/O systems.

UNITI: Introduction to Operating System, Computer System Architecture: Single Processor System, Multiprocessor System, Clustered System, Multiprogramming System, Multitasking (Time sharing) system, Operating System Services, System Calls, Types of System Calls, System Programs, Operating System Structure: single structure, layered approach, micro kernels, modules.
Application: system calls in the file systems

UNIT II: Process Management: Process concept, process scheduling, operation on processes; CPU scheduling, scheduling criteria, scheduling algorithms -First Come First Serve (FCFS), Shortest-Job-First (SJF), Priority Scheduling, Round Robin(RR), Multilevel Queue Scheduling. Engg. Applications – Process scheduling in Windows, Linux.

UNIT III: Process-Synchronization & Deadlocks: Critical Section Problems, semaphores; Monitors; Deadlock Characterization, methods for handling deadlocks-deadlock prevention, Avoidance & Detection; Deadlock recovery. Applications: Handling deadlocks in computer system

UNIT IV: Memory Management: Logical& Physical Address Space, swapping, Contiguous memory allocation, Paging and Segmentation techniques, Segmentation with paging; Virtual memory: Demand Paging, Page-Replacement Algorithms, Thrashing. Engg. Applications – Memory management in Windows, Linux.
UNIT V: FileSystem: Different types of files and their access methods, directory structures, various allocation methods, disk scheduling and management and its associated algorithms.
Applications: File allocation, FAT

UNIT VI: I/O Systems: I/O Hardware, Application I/O Interface, Kernel, Transforming I/O requests, Performance Issues. Protection and Security: Goals of protection, Principles of protection, Access matrix, Access control list, Capability List. Security Attacks, Program threats. Applications: Handling I/O requests

TEXT BOOKS:

1. Operating System Concepts by Silberchatz Galvin, 8th edition.
2. Modern Operating Systems by A. Tanenbaum, 1992, Prentice-Hall.
3. Operating Systems Internals and Design Principles by William Stallings,4th edition, 2001, Prentice-Hall

REFERENCES:

1. Operating System By Peterson , 1985, AW.
2. Operating System ByMilankovic, 1990, TMH.
3. Operating System Incorporating With Unix& Windows By Colin Ritche, 1974, TMH.
4. Operating Systems by Mandrik& Donovan, TMH
5. Operating Systems ByDeitel, 1990, AWL.
6. Operating Systems – Advanced Concepts By MukeshSinghal , N.G. Shivaratri, 2003, T.M.H

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	H	H	H	H							

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
WEB TECHNOLOGIES

L	T	P	C
2	1	0	3

Code: 8EC07

Prerequisite: Data Communications and Computer Networks, Object Oriented Programming through Java

Course Objective:
To understand the basics of Web Designing using HTML and CSS, perform the client-side scripting with JavaScript. Understand the different data stores XML, and JSON with full-stack web application development using Angular and study with Server-side programming using Java Servlets and PHP.

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

1. Demonstrate the use of HTML tags. Apply Styles using CSS and Bootstrap.
    a. Develop dynamic programs using Javascript and Typescript.
2. Develop scripts using XML and validate using parsers.
    a. Design a data-interchange format using JSON.
3. Appraise the Expressions, Filters, Directives, Controller, and Modules of Angular.
4. Design responsive web applications with Forms, Scope, Dependency Injection & Services, and Single Page Application (SPA) of Angular.
5. Comprehend the uses of Web servers and design the server-side scripts using Servlets.
6. Design and develop server-side scripts and components using PHP.

UNIT I: Client-Side Web Development. (Text Book 1)
HTML 4 - List, Tables, Images, Forms, Div. (with all attributes and sub-elements)
Cascading Style sheets 3 - Selectors (Basic, Combinatory, Attribute, Pseudo-class, Pseudo Element) using properties (font, background),
Bootstrap basics **(Text Book 2)**
JavaScript - Introduction, variables, objects (Boolean, Number, String, Date, Math, Regular expression, Array), Function, Event handlers (mouse, keyboard, window), Using CSS with JavaScript. Introduction to **Typescript.(Text Book 2)**

UNIT II: Data Store
XML: DTD, XML Schemas, Using XML Processors: DOM Parser and SAX Parser. **(Text Book 1)**
JSON: Introduction, JSON vs XML, Data Types, Parsing JSON, stringify(), Objects, Array, JSON HTML, JSONP (Refer to Textbook: 1 and 5)

UNIT III: Application Development Using Angular: (Part –I) **(Text Book 2)**
Basics: MVC-The Angular way, Features of Angular, Model-View-Controller, My First Angular app.
Expressions: Angular Expressions, Angular vs JavaScript.
Filters: Built-In Filters, Using Angular Filters, Creating Custom Filters.

Directives: Introduction to Directives, Directive Lifecycle, Binding controls to data, Matching directives, Using Angular built-in directives, creating a custom directive.
Controllers: Role of a Controller, Controllers & Modules, Attaching Properties and functions to scope, Nested Controllers, Using Filters in Controllers, Controllers in External Files
Modules: Introduction to Angular Modules, Bootstrapping Angular.

UNIT IV: Application Development Using Angular: (Part- II) **(Text Book 2)**
Forms: Working with Angular Forms, Model Binding, Forms Events, Updating Models with a Twist, Form Controller, Validating Angular Forms, $error object.
Scope: Scope Lifecycle, Scope Inheritance, Scope & Controllers, Root scope, Scope Broadcasting, Two-way data binding, Scope Inheritance, Scope & Directives, $apply and $watch, Scope Events.
Dependency Injection & Services: Dependency Injection, Creating Services, Factory, Service & Provider, Using Dependency Injection, Using Angular built-in services.
Single Page Application (SPA): SPA and its Pros and Cons, Passing Parameters, Changing location, Installing the ngRoute module, Configure routes, Resolving promises, Creating Single Page Apps.

UNIT V: Web Hosting (Text Book 3)
Introduction to Servlets, Lifecycle of a Servlet, Servlet API: javax.servlet Package, javax.servlet.httppackage.Reading Servlet Context Parameters, Reading Initialization parameters, Request Dispatcher Handling HTTP Requests & Responses. Session Tracking.

UNIT VI: **Server Scripting Language: PHP (Text Book 1)**
Declaring variables, data types, array, string, operators, Expression, control statement, function, Reading data from form controls like text boxes, radio buttons, lists, etc.
Handling file upload. Connecting to the database with CRUD operation (Mysql as reference), Handling sessions and cookies. File handling in PHP.

TEXTBOOKS:
1. Web Programming: Building Internet Applications, 3rd Edition, Chris Bates, Wiley Publications.
2. Angular - The Complete Guide [2021 Edition], Maximilian Schwarzmuller, Packt Publishing.
3. Head First Servlets and JSP, 2nd Edition by Kathy Sierra, Bryan Basham, Bert Bates, O'Reilly Media, Inc.

REFERENCES:

1. Programming the World Wide Web, Robert W. Sebesta.
2. Building Web Applications with TypeScript, Angular and React, Sahil Malik, Ivo Gabe de Wolff, Gabriel Isenberg, Packt Publishing.
3. Web Technologies – Uttam Kumar Roy- Oxford University Press
4. Core SERVLETS AND JAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES, Marty Hall and Larry Brown Pearson
5. Internet and World Wide Web – How to program, Dietel and Nieto PHI/Pearson.
6. Murach's Beginning JAVA JDK 5, Murach, SPD
7. An Introduction to Web Design and Programming –Wang-Thomson
8. Web Warrior Guide to Web Programming-Bai/Ekedaw-Thomas
9. Beginning Web Programming-Jon Duckett WROX
10. Java Script, D.Flanagan, O'Reilly, SPD.
11. Complete Reference to PHP.

12. https://www.w3schools.com/
13. https://angular.io/
14. https://www.php.net/
15. https://www.typescriptlang.org/
16.https://www.json.org/json-en.html

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	L	M	M	M	M	M	L					

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
CYBER SECURITY AND CYBER LAWS

Code: 8FC08 **L T P C**
Prerequisite: Nil **3 0 0 3**

Course Objectives:

1. To learn fundamentals of cryptography and its application to network security.
2. To understand network security threats, security services, and countermeasures.
3. To learn computer security, Internet, E-commerce and E-governance with reference to Free
4. Market Economy
5. To learn International Efforts relating to Cyberspace laws and Cyber crimes
6. To learn Law relating to electronic records and intellectual property rights in India
7. To understand ethical laws of computer for different countries.
8. To learn Penalties, Compensation and Offences under the Cyberspace and Internet in India
9. To learn Miscellaneous provisions of IT Act and Conclusions

Course Outcomes:

At the end of this course the student will be able to

1. Familiarize the cryptographic procedures and Understand its primitives
2. Outline Security policy in Legislation and Comprehend E-Commerce frame work, models and its associated threats
3. Justify the role of electronic signatures in E-Commerce and summarize the various laws relating to it.
4. Categorize international cyber laws and cyber crimes.
5. Explore Penalties, Compensation and Adjunction of violations of provisions of IT Act 2000
6. Classify and Outline the offences under the Cyberspace law and the Internet in India

UNIT-I

Introduction to cyber Security, cryptography, Types of Attacks, Secrete Key Cryptography

Introduction: Cyber attacks, Defense Strategies and Techniques Mathematical background for Cryptography: Modulo arithmetic, The greatest common divisor, Useful Algebraic Structures, Chinese Remainder Theorem Basics of Cryptography: Secret versus Public key Cryptography, Types of attacks, Elementary substitution Ciphers, Elementary Transposition Ciphers, Other Cipher Properties Secrete Key Cryptography: Product Ciphers, DES Construction, Modes of Operation, MAC and other Applications, Attacks, Linear Crypt analysis.

UNIT-II

Introduction to Computer Security, Internet, E-commerce and E-governance with reference to Free Market Economy

Definition, Threats to security, Government requirements, Information Protection and Access Controls, Computer security efforts, Standards, Computer Security mandates and legislation,

Privacy considerations, International security activity, Conceptual Framework of E-commerce: governance, the role of Electronic Signatures in E-commerce with Reference to Free Market Economy in India.

UNIT-III

Law relating to electronic records and intellectual property rights in India

Legal aspects of Electronic records / Digital signatures, Cyber laws, the roles and regulations of Certifying Authorities in India, Protection of Intellectual Property Rights in Cyberspace in India.

UNIT-IV

International Efforts relating to Cyberspace laws and Cyber crimes

International efforts related to Cyber laws, Council of Europe (COE) convention on Cyber Crimes.

UNIT-V

Penalties, Compensation

Penalties, Compensation and Adjunction of violations of provisions of IT Act 2000 and judicial review.

UNIT-VI

Offences under the Cyberspace, Internet in India and Miscellaneous provisions of IT Act and Conclusions

Some important offences under the Cyberspace law and the Internet in India, Other offences under the Information Technology Act in India, The role of Electronic Evidence and miscellaneous provisions of the IT Act.

TEXT BOOK:

1. Network security and Cryptography by Bernard Menezes CENGAGE Learning Publications, 2010.
2. Cyber Laws and IT Protection, Harish Chander, PHI, 2012

REFERENCE BOOKS:

1. Debby Russell and Sr. G.T Gangemi, "Computer Security Basics (Paperback)", 2ndEdition, O' Reilly Media, 2006.
2. Wenbo Mao, "Modern Cryptography – Theory and Practice", Pearson Education, New Delhi, 2006.
3. Cyberspace and Cybersecurity, George Kostopoulos, Auerbach Publications, 2012.
4. Cyber Forensics: A Field Manual for Collecting, Examining, and Preserving Evidence of Computer Crimes, Second Edition, Albert Marcella, Jr., Doug Menendez, Auerbach Publications, 2007

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M		M	H					M			M

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
Compiler Design Lab

L	T	P	C
0	0	2	1

Code: 8FC66
Prerequisite: Nil

Course Objectives:
This laboratory course is intended to make the students experiment on the basic techniques of compiler construction and tools that can used to perform syntax-directed translation of a high-level programming language into an executable code.

Course Outcomes:
At the end of this course the student will be able to
1. Implementation of DFA for a given Languages/ Regular Expression.
2. Usage LEX of tool to implement lexical analyzer in compiler design and implementation of Top-Down Parser.
3. Usage of YACC tools for implementing bottom up parser.

Exercises:
1) Implement DFA accepting the language containing even binary numbers.
2) Implement DFA that accept all the strings of a's and b's 3rd symbol from is RHS always a .
3) Implement DFA accepting the language of strings not ending with 00 over the input (0,1)
4) Implement the DFA that accepts all the string of a's and b's where number of a 's is divisible by 3 and number of b's is divisible by2.
5) write lex program to implement lexical analyzer functionality.
6) Write a lex program to count the number of words and number of lines in a given file or program.
7) Write a 'C' program to implement lexical analyzer using c program.
8) write recursive descent parser for the grammar E->E+T E->T T->T*F T->F F->(E)/id.
9) write recursive descent parser for the grammar S->(L) S->a L->L,S L->S
10) Write a C program to calculate first function for the grammar
E->E+T E->T T->T*F T->F
F->(E)/id
11) Write a YACC program to implement top down parser for the given grammar.
12) Write a YACC program to evaluate algebraic expression.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	L	M						M			H

H:High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
OPERATING SYSTEMS LAB

Code: 8EC66
Prerequisite: NIL

L	T	P	C
0	0	2	1

COURSE OBJECTIVES:
To provide an understanding of the design aspects of operating system concepts through simulation

COURSE OUTCOMES:
At the end of this course, the students will be able to
Implement scheduling algorithms, Deadlocks, File allocation and Memory management techniques.

Exercises

1. Simulate the following CPU scheduling algorithms
a) Round Robin b) SJF c) FCFS d) Priority

2. Simulate all file allocation strategies
a) Sequential b) Indexed c) Linked

3. Implement MVT and MFT

4. Implement Bankers Algorithm for Deadlock Avoidance

5. Develop Bankers Algorithm for Deadlock Prevention

6. Simulate all page replacement algorithms
a) FIFO b) LRU c) LFU

7.Develop programs for Paging Technique of memory management.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	H	L	H				M			M

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
WEB TECHNOLOGIES LAB

Code: 8EC67 **L T P C**
0 0 2 1
Prerequisite: Object Oriented Programming through Java Lab

Course Objectives:
Implement programs using HTML tags, Java scripts along with Event Handling. Implement scripts using XML, DOM parser, and SAX parser for project development. Also, the student should understand and implement the MVC architecture applications.

Course Outcomes:
At the end of this course, the student will be able to
1. Demonstrate the use of HTML tags and be able to design web pages.Develop dynamic programs involving Java scripts, popup windows in JavaScript along Event Handling.
2. Develop scripts using XML and XSLT and read XML documents using parsers, DOM parser, and SAX parser. Develop JSON files and access them via HTML pages.
3. Implement Angular with Expressions, Filters, Directives, Controller, and Modules.
4. Develop a Single Page Application with implementation of Scope and Form.
5. Implement Java servlets using Apache Tomcat Server for User authentications
6. Develop an application in PHP with Database connectivity.

Hardware and Software required:
1. A working computer system with either Windows or Linux
2. A web browser either Microsoft Edge or Firefox or Chrome
3. Visual Studio IDE or Eclipse IDE
4. XML editor like Altova Xml-spy [www.Altova.com/XMLSpy – free] ,Stylusstudio , etc.,
5. Tomcat web server and Apache web server
6. XAMPP for PHP and Database programs JVM(Java virtual machine) must be installed on your system

Week-1:
1. Create a web page with advanced layouts and positioning with CSS and HTML.
2. Design a website with different methods of embedding CSS in a web page.
3. Create a static web page which displays your personal details. (Hint: CSS3 and HTML5)
4. Create a web page through which the user can enter his / her details to become an authenticated user of that page.

Week-2:
1. Create a web page that shows different methods of embedding JavaScript with validation.
2. Create a web page with rollover menus. Rollover menus should be created using JavaScript.
3. Create a simple calculator, which can perform the basic arithmetic operations.

Week-3:
1. Write an XML file which will display the Book information which includes the following:

1) Title of the book
2) Author Name
3) ISBN number
4) Publisher name
5) Edition
6) Price

2. Write a Document Type Definition (DTD) or XML Schema Definition (XSD) to validate the above XML file.

Week-4:

1. Prepare a JSON file with Student information and display the content in HTML Table format.

Week-5:

1. Prepare a program that displays the name that we feed in the ng-init directive.
2. AngularJS expression can contain arithmetic operators which will produce the result based on the type of operands
3. Program for AngularJS expression can contain variables declared via ng-init directive.
4. Return the names that contain the letter "i".
5. Type a letter in the input field, and the list will shrink/grow depending on the match.
6. By using ng-click directive on the table headers, we can run a function that changes the sorting order of the array.
7. Creating a custom myFormat filter will format every other character to uppercase.

Week-6:

1. Program to implement ay 5 directives from ng-app, ng-init, ng-model, ng-controller, ng-bind, ng-repeat ,ng-show ,ng-readonly, ng-disabled , ng-if, ng-click.
2. Demonstrates by attaching properties to the $scope object inside a controller and then displaying property value in HTML.
3. Program to handle click events of a button.
4. Program to create the "message" property is defined inside myController, so it will only be available to div1 and div2 but not div3 and div4. The same way, message property defined inside anotherController will only be available to div4. The div3 element does not come under any controller, so "message" property will be null or undefined.
5. Program to implement complex and nested controllers
6. Create a module using controllers

Week-7:

1. Prepare a angular Student information form
2. Prepare a program to implement Scope & Directives, $apply and $watch

Week-8:

1. Write a program for Single Page Application (SPA) using angular.

Week-9:

1. Install APACHE TOMCAT web server and while installation, assign port number 8181. Make sure that this port is available i.e., no other process is using this port.
2. Write a servlet program to print welcome messages on the browser.
3. Develop a web application to pass the parameters from the HTML page and display them using servlet.

Week-10:

1. Develop a web application using servlet to perform Session Tracking with hidden form fields, cookies and url-rewriting and http sessions. (Files to developed- Html,Java, Web.xml)
2. Write a servlet using the RequestDispatcherclass.Develop a web application using servlet to perform the user Authentication:

A. Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following:

1. Create a Cookie and add these four user id's and passwords to this Cookie.

2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user ".

Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.

B. Authenticate the user when he submits the login form using the username and password from the database.

Week-11:

1. Write a PHP to test the database connection
2. Write a php to create a Table.

Week-12:

1. Write a PHP to insert values form HTML to database(registration Page)
2. Write a PHP to insert values to a Database.
3. Write a PHP to select values from a database table.
4. Write a PHP to update existing records of a database table.
5. Write a PHP to validate user login

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M	M	L	L	L	L	H	H		H

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
GROUP PROJECT

Code: 8E694
Prerequisite:

L	T	P	C
0	0	2	1

Course Objectives:
To acquire basic knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

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

1. Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
2. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
3. Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
4. Improve their communicative skills and team skills largely improve.
5. Work as an individual and in a team.

A group project shall be carried out by a group of students consisting of 2 to 3 in number in third year first semester. This work shall be carried out under the guidance of the faculty assigned as internal guide and shall involve design, fabrication, software development or any other significant activity. This can be of interdisciplinary nature also.
There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external

The **internal evaluation** shall consist of:

Day to day work	:	15 marks
Report	:	05 marks
Demonstration / presentation	:	10 marks
----------		
		30 marks
End examination	:	70 Marks.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the supervisor.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H	H	M					M			H

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
COMPREHENSIVE VIVA VOCE

L	T	P	C
1	0	0	1

Code: 8E681

Prerequisite: All core Courses till this semester

Course Objectives:

Prepare students in basics and advanced relevant courses to revise and face technical interviews for enhancing employability.

Course Outcomes:

At the end of this course the student will be

1. Assessed the knowledge of the students in the Core and Elective subjects that they have studied till the completion of that academic year.

Comprehensive Viva Voce will be conducted in third year second semester for 100 marks. Out of 100 marks 30 marks are evaluated internally and 70 marks for external evaluation.

Internal:

Comprehensive Viva Voce is conducted twice in a semester and evaluated for 30 marks each and average will be considered for internal.

Internal Examination : 30 Marks
End examination : 70 Marks.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. The end examination will be carried out by a committee consisting of an external examiner, head of the department, and subject experts.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M	M	M	M	M	L	M	H	H	L	H

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
SUMMER INDUSTRY INTERNSHIP-II
(Evaluation will be done along with 4-1 courses)

Code : 8E692

Students shall carry out the project in industry during summer vacation for 3 - 6 weeks and the evaluation is carried out in fourth year first semester.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M		H							H

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering
BLOCK CHAIN TECHNOLOGIES
(Professional Elective –III)

Code: 8EC13
Prerequisite: Information Security

L	T	P	C
3	0	0	3

Course Objectives:
By the end of the course, students will be able to understand how blockchain systems (mainly Bitcoin and Ethereum) work, To securely interact with them, Design, build, and deploy smart contracts and distributed applications, Integrate ideas from blockchain technology into their own projects.

Course Outcomes:
At the end of this course the student will be able to
1. Understand the principles of HDFS and digital signature.
2. Explore the blockchain Technology, Simplified Payment Verification protocol and its life cycle.
3. Analyze the Nakamoto consensus and differentiate proof-of-work and proof-of-stake consensus algorithms.
4. Understand the working of crypto currency, Bitcoin and Ethereum.
5. Explore Applications on legal issues of blockchain.
6. Explore new trends in blockchain technologies.

UNIT I:Basics: Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. **Cryptography:** Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof.

UNIT II: Blockchain: Introduction, Advantage over conventional distributed database, Blockchain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Private and Public blockchain.

UNIT III: Distributed Consensus: Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy utilization and alternate.

UNIT IV: Cryptocurrency: History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum - Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin

UNIT V: Cryptocurrency Regulation: Stakeholders, Roots of Bitcoin, Legal Aspects-Crypto currency Exchange, Black Market and Global Economy. Applications: Internet of Things, Medical Record Management System, Domain Name Service and future of Blockchain.

UNIT VI - (Trends and Topics) - Zero Knowledge proofs and protocols in Blockchain - Succinct non interactive argument for Knowledge (SNARK) - pairing on Elliptic curves - Zcash.

TEXT BOOK:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).

REFERENCES:

1. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies 2. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System 3. DR. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger,"Yellow paper.2014. 4. Nicola Atzei, Massimo Bartoletti, and TizianaCimoli, A survey of attacks on Ethereum smart contracts

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M		H	M						H

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering
DATABASE SECURITY
(Professional Elective –III)

L	T	P	C
3	0	0	3

Code: 8EC21

Prerequisite: Database Management System, Information Security

Course Objective:
Get familiarity of database security concepts and techniques and describe new directions of database security in the context of Internet information management with respect to database application security models, database access control policies, mechanisms and intrusion detection systems.

Course Outcomes:
At the end of the course, the student will be able to
1. Comprehend the various access control rules available to assign privileges and protect data in databases.
2. Differentiate popular Security Models.
3. Categorize the security mechanisms and their functions.
4. Identify the Security Software Design principles to protect data in databases.
5. Classify and compare the Statistical Database Protection & Intrusion Detection Systems.
6. Study the new models of database systems and the models of protection.

UNIT - I
Introduction: Introduction to Databases, Security Problems in Databases, Security Controls Conclusions.

UNIT - II
Security Models: Introduction Access Matrix Model, Take-Grant Model, Acten Model, PN Model, Hartson and Hsiao's Model, Fernandez's Model, Bussolati and Martella's Model for Distributed databases, Bell and LaPadula's Model, Biba's Model, Dion's Model, Sea View Model, Jajodia and Sandhu's Model, The Lattice Model for the Flow Control.

UNIT - III
Security Mechanisms: Introduction User Identification/Authentication, Memory Protection, Resource Protection, Control Flow Mechanisms, Isolation Security Functionalities in Some Operating Systems, Trusted Computer, System Evaluation Criteria.

UNIT - IV
Security Software Design: Introduction, A Methodological Approach to Security. Software Design, Secure Operating System, Design Secure DBMS Design, Security Packages, Database Security Design.

UNIT - V

Statistical Database Protection & Intrusion Detection Systems: Introduction Statistics Concepts and Definitions, Types of Attacks, Inference Controls Evaluation Criteria for Control Comparison, Introduction IDES System, RETISS System, ASES System, Discovery.

UNIT -VI

Models for the Protection of New Generation Database Systems: Introduction, A Model for the Protection of Frame Based Systems, A Model for the Protection of Object- Oriented Systems , SORION Model for the Protection of Object-Oriented Databases, A Model for the Protection of New Generation Database Systems, The Orion Model Jajodia and Kogan's Model, A Model for the Protection of Active Databases.

Textbooks:

1. S. Castano, M. Fugini, G. Martella, P. Samarati (eds.), Database Security, Addison-Wesley,1994.

REFERENCES:

1. RonBenNatan, Implementing Database Security and Auditing, Elsevier, Indian reprint 2006
2. Michael Gertz, Sushil Jajodia, Handbook of Database Security : Applications and Trends, Springer,2008

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M	M	H	M	M	M	H	M	H	H

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering

SOFTWARE REQUIREMENTS AND ESTIMATION

(Professional Elective –III)

L	T	P	C
3	-	-	3

Code : 8FC14
Prerequisite: Software Project Management

Course Objectives:

1. Demonstrate the knowledge of the distinction between critical and non- critical systems and should author a software requirements document.
2. Understand the proper contents of a software requirements document and distributed system architectures and application architectures.

Course Outcomes:

At the end of this course the student will be able to

1. Explain need, practices and Risk issues in Software requirements.
2. Describe Software Requirements Engineering elements such as review, quality and priorities.
3. Explain software Modeling and Requirements Management.
4. Apply Estimation methods for size using Mark II FPA, Full Function Points, LOC Estimation.
5. Apply Cost and Schedule estimation factors during software development.
6. Apply tools for Requirements Management and Estimation.

UNIT- I Software Requirements: What and Why Essential Software requirement, Good practices for requirements engineering, Improving requirements processes, Software requirements and risk management

UNIT –II Software Requirements Engineering Requirements elicitation, elicitation techniques, requirements analysis, documentation, review, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality.

UNIT – III Software Requirements Modeling, Analysis Models, Use Case Modeling, Dataflow diagram, state transition diagram, class diagrams.
Software Requirements Management Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain.

UNIT IV Software Estimation Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation Size **Estimation** Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, and Conversion between size measures.

UNIT - V Effort, Schedule and Cost Estimation What is Productivity? Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Cost Estimation.

UNIT – VI Tools for Requirements Management and Estimation Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber – RM, implementing requirements management automation.
Software Estimation Tools: Desirable features in software estimation tools, IFPUG, USC's COCOMO II, and SLIM (Software Life Cycle Management) Tools.

TEXT BOOK:

1. Software Requirements and Estimation by Rajesh Naik and Swapna Kishore, Tata Mc Graw Hill.

REFERENCE BOOKS:

1. Software Requirements by Karl E. Weigers, Microsoft Press.
2. Managing Software Requirements, Dean Leffingwell & Don Widrig, Pearson Education, 2003.
3. Mastering the requirements process, second edition, Suzanne Robertson & James Robertson, Pearson Education, 2006.
4. Estimating Software Costs, Second edition, Capers Jones, TMH, 2007.
5. Practical Software Estimation, M.A. Parthasarathy, Pearson Education, 2007.
6. Measuring the software process, William A. Florac & Anita D. Carleton, Pearson Education, 1999.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M		M	H	H							H

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering
BIG DATA ANALYTICS

L	T	P	C
3	0	0	3

Code: 8EC18
Prerequisites: Machine Learning

Course Objectives:

1. To explore the fundamental concepts of big data analytics.
2. To understand storage and parallel processing of Big Data using Hadoop
3. To introduce programming tools like HIVE, SQOOP, HBASE in Hadoop ecosystem.
4. To understand the applications using Apache Spark RDD Concepts.
5. To know high level API like Data Frames and Spark SQL
6. To teach the fundamental techniques and principles in achieving big data analytics with stream processing.

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

1. Comprehend the fundamentals of big data analytics and understand how Hadoop solves the big data problem in real life.
2. Interpret the challenges with big data and elaborate the knowledge about the technological developments in big data environment.
3. Demonstrate the difference between NOSQL and SQL databases.
4. Discuss the Hadoop distributed file system (HDFS) framework and anatomy of Hadoop map-reduce.
5. Design the algorithms to process big data using Apache Spark Low Level API.
6. Apply Hadoop Data Analysis to social Media Analytics and Opinion Mining on Tweets.

UNIT– I:
Introduction to Big Data: Big Data Analytics, Characteristics of Big Data – The Four Vs, importance of Big Data, Different Use cases, Data-Structured, Semi-Structured, Un-Structured Introduction to Hadoop and its use in solving big data problems. Comparison Hadoop with RDBMS, Brief history of Hadoop, Apache Hadoop EcoSystem, Components of Hadoop, The Hadoop Distributed File System (HDFS):, Architecture and design of HDFS in detail, Working with HDFS (Commands)

UNIT-II
Anatomy of Hadoop map-reduce (Input Splits, map phase, shuffle, sort, combiner, reduce phase) (theory)
Hive:Introduction to Hive, data types and file formats, HiveQL data definition(Creating Databases and Tables),HiveQL for Data loading, HiveQL data manipulation, Logical joins,

Window functions, Optimization, Table partitioning, Bucketing, Indexing, Join Strategies.

UNIT-III

SQOOP : Introduction to SQOOP, SQOOP imports : From Database to HDFS/Hive, SQOOP exports: From HDFS/Hive to Database, Incremental imports

NoSQL &HBase: Overview, HBasearchitecture, CRUD operations

UNIT-IV

SPARK Basics: History of Spark, Spark Architecture, Spark Shell,Working with RDDs in Spark:RDD Basics, Creating RDDs in Spark. RDD Operations. Passing Functions to Spark, Transformations and Actions in Spark, Spark RDD Persistence

Working with Key/Value Pairs : Pair RDDs, Transformations on Pair RDDs, Actions Available on Pair RDDs

UNIT-V

Structured API :DataFrames,SQL : Overview of Structured Spark Types, Schemas, Columns and Expressions, DataFrame Transformations, Working with different types of data,

Aggregations- Aggregation Functions, Grouping, User-Defined Aggregation Functions, ,Joins-Inner Joins, Outer Joins, Processing CSV Files, JSON Files, Text Files and Parquet Files, Spark SQL

UNIT-VI

Spark streaming:Stream Processing Fundamentals, Structured Streaming Basics - Core Concepts, Structured Streaming in Action, Transformations on Streams, Input and Output(Kafka)

Case study: Twitter Stream processing application

Text Books:

1. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley,2012
2. SPARK: The Definitive Guide, Bill Chambers &MateiZaharia, O'Reilley, 2018 Edition

REFERENCES:

1. "Hadoop Operations", O'Reilley, Eric Sammer,2012
2. "ProgrammingHive",O'Reilley,E.Capriolo,D.Wampler,andJ.Rutherglen, 2012
3. "HBase: The Definitive Guide", O'Reilley, Lars George,2011
4. Big Data, Big Analytics: Emerging, Michael Minnelli, Michelle Chambers, and AmbigaDhiraj

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	L		H							

Syllabus for B. Tech. III Year II semester
Computer Science and Engineering
COMPUTER VISION
(Professional Elective –III)

L	T	P	C
3	-	-	3

Code: 8FC19
Prerequisite: Image Processing

Course Objectives:
In this course students will learn basic principles of image formation, image processing algorithms and different algorithms for 3D reconstruction and recognition from single or multiple images (video). This course emphasizes the core vision tasks of scene understanding and recognition. Applications to 3D modeling, video analysis, video surveillance, object recognition and vision based control will be discussed.

Course Outcomes:
After learning the course the students should be able to:

1. Understand the basic fundamentals of computer vision and diversity of computer vision applications
2. Explore the various camera models, multi view geometry, structures and generate 3D model from images
3. Analyze and apply image preprocessing, continuous and discrete representation methods and feature extraction techniques
4. Apply regularization theory, optical communication ,stereo vision, and motion estimation techniques to detect moving objects in a video
5. Illustrate different image shape representations and understand Fourier and wavelet descriptors and segmentation methods
6. Understand various object recognition methods, Hough transforms and illustrate shape matching

UNIT 1:
Introduction : Computer Vision and Computer Graphics , What is Computer Vision - Low-level, Mid-level, High-level , Overview of Diverse Computer Vision Applications: Document Image Analysis, Biometrics, Object Recognition, Tracking, Medical Image Analysis, Content-Based Image Retrieval, Video Data Processing, Multimedia.

UNIT 2:
Image Formation Models : Monocular imaging system , Radiosity: The 'Physics' of Image Formation, Radiance, Irradiance, BRDF, color etc, Orthographic & Perspective Projection,• Camera model and Camera calibration, Binocular imaging systems, Multiple views geometry, Structure determination, shape from shading , Photometric Stereo, Depth from Defocus , Construction of 3D model from images

UNIT 3:

Image Processing and Feature Extraction: Image preprocessing, Image representations (continuous and discrete), Edge detection

UNIT 4:
Motion Estimation: Regularization theory, Optical computation, Stereo Vision, Motion estimation, Structure from motion

UNIT 5:
Shape Representation and Segmentation: Contour based representation, Region based representation, Deformable curves and surfaces, Snakes and active contours, Level set representations, Fourier and wavelet descriptors, Medial representations, Multire solution analysis

UNIT 6:
Object recognition: Hough transforms and other simple object recognition methods, Shape correspondence and shape matching, Shape priors for recognition

Text books:

1. Computer Vision - A modern approach, by D. Forsyth and J. Ponce, Prentice Hall Robot Vision, by B. K. P. Horn, McGraw-Hill.
2. Introductory Techniques for 3D Computer Vision, by E. Trucco and A. Verri, Publisher: Prentice Hall.

Reference Books:

1. R. C. Gonzalez, R. E. Woods. Digital Image Processing. Addison Wesley Longman, Inc., 1992.
2. D. H. Ballard, C. M. Brown. Computer Vision. Prentice-Hall, Englewood Cliffs, 1982.
3. Richard Szeliski, Computer Vision: Algorithms and Applications (CVAA). Springer, 2010 4. Image Processing, Analysis, and Machine Vision. Sonka, Hlavac, and Boyle. Thomson.
4. E. R. Davies, Computer & Machine Vision, Fourth Edition, Academic Press, 2012
5. Simon J. D. Prince, Computer Vision: Models, Learning, and Inference, Cambridge University Press, 2012
6. Mark Nixon and Alberto S. Aquado, Feature Extraction & Image
7. Processing for Computer Vision, Third Edition, Academic Press, 2012

List of Open Source Software/learning website:

1. Computer Vision. Ballard and Brown
2. Invitation to 3D Vision: From Images to Geometric Models: Y. Ma, S. Soatto, J. Kosecka and Sastry

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	L	L		M	M	L					L

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering
INFORMATION SECURITY. MANAGEMENT AND STANDARDS
(Professional Elective –IV)

Code: 8EC14

L	T	P	C
3	0	0	3

Prerequisite: Cyber Security and Cyber Laws

Course Objectives:
To introduce the terminology, technology and its applications To introduce the concept of Security Analyst To introduce the tools, technologies & programming languages which are used in day to day security analyst job role

Course Outcomes:
At the end of this course the student will be able to
1: Recall various Security Issues and Measures undertaken.
2: Outline the Key and Logical Elements of Risk Management.
3: Categorize various networking connections & appraise IDS/IPS Systems.
4: Compile the type of audits along with the Significance.
5: Comprehend SSE, CMM & other Models.
6: Discriminate various policies & laws in Information Security.

UNIT I:Information Security Management in Organizations Security Policy, Standards, Guidelines and Procedures, Information Security Management System (ISMS), Organizational responsibility for Information Security Management, Information Security Awareness Scenario in Indian Organizations, Building Blocks of Information Security

UNIT II: Risk Management Overview of Risk Management, Risk Identification, Risk Assessment, Risk Control, Quantitative and Qualitative Approaches, Introduction to OCTAVE and COBIT approach.

UNIT III: Finding Networking vulnerabilities, Firewalls – Processing modes, Categorization, Architectures, Selecting the right firewall, managing the firewalls. Intrusion Detection and Prevention Systems (IDS & IPS), Protecting Remote Connections – Virtual Private Networks for security

UNIT IV: Introduction to security audits, need for security audits, organizational roles, Auditor's roles, Types of security audits, Audit approaches, and Technology based audits. Business Continuity and Disaster Recovery Planning.

UNIT V Overview of ISO 17799/ISO 27001 Standards, System Security Engineering Capability Maturity Model (SSE-CMM). NIST Model, VISA International Security Model, Base lining and Best Business practitioners, Design of Security Architecture.

UNIT VI Legal, Ethical, and professional Issues in Information Security – Law and Ethics in Information Security, Types of Law, Relevant US Laws, International Laws and Legal Bodies,

Policy versus Law, Ethics and Information Security, Codes of Ethics and Professional Organizations.

TEXT BOOKS:

1 Information Systems Security, *Nina Godbole*, Wiley India, 2009
2 Principles and Practices of Information Security. *Michael E. Whitman, Herbert J. Mattord*, Cengage Learning,

REFERENCES:

1. Microsoft Security Risk Management Guide
2. Risk Management Guide for Information Technology Systems
   http://csrc.nist.gov/publications/nistpubs/800-30/sp800-30.pdf
3. OCTAVE approach
   http://www.cert.org/octave/
4. COBIT
   http://www.isaca.org/
5. Guide to Firewalls and Policies (Unit 3)
   http://csrc.nist.gov/publications/nistpubs/800-41/sp800-41.pdf
6. Firewalls and Network Security, MichealE.Whitman, et al. Cengage Learning, 2008
7. Audit Trails (Unit 7)
   http://csrc.nist.gov/publications/nistpubs/800-12/800-12-html/chapter18.html

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	H	H	H	M	M	M	M	M	M	H

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering

Agile Software Development

(Professional Elective –IV)

L	T	P	C
3	-	-	3

Code : 8FC15

Prerequisite: Software Engineering and OOAD

Course Objectives:

To understand how an iterative, incremental development process leads to faster delivery of more useful software

Course Outcomes:

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

1. To understand the essence of agile development methods
2. To apply the principles and practices of extreme programming in real world problems.
3. To incorporate proper coding standards and guidelines in an agile process.
4. To optimize an agile process by exploring the possible risks and threats in the software process
5. To improve the process by eliminating waste
6. To design an agile process for a business application and deal with appropriate tradeoff.

UNIT I: Why Agile? Understanding Success, Beyond Deadlines, The Importance of Organizational Success, Enter Agility, How to Be Agile? Agile Methods, Don't Make Your Own Method, The Road to Mastery, Find a Mentor

UNIT II: Understanding XP: The XP Lifecycle, The XP Team, XP Concepts, Adopting XP: Is XP Right for Us? Assess Your Agility

UNIT III: Practicing XP: Thinking: Pair Programming, Energized Work, Informative Workspace, Root-Cause Analysis, Retrospectives, Collaborating: Trust, Sit Together, Real Customer Involvement, Ubiquitous Language, Stand-Up Meetings, Coding Standards, Iteration Demo, Reporting, Releasing:"Done Done", No Bugs, Version Control, Ten-Minute Build, Continuous Integration, Collective Code Ownership, Documentation.

UNIT IV: Planning: Vision, Release Planning, The Planning Game, Risk Management, Iteration Planning, Slack, Stories, Estimating. Developing: Incremental requirements, Customer Tests, Test-Driven Development, Refactoring, Simple Design, Incremental Design and Architecture, Spike Solutions, Performance Optimization, Exploratory Testing

UNIT V: Mastering Agility Values and Principles: Commonalities, About Values, Principles, and Practices, Further Reading, Improve the Process: Understand Your Project, Tune and Adapt, Break the Rules, Rely on People: Build Effective Relationships, Let the Right People Do the Right Things, Build the Process for the People, Eliminate Waste: Work in Small, Reversible Steps, Fail Fast, Maximize Work Not Done, Pursue Throughput

UNIT VI: Deliver Value: Exploit Your Agility, Only Releasable Code Has Value, Deliver Business Results, Deliver Frequently, Seek Technical Excellence: Software Doesn't Exist, Design Is for Understanding, Design Tradeoffs, Quality with a Name, Great Design, Universal Design Principles, Principles in Practice, Pursue Mastery

TEXT BOOKS:

1. James Shore and Shane Warden, "The Art of Agile Development", O'REILLY, 2007.

REFERENCES:

1. Robert C. Martin, "Agile Software Development, Principles, Patterns, and Practices" , PHI, 2002.
2. Angel Medinilla, "Agile Management: Leadership in an Agile Environment", Springer, 2012.
3. Bhuvan Unhelkar, "The Art of Agile Practice: A Composite Approach for Projects and Organizations", CRC Press.
4. Jim Highsmith, "Agile Project Management", Pearson education, 2004
5. Elisabeth Hendrickson, "Agile Testing" Quality Tree Software Inc 2008.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	L			L								M

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering
BUSINESS INTELLIGENCE
(Professional Elective –IV)

Code: 8EC19
Prerequisite: Nil

L	T	P	C
3	0	0	3

Course Objectives:
1. Introduce the Business intelligence concepts, techniques and models
2. Understand the modeling process behind business analytics
3. To analyze different data analysis tools and techniques Expected

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

1. Understand the importance of business intelligence and its applications in today's world.
2. Illustrate the different form of analytics such as business analytics, predictive analytics.
3. Compare in detail the various aspects of business intelligence.
4. Understand the technological components of operational intelligence.
5. Analyze and understand the broad concepts in prescriptive analytics with Decision Tables.
6. Apply business intelligence process for web mining and web analytics.

UNIT-I
Introduction to Business Intelligence, Business Intelligence, Mobile Business Intelligence, Real-time Business Intelligence (Text Book-1)

UNIT-II
Analytics: A Comprehensive Study, Business Analytics, Analytics, Software Analytics, Embedded Analytics, Learning Analytics, Predictive Analytics, Prescriptive Analytics, Social Media Analytics, Behavioral Analytics (Text Book-1)

UNIT-III
Essential Aspects of Business Intelligence, Context Analysis, Business Performance Management, Business Process Discovery, Information System, Organizational Intelligence, Data Visualization, Data Profiling, Data Cleansing, Process Mining, Competitive Intelligence (Text Book-1)

UNIT-IV
Operational Intelligence: Technological Components, Operational Intelligence, Business Activity Monitoring, Complex Event Processing, Business Process Management, Metadata, Root Cause Analysis (Text Book-1)

UNIT-V

Prescriptive Analytics
Decision Support Systems Modeling - Mathematical Models for Decision Support - Certainty, Uncertainty, and Risk- Decision Modeling with Spreadsheets - Mathematical Programming Optimization - Decision Analysis with Decision Tables and Decision Trees - Problem-Solving Search Methods - Problem-Solving Search Methods (Text Book-2)

UNIT-VI
Web Analytics and Web Mining
Web Mining Overview - Web Content and Web Structure Mining - Search Engines - Search Engine Optimization - Web Analytics Technologies, metrics - Web Analytics Maturity Model and Web Analytics Tools (Text Book-2)

TEXT BOOK
1. Drew Bentley, Business Intelligence and Analytics, Published by Library Press
2. Efraim Turban, Ramesh Sharda, DursunDelen, "Business Intelligence and Analytics", 10th Edition, Pearson, 2015

REFERENCES:
1 S. Christian Albright, Wayne L. Winston, Business Analytics: Data Analysis & Decision Making, 6th Edition, CENGAGE INDIA, 2017
2 Dinabandhu Bag, Business Analytics, Routledge, 1st edition, 2016
3 Rick Sherman, Business Intelligence Guidebook: From Data Integration to Analytics, Morgan Kaufmann, 1st edition 2014
4.Introduction to business Intelligence and data warehousing, IBM, PHI.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M									

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering
Augmented Reality and Virtual Reality
(Professional Elective –IV)

L	T	P/D	C
3	-	-	3

Code: 8FC20
Pre-Requisites: Data Structure

COURSE OBJECTIVE:
This course provides students with an opportunity to explore the research issues in Augmented Reality and Virtual Reality (AR &VR). It also makes the students know the basic concept and framework of virtual reality.

COURSE OUTCOMES:
After completion of course, students will be able to

1. Understand the fundamentals of Virtual Reality.

2. Analyze multiple Models of Input and Output Interface in Virtual Reality like Gloves, Video-based Input, 3D Menus & 3DScanner etc.

3. Illustrate the fundamentals or advanced topics of Computer Graphics.

4. Analyze the Interactive Techniques on VR in respect of Body Track, Hand Gesture, 3D Manus, and Object Grasp.

5. Understand the development Tools of VR.

6. Explore the Conceptual idea on Augmented Reality and relate the illustrations.

Unit 1: Introduction of Virtual Reality: Fundamental Concept and Components of Virtual Reality. Primary Features and Present Development on Virtual Reality.

Unit 2: Multiple Models of Input and Output Interface in Virtual Reality: Input -- Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus & 3DScanner etc. Output -- Visual /Auditory Haptic Devices.

Unit 3: Visual Computation in Virtual Reality: Fundamentals of Computer Graphics. Software and Hardware Technology on Stereoscopic Display. Advanced Techniques in CG: Management of Large Scale Environments & Real Time Rendering.

Unit 4: Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Manus, And Object Grasp.

Unit 5: Development Tools and Frameworks in Virtual Reality: Frameworks of Software Development Tools in VR. X3D Standard; Vega, MultiGen, Virtools etc. Application of VR in

Digital Entertainment: VR Technology in Film & TV Production. VR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR.

Unit 6: Augmented and Mixed Reality, Taxonomy, technology and features of augmented reality, difference between AR and VR, Challenges with AR, AR systems and functionality, Augmented reality methods, visualization techniques for augmented reality, wireless displays in educational augmented reality applications, mobile projection interfaces, marker-less tracking for augmented reality, enhancing interactivity in AR environments, evaluating AR systems.

TEXTBOOK:

1) Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEE Press, 2003/2006.
2) Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann, 2013.

REFERENCE BOOKS:

1) Alan Craig, William Sherman and Jeffrey Will, Developing Virtual Reality Applications, Foundations of Effective Design, Morgan Kaufmann, 2009**.**

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	L	M	M	H	M	H	M	M	M	M	H

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering
SOFTWARE AUTOMATION AND TESTING

L	T	P	C
2	1	0	3

Code: 8F711

Prerequisite: Software Engineering and OOAD

COURSE OBJECTIVES:

To Understand the Basic concepts in Software testing, concepts of Flow graphs, Path testing and Data Flow Testing, understand the concept of metrics and their types. Understand and implement various testing techniques and to make a thorough study on various testing tools. Set a strategy for testing environment and to learn the testing methodologies in detail.

COURSE OUTCOMES :

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

1. Describe concepts of Software testing
2. Describe and apply the concepts Flow graphs, Path testing and Data Flow Testing**.**
3. Practice Software testing strategy and Environment with economics and apply Software Metrics useful in software development and maintenance.
4. Software Testing Methodology, finding defects hard to find, Verification and validation, Functional and structural, Workbench concept, Eight Consideration of software testing methodology, checklist. Describe Agile computing with agile testing
5. Demonstrate Software Testing Techniques such as JADs, Pareto Analysis , Regression Tasting, Structured walkthroughs, Thread testing , Performance testing and White box testing.
6. Describe Graph matrices and applications, and practice and apply automated testing tools such load Runner, UFT and QTP.

UNIT I : What is Testing, Characteristics of Test Engineers, Software Testing Life Cycle, Levels of Testing, Testing Approaches, Test Cases: Format for Writing Test Case, Test plan: Format to prepare Test plan Purpose of testing, Dichotomies, Consequences of bugs

UNIT II: Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, application of path testing. Data Flow Testing: Basics of Data flow Testing Logic Based Testing : Decision Tables

UNIT III : Software testing strategy and Environment, Establishing testing policy, structured approach to testing, Test factors, Economics of SDLC testing. Software Metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

UNIT IV: Software Testing Methodology, Defects hard to find, Verification and validation, Functional and structural, Defects and Failures, Testing that parallels the software Development

process, Workbench concept, Eight Consideration of software testing methodology, testing tactics checklist. Importance of Agility, Building an Agile Testing Process

UNIT V: Software Testing Techniques, Black-box, Boundary value, Branch coverage, Cause Effect graphing, CRUD, Database, Histogram, Gray box, Inspections, JADs, Pareto Analysis , Prototyping , Random Testing, Risk based testing , Regression Testing, Structured walkthroughs, Thread testing , Performance testing, Stress Testing, Accepting Testing, White box testing, Alpha and Beta Testing.

UNIT VI: Graph matrices and application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm. Need for Automated testing tools, Taxonomy of Testing Tools, Exposure to Software Testing Tools: Load Runner, UFT and QTP.

TEXT BOOKS

1. Software testing techniques – Boris Beizer, Dreamtech, second edition.(Unit 1,2,6)
2. Software testing tools – by Dr. K.V.K.K Prasad Dreamtech (Unit 1,6)
3. Effective Methods for Software Testing, 2nd Edition by William E.Perry, Wiley publications.(Unit 3,4)
4. Software Testing and continuous Quality Improvement, by William E.Lewis,Gunasekaran,2nd Edition Auerbach publications (Unit 5,Refer Internet)
5. Software Engineering A practitioner's Approach, Roger S Pressman, 6th edition. McGrawHill International Edition (Unit 3)

REFERENCES

1. Software Testing Techniques ,by Bories Beizer, Second Edition,Dreamtech Press
2. Testing and Quality Assurance for Component based software ,by Gao,Tsao and Wu,Artech House Publishers
3. Managing the Testing Process,by Rex Black,Wiley.
4. Handbook of Software Quality Assurance, by G.Gordon Schulmeyer,James I.McManus,2nd Edition,International Thomson Computer Press

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M	M	M	L						

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering
Artificial Intelligence and Deep Learning

Code: 8EC08 **L T P C**
2 1 0 3

Prerequisite: Machine Learning

COURSE OBJECTIVES:

1. To understand the different types of AI agents
2. Know various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms)
3. To understand the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving
4. Know how to build simple knowledge-based systems
5. Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information
6. Ability to apply knowledge representation, reasoning, and machine learning techniques to real-world problems
7. Ability to carry out independent (or in a small group) research and communicate it effectively in a seminar setting.
8. Ability to apply concepts of convolutional networks in day to day applications.

Course Outcomes:

After completion of this course, student will be able to

1. Identify different types of agents and their relationships with the environment.
2. Demonstrate the application of agents handling applications dealing with conflict resolution
3. Represent knowledge in logical level and also be able to convert it to a form suitable for implementation.
4. Derive inferences applying rules of First Order Logic
5. Formulate an approach for applications involving complete and incomplete Planning
6. Choose the appropriate learning strategy needed for solving a given problem.

UNIT I

Introduction: AI problems, Intelligent agents: Agents and Environments, Rationality, Nature of environments, Structure of agents, Problem solving agents, Problem formulation – Planning Application – Classical Planning problem

UNIT II

Searching and Game Theory: Searching for solutions, Searching with partial information (Heuristic search), Greedy best first search, A* search Constraint Satisfaction problem -Game Playing: Adversarial search : Games, Minimax algorithm, Optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions. **Case studies:** Tic-tac-toe game

UNIT III

Knowledge Representation and Reasoning : Logical Agents, Knowledge Based Agents, Wumpus world, Propositional logic, Resolution patterns in propositional Logic, First order

logic, Inference in first order logic, propositional vs. First order inference, Unification and Lifting, Forward chaining, Backward chaining, Resolution

UNIT IV

Uncertain Knowledge and Reasoning : Bayes Rule, Concepts of Time and Uncertainty, Utility Functions, Value of Information, Value iteration, Policy iteration, Partially Observable MDP

UNIT – V

BASICS OF DEEP LEARNING

Deep learning architectures: Convolutional Neural Networks : Neurons in Human Vision-The Shortcomings of Feature Selection - Full Description of the Convolutional Layer - Max Pooling-Full Architectural Description of Convolution Networks - Closing the Loop on MNIST with Convolutional Networks- -Building a Convolutional Network for CIFAR-10 - Visualizing Learning in Convolutional Networks- Leveraging Convolutional Filters to Replicate Artistic Styles-Learning Convolutional Filters for Other Problem Domains-Training algorithms.

UNIT VI

DEEP REINFORCEMENT LEARNING:

Deep Reinforcement Learning Masters Atari Games - Reinforcement Learning-Markov Decision Processes (MDP)-Explore Versus Exploit - Pole-Cart with Policy Gradients-Q-Learning and Deep Q-Networks-Improving and Moving Beyond DQN.

TEXT BOOKS

1 S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, Third Edition, 2009.
2. Artificial Intelligence, 3rd Edition, Patrick Henry Winston, Pearson Education, 1992.
3. Nikhil Buduma, Nicholas Locascio, "Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms", O'Reilly Media, 2017.
4. Ian Goodfellow, YoshuaBengio, Aaron Courville, "Deep Learning (Adaptive Computation and Machine Learning series", MIT Press, 2017.

REFERENCES:

1. M. Tim Jones, ―Artificial Intelligence: A Systems Approach(Computer Science), Jones and Bartlett Publishers, Inc.; First Edition, 2008
2. Nils J. Nilsson, ―The Quest for Artificial Intelligence, Cambridge University Press, 2009.

3. William F. Clocksin and Christopher S. Mellish, Programming in Prolog: Using the ISO Standard, Fifth Edition, Springer, 2003.
4. Gerhard Weiss, ―Multi Agent Systems, Second Edition, MIT Press, 2013.

5. David L. Poole and Alan K. Mackworth, ―Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 2010.
6. Bratko, ―Prolog: Programming for Artificial Intelligence, Fourth edition, Addison-Wesley Educational Publishers Inc., 2011.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	L	L	L	L	M	L					M

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering

Linux Programming

L	T	P	C
3	-	-	3

Code : 8F710
Prerequisite : Operating Systems

Course Objectives:

1. Induce working principles of Linux operating system, usage of File handling utilities, Security by file permissions, process utilities, Disk utilities, networking utilities.
2. Impart the shell responsibilities and meta-characters of it, control structures, shell interrupt processing, functions, debugging shell scripts.
3. Impart basics of file concepts kernel support for file, file structure and low-level I/O functions, system calls (file API's). Induce knowledge regarding Directory management and its API.
4. Demonstrate basics of process creation, execution and synchronization mechanisms. Give knowledge regarding a signal, need for having them, usage of various signals.
5. Narrate the need for Inter Process Communication. Explore the possible mechanisms to implement System V APIs. To demonstrate the usage of Message queues.
6. Incorporate implementation for semaphore API and shared memory API. To explain the need for using a basic Client-Server model.

Course Outcomes:

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

1. List and demonstrate the basic Linux utilities
2. Recite and solve problems using Shell Scripting
3. Understand and elaborate File System structure and kernel supportfor files in Linux.
4. Summarize the fundamentals of process control primitives and signal handling.
5. Classify the techniques of Inter process communication and apply them to real world problems.
6. Demonstrate the significance of Semaphores for Kernel support and simulate program using the same.

UNIT-I : Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities, sed – scripts, operation, addresses, commands, applications, awk – execution, fields and records, scripts, operation, patterns, using system commands in awk.
(Applications: Determining what types of files are present in a system, debugging issues with file accessibility, finding a process troubling for a task and discarding from its existing, Write and extract necessary information from huge test files.)

UNIT – II: Working with the Bourne again shell(bash): Introduction, shell responsibilities, pipes and input Redirection, output redirection, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures,

arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.
(Applications: Writing shell scripts for automating most of the regular jobs, taking backup on regular basis and restoring the same)

UNIT-III: Files: File Concept, File System Structure, I nodes, File Attributes, File types, Library functions, the standard I/O and formatted I/O in C, stream errors, kernel support for files, System calls, file descriptors, low level file access – File structure related system calls (File APIs), file and record locking, file and directory management – Directory file APIs, Symbolic links & hard links. (Applications: write some system programs to interact with file system, developing small system software's to work with files and devices, developing program's on directory management system)

UNIT-IV: Process – Process concept, Kernel support for process, process attributes, process control - process creation, waiting for a process, process termination, zombie process, orphan process, Process APIs. Signals– Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions.
(Applications: Applications to find number of typical processes are under different context and controlling them in synchronous manner. Develop user defined modules for handling a signal and controlling several issues with signals.)

UNIT-V: Inter-process Communication: Introduction to IPC, Pipes, FIFOs, Introduction to three types of IPC-message queues, semaphores and shared memory. Message Queues Kernel support for messages, UNIX system V APIs for messages, client/server example.
(Applications: Developing applications complying with IPC mechanisms, developing an application that exchanges a set of messages among different processes. Write a client server application to go with any concurrent approach)

UNIT- VI: Semaphores-Kernel support for semaphores, UNIX system V APIs for semaphores. Shared Memory- Kernel support for shared memory, UNIX system V APIs for shared memory, semaphore and shared memory example.
(Applications: Develop critical section handling mechanisms to deal with any real problems. Building applications to share a piece of memory resource among processes concurrently)

TEXT BOOKS:

1. Unix System Programming using C++, T.Chan, PHI.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH, 2006.
3. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, Wiley India Edition,rp-2008

REFERENCES:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Advanced Programming in the Unix environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. Unix Network Programming, W.R. Stevens, PHI.
4. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	L	M	M	H	M	L	M	H	M	L	H

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering
SOFTWARE AUTOMATION AND TESTING LAB

Code: 8F769
Prerequisite: NIL

L	T	P	C
0	0	4	2

COURSE OBJECTIVES:

In software testing lab the various manual and automation testing processes are carried out to efficiently learn the testing activities. Both commercial and open source testing tools are being taught to better the software testing in detail. According to the software industry requirements the testing tools are taught so that the students can directly make use of testing tools in industry. Implement various testing techniques and to make a thorough study on various testing tools.

COURSE OUTCOMES:

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

1. Prepare Test Plan document and write Test Cases for Small scale Project (Like for their B.Tech IV Year Project or Post-Graduate Projects), they are learn how to Analyze SRS document in order to prepare Test Plan Document.
2. Demonstrate skills to use modern software testing tools (EX: UFT, TestLink, Bugzilla, Selenium, Test Director and Quality Center) and test application (web, Window application) by using the tools.
3. Demonstrate the ability to differentiate between different Testing tools present in the market (like functional testing tools, Test Management Tools, Bug Tracking Tools and Performance Testing Tools) and prepare Test Plan document and write Test Cases for Small scale Project (Like for their B.Tech IV Year Project or Post-Graduate Projects).

Week 1

1. Write programs in 'C' Language to demonstrate the working of the following constructs: i) do…while ii) while…do iii) if …else iv) switch v) for
2. A program written in 'C' language for matrix multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.

Week 2

3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (Ex: Banking application)

Week 3 &4

5. Create a test plan document for any application (Ex: Internet Banking Application)
6. Overview of any Test Management Tools (Open source testing tool : Ex - Test Link)

Week 5 to 10

7. Study of any Functional and Regression Testing Tools:
   i) Open source Tool: SoapUI

ii) Licensed Tool: UFT 12.01

Week 11 & 12

8. Study of any bug tracking tool (open source testing tool : Bugzilla)
9. Overview of Performance Testing Tools (Open source testing tool : Apache Jmeter)
10. Study of Selenium IDE (open source testing tool)

TEXT BOOKS

6. Software testing techniques – Boris Beizer, Dreamtech, second edition.(Unit 1,2,6)
7. Software testing tools – by Dr. K.V.K.K Prasad Dreamtech (Unit 1,6)
8. Effective Methods for Software Testing, 2nd Edition by William E.Perry, Wiley publications.(Unit 3,4)
9. Software Testing and continuous Quality Improvement, by William E.Lewis,Gunasekaran,2nd Edition Auerbach publications (Unit 5,Refer Internet)
10. Software Engineering A practitioner's Approach, Roger S Pressman, 6th edition. McGrawHill International Edition (Unit 3)

REFERENCES

1. Software Testing Techniques ,by Bories Beizer, Second Edition,Dreamtech Press
2. Testing and Quality Assurance for Component based software ,by Gao,Tsao and Wu,Artech House Publishers
3. Managing the Testing Process,by Rex Black,Wiley.
4. Handbook of Software Quality Assurance, by G.Gordon Schulmeyer,James I.McManus,2nd Edition,International Thomson Computer Press

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	L	L	L	L	M				L			L

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering
DATA ANALYTICS LAB

Code: 8EC68

L	T	P	C
0	0	4	2

Prerequisite: Introduction to Data Science

COURSE OBJECTIVES:

1. Learn concepts, techniques and tools they need to deal with various facets of data science practice, including data collection and integration
2. Exploring data analysis, predictive modeling, descriptive modeling, data product creation, evaluation, and effective communication
3. Understand the basic knowledge of algorithms and reasonable programming experience and some familiarity with basic linear algebra and basic probability and statistics
4. Identify the importance of recommendation systems and data visualization techniques

COURSE OUTCOMES:

After completion of the course, the student should be able to

1. Fit a model to data using R commands
2. Use different types of Attributes and types of Data sets apart from Precision, Bias and accuracy parameters & create them using R commands
3. Apply basic concepts like vectors, Matrices, Factors and Data Frames and also lists for manipulation of data & create them using R commands
4. Implement control flow structures
5. Implement dimensionality Reduction techniques using R commands
6. Implement Data Visualization concepts like Charts and Graphs using R commands

Exercises:

1. R Environment setup: Installation of R and RStudio in Windows
2. Write R commands for i) Variable declaration and Retrieving the value of the stored variables, ii) Write an R script with comments, iii)Type of a variable using class() Function.
3. Write R command to i) illustrate summation, subtraction, multiplication, and division operations on vectors using vectors.

ii) Enumerate multiplication and division operations between matrices and vectors in R console

4. Write R command to i) illustrates the usage of Vector subsetting& Matrix subsetting

   ii) Write a program to create an array of 3×3 matrixes with 3 rows and 3 columns.

   iii) Write a program to create a class, object, and function
5. Write a command in R console i)to create a tshirt_factor, which is ordered with levels 'S', 'M', and 'L'. Is it possible to identify from the examples discussed earlier, if blood type 'O' is greater or less than blood type 'A'?

   ii) Write the command in R console to create a new data frame containing the 'age' parameter from the existing data frame. Check if the result is a data frame or not. Also R commands for data frame functions *cbind*(), rbind(), sort()
6. Write R command for i) Create a list containing strings, numbers, vectors and logical values

   ii) To create a list containing a vector, a matrix, and a list. Also give names to the elements in the list and display the list also access the list elements

iii) To add a new element at the end of the list and delete the element from the middle display the same

iv) To create two lists, merge two lists. Convert the lists into vectors and perform addition on the two vectors. Display the resultant vector.

7. Write R command for i) logical operators—AND (&), OR (|) and NOT (!).

ii) Conditional Statements

iii) Create four vectors namely patientid, age, diabetes, and status. Put these four vectors into a data frame patientdata and print the values using a for loop & While loop

iv) Create a user-defined function to compute the square of an integer in R

v) Create a user-defined function to compute the square of an integer in R

vi) Recursion function for a) factorial of a number b) find nth Fibonacci number

8. Write R code for i) Illustrate Quick Sort

ii) Illustrate Binary Search Tree

9. Write R command to i) illustrate Mathematical functions & I/O functions

ii) Illustrate Naming of functions and sapply(), lapply(), tapply() &mapply()

10. Write R command for i) Pie chart & 3D Pie Chart, Bar Chart to demonstrate the percentage conveyance of various ways for traveling to office such as walking, car, bus, cycle, and train

ii)Using a chart legend, show the percentage conveyance of various ways for traveling to office such as walking, car, bus, cycle, and train.

(a) Walking is assigned red color, car – blue color, bus – yellow color, cycle – green color, and train – white color; all these values are assigned through *cols and lbls variables and the legend function.*

(b) *The fill parameter is used to assign colors to the legend.*

(c) Legend is added to the top-right side of the chart, by assigning

iii) Using box plots, Histogram, Line Graph, Multiple line graphs and scatter plot to demonstrate the relation between the cars speed and the distance taken to stop, Consider the parameters data and *x* Display the *speed and dist parameter of Cars data set using x and data parameters*

TEXT BOOK:

1. K G Srinivas, G M Siddesh, “Statistical programming in R”, Oxford Publications.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	L	L		L	M	L			M			M

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering

Linux Programming Lab

L	T	P	C
0	0	4	2

Code: 8FC68
Prerequisite: NIL

Course Objectives:

1. To make use of File handling utilities, Security by file permissions, process utilities, Disk utilities, networking utilities.
2. To understand meta-characters of BASH, acquire the knowledge regarding control structures, shell interrupt processing, functions, debugging shell scripts.
3. To impart usage of kernel support for files using C, understand file structure and low-level I/O functions, system calls (file API's). Induce knowledge regarding Directory management and its API.
4. To analyze syntaxes for process creation, execution and synchronization mechanisms. Give knowledge regarding a signal, need for having them, usage of various signals.
5. To understand the possible mechanisms to implement System V APIs and analyze the usage of Message queues APIs.
6. To incorporate implementation for semaphore API and shared memory API. To explain the need for using a basic Client-Server model.

Course Outcomes:

1. To understand how to work with Linux commands for handling files, processes, text utilities, backup and network utilities.
2. To explore basics of building shell scripts gain knowledge to compose various Shell Scripts.
3. To learn and demonstrate the I/O functions, low-level system calls System Calls available for file and directory handling.
4. To gain knowledge in implementing processes aspects, mastering the process APIs.
5. To understand how to implement pipes, FIFO, how to use for communication purpose in IPC.
6. To understand the significance of Semaphores for Kernel support and simulate program using the same.

List of Experiments

1. Basic Linux Commands File handling utilities, Security by file permissions, Process utilities, Disk utilities, sed, awk, grep.
2. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
3. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

4. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
5. C programming examples using Linux Operating systems.

   a) wc b) cat c) cp
6. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
7. Write the following Shell scripts:
   a) To accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
   b) To list all of the directory files in a directory.
   c) To find factorial of a given integer.
8. a) Write an awk script to count the number of lines in a file that do not contain vowels.
   b) Write an awk script to find the number of characters, words and lines in a file.
9. Implement in C the following UNIX commands using System calls a) rename b) link
10. Write a C program to emulate the UNIX ls – l command.
11. Write a C program on zombie process
12. Write a C program that illustrates the following. a) Creating a message queue. b) Writing to a message queue. c) Reading from a message queue.
13. Write a C program that illustrates file locking using semaphores.
14. Write a C program to implement record locking.
15. Write a C program to implement data communication between two processes using PIPE.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	M	M	M	M	M	L	M	H	H	L	H

Syllabus for B. Tech. IV Year I semester
Computer Science and Engineering
SUMMER INDUSTRY INTERNSHIP - II

L	T	P	C
0	0	0	1

Code: 8E692
Prerequisite: NIL

Course Objectives: To enhance the knowledge on selecting a Project, learn related tools and enhance programming and communication skills for employability.

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

1. Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
2. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
3. Inculcate an enthusiasm to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole.
4. Improve their communicative skills and team skills.

A summer industry internship project shall be carried out by a group of students consisting of 2 to 3 in number during summer third year first semester at industries. This work shall be carried out under the guidance of the faculty assigned as internal guide as well as external guide at industry where students are carrying out summer industry internship project. Project shall consist of design, fabrication, software development or building of prototype. This can be of interdisciplinary nature also.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external
The **internal evaluation** shall consist of:

Day to day work (internal guide 10M external guide : 5M)	:	15 marks
Report	:	05 marks
Demonstration / presentation (internal presentation is evaluated by HOD, senior faculty and internal guide)	:	10 marks
		30 marks
End examination	:	70 Marks.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the internal guide.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level		M	H	L		L	L					

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. IV Year II semester
Computer Science and Engineering
PRODUCT AND SERVICES
(Open Elective –III)

L	T	P	C
2	-	-	2

Code: 8ZC24
Prerequisite: NIL

Course Objectives:
This course helps to provide the basic concepts of Product and Services. This course will enable the students to study areas of basic insights in product management and Services Design.

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

1. Understand the basic concepts of product.
2. Determine the process of new product development and stages in the process.
3. Understand the concept of product testing, product planning and the preparatory groundwork for launching a new product
4. Differentiate various types of services, its differences with the goods and the application of marketing principles for services.
5. Understand the attributes of a good service design and the tools for producing and distributing the services.
6. Identify the importance of quality of services and also introduce some measurement scales to evaluate the service quality.

UNIT- I
PRODUCT AS A COMMERCIAL FACTOR
Product concept: premarketing, product definition, product dimensions. Product classification-by its nature, by final use by reasons for purchase, by consumer groups.

UNIT- II
PRODUCT INNOVATION
New products-What is a new product, Concept, Reasons, Succeed and failure factors, Launch process, Opportunities identification, Idea generation Systems, Evaluation, Check list, Financial analysis, Product concept.

UNIT- III
PRODUCT MANAGEMENT
Concept test, Product testing, Pre-launch, Market test, Final evaluation “Stage / Gate Process” A sequence system for a product launch. Product planning and development-Product planning, Price planning, Bake even point analysis, Communications Planning, Advertising Planning, Distribution planning

UNIT - IV: INTRODUCTION TO SERVICE:

Meaning and Definition of Service, Characteristics of Services, Classification of Service, Five levels of Service, Service verses Physical Goods, 7 P's for Marketing of Services, Marketing Mix for Tourism, Hospitality, Education, and Health Industry.

UNIT – V: SERVICE PROCESS DESIGN:
Challenges & Critical Success Factors, Distribution Methods for Service, Process of Service Delivery, Tools for Service Design, Customer involvement in the Production Process, Tools for Innovation, Role of Intermediaries, Attributes of a Good Design.

UNIT – VI: QUALITY OF SERVICE:
Definition of Service Quality, Elements of Service Quality, Service Quality Measuring Tools; SERVQUAL Scale, Service Quality Gap Analysis, Objective Service Metrics, Cost of Quality in Service. Challenges and Problems of Service Quality in India.

References:

1. Dr. S.L. Gupta, Product Management, Wisdom Publications
2. C.Merle Crawford ,New Product Management
3. Valarie A.Zeithaml & Mary Jo-Bitner: Services Marketing—Integrating Customer Focus Across the Firm, 3/e, Tata McGraw Hill, 2007.
4. Thomas J.Delong & Asish Nanda: Managing Professional Servies—Text and Cases, McGraw-Hill International, 2006.
5. Christopher Lovelock: Services Marketing People, Technology, Strategy, Fourth Edition, Pearson Education, 2006

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level		M				M	M	M				L

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. IV Year II semester
Computer Science and Engineering
INDIAN HISTORY, CULTURE AND GEOGRAPHY
(Open Elective –III)

L	T	P	C
2	-	-	2

Code: 8ZC27
Prerequisite: NIL

COURSE OBJECTIVES:

To equip the students with necessary knowledge related to ancient, medieval and modern Indian and its culture and also facts relating to existence of earth.

COURSE OUTCOMES:

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

1. Understand our Indian History, Culture and Indian heritage.
2. Understand secularism of our country.
3. Analyze and understand the social reformers who brought revolutionary changes in Indian society.
4. Review earth evolution and world climatic change.
5. Understand India Oceanography,
6. Relate the effects of Indian monsoons on Indian agriculture.

UNIT I: Ancient Indian History Fundamental Unity of Indian Harappan and Vedic Civilization – Evolution of Caste System – ainism and Buddhism – Gandhara Art., Political unification of India under Mauryas and Guptas, Historical evolution of Satavahanas., Contribution of Pallavas and Cholas to Art – Chola Administrative Systems .

UNIT II: Medieval India and Culture Influence of Islam on Indian Culture – The Sufi, Bhakthi and Vishnavite movements, Historical Achievements of Vijayanagara Rulers., Contribution of Shershah and Akbar to the evolution of administration system in India – Cultural Development under Mughals.

UNIT III: Modern India Western Impact on India – Introduction of Western Education – Social and Cultural awakening and social reform movements – Raja Rama Mohan Roy – Dayananda Saraswathi – Theosophical Society – Ramakrishna Paramahamsa and Vivekananda – Iswara Chandra Vidyasagar and Veeresalingam – Emancipaition of women and struggle against Caste. Rise of Indian Nationalism – Mahatma Gandhi – Non Violence and Satyagraha – Eradication of untouchability – Legacy of British rule.

Unit IV: Geo Morphology and Climatology The Origin and Evolution of the Earth, Interior of the Earth, Distribution of Oceans and Continents , Minerals and Rocks, Geomorphic Processes, Landforms and their Evolution Composition and Structure of Atmosphere, Solar Radiation, Heat Balance and Temperature. Atmospheric Circulation and Weather Systems, World Climate and Climate Change

Unit V: Oceanography Water (Oceans), Movements of Ocean Water, Physical features of India viz., The Mountains in the North , The Northern Plains, The Peninsular Plateau, The Great Indian Desert, The Coast; and The Islands.

Unit VI: Physical Features Of India And India's Monsoon India's monsoon., Winter, Summer(pre-monsoon),rainy (monsoon),autumn (post-monsoon)., Indian Agriculture, Agriculture and colonialism, Indian Agriculture after Independence Major crops and yields, Horticulture, Organic farming.

References:

1. Sharma .R.S., (2011).Indian Ancient past.,Oxford Publications.
2. Nitin Singhaniya.,(2017). Indian Culture and Heritage., Publisher: McgrawTestPrep., Second Edition.
3. Certificate of Physical and Human Geography,Goh Cheng Leong,Oxford University Press.
4. Bipin Chandra.(2000). India's Struggle for Independence., Penguin Global Publishers
5. Saveendra Singh: Physical Geograpghy.,PrayagPustakBhavan ISBN-10: 8186539298. Edition : 1st Edition Number of Pages : 641 Pages Publication : Year 2006.
6. Majumdar, R. C. et al. *An Advanced History of India* London: Macmillan. 1960. ISBN 0-333-90298-X
7. Basham, A.L. : The wonder that was India ,New York: Grove Press, 1954. (OUP, Madras 1983)Basham, A.L. : Cultural heritage of India , Vols.I to IV ,Oxford University Press, Delhi, 1975**.**

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level		M				M	L	L			M	

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. IV Year II semester
Computer Science and Engineering
FINANCIAL INSTITUTIONS, MARKETS AND SERVICES
(Open Elective –III)

L	T	P	C
2	-	-	2

Code: 8ZC15
Prerequisite: Banking Operations, Insurance and Risk Management

COURSE OBJECTIVES:
The objective of the course is to provide to students an understanding of Financial Markets, the major Institutions involved and the Services offered within this framework.

COURSE OUTCOMES:
At the end of this course, the students will be able to

1. Understand the financial structure and the financial sector reforms after 1991.
2. Identify the role of RBI and the Regulating and credit policies adopted by the RBI.
3. Analyze the role of Non-Banking financial institutions and the role of financial institutions in India.
4. Understand the role of regulatory bodies like SEBI and also to know the capital and money market instruments.
5. Understand about the asset fund based financial services
6. Expose to investment banking and merchant banking.

UNIT I INTRODUCTION: The structure of financial system, Equilibrium in financial markets, Indicators of Financial Development, Financial system and Economic Development, Financial Sector Reforms after 1991.

UNIT II BANKING INSTITUTIONS: Structure and Comparative performance, Functions and Role of RBI, Competition, Interest rates, Spread; Bank Capital Adequacy norms; Banking Innovations – BPLR to Base rate, Core Banking System, Financial Inclusion, Current rates: Policy rates, Reserve Ratios, Exchange rates, Lending/ Deposit rates.

UNIT III NON BANKING FINANCIAL INSTITUTIONS: Structure and functioning of Unit Trust of India and Mutual Funds, Growth of Indian Mutual funds and their Regulation, Role of AMFI. Performance of Non-Statutory Financial Organizations: IFCI, IRBI, NABARD, SIDBI and SFCs.

UNIT IV FINANCIAL AND SECURITIES MARKETS: -, Role and functions of SEBI, Structure and functions of Call Money Market, Government Securities Market – T-bills Market, Commercial Bills Market, Commercial paper and Certificate of Deposits; Securities Market – Organization and Structure, Listing, Trading and Settlement, SEBI and Regulation of Primary and Secondary Markets.

UNIT V ASSET/FUND BASED FINANCIAL SERVICES: Lease Finance, Consumer Credit and Hire purchase Finance, Factoring - Definition, Functions, Advantages, Evaluation,

Forfeiting, Bills Discounting, Housing Finance, and Venture Capital Financing. Fee-based Advisory services: Stock Broking, Credit Rating.

UNIT VI INVESTMENT BANKING AND MERCHANT BANKING: Investment Banking: Introduction, Functions and Activities, Underwriting, Banker to an Issue, Debenture Trustees and Portfolio managers, Challenges faced by Investment Bankers. Merchant Banking: Definition, Merchant Banks Vs Commercial Banks, Services of Merchant Banks.

References:

1. L.M. Bhole: Financial Institutions and Markets, TMH, 2009.
2. E. Gordon, K. Natarajan: Financial Markets and Services, Himalaya Publishing House, 2013.
3. Vasant Desai: Financial Markets and Financial Services, Himalaya,2009
4. Pathak: Indian Financial Systems, Pearson, 2009
5. M.Y. Khan: Financial Services, TMH, 2009.
6. S. Gurusamy: Financial Services and System, Cengage,2009
7. Justin Paul and Padmalatha Suresh: Management of Banking and Financial Services, Pearson, 2009.
8. Gomez, Financial Markets, Institutions and Financial Services, PHI, 2012.
9. R M Srivatsava: Dynamics of Financial Markets and Institutions in India, Excel, 2013.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H		M	M	L	L						

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. IV Year II semester
Computer Science and Engineering
PRINCIPLES OF AUTOMATION AND ROBOTICS
(Open Elective –III)

L	T	P	C
2	-	-	2

Code: 8BC53

Course Objectives:
To improve a company's workflows with automation, we can reduce costs, time, and waste as well as increase productivity, reduce mistakes, and control all the processes of the business in real time. To introduce the concepts of Robotic system, its components and instrumentation and control related to robotics.

Course Outcomes:
After completing the subject, students will be able to:

1. Understand a production system, principles of automobile
2. Classify the methods of work part transfer mechanical buffer storage control functions
3. Understand the implementation of automated flow lines
4. Aanalyse and design of material handling systems, automated guided vehicle system
5. Understand adaptive control systems and Applications.
6. Outline the business process Engineering. Concept of concurrent Engineering, techniques of rapid prototype.

UNIT – I
Introduction: Production system, Automated manufacturing systems, Reasons, Principles and strategies of automation, Basic elements of automated system, pneumatic and hydraulic circuit components, Assembly system and line balancing: Manual Assembly process, and work transport systems, Line pacing, Analysis of manual assembly lines, line balancing methods-problems, ways of improving line balance
lines.

UNIT – II
Analysis of Automated flow lines: System configuration, Workpart transfer, General terminology and analysis of transfer lines without and with buffer storage.
Automated Assembly systems: Fundamentals and Design of assembly systems.

UNIT – III
Automated material handling: Principles, Types of equipment, functions, analysis and design of material handling systems, conveyor systems, automated guided vehicle systems-technology, Analysis of material transport systems.
Automated storage systems: Basic terminology, AS/RS; Carousel storage, work in process storage,

UNIT – IV

Adaptive control systems: Introduction, Adaptive control with optimization, Adaptive control with constraints, Application of A.C. in Machining operations. Use of various parameters such as cutting force, Temperature, vibration and acoustic emission. Concept of Concurrent Engineering, MRP,MRP II, Techniques of Rapid Proto typing.

Unit – V: **Robotics**:
Classification and structure of Robotic systems, structure of continuous path robot systems, drives and control systems, control approaches for robots.

Unit – VI
Robot arm kinematics, the direct kinematics problem and inverse kinematic solutions, planning of manipulator trajectories, robot sensors, range sensors, proximity sensors, touch sensors, force and torque sensors, programming, manual teaching, lead through teaching, programming languages, storing and operating task programmes, robot selection and application.

TEXT BOOKS:
1. Automation, Production Systems and Computer Integrated Manufacturing: M.P. Groover./PE/PHI
2. Mittal and Nagrath, 'Robotics and Control', Tata Mc Graw Hill.

REFERENCES:
1. Computer control of Manufacturing Systems by Yoram Coreom.
2. CAD / CAM/ CIM by Radhakrishnan.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M				M	M	L				

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. IV Year II semester
Computer Science and Engineering
FUNDAMENTALS OF RENEWABLE ENERGY SOURCES
(Open Elective –III)

Code: 8AC45
Prerequisite: Nil

L	T	P	C
2	-	-	2

COURSE OBJECTIVES:
Becomes familiar with solar energy, its radiation, Collection, storage and application and also gets introduced to other forms of Renewable Energy sources viz., the Wind energy, Biomass energy, geothermal energy and ocean energy.

COURSE OUTCOMES:
At the end of this course, the students will be able to

1. Understand the role and potential of new and renewable energy sources realize the potential of solar energy, its impact on environment; define and understand the terms describing the different angles that one may incur in setting up a solar panel and be able to use the instruments for measuring solar radiation.
2. Demonstrates the knowledge of different techniques of solar collection and storage.
3. Classify different types of horizontal and vertical axis wind mills and understands the performance characteristics of the same. The student also demonstrates the knowledge of different Bio-gas digesters and factors influencing its yield.
4. Understand the potential of geothermal energy in India and will be able to characterize different types of geothermal wells.
5. Differentiate the different methods of kinetic energy extraction from Ocean waves and tides and thermal energy extraction from Oceans.
6. Demonstrates the knowledge of Direct Energy Conversion in different phenomena viz., Joule Thomson effect, Seebeck effect, Peltier effect etc. and the principle of operation of Fuel Cells.

UNIT – I -PRINCIPLES OF SOLAR RADIATION: Role and potential of new and renewable source, The solar energy option, Environmental impact of solar power, Physics of the sun, the solar constant, Extraterrestrial and terrestrial solar radiation, Solar radiation on titled surface, Instruments for measuring solar radiation and sun shine, Solar radiation data.

UNIT-II- SOLAR ENERGY COLLECTION STORAGE AND APPLICATIONS: Flat plate and concentrating collectors, Classification of concentrating collectors, orientation and thermal analysis, advanced collectors. Different methods, Sensible, Latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT – III WIND ENERGY: Sources and potentials, Horizontal and vertical axis windmills, Performance characteristics, Betz criteria

BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, Types of Bio-gas digesters, Gas yield, Combustion characteristics of bio-gas, Utilization for cooking, I.C.Engine operation and economic aspects.

UNIT – IV GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, Potential in India.

UNIT-V OCEAN ENERGY: OTEC, Principles utilization, Setting of OTEC plants, Thermodynamic cycles. Tidal and wave energy, Potential and conversion techniques, Mini-hydel power plants and their economics.

UNIT-VI DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, Limitations, principles of DEC. Thermoelectric generators, seebeck, Peltier and joul Thomson effects, Figure of merit, materials, Applications, MHD generators, Principles, Dissociation and ionization, Hall effect, Magnetic flux, MHD accelerator, MHD Engine, Power generation systems, Electron gas dynamic conversion, economic aspects. Fuel cells – principles - Faraday's law's - Thermodynamic aspects - selection of fuels and operating conditions.

TEXT BOOKS:

1. Non-Conventional Energy Sources - G.D. Rai
2. Renewable Energy Technologies - Ramesh & Kumar /Narosa.

REFERENCE BOOKS:

1. Renewable energy resources - Tiwari and Ghosal/ Narosa.
2. Non-Conventional Energy - Ashok V Desai /Wiley Eastern.
3. Non-Conventional Energy Systems - K Mittal /Wheeler

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M									

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech IV Year II semester
Computer Science and Engineering
ELECTRONICS CIRCUIT DESIGN AND ANALYSIS
(Open Elective –III)

	L	T	P	C
Code: 8CC44	**2**	**-**	**-**	**2**

Prerequisite: Analog Electronic Circuits

COURSE OBJECTIVES:
This course provides the analysis to design all kinds of amplifiers (Small signal and large signal amplifiers). It provides the back bone to design and generate the signals with different frequencies.

COURSE OUTCOMES:
At the end of this course, the students will be able to

1. Analyse and Design of BJT Single stage, multistage amplifiers at low and high frequencies.
2. Analyse and Design JFET and MOSFET amplifiers
3. Design different types of Feedback Amplifier, Oscillators and their analysis.
4. Analyse and Design power amplifiers. Understand distortions
5. Analyse and Design tuned and RF amplifiers such as single tuned, double tuned, stagger tuned and wide band amplifier.
6. Understand the stability of oscillators and tuned amplifiers.

UNIT I: MULTISTAGE AMPLIFIERS Review of Transistor Amplifiers. Review of BJT hybrid π model. Methods of inter stage coupling, N-stage cascaded amplifier, equivalent circuits, Miller's theorem, high input resistance transistor circuits, cascade transistor configuration, CE – CC amplifier, two stage RC coupled J-FET amplifier (common sources configuration). **Frequency response of BJT Amplifier, Analysis at Low and High frequencies.**
Applications: Design of a 3-stage RC coupled amplifier (gain= 30 dB) which operates from 350Hz to 2 KHz.

UNIT II: FET AMPLIFIERS Biasing of JFET - Self bias and fixed bias. Biasing of MOSFETS -. Depletion and Enhancement mode. Analysis of common source, common drain and common gate amplifier configurations – Thermal runaway in MOSFET – MOS Differential amplifier – Analysis. **Frequency Response of Common Source Amplifier.**

UNIT III: FEED BACK AMPLIFIERS Fundamentals-classification- Characteristics of feedback Amplifier effect of feedback in voltage series, voltage shunt, current series and current shunt amplifiers.
Applications: Design of a stable 50 KHz sinusoidal oscillator.
UNIT IV: OSCILLATORS Condition for Oscillations. Classification of Oscillators.RC Oscillators-LC Oscillators, tuned collector and tuned drain oscillator and stability of oscillators. Design of audio and radio frequency oscillators.

UNIT V: POWER AMPLIFIERS Class A, B, AB, C& D power amplifiers –push pull configuration, complementary symmetry circuits , Distortion in Amplifiers. Harmonic distortion and Crossover Distortion in Power Amplifiers– Conversion efficiency and relative performance,

UNIT VI: TUNED AND RF AMPLIFIERS Introduction to Tuned Amplifiers,Q-Factor.single tuned capacitive coupled amplifier, tapped single tuned capacitance coupled amplifier, single tuned transformer coupled amplifier, stagger tunning, wideband tuned amplifiers.
Applications: Design of a IF tuner for AM receiver.

TEXT BOOKS:

1. Integrated electronics-J.Milliman and C.C.Halkias, MC Graw –Hill-1972
2. Electronic Devices and Circuits: T.F.Bogart, j.s.Bearsley, Pearson Edition, 6th edition, 2000
3. Electronic devices and Circuit Theory-Robert L. Boylsted, Louis Nashelsky, 9ht ed., 2008, PE

REFERENCE:

1. Electronic Circuit Analysis-K.Lal Kishore, 2004, BSP
2. Electronic Circuits and Applications, Muhammad H Rashid, Cengage Learning
3. Microelectronic Circuits – Sedra and Smith-5th ed., 2009, OxfordUniversity Press
4. Electronic Devices and Circuits –S.Salivahanan, N.Suresh Kumar,AVallavaraj,2ed., 2009,TMH.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	L		M			M	L	L				L

H: High, M: Medium, L: Low Correlation

Syllabus for B.Tech IV Year II semester
Computer Science and Engineering
ENTREPRENEURSHIP AND BUSINESS DESIGN
(Open Elective –III)

	L	T	P	C
Code: 8ZC10	**2**	**-**	**-**	**2**

Prerequisite:

Course Objective:
The objective of the course is to make students understand the essentials of building their startups and to familiarize with business design process develop business models, and market their product.

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

1. Understand the essentials of entrepreneurship and the key role played by the entrepreneurs.
2. Differentiate the different phases of UI /UX.
3. Outline the attentiveness on designing a business strategy.
4. Explore on designing and delivery of services.
5. Understand reverse engineering methods in product development.
6. Indicate information on IPR, and patent application.

Unit – I: Introduction to Entrepreneurship: Meaning of Entrepreneurship. Reasons feeding the Entrepreneurial fire. Understanding Entrepreneurship as a Process. Multiple roles of Entrepreneur: Intrapreneur, Inventor, Coordinator, Manager and Controller. Psychological and behavioral aspects of First-Generation Entrepreneur.

Unit – II: Introduction to UI/UX: Human centered design and benefits, the distinction between UX and UI, UX process – user research, prototyping strategies, UI principles, UI analysis, UI design, UI components and Responsive design.

Unit – III: Designing a Business Strategy: Define a problem and frame a strategic question, map the lives of users, journey mapping and ideation, color theory, killing the ideas through Stage Gate Models, pitching of full-fledged, idea, choosing the Start-Up Team.

Unit – IV: Designing Services and Services Delivery: Services as solutions, Service delivery pathways, rapid branding and marketing strategies, key metrics for Design thinking. Types of New services, Mix of core services and secondary and enhancing services, service flower and service design matrix.

Unit – V: Business Model: Meaning of business model, Difference between business model and business planning, the business model canvas, Risks and Assumptions, Validation of business models, building solution demo and MVP, revenue streams and pricing strategies.

Unit – VI: Entrepreneurial Funding and Risk Management: Bootstrapping, Angel Investors, Venture capitalists, Private equity funding, customer acquisition, return on equity and Break even analysis, Risk propensity Vs. Risk avoidance, Locus of control of entrepreneur, Risk estimation techniques, risk avoidance strategies.

Text Books:

1. Adrian McEwen, Hakim Cassimally – "Designing the Internet of Things", Wiley Publications, 2012
2. Hedman, J., &Kalling, T. (2003). The business model concept: theoretical underpinnings and empirical illustrations. European journal of information systems, 12(1), 49-59.
3. Cabrera, J. (2017). Modular Design Frameworks: A Projects-based Guide for UI/UX Designers. Apress.

References:

1. J. Chris Leach & Ronald W. Melicher "Entrepreneurial Finance, Fourth Edition", South Western, Cengage Learning, 2012.
2. Robert D. Hisrich&VelandRamadani – " Effective Entrepreneurial Management, Strategy, Planning, Risk Management, and Organization" , Springer, 2017.
3. Mæhlum, A. R. (2017). Extending the TILES Toolkit-from Ideation to Prototyping (Master's thesis, NTNU).
4. Norman, D. (2013). The design of everyday things: Revised and expanded edition. Basic books.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	L	L	L		M	M	L					M

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. IV Year II semester
Computer Science and Engineering
MOBILE COMPUTING
(Professional Elective –V)

L	T	P	C
3	-	-	3

Code: 8EC15
Prerequisite:

Course Objectives:
Learn concepts of mobile communication and various media access control methods. Understand IP mobile primitives and concepts of network and transport layer with regard to mobile communication. Learn WAP protocols, Bluetooth and the Necessary Tools for Android.

Course Outcomes:

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

1. Identify vast application areas for mobile / wireless communications and Understand GSM Architecture, Services.
2. Examine Hidden and exposed terminals, Near and far terminals and Differentiate medium access control methods for wireless communication SDMA, FDMA, TDMA and CDMA.
3. Illustrate mobile IP primitives in Network layer and Demonstrate IP packet delivery, DHCP.
4. Distinguish Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP in Transport layer
5. Understand applications of MANETs routing algorithms, data hoarding, client server computing along with the data delivery mechanisms.
6. Understand protocols and tools such as WAP, Bluetooth and Identify emerging mobile operating systems.

UNIT - I
Introduction to Mobile Communications and Computing: Mobile Computing (MC): Introduction to MC, novel applications, limitations, introduction to mobile architecture - UMTS, GSM.
Architecture GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT - II
(Wireless) Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT - III
Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

UNIT - IV
Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT - V

Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing algorithms.

Database: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, data delivery mechanisms

UNIT - VI

Protocols and Tools: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management), introduction to mobile operating systems- Android: **Android versions, Typographical Conventions, the Necessary Tools for Android**.

Textbooks:

1. Jochen Schiller, "Mobile Communications", *Addison-Wesley*. (Chapters 1, 2, 3, 4, 7, 8 and 9). Second edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", *Wiley*, 2002, ISBN 0471419028. (Chapters 6, 11, 15, 17, 18, 19, 26 and 27)
3. Android Programming: The Big Nerd Ranch Guide by Bill Phillips, Chris Stewart, Brian Hardy and Kristin Marsicano, second edition.

References:

1. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, October 2004,
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", *Springer*, second edition, 2003.
4. Martyn Mallick, "Mobile and Wireless Design Essentials", Wiley *DreamTech*, 2003
5. A. Tanenbaum "Computer Networks", 4th edition.
6. Android Programming (Big Nerd Ranch Guide), by Phillips,Stewart, Hardy and Marsicano
7. Android Programming – Pushing the limits by Hellman

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M	M	H	H	M	H	M	M	M	M

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. IV Year II semester
Computer Science and Engineering
ADVANCED SOFTWARE ENGINEERING
(Professional Elective –V)

L	T	P	C
3	-	-	3

Code: 8FC16
Prerequisite: Software Engineering and OOAD

COURSE OBJECTIVES:
This course aims to further develop the understanding of the concepts and methods required for the construction of large software systems. It seeks to provide a broad understanding of the advanced and emerging techniques associated with the development of complex software systems**.**

COURSE OUTCOMES:

At the end of this course, the students will be able to
1. Understand the issues affecting the organization, planning, and development of large and complex software systems
2. Understand the concepts of software metrics and reuse-based software engineering
3. Apply software engineering principles in the development of distributed software systems
4. Design and implement service-oriented software systems
5. Understand the design and development of aspect-oriented software systems
6. Understand software re-engineering process model

Unit 1: Software Reuse Reuse-based Software Engineering – Approaches supporting software reuse – Application Frameworks – Commercial-Of-The-Shelf (COTS) systems: COTS Solution Systems, COTS Integrated Systems. Component-Based Software Engineering (CBSE) – Components, Component Models –CBSE Processes: CBSE for Reuse, CBSE with Reuse – Component-based Development: Component Qualification, Adaptation, and Composition – Economics of CBSE.

Unit 2: Distributed Software Engineering Distributed Software Engineering – Distributed system characteristics – Design Issues –Middleware – Client-Server Computing – Client-Server Interaction – Architectural patterns for Distributed Systems:Master/Slave,Two-tier,Multi-tier, Distributed component, and Peer-to-Peer –Software as a Service(SaaS) –Key elements – Implementation factors – Configuration of a system offered as a service.

Unit 3: Service-Oriented Software Engineering Service-Oriented Architecture(SOA) – Difference between SaaS and SOA - Benefits of SOA – Key Standards-RESTful web services – Service-based Information Systems – Service-Oriented Software Engineering: Services as reusable components – Service Engineering: Service Candidate Identification, Service Interface Design, Service Implementation and Deployment, Legacy system services-Software Development with services: Workflow design and implementation, Service testing.

Unit 4: Real-time Software Engineering Introduction to Embedded and Real-time systems - Soft Real-time and Hard Real-time systems - Characteristics of embedded software - Stimuli and Response - Embedded system modeling - Design process for Real-time systems - Architectural patterns for Real-time systems - Timing analysis - Organization of Real-time Operating Systems.

Unit 5: Software Re-Engineering Software Maintenance – Software Re-Engineering Process Model – Reverse Engineering – Forward Engineering - Software Refactoring –Examples – Principles in Refactoring – Bad Code Smells.

Unit 6: Software Metrics Object-Oriented Metrics (OOM) – Characteristics of OO Metrics – Metrics for the OO Design Model – Class-oriented Metrics: CK Metrics Suite, Lorenz and Kidd Metrics, MOOD Metrics Suite – Metrics for Object-Oriented Testing – Calculation of Metrics.

Text Books:

1. Ian Sommerville,*Software Engineering*, 10th Edition, Pearson, 2017, ISBN-13: 9789332582699, ISBN-10: 9332582696.
2. Roger Pressman andBruce R. Maxim,*Software Engineering: A Practitioner's Approach, 8*th Edition, McGraw-Hill, 2014, ISB-13: 9780078022128,ISBN-10: 0078022126.

Reference Books:

1. Rajib Mall, Real-Time Systems: Theory and Practice, 2007, Pearson, ISBN-10: 8131700690, ISBN-13: 978-8131700693.
2. Robert C. Martin, Clean Architecture: A Craftsman's Guide to Software Structure and Design, 2017, Pearson, ISBN-10: 935286512X, ISBN-13: 978-9352865123,
3. Martin Fowler,Refactoring: Improving the design of existing code, 2nd Edition, 2018, Addison Wesley, ISBN-10: 0134757599, ISBN-13: 978-0134757599.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M	L	H	M	M					H

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. IV Year II semester
Computer Science and Engineering
CLOUD COMPUTING
(Professional Elective –V)

L	T	P	C
3	-	-	3

Code: 8EC20
Prerequisite: NIL

COURSE OBJECTIVES:
Understand the basic characteristics of cloud computing and technologies that support to implement cloud computing. Analyze the basic cloud computing models that are used to implement cloud technology and available cloud resources in the market. Analyzing the security issues in cloud computing environment and understanding different case studies in cloud computing and IOT platform.

COURSE OUTCOMES :
At the end of this course, the students will be able to

1. Summarize the characteristics of cloud and differentiate the cloud service and deployment models.
2. Demonstrate the different kinds of cloud services.
3. Analyze different architectures for cloud applications, Create and run Amazon ec2 instance through python programs
4. Assess the performance of cloud services and summarize the innovative applications of IOT on cloud.
5. Design architecture of an Apps such as map reduce, image processing app etc on cloud.
6. Understand various security aspects in cloud.

UNIT-1 Introduction to Cloud Computing : Introduction ,characteristics ,Cloud Models and examples ,Applications of Cloud Services .Cloud Concepts and Technologies .

UNIT-2 Cloud Services and Platforms : Compute Services, Storage Services, Database Services, Application Services, Content Delivery Services, Analytics Services, Deployment and Management Services, Identity and Access Management Services, Open Source Private cloud Software.

UNIT-3 Cloud Application Design: Design Considerations for Cloud Application, Reference Architectures for Cloud Applications .Cloud Application Design Methodologies , Data Storage Approaches. Python For Cloud: Python for Amazon Web Services, Map Reduce

UNIT – 4 book 2. Cloud and the Internet of Things: Performance of Distributed Systems and the Cloud- Enabling Technologies for the Internet of Things- Innovative Applications of the Internet of Things- Online Social and Professional Networking

UNIT-5 Cloud Application Development in Python: Design Approaches, Image Processing App, Document Storage App, Map Reduce App, Social Media Analytics App.

UNIT-6 Cloud Security: Introduction, Cloud Security Architecture (CSA), Authentication, Authorization, Identity Access Management (IAM), Data Security, Key Management, Auditing. Cloud for Industry, Healthcare and Education.

TEXT BOOKS:

1. Cloud Computing –A Hands on Approach , Arshdeep,Vijay Medisetti,University Press.
2. Distributed and Cloud Computing,1st Edition,From Parallel Processing to the Internet of Things,Authors: Kai Hwang Jack Dongarra Geoffrey Fox(Unit4)
3. Cloud Computing: Raj Kumar Buyya,James Broberg,Andrzej GOscinski,Wiley.

REFERENCES:

1. Cloud Computing: Dr.Kumar Saurab Wiley India 2011 .
2. Code in the cloud computing: K Chandrasekharan CRC Press.
3. Cloud Compuitng: John W. Rittinghouse ,James Ransome,CRC press.
4. Virtualization Security: Dave Shackleford2013,SYBEX a Willy Brand.
5. Cloud Computing and Software Service: Ahson, iiyas.2011.
6. Cloud Computing Bible: Sosinsky 2012 Wiley India.

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M		H							H

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. IV Year II semester
Computer Science and Engineering
INTERNET OF THINGS
(Professional Elective –V)

Code: 8DC44 **L T P C**
3 - - 3

Prerequisite: Data Communications and Computer Networks

COURSE OBJECTIVES:

Terminology, technology and applications of IoT IoT system management using M2M (machine to machine) with necessary protocols Python Scripting Language preferred for many IoT applications Raspberry PI as a hardware platform for IoT sensor interfacing Implementation of web based services for IoT with case studies

COURSE OUTCOMES:

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

1. Getting familiar with terminology, technology and applications of IOT
2. Understand and explain IoT system management using M2M (machine to machine) with necessary protocols
3. Design and develop Python Scripting Language programs preferred for many IoT applications
4. Use Raspberry PI as a hardware platform for designing the IoT sensor interfacing
5. Implement web based services for IoT
6. Understand and analyze the case studies illustrating IoT Design

UNIT I: Introduction to Internet of Things Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies like Wireless Sensor Networks, Cloud Computing, Big data analytics, and Communication protocols, Embedded Systems, IoT Levels and Templates.

UNIT II: IoT and M2M Software defined networks, network function virtualization, difference between SDN and NFV for IoT; Basics of IoT System Management with NETCOZF-YANG (Block Diagrams).

UNIT III: Developing IoT, IoT Design Methodology – The 10 steps design methodology; Logical design using Python: Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, date/time operations, Python packages of interest for IoT.

UNIT IV: IoT Physical Devices and End points Raspberry PI – Introduction to Raspberry PI and its Interfaces (serial, SPI, I2C) Programming – Python programming with Raspberry PI – Controlling Input / output (Interfacing with LED and LDR).

UNIT V: IoT Physical Servers and Cloud Offerings Cloud concepts (IaaS, PaaS, Saas), Introduction to Cloud Storage models and communication APIs – WAMP, Xively; Python web application framework with Django, Designing a RESTful web API

UNIT VI: Case Studies Illustrating IoT Design Home Automation – Smart Lighting, Home intrusion detection, Cities – Smart parking, Environment – Weather monitoring system, Weather reporting bot, Air pollution monitoring, Forest fire detection, Agriculture – Smart irrigation, Productivity applications – IoT printer

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	H	H	H	H	M	L	L	M	H	H	L	H

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. IV Year II semester
Computer Science and Engineering
PROJECT – II

L	T	P/D	C
0	0	10	5

Code: 8E896
Prerequisite: All Courses till this semester

COURSE OBJECTIVES:
To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

COU**RSE OUTCOMES:**
At the end of this course, the students will be able to

1. Estimate the human and physical resources required, and make plan for the development of Project
2. Break down the Project into tasks and determine handover procedures
3. Identify links and dependencies, and schedule to achieve deliverables
4. Allocate roles with clear lines of responsibility and accountability with team spirit.
5. Design and develop the software or prototype using modern software tools wherever applicable to meet societal needs
6. Present the Project done and submit the report

A project shall be carried out by a group of students consisting of 2 to 3 in number in fourth year second semester. This work shall be carried out under the guidance of the faculty assigned as internal guide and shall involve design, fabrication, software development or any other significant activity. This can be of interdisciplinary nature also.

Out of total 100 marks for project work (in the final year second semester), 30 marks shall be for Internal Evaluation and 70 marks for the External Evaluation at the end of the Semester.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. The committee consists of an external examiner, HOD, a Senior Faculty Member and Internal Guide.

Division of marks for internal assessment – 30 marks
Division of Marks for External Evaluation – 70 Marks