Study & Evaluation Scheme

of

Bachelor of Technology
(Computer Science & Engineering)
[Applicable w.e.f. Academic Session - 2020-21 till revised]

[As per CBCS guidelines given by UGC]

TEERTHANKER MAHAVEER UNIVERSITY
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TEERTHANKER MAHAVEER UNIVERSITY
(Established under Govt. of U.P. Act No. 30, 2008)
Delhi Road, Bagarpur, Moradabad (U.P.)

Study & Evaluation Scheme	
SUMMARY	
Institute Name	**FACULTY OF ENGINEERING**
Programme	***Bachelor of Technology (Computer Science & Engineering)***
Duration	*Four Years full time(Eight Semesters)*
Medium	*English*
Minimum Required Attendance	*75%*
Credits	
Maximum Credits	*180*
Minimum Credits Required for Degree	*172*

Assessment:

Evaluation			**Internal**	**External**	**Total**
Theory			40	60	100
Practical/ Dissertations/ Project Reports/ Viva-Voce			50	50	100
Class Test-1	**Class Test-2**	**Class Test-3**	**Assignment(s)**	**Attendance & Participation**	**Total**
Best two out of three					
10	10	10	10	10	40
Duration of Examination			**External**	**Internal**	
			3 Hours	1.5 Hours	

To qualify the course a student is required to secure a minimum of 45% marks in aggregate including the semester end examination and teachers continuous evaluation.(i.e. both internal and external).A candidate who secures less than 45% of marks in a course shall be deemed to have failed in that course. The student should have at least 45% marks in aggregate to clear the semester.

 # Provision for delivery of 25% content through online mode.

 # Policy regarding promoting the students from semester to semester & year to year. No specific condition to earn the credit for promoting the students from one semester to next semester.

 # Maximum Duration: Maximum no of years required to complete the program: N+2 (N=No of years for program for B.TECH(CSE) N=4)

Question Paper Structure	
1	*The question paper shall consist of six questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question no. 2 to 6 (from Unit-I to V) shall have explanatory answers (approximately 350 to 400 words) along with having an internal choice within each unit.*

2	*Question No. 1 shall contain 8 parts from all units of the syllabus with at least one question from each unit and students shall have to answer any five, each part will carry 2 marks.*
3	*The remaining five questions shall have internal choice within each unit; each question will carry 10 marks.*

Evaluation of practical course [From Second Year Onwards]

1 **Practical Courses Internal Evaluation (50 marks)**

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

2 **Practical Courses External Evaluation (50 marks)**

The external evaluation would also be done by the External Examiner based on the experiment performed during the examination.

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

IMPORTANT NOTES:

1	*The purpose of examination should be to assess the Course Outcomes (CO) that will ultimately lead to of attainment of Programme Specific Outcomes (PSOs). A question paper must assess the following aspects of learning: Remember, Understand, Apply, Analyze, Evaluate & Create (reference to Bloom's Taxonomy).*
2	*Case Study is essential in every question paper (wherever it is being taught as a part of pedagogy) for evaluating higher-order learning. Not all the courses might have case teaching method used as pedagogy.*
3	*There shall be continuous evaluation of the student and there will be a provision of fortnight progress report.*
4	*Progression: There is no restriction to earn minimum credits for progression from semester to semester and year to year.*

A. Introduction:

An undergraduate degree programme in computer engineering aims to provide students with a solid foundation in the underlying principles of computer engineering before students move forward and decide on a specialization in an area of interest later in the course. The course will comprise of a range of learning modes- laboratory work tutorials, lectures, project work and individual research. Engineering bachelor course will take four years for completion. Computer engineering seeks to understand the application of computer science in the form of software and hardware. It comprises of the skills like computer programming languages, database utilities, web programming and others.

Students will develop and gain various skills that are transferable within the engineering world and practical skills that are equally useful in plenty of other sectors. Problem-solving skills are honed, and their interpersonal and communication skills will also improve with the amount of team work that they will be required to do. Students will also learn how to better manage their time and resources and assess the risks involved in a certain project. Other useful skills that they will learn include design, leadership and organizational skills.

The institute emphasis on the following courses ***balanced with core and elective courses****:* The curriculum of B.Tech. program emphasizes an intensive, flexible engineering education with 138 credits of core courses (all types), 22 credits of electives and 20 credits of field/internship projects. Total 180 credits are allotted for the B.Tech. degree.

The programme structure and credits for B.Tech. are finalized based on the stakeholders' requirements and general structure of the programme. Minimum number of classroom contact teaching credits for the B.Tech. program will be 152 credits and Project/internship will be of 20 credits. However, the minimum number of the credits for award of B.Tech. degree will be 172 credits. Out of 180 total credits of classroom contact teaching, 57 credits are to be allotted for Professional core courses (PCC), 19 credits are allotted to Basic Science Courses (BSC), 11 credits are allotted to Engineering Science Courses (ESC), 6 credits are allotted to open elective courses (OEC), 22 credits are allotted to Humanities and Social Sciences including Management courses (HSMC), 16 credits are allotted to Professional Elective courses and rest of 26 credits for Laboratory courses.

Credit Category Distribution:

Student must earn minimum 172 credits required for the the award of B.Tech Degree out of maximum 180 credits offered in the programme. However, it is mandatory to earn credit in core courses and credit in elective papers. The category of programmne B.Tech is mentioned below:

B.TECH (CSE): Four-Year (8-Semester) CBCS Programme				
Basic Structure: Distribution of Courses				
S.No.	**Type of Course**	**Credit Hours**	**Total Maximum Credits**	**Minimum credit required**
1	Professional Core Courses (PCC)	3 Courses of 4 Credit Hrs. each (Total Credit Hrs. 3X4) 15 Courses of 3 Credit Hrs. each (Total Credit Hrs. 15X3)	57	57
2	Professional Elective Courses (PEC)	5 Courses of 3 Credit Hrs. each (Total Credit Hrs. 5X3) 1 Courses of 1 Credit Hrs. each (Total Credit Hrs. 1X1)	16	16
3	Mandatory Courses (MC)	1 Courses of 3 Credit Hrs. each (Total Credit Hrs. 1X3) 8 Courses of 0 Credit Hrs. each (Total Credit Hrs. 8X0)	3	3
4	Laboratory Courses (LC)	5 Courses of 2 Credit Hrs. each (Total Credit Hrs. 5X2) 16 Courses of 1 Credit Hrs. each (Total Credit Hrs. 16X1)	26	26
5	Project / Industrial Training/Seminar (PROJ)	1 Courses of 6 Credit Hrs. each (Total Credit Hrs. 1X6) 2 Courses of 4 Credit Hrs. each (Total Credit Hrs. 2X4) 3 Courses of 2 Credit Hrs. each (Total Credit Hrs. 3X2)	20	20
6	Open Elective Courses (OEC)	2 Courses of 3 Credit Hrs. each (Total Credit Hrs. 2X3)	6	50
7	Basic Science Courses (BSC)	4 Courses of 4 Credit Hrs. each (Total Credit Hrs. 4X4) 1 Courses of 3 Credit Hrs. each (Total Credit Hrs. 1X3)	19	
8	Engineering Science Courses (ESC)	2 Courses of 4 Credit Hrs. each (Total Credit Hrs. 2X4) 1 Courses of 3 Credit Hrs. each (Total Credit Hrs. 1X3)	11	
9	Humanities And Social Science Including Management Courses (HSMC)	6 Courses of 3 Credit Hrs. each (Total Credit Hrs. 6X3) 2 Courses of 2 Credit Hrs. each (Total Credit Hrs. 2X2)	22	
10	Value Added Audit Course (VAC)	6 Courses of 0 Credit Hrs. each (Total Credit Hrs. 6X0)	0	
Total Credits			**180**	**172**

Contact hours include work related to Lecture, Tutorial and Practical (LTP), where our institution will have flexibility to decide course wise requirements.

B. Tech (Honours) Programme:

Additionally, A programme B.Tech with Honours is introduced in order to facilitate the students to choose additionally with the specialized courses of their choices and build their competence in a specialized area. The features of the new programme, include:

:

1. B.Tech Student in regular stream can opt for B.Tech (Hons.), provided he/she passed in all courses with minimum aggregate 75% marks upto the end of second semester.
2. For B. Tech (Hons), Student needs to earn additional 24 credits (over and above the required minimum 180 credits) relevant to her/his discipline as recommended by the faculty advisor.
3. The students opting for this program have to take four additional courses of their specialization of a minimum of 2 credits each from 3rd to 8th semesters.
4. The faculty advisor will suggest the additional courses to be taken by the students based on their choice and level of their academic competence.
5. The list of such additional courses offered by the NPTEL will be approved by the Honourable Vice Chancellor in the beginning of the academic year to facilitate the registration process.
6. The student can also opt for post graduate level courses.
7. The students have to submit the NPTEL course completion certificate to exam division for considering as B.Tech (Hons)

* Student should have to take permission of registration for the B.Tech. (Hons.) degree from Honourable Vice Chancellor in starting of third semester.

B. Choice Based Credit System (CBCS)

Choice Based Credit System (CBCS) is a versatile and flexible option for each student to achieve his target number of credits as specified by the UGC/AICTE and adopted by our University.

The following is the course module designed for the B.TECH (CSE) program:

Professional Core Course (PCC): Professional core courses of B.TECH (CSE) program will provide a holistic approach to computer education, giving students an overview of the field, a basis to build and specialize upon. These core courses are the strong foundation to establish computer knowledge and provide broad multi-disciplined knowledge can be studied further in depth during the elective phase.

The core courses will provide more practical-based knowledge, case-based lessons and collaborative learning models. It will train the students to analyze, decide, and lead-rather than merely know-while creating a common student experience that can foster deep understanding, develop decision-making ability and contribute to the society at large.

A wide range of core courses provides groundwork in the basic computer disciplines: programming languages, Database, Web Programming, Mobile Applications, Big data, Data Mining, Machine Learning etc.

The integrated foundation is important for students because it will not only allow them to build upon existing skills, but they can also explore career options in a range of industries, and expand their understanding of various computer fields.

We offer core courses from semester III onwards during the B.Tech. program. There will be 3,4 and 2 credits for each core course offered.

HSMC – (Humanities and Social Sciences including Management courses): As per the AICTE guidelines of Choice Based Credit System (CBCS) for all Universities, including the private Universities, the ***Humanities and Social Sciences including Management courses*** are actually Ability Enhancement Compulsory Course (AECC) which is designed to develop the ability of students in communication (especially English) and other related courses where they might find it difficult to communicate at a higher level in their prospective job at a later stage due to lack of practice and exposure in the language, etc. Students are motivated to learn the theories, fundamentals and tools of communication which can help them develop and sustain in the corporate environment and culture. We offer six HSMC courses of 3 credits and two courses of 2 credits in different semesters of engineering course.

Basic Science Course (BSC): Basic Science Course of B.TECH (CSE) program will provide a basic foundation to build the knowledge in the field of engineering and science. The BSC consists of courses like mathematics, physics and chemistry. These BSC courses has been placed in Semester-I, II and III. Total 19 credits has been assigned to BSC with 4 Courses of 4 Credit, 1 Courses of 3 Credit.

Engineering Science Course (ESC): Engineering Science Course of B.TECH (CSE) program will provide a basic foundation of the various field of engineering like Electrical, Electronics, Mechanical and Civil. These ESC courses has been placed in Semester-I & II and total 11 credits has been assigned with 2 Courses of 4 Credit,1 Courses of 3 Credit .

Open Elective Course (OEC): Open Elective is an interdisciplinary additional subject that is compulsory in the seven and eight semester of a program. The score of Generic Elective is counted in your overall aggregate marks under Choice Based Credit System (CBCS). Each Generic Elective paper will be of 3 Credits and students will have the choice of taking 2 OEC: 1 each in Semester VII & VIII. Each student has to take Open Electives from department other than the parent department. Core / Discipline Specific Electives will not be offered as Generic Electives.

Mandatory Course (MC): This is a compulsory course that does not have any choice and will be of 3 credits. Each student of B.TECH(CSE) program has to compulsorily pass the Environment Studies course and acquire 3 credits.

Value Added Course (VAC): A Value Added Course is a non-credit audit course which is basically meant to enhance general ability of students in areas like soft skills, quantitative aptitude and reasoning ability - required for the overall development of a student and at the same time crucial for industry/corporate demands and requirements. The student possessing these skills will definitely develop acumen to perform well during the recruitment process of any premier organization and will have the desired confidence to face the interview. Moreover, these skills are also essential in day-to-day life of the corporate world. The aim is to nurture every student for making effective communication, developing aptitude and a general reasoning ability for a better performance, as desired in corporate world. There shall be four courses of Aptitude in Semester III, IV, V & VI semesters and two courses of Soft Skills in V &VI Semesters and will carry no credit, however, it will be compulsory for every student to pass these courses with minimum 45% marks to be eligible for the certificate. These marks will not be included in

the calculation of CGPI. Students have to specifically be registered in the specific course of the respective semesters.

Professional Elective Course (PEC): The discipline specific elective course is chosen to make students specialist or having specialized knowledge of a specific domain. It will be covered from Vth semester onward of the program relevant to chosen disciplines of core courses of the program. Each student has to choose six Program Elective Course (PEC); 1 PEC in Semester-V of 3 credit, 1 PEC in Semester-VI of 3 credit, 2 PEC in Semester-VII of 3 credit and 1 credit each, 2 PEC in Semester VIII of 3 credit.

Laboratory Course (LC): The Lab Course (LC) is the laboratory course which student has to take as per the core courses. In computer science and engineering these lab course has the emphasis on technicalities related to enhancing the knowledge in programming languages / Database / web programming. Total 21 LC has to be chosen across the eight semester of with 5 courses of 2 credit and 16 courses of 1 credit.

Project / Industrial Training/ Seminar-Field Project (PROJ): The project and Industrial training has to be taken as per the guideline issued from time to time. It helps to provide the industrial exposure to the students. They are being able to learn, enhance their skills and utilize the learnt concept to be able to understand the facts practically. Total 20 credit are being assigned to it with 2 courses of 2 credit each in Vth Semester, 1 course of 2 credit in VI semester, 2 course of 4 credit in VIIth semester, 1 course of 6 credit in VII semester.

C. Program Outcomes for Engineering:

PO – 1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO – 2	**Problem analysis& Solving:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO – 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.
PO – 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.
PO – 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO – 6	**Social Interaction & effective citizenship:** 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.
PO – 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.
PO – 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO – 9	**Attitude (Individual and team work):** Function effectively as an individual, and as member or leader in diverse teams, and in multidisciplinary settings.
PO – 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 clean instructions.
PO – 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.
PO – 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.

D. Programme Specific Outcomes (PSOs)

The learning and abilities or skills that a student would have developed by the end of Four-year **B.TECH(CSE):**

PSO – 1	Developing skills for creating computational solutions with emerging technologies, programming languages, mathematical foundations, algorithmic principles and open source platforms to solve complex engineering problems.	
PSO – 2	Ability to understand the evolutionary changes in computing by applying standard practices and skills acquired through computer engineering to provide solutions with innovative ideas and interdisciplinary research.	
PSO – 3	Ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur and pursue higher studies in their respective domains.	

E. Pedagogy & Unique practices adopted: "Pedagogy is the method and practice of teaching, especially for teaching an academic subject or theoretical concept". In addition to conventional time-tested lecture method, the institute will emphasize on experiential learning:

***1. Case Based Learning*:** Case based learning enhances student skills at delineating the critical decision dilemmas faced by organizations, helps in applying concepts, principles and analytical skills to solve the delineated problems and develops effective templates for business problem solving. Case method of teaching is used as a critical learning tool for effective learning and we encourage it to the fullest.

2. Role Play & Simulation: Role-play and simulation are forms of experiential learning. Learners take on different roles, assuming a profile of a character or personality, and interact and participate in diverse and complex learning settings. Role-play and simulation function as learning tools for teams and groups or individuals as they "play" online or face-to-face. They alter the power ratios in teaching and learning relationships between students and educators, as students learn through their explorations and the viewpoints of the character or personality they are articulating in the environment. This student-centered space can enable learner-oriented assessment, where the design of the task is created for active student learning. Therefore, role-play& simulation exercises such as virtual share trading, marketing simulation etc. are being promoted for the practical-based experiential learning of our students.

3. Video Based Learning (VBL) & Learning through Movies (LTM): These days technology has taken a front seat and classrooms are well equipped with equipment and gadgets. Video-based learning has become an indispensable part of learning. Similarly, students can learn various concepts through movies. In fact, many teachers give examples from movies during their discourses. Making students learn few important theoretical concepts through VBL & LTM is a good idea and method. The learning becomes really interesting and easy as videos add life to concepts and make the learning engaging and effective. Therefore, our institute is promoting VBL & LTM, wherever possible.

***4. Field / Live Projects*:** The students, who take up experiential projects in companies, where senior executives with a stake in teaching guide them, drive the learning. All students are encouraged to do some live project other their regular classes.

5. Industrial Visits: Industrial visit are essential to give students hand-on exposure and experience of how things and processes work in industries. Our institute organizes such visits to enhance students' exposure to practical learning and work out for a report of such a visit relating to their specific topic, course or even domain.

6. MOOCs: Students may earn credits by passing MOOCs as decided by the college. Graduate level programs may award Honors degree provided students earn pre-requisite credits through MOOCs.

University allows students to undertake additional subjects/course(s) (In-house offered by the university through collaborative efforts or courses in the open domain by various internationally recognized universities) and to earn additional credits on successful completion of the same. Each course will be approved in advance by the University following the standard procedure of approval and will be granted credits as per the approval.

Keeping this in mind, University proposed and allowed a maximum of two credits to be allocated for each MOOC courses. In the pilot phase it is proposed that a student undertaking and successfully completing a MOOC course through only NPTEL/Swayam could be given 2 credits for each MOOC course.

For smooth functioning and monitoring of the scheme the following shall be the guidelines for MOOC courses, Add-on courses carried out by the College from time to time.

a) This is recommended for every student to take at least one MOOC Course throughout the programme.

b) There shall be a MOOC co-ordination committee in the College with a faculty at the level of Professor heading the committee and all Heads of the Department being members of the Committee.

c) The Committee will list out courses to be offered during the semester, which could be requested by the department or the students and after deliberating on all courses finalize a list of courses to be offered with 2 credits defined for each course and the mode of credit consideration of the student. The complete process shall be obtained by the College before end of June and end of December for Odd and Even semester respectively of the year in which the course is being offered. In case of MOOC course, the approval will be valid only for the semester on offer.

d) Students will register for the course and the details of the students enrolling under the course along with the approval of the Vice Chancellor will be forwarded to the Examination department within fifteen days of start of the semester by the Coordinator MOOC through the Principal of the College.

e) After completion of MOOC course, Student will submit the photo copy of Completion certificate of MOOC Course to the Examination cell as proof.

f) Marks will be considered which is mentioned on Completion certificate of MOOC Course.

College will consider the credits only in case a student fails to secure minimum required credits then the additional subject(s) shall be counted for calculating the minimum credits required for the award of degree

7. Special Guest Lectures (SGL): Some topics/concepts need extra attention and efforts as they either may be high in difficulty level or requires experts from specific industry/domain to make things/concepts clear for a better understanding from the perspective of the industry. Hence, to cater to the present needs of industry, we organize such lectures, as part of lecture-series and invite prominent personalities from academia and industry from time to time to deliver their vital inputs and provide greater insights.

8. Student Development Programs (SDP): Harnessing and developing the right talent for the right industry an overall development of a student is required. Apart from the curriculum teaching various student development programs (training programs) relating to soft skills, interview skills, SAP, Advanced excel training etc. that may be required as per the need of the student and industry trends, are conducted across the whole program. Participation in such programs is solicited through volunteering and consensus.

9. Industry Focused programes: Establishing collaborations with various industry partners to deliver the programme on sharing basis. The specific courses/contents are to be delivered by industry experts to provide practice based insight to the students.

10. Special Assistance Programme for Slow & Fast Learners: The College gets a diverse group of students every year. They differ in terms of their intelligence , efforts and interest. We make efforts to identify them as Slow and fast learners within first three months of their joining. Slow learners are given extra time and sessions to bridge the learning gap under the guidance of faculty coordinator and Fast learners are provided challenging assignments/Projects/Readings and learning opportunity

11. Orientation Program: The Orientation Programme is designed keeping in mind the guidelines of UGC & the Council. This Programme is for 03 Weeks duration. The Programme designed by the College is Approved by the office of the Vice Chancellor. The purpose is to make the fresh students comfortable and provide awareness about the college and the university. The Topics covered are multi -faceted encompassing: Academic rules & regulation, Examination rules & regulation, Learning resources, participation in Extra -curricular & extra Mural Activities, Discipline, Conduct, Motivational talks, Industry talks, & Bridge Courses/content etc

12. Mentoring Scheme: Every Student shall be provided with a faculty Mentor to help him /her in their personal & Academic Issues. The mentor maintains a register of al all his/her mentees with complete personal & parents 'details. It is essential to have at least to meet once in a month. The mentor enters the discussions held, advice given and efforts & improvements made by the mentee. This register of the mentor must be counter signed by the HOD once a month and by the Principal once in a semester

13. Career & Personal Counseling: Helps Gain Confidence and Insight. Career Counselling helps a counselee understand the hurdles in his/her career path. This knowledge helps to develop the confidence to overcome these hurdles. It is the duty of a good counselor to provide such insight and confidence to the counselee.

14. Competitive Exam Preparation: It is true that competitive exams are not that easy to ace it, but it is also not something impossible. With proper guidance and hard work of faculties, student's can easily

crack any competitive exam such as GATE, Bank Services, Civil Services or any other govt. administrative platform.

15. Extra-curricular Activities: organizing & participation in extracurricular activities will be mandatory to help students develop confidence & face audience boldly. It brings out their leadership qualities along with planning & organizing skills. Students undertake various cultural, sports and other competitive activities within and outside then campus. This helps them build their wholesome personality.

16. Participation in Workshops, Seminars & writing & Presenting Papers: A seminar may have several purposes or just one purpose. For instance, a seminar may be for the purpose of education, such as a lecture, where the participants engage in the discussion of an academic subject for the aim of gaining a better insight into the subject. Other forms of educational seminars might be held to impart some skills or knowledge to the participants.

17. Formation of Student Clubs, Membership & Organizing & Participating events: Computer Science clubs channelize the energies of students and make use of their skills and talents, which satisfy their instincts and urges and helps in their overall personality development. Through activities of a computer science club, learning of computer science and its applications become joyful. The computer science club caters to freedom for expression, where as the classroom atmosphere leads to conformity and repression. Students organize thought and translate into action.

18. Capability Enhancement & Development Schemes: The development of soft skills has become important in today's fast growing world. The students at the college are taught to communicate and interact at a professional level. The qualities of confidence and critical thinking are developed making the students better at soft skills. Soft skill development courses inculcate ethical attitude towards others and also help in the nurturing of better interpersonal skills. Much of the communication related activities are developed and taught to students who are willing and interested to enhance their skills.

19. **Library Visit & Utilization of E-Learning Resources:** Student can visit the library from morning 10 AM to evening 8 PM. Library created its resources Database and provided Online Public Access Catalogue (OPAC) through which users can be accessed from any of the computer connected in the LAN can know the status of the book. Now we are in process to move from OPAC to KOHA.

- **a)** Institute Library & Information is subscribing online e-books and e-journals databases (DELNET and EBSCO host E-databases) as per the requirement of the institute and fulfilling AICTE norms. IP based access is given to all computers connected on campus LAN to access e-journals.
- **b)** For the effective utilization of resources, Information Literacy training programs are conducted to the staff and students.
- **c)** Wi-Fi enabled campus
- **d)** Regular addition of latest books and journals
- **e)** Well maintained e-library to access e-resources

Study & Evaluation Scheme

B. Tech. (Computer Science & Engineering)
Semester I

S. No	*Course Category*	*Course Code*	*Course*	*Periods*			*Credit*	*Evaluation Scheme*		
				L	*T*	*P*		*Internal*	*External*	*Total*
1	BSC-1	EAS116	Engineering Mathematics-I	3	1	-	4	40	60	100
2	BSC-2	EAS112	Engineering Physics	3	1	-	4	40	60	100
		EAS113	Engineering Chemistry							
3	ESC-1	EEE117	Basic Electrical Engineering	3	1	-	4	40	60	100
		EEC111	Basic Electronics Engineering							
4	MC-1	TMU-101	Environmental Studies	2	1	0	3	40	60	100
5	HSMC-1	TMUGE101	English Communication–I	2	0	2	3	40	60	100
6	LC-1	EAS162	Engineering Physics (Lab)	-	-	2	1	50	50	100
		EAS163	Engineering Chemistry (Lab)							
7	LC-2	EEE161	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
		EEC161	Basic Electronics Engineering (Lab)							
8	LC-3	EME161	Engineering Drawing (Lab)	-	-	4	2	50	50	100
		EME162	Workshop Practice (Lab)							
9	DGP-1	EGP111	Discipline & General Proficiency	**-**	**-**	**-**	**-**	100	-	100
			Total	**13**	**4**	**10**	**22**	**450**	**450**	**900**

B. Tech. (Computer Science & Engineering)
Semester II

S. No	*Course Category*	*Course Code*	*Course*	*Periods*			*Credit*	*Evaluation Scheme*		
				L	*T*	*P*		*Internal*	*External*	*Total*
1	BSC-3	EAS211	Engineering Mathematics-II	3	1	-	4	40	60	100
2	BSC-4	EAS212	Engineering Physics	3	1	-	4	40	60	100
		EAS213	Engineering Chemistry							
3	ESC-2	EEE217	Basic Electrical Engineering	3	1	-	4	40	60	100
		EEC211	Basic Electronics Engineering							
4	ESC-3	ECS201	Computer Basics & C Programming	3	-	-	3	40	60	100
5	HSMC-2	TMUGE201	English Communication–II	2	0	2	3	40	60	100
6	LC-4	EAS262	Engineering Physics (Lab)	-	-	2	1	50	50	100
		EAS263	Engineering Chemistry (Lab)							
7	LC-5	EEE261	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
		EEC261	Basic Electronics Engineering (Lab)							
8	LC-6	ECS251	Computer Basics & C Programming (Lab)	-	-	2	1	50	50	100
9	LC-7	EME261	Engineering Drawing (Lab)		-	4	2	50	50	100
		EME262	Workshop Practice (Lab)							
10	DGP-2	EGP211	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**14**	**3**	**12**	**23**	**500**	**500**	**1000**

B. Tech. (Computer Science & Engineering)
Semester III

S. No	*Course Category*	*Course Code*	*Course*	*Periods*			*Credit*	*Evaluation Scheme*		
				L	*T*	*P*		*Internal*	*External*	*Total*
1	PCC-1	ECS305	Data Structure using C++	3	0	0	3	40	60	100
2	PCC-2	ECS306	Data Base Management System	3	0	0	3	40	60	100
3	PCC-3	EEC302	Digital Electronics & Computer Organization	3	0	0	3	40	60	100
4	BSC-5	EAS 301	Mathematics-III	3	0	0	3	40	60	100
5	HSMC-3	EAS303	Human Values & professional Ethics	2	0	0	2	40	60	100
6	LC-8	ECS355	Data Structure using C++ (Lab)	0	0	4	2	50	50	100
7	LC-9	ECS356	Data Base Management System (Lab)	0	0	2	1	50	50	100
8	LC-10	EEC351	Digital Logic Circuit Lab	0	0	2	1	50	50	100
9	HSMC-4	TMUGE301	English Communication–III	2	0	2	3	40	60	100
10	DGP-3	EGP311	Discipline & General Proficiency	0	0	0	-	100	--	100
			Total	**16**	**0**	**10**	**21**	**490**	**510**	**1000**

For Lateral Entry student with polytechnic/ B.Sc background will have to pass below additional courses either in III[rd] or IV[th] semester with minimum 40% marks if they have not taken these courses in their polytechnic/B.Sc degree.

1	LC-3	EME161/261	Engineering Drawing (Lab)	-	-	4	-	50	50	100
2	LC-7	EME162/262	Workshop Practice (Lab)	-	-	4	-	50	50	100
3	HSMC-1	TMU101	Environmental Studies	2	1	3	-	40	60	100

Value Added Course:
It is an audit course. The performance of the student in this course will not be counted in the overall result however the student has to pass it compulsorily with 45% marks.

SNO	*Course Category*	*Course Code*	*Course*		*Periods*		*Credit*	*Evaluation Scheme*		
				L	*T*	*P*		*Internal*	*External*	*Total*
1	VAC – I	TMUGA301	Foundation in Quantitative Aptitude	2	1	0	0	40	60	100

B. Tech. (Computer Science & Engineering)
Semester IV

S. No	*Course Category*	*Course Code*	*Course*	*Periods*			*Credit*	*Evaluation Scheme*		
				L	*T*	*P*		*Internal*	*External*	*Total*
1	PCC-4	ECS401	Theory of Computation	3	0	0	3	40	60	100
2	PCC-5	ECS407	Java Programming	3	0	0	3	40	60	100
3	PCC-6	ECS404	Software Engineering	3	0	0	3	40	60	100
4	PCC-7	ECS405	Computer Based Numerical & Statistical Techniques	3	0	0	3	40	60	100
5	PCC-8	ECS406	Operating System	3	0	0	3	40	60	100
6	HSMC-5	EHM403	Management Concepts & Organizational Behavior	2	0	0	2	40	60	100
7	LC-11	ECS456	Java Programming (Lab)	0	0	4	2	50	50	100
8	LC-12	ECS453	Computer Based Numerical & Statistical Techniques (Lab)	*0*	*0*	2	1	50	50	100
9	LC-13	ECS455	OS Lab with Software Engineering (Lab)	0	0	2	1	50	50	100
10	HSMC-6	TMUGE401	English Communication-IV	2	0	2	3	40	60	100
11	DGP-4	EGP411	Discipline & General Proficiency	0	0	0	0	100	-	100
			Total	**19**	**0**	**10**	**24**	**530**	**570**	**1100**

Value Added Course* :

SNO	*Course Category*	*Course Code*	*Course*		*Periods*		*Credit*	*Evaluation Scheme*		
				L	*T*	*P*		*Internal*	*External*	*Total*
1	VAC-II	TMUGA401	Analytical Reasoning	2	1	0	0	40	60	100

NOTE: After the examination of 4th Semester. Student has to take industrial training of minimum 40days before the starting of 5th Semester. The evaluation will be performed with below mentioned code in 5th semester.

PROJ-1	ECS591	Industrial Training

B. Tech. (Computer Science & Engineering)
Semester V

S. No	*Course Category*	*Course Code*	*Course*	*Periods*			*Credit*	*Evaluation Scheme*		
				L	*T*	*P*		*Internal*	*External*	*Total*
1	PCC-9	ECS511	Computer Architecture	3	0	0	3	40	60	100
2	PCC-10	ECS503	Analysis and Design of Algorithms	3	1	0	4	40	60	100
3	PCC-11	ECS510	Computer Network	3	0	0	3	40	60	100
4	LC-14	ECS552	Analysis and Design of Algorithms (Lab)	0	0	2	1	50	50	100
5	LC-15	ECS556	Python (Lab)	0	0	2	1	50	50	100
6	PROJ-1	ECS591	Industrial Training	*0*	*0*	0	2	50	50	100
7	LC-16	ECS555	Computer Network (Lab)	0	0	2	1	50	50	100
8	PEC-1	Professional Elective Course-I		3	0	0	3	40	60	100
9	PROJ-2	ECS559	MOOC Course	0	0	0	2	50	50	100
10	DGP-5	EGP511	Discipline & General Proficiency	0	0	0	0	100	-	100
			Total	**12**	**1**	**06**	**20**	**510**	**490**	**1000**

Value Added Course *:

SNO	*Course Category*	*Course Code*	*Course*		*Periods*		*Credit*	*Evaluation Scheme*		
				L	*T*	*P*		*Internal*	*External*	*Total*
1	VAC-III	TMUGS501	Managing Self	2	1	0	0	40	60	100
2	VAC-IV	TMUGA501	Modern Algebra & Data Analysis	2	1	0	0	40	60	100

B. Tech. (Computer Science & Engineering)
Semester VI

S. No	Course Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	PCC-12	ECS601	Artificial Intelligence	3	1	0	4	40	60	100
2	PCC-13	ECS 611	Data Warehousing and Data Mining with R- programming	3	0	0	3	40	60	100
3	PCC-14	ECS612	Mobile Communication	3	0	0	3	40	60	100
4	LC-17	ECS 651	Artificial Intelligence (Lab)	0	0	2	1	50	50	100
5	LC-18	ECS654	Data Warehousing and Data Mining with R- programming (Lab)	0	0	2	1	50	50	100
6	PEC-2	Professional Elective Course-II		3	0	0	3	40	60	100
7	PROJ-3	ECS 692	Seminar (Field Project)	-	-	-	2	50	50	100
8	HSMC-7	FOE023	Entrepreneurship	3	0	0	4	40	60	100
9	DGP-6	EGP611	Discipline & General Proficiency	0	0	0	0	100	-	100
			Total	**15**	**0**	**4**	**20**	**450**	**450**	**900**

Value Added Course *:

SNO	Course Category	Course Code	Course		Periods		Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	VAC-V	TMUGS601	Managing Work and Others	2	1	0	0	40	60	100
2	VAC-VI	TMUGA601	Advance Algebra and Geometry	2	0	0	0	40	60	100

NOTE: After the examination of 6th Semester. Student has to take industrial training of 40days minimum before the starting of 7th Semester. The evaluation will be performed with below mentioned code in 7th semester.

PROJ-4	ECS791	Industrial Training - II

B. Tech. (Computer Science & Engineering)
Semester VII

S. No	*Course Category*	*Course Code*	*Course*	*Periods*			*Credit*	*Evaluation Scheme*		
				L	*T*	*P*		*Internal*	*External*	*Total*
1	PCC-15	ECS701	Web Technology(Design And Architecture Using .NET)	3	1	0	4	40	60	100
2	PCC-16	ECS703	Cryptography and Network Security	3	0	0	3	40	60	100
3	PCC-17	ECS709	Cloud Computing	3	0	0	3	40	60	100
4	LC-19	ECS751	Web Technology(Design And Architecture Using .NET)(Lab)	0	0	4	2	50	50	100
5	LC-20	ECS752	Cryptography and Network Security(LAB)	0	0	2	1	50	50	100
6	PEC-3	Professional Elective Courses-III		3	0	0	3	40	60	100
7	PEC-4	Professional Elective Courses-IV (Lab)		0	0	2	1	50	50	100
8	PROJ-4	ECS791	Industrial Training - II	0	0	0	4	50	50	100
9	PROJ-5	ECS799	Project Work Phase-1	0	0	8	4	50	50	100
10	OEC-1		**OPEN ELECTIVE COURSE–I**	3	0	0	3	40	60	100
11	DGP-7	EGP711	Discipline & General Proficiency	0	0	0	0	100	-	100
			Total	**15**	**1**	**16**	**28**	**550**	**550**	**1100**

B. Tech. (Computer Science & Engineering)
Semester VIII

S. No	*Course Category*	*Course Code*	*Course*	*Periods*			*Credit*	*Evaluation Scheme*		
				L	*T*	*P*		*Internal*	*External*	*Total*
1	HSMC-8	EHM801	Project Management for Engineers	3	0	0	3	40	60	100
2	PCC-18	ECS812	Big Data Analytics	3	0	0	3	40	60	100
3	PEC-5	Professional Elective Courses-V		3	0	0	3	40	60	100
4	PEC-6	Professional Elective Courses-VI		3	0	0	3	40	60	100
5	LC-21	ECS855	Big Data Analytics (Lab)	0	0	2	1	50	50	100
6	PROJ-6	ECS899	Project Work Phase- 2	0	0	12	6	50	50	100
7	OEC-2		**OPEN ELECTIVE COURSE –II**	3	0	0	3	40	60	100
8	DGP-8	EGP811	Discipline & General Proficiency	0	0	0	0	100	-	100
			Total	**15**	**0**	**14**	**22**	**400**	**400**	**800**

Scheme of Professional Elective Courses (PEC)

Professional Elective Courses (PEC) I (Semester-V)- Select any one course from Group No 1 given below:			
1	**[Group No 1]** **Professional Elective Courses (PEC)-I**	**Course code**	**Course**
		ECS506	ERP System
		EHM504	Managerial Economics & Engineering
		ECS512	E-commerce
		ECS513	Software Project Management
		ECS514	Software Testing
Professional Elective Courses (PEC)-II (Semester-VI) - Select any one course from Group No 2 given below:			
2	**[Group No 2]** **Professional Elective Courses (PEC)-II**	**Course code**	**Course**
		ECS606	Real Time Operating System
		ECS607	Soft Computing
		EEC606	Microprocessor & Applications
		ECS603	Computer Graphics
		ECS610	Cyber Law & Information Security
		ECS613	Compiler Design and Construction
		ECS614	Multimedia & Animation
Professional Elective Courses (PEC)-III (Semester-VII) - Select any one course from Group No 3 given below:			
3	**[Group No 3]** **Professional Elective Courses (PEC)-III**	**Course code**	**Course**
		ECS713	Data compression
		ECS716	Digital Image Processing
		ECS5717	Android Programming
Professional Elective Courses (PEC)-IV (Lab) (Semester-VII) - Select any one course from Group No 4 same as one selected from Group No 3 mentioned above			
4	**[Group No 4]** **Professional Elective Courses (PEC)-IV (Lab)**	**Course code**	**Course**
		ECS754	Data compression(LAB)
		ECS756	Digital Image Processing Using SCI-Lab (Lab)
		ECS757	Android Programming (Lab)

Professional Elective Courses (PEC)-V (Semester-VIII) - Select any one course from Group No 5 given below:			
5	**[Group No 5]** **Professional Elective Courses (PEC)-V**	**Course code**	**Course**
		ECS809	Pattern Recognition
		ECS810	Neural Network
		ECS811	Natural Language Processing
		ECS814	Block Chain Technology
Professional Elective Courses (PEC)-VI (Semester-VIII) - Select any one course from Group No 6 given below:			
6	**[Group No 6]** **Professional Elective Courses (PEC)-VI**	**Course code**	**Course**
		ECS805	Distributed System
		ECS812	Concept of IoT(Internet of Things)
		ECS813	Machine Learning

Course Code: EAS116	**Basic Science Course-1** **B.TECH(CSE)- Semester-I** **Engineering Mathematics-I**	**L-3** **T-1** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts of eigenvalues and eigenvectors, Optimization & derivatives of functions of several variables, partial and total differentiation, implicit functions.	
CO2.	**Understanding** the concepts of curl and divergence of vector field.	
CO3.	**Understanding** of Green's theorem, Gauss Theorem, and Stokes theorem.	
CO4.	**Applying** the concept of Leibnitz's theorem for successive derivatives.	
CO5.	**Analyzing** the intangibility of a differential equation to find the optimal solution of first order first degree equations.	
CO6.	**Evaluating** the double integration and triple integration using Cartesian, polar co-ordinates and the concept of Jacobian of transformation.	
Course Content:		
Unit-1:	**Determinants**- Rules of computation; Linear Equations and Cramer's rule. **Matrices:** Elementary row and column transformation; Rank of matrix; Linear dependence; Consistency of linear system of equations; Characteristic equation; Cayley-Hamilton Theorem (without proof); Eigen values and Eigen vectors; Complex and Unitary matrices.	**8 Hours**
Unit-2:	**Differential Equation--**First order first degree Differential equation: variable separable, Homogeneous method, Linear differential equation method, Exact Differential equation.	**8 Hours**
Unit-3:	**Differential Calculus:** Leibnitz theorem; Partial differentiation; Euler's theorem; Change of variables; Expansion of function of several variables, Jacobians, Error function.	**8 Hours**
Unit-4:	**Multiple Integrals:** Double integral, Triple integral, Beta and Gamma functions; Dirichlet theorem for three variables, Liouville's Extension of Dirichlet theorem.	**8 Hours**
Unit-5:	**Vector Differentiation:** Vector function, Differentiation of vectors, Formulae of Differentiation, Scalar and Vector point function, Geometrical Meaning of Gradient, Normal and Directional Derivative, Divergence of a vector function, Curl of a vector **Vector Integration:** Green's theorem, Stokes' theorem; Gauss' divergence theorem.	**8 Hours**
Text Books:	**1.** Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers.	
Reference Books:	**1.** Kreyszig E., *Advanced Engineering Mathematics*, Wiley Eastern. **2.** Piskunov N, *Differential & Integral Calculus*, Moscow Peace Publishers. **3.** Narayan Shanti, *A Text book of Matrices*, S. Chand ***Latest editions of all the suggested books are recommended.**	
Additional electronic reference material:	**1.** https://www.youtube.com/watch?v=EGnI8WyYb3o **2.** https://www.youtube.com/watch?v=ksS_yOK1vtk&list=PLbRMhDVUMngfIrZCNOyPZwHUU1pP66vQW	

Course Code: EAS112	**Basic Science Course-2** **B.TECH(CSE)- Semester-I** **Engineering Physics**	**L-3** **T-1** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the basic concepts of interference, diffraction and polarisation.	
CO2.	**Understanding** the concept of bonding in solids and semiconductors.	
CO3.	**Understanding** the special theory of relativity.	
CO4.	**Applying** special theory of relativity to explain the phenomenon of length contraction, time dilation, mass-energy equivalence etc.	
CO5.	**Applying** the concepts of polarized light by the Brewster's and Malus Law	
Course Content:		
Unit-1:	**Interference of Light:** Introduction, Principle of Superposition, and Interference due to division of wavefront: Young's double slit experiment, Theory of Fresnel's Bi-Prism, Interference due to division of amplitude: parallel thin films, Wedge shaped film, Michelson's interferometer, Newton's ring.	**8 Hours**
Unit-2:	**Diffraction**: Introduction, Types of Diffraction and difference between them, Condition for diffraction, difference between interference and diffraction. **Single slit diffraction**: Quantitative description of maxima and minima with intensity variation, linear and angular width of central maxima. **Resolving Power**: Rayleigh's criterion of resolution, resolving power of diffraction grating and telescope.	**8 Hours**
Unit-3:	**Polarization:** Introduction, production of plane polarized light by different methods, Brewster's and Malus Law. Quantitative description of double refraction, Nicol prism, Quarter & half wave plate, specific rotation, Laurent's half shade polarimeter.	**8 Hours**
Unit-4:	**Elements of Material Science:** Introduction, Bonding in solids, Covalent bonding and Metallic bonding, Classification of Solids as Insulators, Semi-Conductor and Conductors, Intrinsic and Extrinsic Semiconductors, Conductivity in Semiconductors, Determination of Energy gap of Semiconductor. **Hall Effect:** Theory, Hall Coefficients and application to determine the sign of charge carrier, Concentration of charge carrier, mobility of charge carriers.	**8 Hours**
Unit-5:	**Special Theory of Relativity:** Introduction, Inertial and non-inertial frames of Reference, Postulates of special theory of relativity, Galilean and Lorentz Transformations, Length contraction and Time Dilation, Relativistic addition of velocities, Variation of mass with velocity, Mass-Energy equivalence.	**8 Hours**
Text Books:	**1.** Elements of Properties of Matter, D. S. Mathur, S. Chand & Co.	
Reference Books:	**1.** F. A. Jenkins and H. E. White, Fundamentals of Optics, McGraw-Hill. **2.** Concept of Modern Physics, Beiser, Tata McGraw-Hill. **3.** R. Resnick, Introduction to Special Relativity, John Wiley, Singapore. ***Latest editions of all the suggested books are recommended.**	

Additional electronic reference material:	1. https://www.youtube.com/watch?v=toGH5BdgRZ4&list=PLD9DDFBDC338226CA 2. https://www.youtube.com/watch?v=CuqsU7B1MtU	

Course Code: EAS113	Basic Science Course-2 B.TECH(CSE)- Semester-I **Engineering Chemistry**	L-3 T-1 P-0 C-4
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concept of softening & purification of water.	
CO2.	**Understanding** calorific value& combustion, analysis of coal, Physical & Chemical properties of hydrocarbons & quality improvements.	
CO3.	**Understanding** the concept of lubrication, Properties of Refractory & Manufacturing of cements.	
CO4.	**Applying** the concepts of the mechanism of polymerization reactions, Natural and synthetic rubber& vulcanization.	
CO5.	**Applying** the concepts of spectroscopic & chromatographic techniques.	
Course Content:		
Unit-1:	**Water and Its Industrial Applications:** Sources, Impurities, Hardness and its units, Industrial water, characteristics, softening of water by various methods (External and Internal treatment), Boiler trouble causes effects and remedies, Characteristic of municipal water and its treatment, Numerical problem based on water softening method like lime soda, calgonetc	**8 Hours**
Unit-2:	**Fuels and Combustion:** Fossil fuel and classification, calorific value, determination of calorific value by Bomb and Jumker's calorimeter, proximate and ultimate analysis of coal and their significance, calorific value computation based on ultimate analysis data, Combustion and its related numerical problems carbonization manufacturing of coke, and recovery of byproduct, knocking relationship between knocking and structure and hydrocarbon, improvement ant knocking characteristic IC Engine fuels, Diesel Engine fuels, Cetane Number.	**8 Hours**
Unit-3:	**Lubricants:** Introduction, mechanism of lubrication, classification of lubricant, properties and testing of lubricating Oil Numerical problem based on testing methods. **Cement and Refractories:** Manufacture, IS code, Setting and hardening of cement, Portland cement Plaster of Paris, **Refractories.** Introduction, classification and properties of refractories	**8 Hours**
Unit-4:	**Polymers:** Introduction, types and classification of polymerization, reaction mechanism, Natural and synthetic rubber, Vulcanization of rubber, preparation, properties and uses of the following Polythene, PVC, PMMA, Teflon, Polyacrylonitrile, PVA, Nylon 6, Terylene, Phenol Formaldehyde, Urea Formaldehyde Resin, Glyptal, Silicones Resin, Polyurethanes, Butyl Rubber, Neoprene, Buna N, Buna S.	**8 Hours**

Unit-5:	**A. Instrumental Techniques in chemical analysis:** Introduction, Principle, Instrumentation and application of IR, NMR, UV, Visible, Gas Chromatography, Lambert and Beer's Law. **B. Water Analysis Techniques:** Alkalinity, Hardness (Complexometric), Chlorides, Free Chlorine, DO, BOD, and COD, Numerical Problem Based on above techniques.	**8 Hours**
Text Books:	**1.** Agarwal R. K., Engineering Chemistry, Krishna Prakashan.	
Reference Books:	**1.** Morrison & Boyd, Organic Chemistry, Prentice Hall **2.** Barrow Gordon M., Physical Chemistry, McGraw-Hill. **3.** Manahan Stanley E., Environmental Chemistry, CRC Press	
Additional electronic reference material:	1. https://www.youtube.com/watch?v=RV-OyRTaIOI 2. https://www.youtube.com/watch?v=phhfkikb6Lw	

Course Code: EEE117	**Engineering Science Course-1** **B.Tech(CSE)-Semester-I** **Basic Electrical Engineering**	**L-3** **T-1** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the basics of Network, AC Waveform and its characteristics.	
CO2.	**Understanding** the basic concept of Measuring Instruments, Transformers & three phase Power systems.	
CO3.	**Understanding** the basic concepts of Transformer.	
CO4.	**Understanding** the basic concept of power measurement using two wattmeter methods.	
CO5.	**Applying** the concept of Kirchhoff's laws and Network Theorems to analyze complex electrical circuits.	
Course Content:		
Unit-1:	**D.C. Network Theory:** Passive, active, bilateral, unilateral, linear, nonlinear element, Circuit theory concepts-Mesh and node analysis; Voltage and current division, source transformation, Network Theorems- Superposition theorem, Thevenin's theorem, Norton's theorem, and Maximum Power Transfer theorem, Star-delta & delta-star conversion.	**8 Hours**
Unit-2:	**Steady State Analysis of A.C. Circuits:** Sinusoidal and phasor representation of voltage and Current; Single phase A.C. circuit behavior of resistance, inductance and capacitance and their Combination in series & parallel; Power factor; Series and parallel resonance; Band width and Quality factor.	**8 Hours**
Unit-3:	**Basics of Measuring Instruments:** Introduction to wattmeter & Energy meter extension range of voltmeter and ammeter. **Three Phase A.C. Circuits:** Line and phase voltage/current relations; three phase power, power measurement using two wattmeter methods.	**8 Hours**
Unit-4:	**Single phase Transformer:** Principle of operation; Types of construction; Phasor diagram; Equivalent circuit; Efficiency and losses.	**8 Hours**
Unit-5:	**Electrical machines:** DC machines: Principle & Construction, Types, EMF equation of generator and torque equation of motor, applications of DC motors (simple numerical problems)	**8 Hours**
Text Books:	**1.** V. Del Toro, Principles of Electrical Engineering, Prentice-Hall International.	
Reference Books:	**1.** Fitzgerald A.E & Higginbotham., D.E., Basic Electrical Engineering, McGraw Hill. **2.** A Grabel, Basic Electrical Engineering, McGraw Hill. **3.** Cotton H., Advanced Electrical Technology, Wheeler Publishing. ***Latest editions of all the suggested books are recommended.**	
Additional electronic reference material:	• https://nptel.ac.in/courses/108/108/108108076/ • https://sites.google.com/tmu.ac.in/dr-garima-goswami/home	

Course Code: EEC111	**Engineering Science Course-1** **B.TECH(CSE)- Semester-I** **Basic Electronics Engineering**	**L-3** **T-1** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts of electronic components like diode, BJT & FET.	
CO2.	**Understanding** the applications of pn junction diode as clipper, clamper, rectifier & regulator whereas BJT & FET as amplifiers	
CO3.	**Understanding** the functions and applications of operational amplifier-based circuits such as differentiator, integrator, and inverting, non-inverting, summing & differential amplifier.	
CO4.	**Understanding** the concepts of number system, Boolean algebra and logic gates.	
CO5.	**Applying** the knowledge of series, parallel and electromagnetic circuits.	
Course Content:		
Unit-1:	**p-n Junction:** Energy band diagram in materials, Intrinsic & Extrinsic Semiconductor, Introduction to PN-Junction, Depletion layer, V-I characteristics, p-n junction as rectifiers (half wave and full wave), calculation of ripple factor of rectifiers, clipping and clamping circuits, Zener diode and its application as shunt regulator	**8 Hours**
Unit-2:	**Bipolar Junction Transistor (BJT):** Basic construction, transistor action; CB, CE and CCconfigurations, input/output characteristics, Relation between α, β & γ, Biasing of transistors: Fixed bias, emitter bias, potential divider bias	**8 Hours**
Unit-3:	**Field Effect Transistor (FET):** Basic construction of JFET; Principle of working; concept of pinch-off condition & maximum drain saturation current; input and transfer characteristics; Characteristics equation; fixed and self-biasing of JFET amplifier; Introduction of MOSFET; Depletion and Enhancement type MOSFET-Construction, Operation and Characteristics.	**8 Hours**
Unit-4:	**Operational Amplifier (Op-Amp):** Concept of ideal operational amplifier; ideal and practical Op-Amp parameters; inverting, non-inverting and unity gain configurations, Applications of Op-Amp as adders, difference amplifiers, integrators and differentiator.	**8 Hours**
Unit-5:	**Switching Theory:** Number system, conversion of bases (decimal, binary, octal and hexadecimalnumbers), Addition & Subtraction, BCD numbers, Boolean algebra, De Morgan's Theorems, Logic gates and truth table- AND, OR &NOT,Seven segment display & K map.	**8 Hours**
Text Books:	**1.** Robert Boylestad& Louis Nashelsky, Electronic Circuit and Devices, Pearson India.	
Reference Books:	**1.** Sedra and Smith, Microelectronic Circuits, Oxford University Press. **2.** Gayakwad, R A, Operational Amplifiers and Linear Integrated circuits, Prentice Hall of India Pvt. Ltd.	

	3. Chattopadhyay D and P C Rakshit, Electronics Fundamentals and Applications, New Age International.	
Additional electronic reference material:	1. https://www.youtube.com/watch?v=USrY0JspDEg 2. https://www.youtube.com/watch?v=Hkz27cFW4Xs	

Course Code: TMU101	Mandatory Course-1 B.TECH(CSE)- Semester-I **Environmental Studies**	L-2 T-1 P-0 C-3
Course Outcomes :	**On completion of the course, the students will be :**	
CO1.	**Understanding** environmental problems arising due to constructional and developmental activities.	
CO2.	**Understanding** the natural resources and suitable methods for conservation of resources for sustainable development.	
CO3.	**Understanding** the importance of ecosystem and biodiversity and its conservation for maintaining ecological balance.	
CO4.	**Understanding** the types and adverse effects of various environmental pollutants and their abatement devices.	
CO5.	**Understanding** Greenhouse effect, various Environmental laws, impact of human population explosion, environment protection movements, different disasters and their management.	
Course Content:		
Unit-1:	Definition and Scope of environmental studies, multidisciplinary nature of environmental studies, Concept of sustainability & sustainable development. **Ecology andEnvironment**:ConceptofanEcosystem-its structure andfunctions, Energy Flow in an Ecosystem,FoodChain,FoodWeb, Ecological Pyramid& Ecological succession, Study of following ecosystems: Forest Ecosystem, Grass land Ecosystem & Aquatic Ecosystem & Desert Ecosystem.	**8 Hours**
Unit-2:	**Natural Resources:** Renewable & Non-Renewable resources; Landresources and landuse change;Land degradation, Soil erosion & desertification. **Deforestation**: Causes & impacts due to mining, Dam building on forest biodiversity & tribal population. **Energy Resources**: Renewable & Non-Renewable resources, Energy scenario & use of alternate energy sources, Case studies. **Biodiversity:** Hot SpotsofBiodiversityinIndiaandWorld,Conservation,ImportanceandFactorsResponsibleforLossofBiodiversity,BiogeographicalClassification ofIndia	**8 Hours**
Unit-3:	**Environmental Pollutions:** Types, Causes, Effects & control; Air, Water, soil & noise pollution, Nuclear hazards & human health risks, Solid waste Management; Control measures of urban & industrial wastes, pollution case studies	**8 Hours**
Unit-4:	**Environmental policies & practices: Climate change & Global** Warming (Greenhouse Effect),Ozone Layer -Its Depletion and Control Measures,	**8 Hours**

	Photochemical Smog, Acid Rain Environmental laws: Environment protection Act; air prevention & control of pollution act, Water Prevention & Control of Pollution Act, Wild Life Protection Act, Forest Conservation Acts, International Acts; Montreal & Kyoto Protocols & Convention on biological diversity, Nature reserves, tribal population & Rights & human wild life conflicts in Indian context	
Unit-5:	Human population growth;impacts on environment, human health & welfare, Resettlement & rehabilitation of projects affected person: A case study, Disaster Management; Earthquake, Floods & Droughts, Cyclones & Landslides, Environmental Movements; Chipko, Silent Valley, Vishnoi's of Rajasthan, Environmental Ethics; Role of Indian & other regions & culture in environmental conservation, Environmental communication & public awareness; Case study	**8 Hours**
Field Work:	**1.** Visit to an area to document environmental assets; river/forest/flora-fauna etc. **2.** Visit to a local polluted site: urban/ rural/industrial/agricultural. **3.** Study of common plants, insects, birds & basic principles of identification. **4.** Study of simple ecosystem; pond, river etc.	
Text Books:	**1.** "Environmental Chemistry", De, A. K., New AgePublishersPvt.Ltd.	
Reference Books:	**1.** "BiodiversityandConservation",Bryant, P. J., Hypertext Book **2.** "Textbook of Environment Studies", Tewari, Khulbe&Tewari,I.K. Publication	
Additional electronic reference material:	1. https://www.youtube.com/watch?v=8tamfocnHb8 2. https://www.youtube.com/watch?v=YlE1DDo25IQ	

Course Code: **TMUGE101**	**Humanities And Social Science Course-1** **B.TECH(CSE)- Semester-I** **English Communication – I**	**L-2** **T-0** **P-2** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Remembering and understanding** of the basic of English grammar and vocabulary.	
CO2.	**Understanding** of the basic Communication process.	
CO3.	**Applying** correct vocabulary and tenses in sentences construction.	
CO4.	**Analyzing** communication needs and developing communication strategies using both verbal & non-verbal method.	
CO5.	**Drafting** applications in correct format for common issues.	
CO6.	**Developing** self-confidence.	
Course Content:		
Unit-1:	**I Introductory Sessions** • Self-Introduction • Building Self Confidence: Identifying strengths and weakness, reasonsFailure,strategies to overcome Fear of Failure • Importance of English Language in present scenario (Practice: Self-introduction session)	**6 Hours**
Unit-2:	**Basics of Grammar** • Parts of Speech • Tense • Subject and Predicate • Vocabulary: Synonym and Antonym (Practice: Conversation Practice)	**12 Hours**
Unit-3:	**Basics of Communication** • Communication: Process, Types, 7Cs of Communication, Importance & Barrier • Language as a tool of communication • Non-verbal communication: Body Language • Etiquette & Manners • Basic Problem Sounds (Practice: Pronuciation drill and building positive body language)	**10 Hours**
Unit-4:	**Application writing**	**8 Hours**

	• Format & Style of Application Writing • Practice of Application writing on common issues.	
Unit-5:	**Value based text reading:** Short Story (Non- detailed study) • Gift of Magi - O. Henry	**4 Hours**
Text Books:	**1**. Singh R.P., An Anthology of Short stories, O.U.P. New Delhi.	
Reference Books:	1. Kumar, Sanjay. &PushpLata. "Communication Skills" New Delhi: Oxford University Press. 2. Carnegie Dale. "How to win Friends and Influence People" New York: Simon & Schuster. 3. Harris, Thomas. A. "I am ok, You are ok" New York: Harper and Row. 4. Goleman, Daniel. "Emotional Intelligence' Bantam Book.	
Additional electronic reference material:	**1.** https://www.youtube.com/watch?v=4XEa-8HD3lE **2.** https://www.youtube.com/watch?v=sb6ZZ2p3hEM&feature=youtu.be **3.** https://www.youtube.com/watch?v=Df3ysUkdB38 **4.** https://www.youtube.com/watch?v=0LdYaj3jcws **5.** https://www.youtube.com/watch?v=64XIkMqPm_8 **6.** https://www.youtube.com/watch?v=_vS6O8YlMq0	
Methodology:	**1.** Language Lab software. **2.** The content will be conveyed through Real life situations, Pair Conversation, Group Talk and Class Discussion. **3.** Conversational Practice will be effectively carried out by Face to Face & Via Media (Telephone, Audio-Video Clips) **4.** Modern Teaching tools (PPT Presentation, Tongue-Twisters & Motivational videos with sub-titles) will be utilized	

Evaluation Scheme

Internal Evaluation			**External Evaluation**		**Total Marks**
40 Marks			**60 Marks**		**100**
20 Marks (Best 2 out of Three CTs) ***(From Unit- II, IV & V)***	10 Marks (Oral Assignments) ***(From Unit I & III)***	10 Marks (Attendance)	40 Marks (External Written Examination) ***(From Unit II, IV & V)***	20 Marks (External Viva)* ***(From Unit -1 & III)***	

*Parameters of External Viva

Content	Body Language	Confidence	Question Responsiveness	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

Note: External Viva will be conducted by 2-member committee comprising

a) One Faculty teaching the class

b) One examiner nominated by University Examination cell.

Each member will evaluate on a scale of 20 marks and the average of two would be the 20 marks obtained by the students.

Course Code: EAS162	Laboratory Course-1 B.TECH(CSE) Semester-I **Engineering Physics (Lab)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding of the operation of various model of optical devices.	
CO2.	Understanding types of Semiconductors using Hall experiments.	
CO3.	Applying the concept of interference, polarization & dispersion in optical devices through Newton's ring, Laser, polarimeter& spectrometer.	
CO4.	Applying the concept of resonance to determine the AC frequency using sonometer&Melde's apparatus.	
CO5.	Applying the concept of resolving & dispersive power by a prism.	
LIST OF EXPERIMENTS:	**Note: Select any ten experiments from the following list**	
1	To determine the wavelength of monochromatic light by Newton's ring.	
2	To determine the wavelength of monochromatic light by Michelson-Morley experiment.	
3	To determine the wavelength of monochromatic light by Fresnel's Bi-prism.To determine the Planck's constant using LEDs of different colours.	
4	To determine the Planck's constant using LEDs of different colours.	
5	To determine the specific rotation of cane sugar solution using Polarimeter	
6	To verify Stefan's Law by electrical method	
7	To study the Hall Effect and determine Hall coefficient and mobility of a given semiconductor material using Hall-effect set up	
8	To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's experiment.	
9	To compare Illuminating Powers by a Photometer.	
10	To determine the frequency of A.C. mains by means of a Sonometer.	
11	To determine refractive index of a prism material by spectrometer	
12	To determine the Flashing & Quenching of Neon bulb.	
13	Determination of Cauchy's constant by using spectrometer.	
14	To study the PN junction characteristics	
15	To determine the resolving power and dispersive power by a prism	

16	To determine the value of Boltzmann Constant by studying Forward Characteristics of a Diode	
17	Study the characteristics of LDR	
18	To study the characteristics of a photo-cell.	
Books:	**1.** B.Sc.Practical Physics, Gupta and Kumar, PragatiPrakashan. **2.** B.Sc. Practical Physics, C.L. Arora, S. Chand & Company Pvt. Ltd.	

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: EAS163	Laboratory Course-1 B.TECH(CSE)- Semester-I **Engineering Chemistry (Lab)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts of Hardness of water.	
CO2.	**Analyzing** & estimating of various parameters of water.	
CO3.	**Analyzing** of Calorific value of Solid fuel by Bomb calorimeter & Liquid Fuels by Junkers Gas Calorimeter.	
CO4.	**Analyzing** of open & closed Flash point of oil by Cleveland & Pensky's Martens apparatus.	
CO5.	**Analyzing** of viscosity of lubricating oil using Redwood Viscometer.	
LIST OF EXPERIMENTS:	**Note: Select any ten experiments from the following list**	
1	Determination of Total Hardness of a given water sample.	
2	Determination of mixed alkalinity (a) Hydroxyl & Carbonate (b) Carbonate & Bicarbonate	
3	To determine the pH of the given solution using pH meter and pH-metric titration	
4	Determination of dissolved oxygen content of given water sample	
5	To find chemical oxygen demand of waste water sample by potassium dichromate	
6	Determination of free chlorine in a given water sample	
7	To determine the chloride content in the given water sample by Mohr's method	
8	To prepare the Bakelite resin polymer	
9	To determine the concentration of unknown sample of iron spectrophotometrically	
10	To determine the viscosity of a given sample of a lubricating oil using Redwood Viscometer	
11	To determine the flash & fire point of a given lubricating oil	
12	Determination of calorific value of a solid or liquid fuel.	
13	Determination of calorific value of a gaseous fuel	
14	Determination of % of O_2, CO_2, % CO in flue gas sample using Orsat apparatus.	
15	Proximate analysis of coal sample.	

Evaluation Scheme of Practical Examination:
Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: EEE161	Laboratory Course-2 B.TECH(CSE)- Semester-I **Basic Electrical Engineering (Lab)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts of Kirchoff & Voltage law.	
CO2.	**Understanding** the concepts of Thevenin & Norton theorem.	
CO3.	**Analyzing** the energy by a single-phase energy meter.	
CO4.	**Analyzing** the losses and efficiency of Transformer on different load conditions.	
CO5.	**Analyzing** the electrical circuits using electrical and electronics components on bread board.	
LIST OF EXPERIMENTS:	**Note: Select any ten experiments from the following list**	
1	To verify the Kirchhoff's current and voltage laws.	
2	To study multimeter.	
3	To verify the Superposition theorem	
4	To verify the Thevenin's theorem.	
5	To verify the Norton's theorem.	
6	To verify the maximum power transfer theorem	
7	To verify current division and voltage division rule.	
8	To measure energy by a single-phase energy meter	
9	To measure the power factor in an RLC by varying the capacitance	
10	To determine resonance frequency, quality factor, bandwidth in series resonance	
11	To measure the power in a 3-phase system by two-wattmeter method	
12	To measure speed for speed control of D.C. Shunt Motor	
13	To determine the efficiency of single-phase transformer by load test.	

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: EEC161	Laboratory Course-2 B.TECH(CSE)- Semester-I **Basic Electronics Engineering (Lab)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the implementation of diode-based circuits.	
CO2.	**Understanding** the implementation of Operational amplifier-based circuits.	
CO3.	**Analyzing** the characteristics of pn junction diode & BJT.	
CO4.	**Analyzing** the different parameters for characterizing different circuits like rectifiers, regulators using diodes and BJTs.	
CO5.	**Analyzing** the truth tables through the different type's adders.	
LIST OF EXPERIMENTS:	**Note: Minimum eight experiments should be performed-**	
1	To study the V-I characteristics of p-n junction diode.	
2	To study the diode as clipper and clamper	
3	To study the half-wave rectifier using silicon diode.	
4	To study the full-wave rectifier using silicon diode.	
5	To study the Zener diode as a shunt regulator.	
6	To study transistor in Common Base configuration & plot its input/output characteristics	
7	To study the operational amplifier in inverting & non-inverting modes using IC 741.	
8	To study the operational amplifier as differentiator & integrator.	
9	To study various logic gates & verify their truth tables.	
10	To study half adder/full adder & verify their truth tables	

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: EME161	Laboratory Course-3 B.TECH(CSE)- Semester-I **Engineering Drawing (Lab)**	L-0 T-0 P-4 C-2
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts of Engineering Drawing.	
CO2.	**Understanding** how to draw and represent the shape, size & specifications of physical objects.	
CO3.	**Applying** the principles of projection and sectioning.	
CO4.	**Applying** the concepts of development of the lateral surface of a given object.	
CO5.	**Creating** isometric projection of the given orthographic projection.	
LIST OF EXPERIMENTS:	**All to be performed**	
1	To write all Numbers (0 to 9) and alphabetical Letters (A to Z) as per the standard dimensions.	
2	To draw the types of lines and conventions of different materials.	
3	To draw and study dimensioning and Tolerance	
4	To construction geometrical figures of Pentagon and Hexagon	
5	To draw the projection of points and lines	
6	To draw the Orthographic Projection of given object in First Angle	
7	To draw the Orthographic Projection of given object in Third Angle	
8	To draw the sectional view of a given object	
9	To draw the development of the lateral surface of given object	
10	To draw the isometric projection of the given orthographic projection.	

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Note: The drawing sheet could be manual or in Auto CAD.

Course Code: EME162	Laboratory Course-3 B.TECH(CSE)- Semester-I **Workshop Practice (Lab)**	L-0 T-0 P-4 C-2
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts to prepare simple wooden joints using wood working tools.	
CO2.	**Applying** the techniques to produce fitting jobs of specified dimensions.	
CO3.	**Applying** the concepts to prepare simple lap, butt, T and corner joints using arc welding equipment.	
CO4.	**Applying** the concepts of black smithy and lathe machine to produce different jobs.	
CO5.	**Creating** core and moulds for casting.	
LIST OF EXPERIMENTS:	**Perform any ten experiments selecting at least one from each shop**	
1	**Carpentry Shop**: 1. To prepare half-lap corner joint. 2. To prepare mortise &tenon joint. 3. To prepare a cylindrical pattern on woodworking lathe.	
2	**Fitting Bench Working Shop:** 1. To prepare a V-joint fitting 2. To prepare a U-joint fitting 3. To prepare a internal thread in a plate with the help of tapping process	
3	**Black Smithy Shop:** 1. To prepare a square rod from given circular rod 2. To prepare a square U- shape from given circular rod	
4	**Welding Shop:** 1. To prepare a butt and Lap welded joints using arc welding machine. 2. To prepare a Lap welded joint Gas welding equipment. 3. To prepare a Lap welded joint using spot welding machine	
5	**Sheet-metal Shop:** 1. To make round duct of GI sheet using 'soldering' process. 2. To prepare a tray of GI by fabrication	
6	**Machine Shop:** 1. To study the working of basic machine tools like Lathe m/c, Shaper m/c, Drilling m/c and Grinding m/c. 2. To perform the following operations on Centre Lathe:	

	Turning, Step turning, Taper turning, Facing, Grooving and Knurling 3. To perform the operations of drilling of making the holes on the given metallic work-piece (M.S.) by use of drilling machine.	
7	**Foundry Shop:** 1. To prepare core as per given size. 2. To prepare a mould for given casting.	

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: EGP111	DGP-1 B.Tech (CSE) Semester III **DISCIPLINE & GENERAL PROFICIENCY**	L-0 T-0 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Understanding*** the social responsibilities toward the institute and humanity.	
CO2.	***Understanding*** the need of participations in different events to groom the personality.	
CO3.	***Understanding*** the discipline and follow them during academics and institutional activities.	
CO4.	***Understanding*** Social awareness towards society.	
CO5.	***Applying*** actively towards various institution activities like workshop, seminar and other events	
	There shall be continuous evaluation of the student on the following broad parameters:	
	1. Observance of dress code. **2.** Participation in Conferences /Workshops / Seminars. **3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time. **4.** Participation in community projects including NSS. **5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time. **6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel. **7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level. **8.** General behavior **9.** Any extraordinary achievement. The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).	

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops	Participation in guest lectures, invited talks	Participation in community Services	Participation in Culture & extra curriculum	Participation in sports/ co-curricular	General Behavior	Any Extra Achievement

					/ Seminars	and special technical sessions		activities, Department Club Activities	activities		
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Course Code: EAS211	**Basic Science Course-3** **B.TECH (CSE)- Semester-II** **Engineering Mathematics-II**	**L-3** **T-1** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts of the wave, diffusion and Laplace equations & Fourier series.	
CO2.	**Understanding** the methods of separation of variables	
CO3.	**Understanding** the concepts of Fourier series' representation of single variable function.	
CO4.	**Applying** Laplace transform to determine the complete solutions of linear ODE	
CO5.	**Applying** the method of variations of parameters to find solution of equations with variable coefficients.	
Course Content:		
Unit-1:	**Differential Equations:** Linear Differential Equation, Linear Differential Equation with constant coefficient: Complementary functions and particular integrals, Linear Differential Equation with variable coefficient: Removal method, changing independent variables, Method of variation of parameters, Homogeneous Linear Differential Equation, Simultaneous linear differential equations.	**8 Hours**
Unit-2:	**Series Solutions:** PowerSeries solutions of ODE, Ordinary Point, Singular Points, Frobenius Method. **Special Functions:** Legendre equation and Polynomial, Legendre Function, Rodrigue's formula, Laplace definite integral for first and second kind, Bessel equation and Polynomial, Bessel Function, Orthogonal properties and Recurrence Relation for Legendre and Bessel function.	**8 Hours**
Unit-3:	**Partial differential equations –**Method of separation of variables for solving partial differential equations; Wave equation up to two dimensions; Laplace equation in two-dimensions; Heat conduction equations up to two-dimensions; Equations of transmission Lines.	**8 Hours**
Unit-4:	**Fourier Series:** Periodic functions, Trigonometric series; Fourier series; Dirichlet's conditions, Determination of fourier coefficient by Euler's formulae; Fourier series for discontinuous functions, Even and odd functions, Half range sine and cosine series.	**8 Hours**
Unit-5:	**Laplace Transform:** Laplace transform; Existence theorem; Laplace transform of derivatives and integrals; Inverse Laplace transform; Unit step function; Diratch delta function; Laplace transform of periodic functions; Convolution theorem.	**8 Hours**
Text Books:	**1.** Grewal B.S., Higher Engineering Mathematics, Khanna Publishers.	

Reference Books:	**1.** Kreyszig E., Advanced Engineering Mathematics, Wiley Eastern. **2.** Piskunov N, Differential & Integral Calculus, Moscow Peace Publishers. **3.** Narayan Shanti, A Text book of Matrices, S. Chand **4.** Bali N.P., Engineering Mathematics-II, Laxmi Publications.	
Additional electronic reference material:	1. https://www.youtube.com/watch?v=luJMl37-nso **2.** https://www.youtube.com/watch?v=NdouX5-KD6Y	

Course Code: EAS212	**Basic Science Course-4** **B.TECH (CSE)- Semester-II** **Engineering Physics**	**L-3 T-1 P-0 C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the basic concepts of interference, diffraction and polarisation.	
CO2.	**Understanding** the concept of bonding in solids and semiconductors.	
CO3.	**Understanding** the special theory of relativity.	
CO4.	**Applying** special theory of relativity to explain the phenomenon of length contraction, time dilation, mass-energy equivalence etc.	
CO5.	**Applying** the concepts of polarized light by the Brewster's and Malus Law	
Course Content:		
Unit-1:	**Interference of Light:** Introduction,Principle of Superposition, Interference due to division of wavefront: Young's double slit experiment, Theory of Fresnel's Bi-Prism, Interference due to division of amplitude: parallel thin films, Wedge shaped film, Michelson's interferometer, Newton's ring.	**8 Hours**
Unit-2:	**Diffraction**: Introduction, Types of Diffraction and difference between them, Condition for diffraction, difference between interference and diffraction. **Single slit diffraction**: Quantitative description of maxima and minima with intensity variation, linear and angular width of central maxima. **Resolving Power**: Rayleigh's criterion of resolution, resolving power of diffraction grating and telescope.	**8 Hours**
Unit-3:	**Polarization:** Introduction, production of plane polarized light by different methods, Brewster's and Malus Law. Quantitative description of double refraction, Nicol prism, Quarter & half wave plate, specific rotation, Laurent's half shade polarimeter.	**8 Hours**
Unit-4:	**Elements of Material Science:** Introduction, Bonding in solids, Covalent bonding and Metallic bonding, Classification of Solids as Insulators, Semi-Conductor and Conductors, Intrinsic and Extrinsic Semiconductors, Conductivity in Semiconductors, Determination of Energy gap of Semiconductor. **Hall Effect:** Theory, Hall Coefficients and application to determine the sign of charge carrier, Concentration of charge carrier, mobility of charge carriers.	**8 Hours**
Unit-5:	**Special Theory of Relativity:** Introduction, Inertial and non-inertial frames of Reference, Postulates of special theory of relativity, Galilean and Lorentz Transformations, Length contraction and Time Dilation, Relativistic addition of velocities, Variation of mass with velocity, Mass-Energy equivalence.	**8 Hours**
Text Books:	**1.** Elements of Properties of Matter, D. S. Mathur, S. Chand & Co.	
Reference Books:	**1.** F. A. Jenkins and H. E. White, Fundamentals of Optics, McGraw-Hill. **2.** Concept of Modern Physics, Beiser, Tata McGraw-Hill. **3.** R. Resnick, Introduction to Special Relativity, John Wiley, Singapore.	

Additional electronic reference material:	1. https://www.youtube.com/watch?v=toGH5BdgRZ4&list=PLD9DDFBDC338226CA 2. https://www.youtube.com/watch?v=CuqsU7B1MtU	

Course Code: EAS213	**Basic Science Course-4** **B.TECH (CSE)- Semester-II** **Engineering Chemistry**	**L-3** **T-1** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concept of softening & purification of water.	
CO2.	**Understanding** calorific value& combustion, analysis of coal, Physical & Chemical properties of hydrocarbons & quality improvements.	
CO3.	**Understanding** the concept of lubrication, Properties of Refractory & Manufacturing of cements.	
CO4.	**Applying** the concepts of the mechanism of polymerization reactions, Natural and synthetic rubber& vulcanization.	
CO5.	**Applying** the concepts of spectroscopic & chromatographic techniques.	
Course Content:		
Unit-1:	**Water and Its Industrial Applications:** Sources, Impurities, Hardness and its units, Industrial water, characteristics, softening of water by various methods (External and Internal treatment), Boiler trouble causes effects and remedies, Characteristic of municipal water and its treatment, Numerical problem based on water softening method like lime soda, calgonetc	**8 Hours**
Unit-2:	**Fuels and Combustion:** Fossil fuel and classification, calorific value, determination of calorific value by Bomb and Jumker's calorimeter, proximate and ultimate analysis of coal and their significance, calorific value computation based on ultimate analysis data, Combustion and its related numerical problems carbonization manufacturing of coke, and recovery of byproduct, knocking relationship between knocking and structure and hydrocarbon, improvement ant knocking characteristic IC Engine fuels, Diesel Engine fuels, Cetane Number.	**8 Hours**
Unit-3:	**Lubricants:** Introduction, mechanism of lubrication, classification of lubricant, properties and testing of lubricating Oil Numerical problem based on testing methods. **Cement and Refractories:** Manufacture, IS code, Setting and hardening of cement, Portland cement Plaster of Paris, **Refractories.** Introduction, classification and properties of refractories	**8 Hours**
Unit-4:	**Polymers:** Introduction, types and classification of polymerization, reaction mechanism, Natural and synthetic rubber, Vulcanization of rubber, preparation, properties and uses of the following Polythene, PVC, PMMA, Teflon, Polyacrylonitrile, PVA, Nylon 6, Terylene, Phenol Formaldehyde, Urea Formaldehyde Resin, Glyptal, Silicones Resin, Polyurethanes, Butyl Rubber, Neoprene, Buna N, Buna S.	**8 Hours**

Unit-5:	**A. Instrumental Techniques in chemical analysis:** Introduction, Principle, Instrumentation and application of IR, NMR, UV, Visible, Gas Chromatography, Lambert and Beer's Law. **B. Water Analysis Techniques:** Alkalinity, Hardness (Complexometric), Chlorides, Free Chlorine, DO, BOD, and COD, Numerical Problem Based on above techniques.	**8 Hours**
Text Books:	**1.** Agarwal R. K., Engineering Chemistry, Krishna Prakashan.	
Reference Books:	**1.** Morrison & Boyd, Organic Chemistry, Prentice Hall **2.** Barrow Gordon M., Physical Chemistry, McGraw-Hill. **3.** Manahan Stanley E., Environmental Chemistry, CRC Press	
Additional electronic reference material:	**1.** https://www.youtube.com/watch?v=RV-OyRTaIOI **2.** https://www.youtube.com/watch?v=phhfkikb6Lw	

Course Code: EEE217	**Engineering Science Course-2** **B.TECH (CSE)- Semester-II** **Basic Electrical Engineering**	**L-3** **T-1** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the basics of Network, AC Waveform and its characteristics.	
CO2.	**Understanding** the basic concept of Measuring Instruments, Transformers & three phase Power systems.	
CO3.	**Understanding** the basic concepts of Transformer.	
CO4.	**Understanding** the basic concept of power measurement using two wattmeter methods.	
CO5.	**Applying** the concept of Kirchhoff's laws and Network Theorems to analyze complex electrical circuits.	
Course Content:		
Unit-1:	**D.C. Network Theory:** Passive, active, bilateral, unilateral, linear, nonlinear element, Circuit theory concepts-Mesh and node analysis; Voltage and current division, source transformation, Network Theorems-Superposition theorem, Thevenin's theorem, Norton's theorem, and Maximum Power Transfer theorem, Star-delta & delta-star conversion.	**8 Hours**
Unit-2:	**Steady State Analysis of A.C. Circuits:** Sinusoidal and phasor representation of voltage and Current; Single phase A.C. circuit behavior of resistance, inductance and capacitance and their Combination in series & parallel; Power factor; Series and parallel resonance; Band width and Quality factor.	**8 Hours**
Unit-3:	**Basics of Measuring Instruments:** Introduction to voltmeter, ammeter, wattmeter & Energy meter.	**8 Hours**
Unit-4:	**Single phase Transformer:** Principle of operation; Types of construction; Phasor diagram; Equivalent circuit; Efficiency and losses.	**8 Hours**
Unit-5:	**Three Phase A.C. Circuits:** Line and phase voltage/current relations; three phase power, power measurement using two wattmeter method. Introduction to earthing and electrical safety.	**8 Hours**
Text Books:	**1.** V. Del Toro, Principles of Electrical Engineering, Prentice-Hall International.	
Reference Books:	**1.** Fitzgerald A.E & Higginbotham., D.E., Basic Electrical Engineering, McGraw Hill. **2.** A Grabel, Basic Electrical Engineering, McGraw Hill. **3.** Cotton H., Advanced Electrical Technology, Wheeler Publishing.	
Additional electronic	1. https://nptel.ac.in/courses/108/108/108108076/ 2. https://sites.google.com/tmu.ac.in/dr-garima-goswami/home	

reference material:		

Course Code: EEC211	**Engineering Science Course-2** **B.TECH (CSE)- Semester-II** **Basic Electronics Engineering**	**L-3** **T-1** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts of electronic components like diode, BJT & FET.	
CO2.	**Understanding** the applications of pn junction diode as clipper, clamper, rectifier & regulator whereas BJT & FET as amplifiers	
CO3.	**Understanding** the functions and applications of operational amplifier-based circuits such as differentiator, integrator, and inverting, non-inverting, summing & differential amplifier.	
CO4.	**Understanding** the concepts of number system, Boolean algebra and logic gates.	
CO5.	**Applying** the knowledge of series, parallel and electromagnetic circuits.	
Course Content:		
Unit-1:	**p-n Junction:** Energy band diagram in materials, Intrinsic & Extrinsic Semiconductor, Introduction to PN-Junction, Depletion layer, V-I characteristics, p-n junction as rectifiers (half wave and full wave), calculation of ripple factor of rectifiers, clipping and clamping circuits, Zener diode and its application as shunt regulator	**8 Hours**
Unit-2:	**Bipolar Junction Transistor (BJT):** Basic construction, transistor action; CB, CE and CCconfigurations, input/output characteristics, Relation between α, β & γ, Biasing of transistors: Fixed bias, emitter bias, potential divider bias	**8 Hours**
Unit-3:	**Field Effect Transistor (FET):** Basic construction of JFET; Principle of working; concept of pinch-off condition & maximum drain saturation current; input and transfer characteristics; Characteristics equation; fixed and self-biasing of JFET amplifier; Introduction of MOSFET; Depletion and Enhancement type MOSFET- Construction, Operation and Characteristics.	**8 Hours**
Unit-4:	**Operational Amplifier (Op-Amp):** Concept of ideal operational amplifier; ideal and practical Op-Amp parameters; inverting, non-inverting and unity gain configurations, Applications of Op-Amp as adders, difference amplifiers, integrators and differentiator.	**8 Hours**
Unit-5:	**Switching Theory:** Number system, conversion of bases (decimal, binary, octal and hexadecimalnumbers), Addition & Subtraction, BCD numbers, Boolean algebra, De Morgan's Theorems, Logic gates and truth table-AND, OR &NOT,Seven segment display & K map.	**8 Hours**

Text Books:	**1.** Robert Boylestad& Louis Nashelsky, Electronic Circuit and Devices, Pearson India.	
Reference Books:	**1.** Sedra and Smith, Microelectronic Circuits, Oxford University Press. **2.** Gayakwad, R A, Operational Amplifiers and Linear Integrated circuits, Prentice Hall of India Pvt. Ltd. **3.** Chattopadhyay D and P C Rakshit, Electronics Fundamentals and Applications, New Age International.	
Additional electronic reference material:	**1.** https://www.youtube.com/watch?v=USrY0JspDEg **2.** https://www.youtube.com/watch?v=Hkz27cFW4Xs	

Course Code: ECS201	**Engineering Science Course-3** **B.TECH(CSE)- Semester-II** **Computer Basics & C Programming**	**L-3 T-0 P-0 C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the concept of various components of computer system	
CO2.	Understanding the basic programming Language constructs.	
CO3.	Analyzing basic mathematical problem and their solutions through programming	
CO4.	Applying knowledge to prepare programming solutions for distinct problems.	
CO5.	Applying knowledge to prepare scalable solutions through functions.	
Course Content:		
Unit-1:	**Concepts in Computer Application:** Definition of Electronic Computer; History; Generations; Characteristics and Application of Computers; Classification of Computers; Functional Component of Computer: CPU, I/O devices, Type of Memory & Memory Hierarchy, Firmware and Human ware. **Data and data types:** Definitions, data, data types: Integer, Character, Float, String, etc.: Constants and Variable Declaration; Token; Keyboard; Identifier	**8 Hours**
Unit-2:	**Programming Language Classification & Computer Languages:** Generation of Languages; Introduction to 4GLs; Translators; Assemblers; Compilers; Interpreters. Number System: Decimal, Octal, Binary and Hexadecimal & their Conversions; Various Code: BCD, ASCII and EBCDIC and Gray Code. **Operators and Expressions:** Numeric and relation operators; logical operator; bit operator; operator precedence and associatively	**8 Hours**
Unit-3:	**Internet and Web Technologies:** Hypertext Markup Language; WWW; Gopher; FTP; Telnet; Web Browsers; Search Engines; Email. **Control Structure:** while statement, if, else, Nested if else statement. Nested logic: for loop, do while loop, While Loop, loop inside a loop structure, Switch Statement. Break and default with switch.	**8 Hours**
Unit-4:	**Concepts in Operating Systems:** Elementary Concepts in Operating Systems; Textual Vs GUI Interface. **Arrays:** Notation and representation; Manipulation of array elements; Multidimensional arrays.	**8 Hours**
Unit-5:	**Functions & Strings**: Definition; Declaration; Call by Value; Call by Reference; Returns values and their types; Function calls. **Structure & Dynamic Memory Allocation:**Structures and union, run time memory allocation functions, Introduction of preprocessor directives.	**8 Hours**

Text Books:	**1.** Sinha P. K., Computer Fundamentals, BPB Publications.	
Reference Books:	**1.** Peter Nortans, Introduction to Computers, Tata McGraw Hill. **2.**Yashavant Kanetkar, Let us C , BPB Publications. **3.** Leon & Leon, Fundamental of Information Technology, Vikas Publishing. **4.** Kanter, Managing Information System, Prentice-Hall. *** Latest editions of all the suggested books are recommended.**	
Additional electronic reference material:	1. https://www.digimat.in/nptel/courses/video/106105171/L01.html 2. https://nptel.ac.in/courses/106/104/106104128/	

Course Code: **TMUGE201**	**Humanities And Social Science Course-2** **B.TECH(CSE)- Semester-II** **English Communication – II**	**L-2** **T-0** **P-2** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Remembering & understanding** the basics of English Grammar and Vocabulary	
CO2.	**Understanding** the basics of Listening, Speaking & Writing Skills	
	Understanding principles of letter drafting and various types of formats.	
CO3.	**Applying** correct vocabulary and grammar in sentence construction while writing and delivering presentations	
CO4.	**Analyzing** different types of listening, role of Audience & Locale in presentation	
CO6.	**Creating** Official Letters, E-Mail & Paragraphs in correct format.	
Course Content:		
Unit-1:	**Unit - I Functional Grammar** • Prefix, suffix and One words substitution • Modals • Concord	**10 Hours**
Unit-2:	Listening Skills (04 hours) • Difference between listening & hearing, Process and Types of Listening • Importance and Barriers to listening	**04Hours**
Unit-3:	**Writing Skills** • Official letter and email writing • Essentials of a paragraph, • Developing a paragraph: Structure and methods Paragraph writing (100-120 words)	**12 Hours**
Unit-4:	**Strategies & Structure of Oral Presentation** • Purpose, Organizing content, Audience & Locale, Audio-visual aids, Body langauge • Voice dynamics: Five P's - Pace, Power, Pronunciation, Pause, and Pitch. • Modes of speech delivery and 5 W's of presentation	**8 Hours**
Unit-5:	**Value based text reading:** Short Essay (Non- detailed study) • How should one Read a book? - Virginia Woolf	**6 Hours**
Text Books:	**1.** Singh R.P., An Anthology of English Essay, O.U.P. New Delhi	

Reference Books:	**1.** Nesfield J.C. "*English Grammar Composition & Usage*" Macmillan Publishers .	
Additional Electronic Reference Material	**1.** https://www.youtube.com/watch?v=A0uekze2GOU **2.** https://www.youtube.com/watch?v=JIKU_WT0Bls **3.** https://www.youtube.com/watch?v=3Tu1jN65slw **4.** https://youtu.be/sb6ZZ2p3hEM **5.** https://youtu.be/yY6-cgShhac **6.** https://youtu.be/cc4yXwOQsBk **7.** https://youtu.be/yY6-cgShhac **8.** https://youtu.be/84qoeCofXXQ **9.** https://www.youtube.com/watch?v=-9MXmxLisI8&t=28s	
Methodologies:	**1.** Words and exercises, usage in sentences. **2.** Language Lab software. **3.** Sentence construction on daily activities and conversations. **4.** Format and layout to be taught with the help of samples and preparing letters on different subjects. **5.** JAM sessions and Picture presentation. **6.** Tongue twisters, Newspaper reading and short movies. **7.** Modern Teaching tools (PPT Presentation, Tongue-Twisters & Motivational videos with sub-titles) will be utilized. **8.** Text reading: discussion in detail, critical appreciation by reading the text to develop students' reading habits with voice modulation.	

Evaluation Scheme

<table>
<tr><th colspan="3">Internal Evaluation</th><th colspan="2">External Evaluation</th><th>Total Marks</th></tr>
<tr><td colspan="3">40 Marks</td><td colspan="2">60 Marks</td><td rowspan="4">100</td></tr>
<tr><td>20 Marks (Best 2 out of Three</td><td>10 Marks (Oral</td><td rowspan="3">10 Marks (Attendance)</td><td>40 Marks (External Written</td><td>20 Marks</td></tr>
<tr><td>CTs)</td><td>Assignments)</td><td>Examination)</td><td>(External Viva)*</td></tr>
<tr><td>(From Unit-I, III & V)</td><td>(From Unit-II &IV)</td><td>(From Unit-1, III & V)</td><td>(From Unit- II & IV)</td></tr>
</table>

*Parameters of External Viva

Content	Body Language	Communication skills	Confidence	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

***Note**: External Viva will be conducted by 2-member committee comprising*

***a)** One Faculty teaching the class*

***b)** One examiner nominated by University Examination cell.*

Each member will evaluate on a scale of 20 marks and the average of two would be the 20 marks obtained by the students.

Course Code: EAS262	**Laboratory Course-4** **B.TECH (CSE)- Semester-II** **Engineering Physics (Lab)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** of the operation of various models of optical devices.	
CO2.	**Understanding** types of Semiconductors using Hall experiments.	
CO3.	**Applying** the concept of interference, polarization & dispersion in optical devices through Newton's ring, Laser, polarimeter & spectrometer.	
CO4.	**Applying** the concept of resonance to determine the AC frequency using sonometer & Melde's apparatus.	
CO5.	**Applying** the concept of resolving & dispersive power by a prism.	
LIST OF EXPERIMENTS:	**Note: Select any ten experiments from the following list**	
1	To determine the wavelength of monochromatic light by Newton's ring.	
2	To determine the wavelength of monochromatic light by Michelson-Morley experiment.	
3	To determine the wavelength of monochromatic light by Fresnel's Bi-prism.To determine the Planck's constant using LEDs of different colours.	
4	To determine the Planck's constant using LEDs of different colours.	
5	To determine the specific rotation of cane sugar solution using Polarimeter	
6	To verify Stefan's Law by electrical method	
7	To study the Hall Effect and determine Hall coefficient and mobility of a given semiconductor material using Hall-effect set up	
8	To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's experiment.	
9	To compare Illuminating Powers by a Photometer.	
10	To determine the frequency of A.C. mains by means of a Sonometer.	
11	To determine refractive index of a prism material by spectrometer	
12	To determine the Flashing & Quenching of Neon bulb.	
13	Determination of Cauchy's constant by using spectrometer.	
14	To study the PN junction characteristics	
15	To determine the resolving power and dispersive power by a prism	

16	To determine the value of Boltzmann Constant by studying Forward Characteristics of a Diode	
17	Study the characteristics of LDR	
18	To study the characteristics of a photo-cell.	
Books:	**1.** B.Sc.Practical Physics, Gupta and Kumar, PragatiPrakashan. **2.** B.Sc. Practical Physics, C.L. Arora, S. Chand & Company Pvt. Ltd.	

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: EAS263	Laboratory Course-4 B.TECH (CSE)- Semester-II Engineering Chemistry (Lab)	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts of Hardness of water.	
CO2.	**Analyzing** & estimating of various parameters of water.	
CO3.	**Analyzing** of Calorific value of Solid fuel by Bomb calorimeter & Liquid Fuels by Junkers Gas Calorimeter.	
CO4.	**Analyzing** of open & closed Flash point of oil by Cleveland & Pensky's Martens apparatus.	
CO5.	**Analyzing** of viscosity of lubricating oil using Redwood Viscometer.	
LIST OF EXPERIMENTS:	**Note: Select any ten experiments from the following list**	
1	Determination of Total Hardness of a given water sample.	
2	Determination of mixed alkalinity (a) Hydroxyl & Carbonate (b) Carbonate & Bicarbonate	
3	To determine the pH of the given solution using pH meter and pH-metric titration	
4	Determination of dissolved oxygen content of given water sample	
5	To find chemical oxygen demand of waste water sample by potassium dichromate	
6	Determination of free chlorine in a given water sample	
7	To determine the chloride content in the given water sample by Mohr's method	
8	To prepare the Bakelite resin polymer	
9	To determine the concentration of unknown sample of iron spectrophotometrically	
10	To determine the viscosity of a given sample of a lubricating oil using Redwood Viscometer	
11	To determine the flash & fire point of a given lubricating oil	
12	Determination of calorific value of a solid or liquid fuel.	
13	Determination of calorific value of a gaseous fuel	
14	Determination of % of O_2, CO_2, % CO in flue gas sample using Orsat apparatus.	
15	Proximate analysis of coal sample.	

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: EEE261	**Laboratory Course-5** **B.TECH (CSE)- Semester-II** **Basic Electrical Engineering (Lab)**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts of Kirchoff & Voltage law.	
CO2.	**Understanding** the concepts of Thevenin & Norton theorem.	
CO3.	**Analyzing** the energy by a single-phase energy meter.	
CO4.	**Analyzing** the losses and efficiency of Transformer on different load conditions.	
CO5.	**Analyzing** the electrical circuits using electrical and electronics components on bread board.	
LIST OF EXPERIMENTS:	**Note: Select any ten experiments from the following list**	
1	To verify the Kirchhoff's current and voltage laws.	
2	To study multimeter.	
3	To verify the Superposition theorem	
4	To verify the Thevenin's theorem.	
5	To verify the Norton's theorem.	
6	To verify the maximum power transfer theorem	
7	To verify current division and voltage division rule.	
8	To measure energy by a single-phase energy meter	
9	To measure the power factor in an RLC by varying the capacitance	
10	To determine resonance frequency, quality factor, bandwidth in series resonance	
11	To measure the power in a 3-phase system by two-wattmeter method	
12	To measure speed for speed control of D.C. Shunt Motor	
13	To determine the efficiency of single-phase transformer by load test.	

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: EEC261	Laboratory Course-5 B.TECH (CSE)- Semester-II Basic Electronics Engineering (Lab)	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the implementation of diode-based circuits.	
CO2.	**Understanding** the implementation of Operational amplifier-based circuits.	
CO3.	**Analyzing** the characteristics of pn junction diode & BJT.	
CO4.	**Analyzing** the different parameters for characterizing different circuits like rectifiers, regulators using diodes and BJTs.	
CO5.	**Analyzing** the truth tables through the different type's adders.	
LIST OF EXPERIMENTS:	**Note: Minimum eight experiments should be performed-**	
1	To study the V-I characteristics of p-n junction diode.	
2	To study the diode as clipper and clamper	
3	To study the half-wave rectifier using silicon diode.	
4	To study the full-wave rectifier using silicon diode.	
5	To study the Zener diode as a shunt regulator.	
6	To study transistor in Common Base configuration & plot its input/output characteristics	
7	To study the operational amplifier in inverting & non-inverting modes using IC 741.	
8	To study the operational amplifier as differentiator & integrator.	
9	To study various logic gates & verify their truth tables.	
10	To study half adder/full adder & verify their truth tables	

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: ECS251	Laboratory Course -6 B.TECH(CSE)- Semester-II **Computer Basics & C Programming Lab**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Analyzing** basic mathematical problem and their solutions through programming	
CO2.	**Applying** knowledge to prepare programming solutions for specific problems.	
CO3.	**Applying** knowledge to prepare scalable solutions through function	
CO4.	**Applying** the concepts of programming solutions for distinct problems	
CO5.	**Applying** the concepts of scalable solutions through function	
Course Content:		
	LIST OF EXPERIMENTS- **1.** To write a program to calculate Sum & average of N numbers. **2.** To write a program to convert integer arithmetic to a given number of day and month. **3.** To write a program to find maximum and minimum out of 3 numbers a, b & c. **4.** To write a program to find factorial of positive integer. **5.** To write a program to find sum of series up to n number, β+5+8+……+n. **6.** To write a program to print all the number between 1 to 100 which are dividing by 7. **7.** To write a program to generate Fibonacci series up to n. **8.** To write a program to implement a function to calculate area of a circle. **9.** To write a program to implement a recursive function to calculate factorial of given number. **10.** To write a program to find whether number is prime or not. **11.** To write a program to find that the enter character is a letter or digit. **12.** To write a program to find addition of two matrix of n*n order. **13.** To write a program to find multiplication of two matrix of n*n order. **14.** To write a program to add 6 digit numbers in even case & multiple 6 digit number in odd case. **15.** To write a program to find even or odd up to a given limit n. **16.** To write a program to find whether a given no is palindrome or not. **17.** To write a program to joining & Comparing the 2 string.	

Evaluation of practical course
Practical Courses Internal Evaluation (50 marks)

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

Practical Courses External Evaluation (50 marks)

The external evaluation would also be done by the External Examiner based on the experiment performed during the examination.

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: EME261	Laboratory Course-7 B.TECH (CSE)- Semester-II Engineering Drawing (Lab)	L-0 T-0 P-4 C-2
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts of Engineering Drawing.	
CO2.	**Understanding** how to draw and represent the shape, size & specifications of physical objects.	
CO3.	**Applying** the principles of projection and sectioning.	
CO4.	**Applying** the concepts of development of the lateral surface of a given object.	
CO5.	**Creating** isometric projection of the given orthographic projection.	
LIST OF EXPERIMENTS:	**All to be performed**	
1	To write all Numbers (0 to 9) and alphabetical Letters (A to Z) as per the standard dimensions.	
2	To draw the types of lines and conventions of different materials.	
3	To draw and study dimensioning and Tolerance	
4	To construction geometrical figures of Pentagon and Hexagon	
5	To draw the projection of points and lines	
6	To draw the Orthographic Projection of given object in First Angle	
7	To draw the Orthographic Projection of given object in Third Angle	
8	To draw the sectional view of a given object	
9	To draw the development of the lateral surface of given object	
10	To draw the isometric projection of the given orthographic projection.	

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the drawing sheet by the students and a Viva taken by the faculty concerned. The marks shall be given on the drawing sheet & regard maintained by the faculty.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Drawing Sheet (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Note: The drawing sheet could be manual or in Auto CAD.

Course Code: EME262	**Laboratory Course-7** **B.TECH (CSE)- Semester-II** **Workshop Practice (Lab)**	**L-0** **T-0** **P-4** **C-2**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts to prepare simple wooden joints using wood working tools.	
CO2.	**Applying** the techniques to produce fitting jobs of specified dimensions.	
CO3.	**Applying** the concepts to prepare simple lap, butt, T and corner joints using arc welding equipment.	
CO4.	**Applying** the concepts of black smithy and lathe machine to produce different jobs.	
CO5.	**Creating** core and moulds for casting.	
LIST OF EXPERIMENTS:	**Perform any ten experiments selecting at least one from each shop**	
1	**Carpentry Shop**: 1. To prepare half-lap corner joint. 2. To prepare mortise &tenon joint. 3. To prepare a cylindrical pattern on woodworking lathe.	
2	**Fitting Bench Working Shop:** 1. To prepare a V-joint fitting 2. To prepare a U-joint fitting 3. To prepare a internal thread in a plate with the help of tapping process	
3	**Black Smithy Shop:** 1. To prepare a square rod from given circular rod 2. To prepare a square U- shape from given circular rod	
4	**Welding Shop:** 1. To prepare a butt and Lap welded joints using arc welding machine. 2. To prepare a Lap welded joint Gas welding equipment. 3. To prepare a Lap welded joint using spot welding machine	
5	**Sheet-metal Shop:** 1. To make round duct of GI sheet using 'soldering' process. 2. To prepare a tray of GI by fabrication	
6	**Machine Shop:** 1. To study the working of basic machine tools like Lathe m/c, Shaper m/c, Drilling m/c and Grinding m/c. 2. To perform the following operations on Centre Lathe: Turning, Step turning, Taper turning, Facing, Grooving and Knurling 3. To perform the operations of drilling of making the holes on the given metallic work-piece (M.S.) by use of drilling machine.	

7	**Foundry Shop:** 1. To prepare core as per given size. 2. To prepare a mould for given casting.	

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: EGP211	DGP-2 B.Tech (CSE) Semester III **DISCIPLINE & GENERAL PROFICIENCY**	L-0 T-0 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Understanding*** the social responsibilities toward the institute and humanity.	
CO2.	***Understanding*** the need of participations in different events to groom the personality.	
CO3.	***Understanding*** the discipline and follow them during academics and institutional activities.	
CO4.	***Understanding*** Social awareness towards society.	
CO5.	***Applying*** actively towards various institution activities like workshop, seminar and other events	
	There shall be continuous evaluation of the student on the following broad parameters:	
	1. Observance of dress code. **2.** Participation in Conferences /Workshops / Seminars. **3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time. **4.** Participation in community projects including NSS. **5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time. **6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel. **7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level. **8.** General behavior **9.** Any extraordinary achievement. The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).	

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S N		Enroll No.	Student Name	Dress code	Participation in Conferences	Participation in guest lectures,	Participation in community	Participation in Culture & extra	Participation in sports/ co-	General Behavior	Any Extra Achievement

o					/Workshops / Seminars	invited talks and special technical sessions	Services	curriculum activities, Department Club Activities	curricular activities		
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Course Code: **ECS305**	**Professional Core Course-1** **B.Tech (CSE) Semester III** **DATA STRUCTURE USING C++**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Understanding*** of different data structures and their usage.	
CO2.	***Applying*** the understanding to solve basic operations on data structures.	
CO3.	***Analyzing*** various approaches to solve different problems using data structures.	
CO4.	***Analyzing*** various methods and the best solution as per running time of basic problems of programming.	
CO5.	***Developing*** programming skills to solve problems with various storage structures.	
Course Content:		
Unit-1:	**C++ Programming Basics:** Variables, data type, features of object oriented programming, Functions, Call by Reference, Call by Address, Call by Value, Function Overloading, Inline Function, Enumerations. **Object & Classes:** Access Specifiers, Constructors. Default, Copy Constructor, destructor, Object as Function, Arguments, Returning Object from Function. Static Data Members, Static Member Functions, Abstract class, Const Data and Classes. Friend Function	**8 Hours**
Unit-2:	**Introduction**: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time Space trade off. **Arrays :** Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Sparse Matrices, and Vectors, Arrays in terms of pointers, Static and Dynamic Memory Management. Tower of Hanoi Problem.	**8 Hours**
Unit-3:	**Stack**: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Linked Representation of Stack, Applications of stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. **Queues**: Array representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty. Circular queue, Deque, Priority Queue. **Linked List:** Representation and Implementation: Singly Linked List, Doubly Linked List, Circular Linked List, Circular Doubly Linked List, Header Linked List. Operations on Linked List: Insert, Delete, Searching, Traversing. Array and Queue Implementation using Linked List, Polynomial representation and addition.	**8 Hours**
Unit-4:	**Sorting**: Insertion Sort, Bubble Sort, Selection Sort, Quick Sort, Merge Sort, Heap Sort and Radix Sort, Practical consideration for Internal Sorting. Searching and Hashing: Sequential search, binary search, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation. **Trees**: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Tree.	**8 Hours**

Unit-5:	**Graphs**: Definitions and concepts, representation using Adjacency matrix, Adjacency lists, BFS and DFS, File Structures: Physical Storage Media FileOrganization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices.	**8 Hours**
Text Books:	1. Lipschutz, S., Data Structure, Tata McGraw Hill.	
Reference Books:	**1.** Sahani, S.and Horowitz, E., *Fundamentals of Data Structures*, Galgotia **2.** Kruse, R., *Data Structures and Program Design in C*, Pearson Education. **3.** Cormen, T. H., *Introduction to Algorithms*, Prentice Hall of India. **4.** Loudon, K., *Mastering Algorithms With C*,Shroff Publisher & Distributors. **5.** Tenenbaum, A.M., *Data Structures using C & C++*, Prentice Hall of India *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	1 https://nptel.ac.in/courses/106/102/106102064/ 2 https://www.youtube.com/watch?v=S47aSEqm_0I 3 https://www.youtube.com/watch?v=5Y8Lfsreeck	

Course Code: **ECS306**	**Professional Core Course-2** **B.Tech (CSE) Semester III** **DATABASE MANAGEMENT SYSTEM**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the basics of data base systems, structure and architecture, data models and types.	
CO2.	Understanding different transaction processing concepts and different types of serialization techniques.	
CO3	Understanding different database recovery like shadow paging, deferred/immediate updates and Concurrency control techniques	
CO4.	Applying integrity and constraints using SQL and PL/SQL.	
CO5.	Analyzing the anomalies of database and removal of these anomalies using different normalization techniques.	
Course Content:		
Unit-1:	**Database:** History, database system vs. file system; Concepts; Architecture; Data models; Schema; Instances; Data independence and Database Languages: Interfaces, DDL(Data Definition Language), DML(Data Manipulation Language); ER Model: Notations,Diagram, reduction of Diagrams to tables, Extended ER Mapping Constraints.Keys: Concepts, Types, Comparison, Operations.**Abstraction:** Generalization, Aggregation.	**8 Hours**
Unit-2:	**Relational data Model and Language:** Concepts; Integrity: Entity, Referential; Constraints: Keys, Domain; Relational Algebra; Relational Calculus; Tuple and Domain Calculus. **Introduction to SQL:** Characteristics, Advantage, Data Types and Literals, Commands, Operators and their Procedure, Tables, Views and Indexes, Queries and sub queries, Aggregate functions, Operations: Insert, Update, Delete, Join, Union, Intersection, Minus, Cursors.	**8 Hours**
Unit-3:	**Data Base Design:** Functional Dependencies; Lossless Join Decompositions; Alternative approaches to Database Design, Canonical Cover and Dependency preservation. **Normalization:** Normal Forms using FD, MVD, and JDs	**8 Hours**
Unit-4:	**Transaction Processing Concepts:** Transaction system, Serializability, Testing, Schedules: Conflict& View Serializable Schedule; Recoverability: Recovery from Transaction Failures; Log Based Recovery, Checkpoints, Deadlock Handling.	**8 Hours**
Unit-5:	**Concurrency Control Techniques:** Locking Techniques, Time-Stamping Protocols, Validation based Protocol, Multiple Granularity, Multi Version Schemes, Recovery with Concurrent Transaction.	**8 Hours**
Text Books:	**1.** Korth, H.F.,Silbertz, A., *Database Concepts*, McGraw Hill.	
Reference Books:	**1.** Desai, B.C., *An introduction to Database Systems,*Galgotia. **2.** Majumdar, A. K. and Bhattacharya, P., *Database Management System*, Tata McGraw Hill. 3. Ramakrishnan, R., Gehrke, J., *Database Management System*, McGraw Hill *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference	1 https://www.youtube.com/watch?v=EUzsy3W4I0g 2 https://nptel.ac.in/courses/106/105/106105175/ 3 https://www.youtube.com/playlist?list=PL52484DF04A264E59	

Material:		
Course Code: **EEC302**	**Professional Core Course-3** **B.Tech (CSE) Semester III** **DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the basics of Number system, Boolean algebra and its applications in digital electronics.	
CO2.	Understanding different combinational and sequential circuits in digital electronics.	
CO3.	Understanding the organization of computer system and its components, memory hierarchy, I/O mechanism.	
CO4.	Applying the concepts to design various combinational and sequential circuits.	
CO5.	Analyzing the efficiency of various gates and flip-flops based upon their functionality.	
Course Content:		
Unit-1:	**Number System:** Data representation, Data Types and Number Systems, Binary Number System, Octal & Hexa-Decimal Number System; Fixed Point Representation; 1's &2's Complement; Binary Fixed Point Representation; Arithmetic Operation on Binary Numbers; Overflow &Underflow; Floating Point Representation; Codes: ASCII, EBCDIC Codes, Gray Code, Excess-3 & BCD; Error Detection & Correcting Codes; Binary Storage and Registers.	**8 Hours**
Unit-2:	**Boolean algebra:** Definition, Properties, Law's. **Digital Logic Circuits**: Logic Gates: AND, OR, NOT Gates and their Truth Tables, NOR, NAND &XOR Gates; Demorgan's Theorem; Map Simplification; Minimization Techniques: K Map Two, Three and More variables maps; Sum of Product & Product of Sums; Don't care conditions; Combination & Sequential Circuits; Half adder &Full adder; Full subtractor and decimal adder, Code Conversion; Multilevel NAND and NOR Circuits; Multiplexers and Demultiplexers; ROM Working & Circuit.	**8 Hours**
Unit-3:	**Sequential logic**: Flip-Flops: RS, D, JK & T Flip-Flop, Triggering in flip flops, Analysis of Clocked Sequential Circuits; State Reduction and Assignment; flip flop excitation tables; Design procedure and Design of Counters; Design with equations; Registers; Counters and the memory unit; Shift registers; Ripple counters and Synchronous counters; Timings sequence digital logic families; Processor organization; General Register Organization; Stack Organization and Addressing Modes.	**8 Hours**
Unit-4:	**Computer Registers and I/O:** Registers transfer logic; Intel Register Transfer; Arithmetic Logic and Shift Micro Operation; Conditional; Constant Statement; Fixed Point Binary Data Floating Point Data; Instruction Codes; Input-output organizations- I/O Interface; Properties of simple I/O Devices and their controller; Isolated vs. Memory-mapped I/O; Modes of data transfer; Synchronous & Asynchronous data transfer.	**8 Hours**
Unit-5:	**Computer Organization:** Block Level Description of the Functional Units as Related to the Execution of a Program; Fetch; decode and Execute Cycle. **Memory organization:** Auxiliary Memory; Magnetic Drum; Disk & Tape; Semi-conductor memories; Memory; Hierarchy; Associative memory; Virtual memory; Address space & memory space; Address mapping; page table; Page replacement; segmentation; Cache memory; Hit ratio; Mapping techniques; Writing into Cache.	**8 Hours**

Text Books:	**1.** Mano, M., *Computer System Architecture*, Prentice Hall of India.	
Reference Books:	**1.** Tannenbaum, O., *Structured Computer Organization*, Prentice Hall of India. **2.** Hayes, P.J., *Computer Organization*, McGraw Hill. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	1 https://www.digimat.in/nptel/courses/video/117105078/L14.html 2http://www.nptelvideos.in/2012/12/digital-computer-organization.html 3https://www.youtube.com/watch?v=TH9nd-KdVHs&list=PL2DC54ABD5C0221FE	

Course Code: EAS301	**Basic Science Course-5** **B.Tech (CSE) Semester III** **MATHEMATICS-III**	**L-3 T-0 P-0 C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	**Understanding** the concepts of singularities, zeroes and poles, functions , relations, propositions, truth tables, logical equivalence and implications, converse, inverse, bi-conditional statements, negation of compound statements, tautologies and contradiction, arguments, fallacies, quantifiers.	
CO2.	**Applying** the concept of power series, Taylor's and Laurent's series, Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic functions, Residue theorem.	
CO3.	**Applying** the core mathematics concept to solve the problems.	
CO4.	**Analyzing** the method of least squares and curve fitting of straight line and parabola, solution of cubic and bi-quadratic equations, correlation and regression, Binomial distribution, Poisson distribution and Normal distribution.	
CO5.	**Evaluating** the real integral of the type $\int_0^{2\pi} f(\cos\theta, \sin\theta)d\theta$, Line integral in the complex plane.	
Course Content:		
Unit-1:	**Functions of a Complex Variable**: Analytic functions; C-R equations and harmonic functions; Line integral in the complex plane; Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic functions; Liouvilles theorem.	**8 Hours**
Unit-2:	**Functions of a Complex Variable II**: Representation of a function by power series; Taylor's and Laurent's series; Singularities, zeroes and poles; Residue theorem, evaluation of real integral of the type $\int_0^{2\pi} f(\cos\theta, \sin\theta)d\theta$.	**8 Hours**
Unit-3:	**Statistical Techniques:** Moments, Moment generating functions, Skewness, Kurtosis, Curve Fitting and Solution of Equations: Method of least squares and curve fitting of straight line and parabola, Solution of cubic and bi-quadratic equations, Correlation and Regression, Binomial distribution, Poisson distribution, Normal distribution.	**8 Hours**
Unit-4:	**Propositional Calculus:** Propositions: Algebra, Conditional; Truth tables; Logical Equivalence andimplications; Converse; Inverse; Contra-positive; Bi-conditional statements; Negation of Compound statements; Tautologies and Contradiction; Normal Forms; Arguments; Fallacies; Quantifiers.	**8 Hours**
Unit-5:	**Set Theory:** Concepts, Operations, Identities, Venn diagram, Cartesian product.**Relation**: Definition, Types, Pictorial representation, Composition.**Function**:Definition, classification, types and composition. **Combinatorics:** Principles, Permutation and Combination, Recurrence Relations and Generating Functions,Mathematical Induction.	**8 Hours**
Text Books:	1. Grewal B.S., *Higher Engineering Engineering Mathematics*, Khanna Publishers.	
Reference Books:	1. Kreyszig E., *Advanced Engineering Engineering Mathematics*, Wiley Eastern. 2. Piskunov N, *Differential & Integral Calculus*, Moscow Peace Publishers. 3. Narayan Shanti, *A Text book of Matrices*, S. Chand. 4. Bali N.P., Engineering Engineering Mathematics-III, Laxmi Publications. 5. Lipchitz, S. & Lipson S., *Discrete Mathematics*, Outline series Tata McGraw Hill. *** Latest editions of all the suggested books are recommended.**	
Additional	1 https://www.youtube.com/watch?v=xlUFkMKSB3Y	

Electronic Reference Material:	2https://www.youtube.com/watch?v=P7gVp333B6M&list=PL562D06BCD5F9B9563 https://www.youtube.com/watch?v=Eqdbe0RF5kQ&list=PLLy_2iUCG87DEfQ7Wp0B9OmAnYKBZUvfn	

Course Code: EAS303	**Humanities and Social Sciences including Management Course-3** **B.Tech (CSE) Semester III** **Human Values & Professional Ethics**	**L-2 T-0 P-0 C-2**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the importance of value education in life and method of self-exploration.	
CO2.	Understanding 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration.	
CO3.	Applying right understanding about relationship and physical facilities.	
CO4.	Analyzing harmony in myself, harmony in the family and society, harmony in the nature and existence.	
CO5.	Evaluating human conduct on ethical basis.	
Course Content:		
Unit-1:	Understanding of Morals, Values and Ethics; Introduction to Value Education- need for Value Education. Self- Exploration–content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration. Continuous Happiness and Prosperity- basic Human Aspirations. Gender Issues: Gender Discrimination and Gender Bias (home & office), Gender issues in human values, morality and ethics.	**8 Hours**
Unit-2:	Conflicts of Interest: Conflicts between Business Demands and Professional Ethics. Social and Ethical Responsibilities of Technologists. Ethical Issues at Workplace: Discrimination, Cybercrime, Plagiarism, Sexual Misconduct, Fraudulent Use of Institutional Resources. Intellectual Property Rights and its uses. Whistle blowing and beyond, Case study.	**8 Hours**
Unit-3:	Harmony in the Family and Society- Harmony in Human-Human Relationship, Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman and other salient values in relationship.	**8 Hours**
Unit-4:	Understanding Harmony in the Nature and Existence – Whole existence as Co-existence. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Coexistence (Sah-astitva) of mutually interacting units in all pervasive space. Holistic perception of harmony at all levels of existence.	**8 Hours**
Unit-5:	Implications of the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values. Definitiveness of Ethical Human Conduct. 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	**8 Hours**

	for above production systems.	
Text Books:	1.R R Gaur, R Sangal, G P Bagaria, A Foundation Course in Value Education.	
Reference Books:	1. Ivan Illich, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA 2. E.F. Schumacher, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain. 2. A Nagraj, Jeevan Vidya ekParichay, Divya Path Sansthan, Amarkantak. 3. Sussan George, How the Other Half Dies, Penguin Press. Reprinted. 4. PL Dhar, RR Gaur, Science and Humanism, Commonwealth Purblishers. 5. A.N. Tripathy, Human Values, New Age International Publishers. 6. E G Seebauer& Robert L. Berry, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	1https://www.youtube.com/watch?v=1xFZ7ZVVJeA&list=PLXcPnJsWbdxujUIptbSdeJXC0Jd-InxFG 2https://www.youtube.com/watch?v=nlh9V5gd8hg&list=PLbMVogVj5nJQ20ZixllzM69agBq-m8ndV 3 https://www.youtube.com/watch?v=cFOZplkRqsk	

Course Code: ECS355	Laboratory Course-8 B.Tech (CSE) Semester III **DATA STRUCTURE USING C++ (LAB)**	L-0 T-0 P-4 C-2
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Applying*** the concept of different data types and their usage using C++ Programs.	
CO2.	***Applying*** the concept of recursion for problem solving.	
CO3.	***Applying*** the programming constructs and their usage for problem solving.	
CO4.	***Applying*** the understanding to solve basic operations searching, sorting, insertion, deletion on data structures.	
CO5.	***Developing*** programming skills to solve problems with various storage structures like stack, queue, linked list and tree.	
	LIST OF EXPERIMENTS	
	1. To write programs implementing Sorting programs: Bubble sort, Merge sort, Insertion sort, Selection sort, and Quick sort. 2. To write programs implementing Searching programs: Linear Search, Binary Search. 3. To write programs Array implementation of Stack, Queue, Circular Queue, Linked List. 4. To write programs implementing Stack, Queue, Circular Queue, Linked List using dynamic memory allocation. 5. To write program implementing Binary tree. 6. To write programs implementing Tree Traversals (pre-order, in-order, post-order). 7. To write programs implementing graph traversal (BFS, DFS). 8. To write programs implementing minimum cost spanning tree, shortest path.	

Course Code: ECS356	**Laboratory Course-9** **B.Tech (CSE) Semester III** **DATA BASE MANAGEMENT SYSTEM (LAB)**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the concepts of DML operation to database table to complete different queries on database.	
CO2.	Applying the concepts of different DDL operations.	
CO3.	Applying the concepts of DCL operations like grant and revoke for administration purpose on a table.	
CO4.	Applying the concepts of PL/SQL for creating different triggers to develop event driven action in database.	
CO5.	Analyzing the concepts of PL/SQL for creating functions and procedure to apply DML on tables	
	LIST OF EXPERIMENTS	
	1. To write a program to Create Table, SQL for Insertion, Deletion, Update and Retrieval using aggregating functions. **2.** To write a program in PL/SQL, Understanding the concept of Cursors. **3.** To write a program for implementing Join, Union & intersection etc. **4.** To write a program for Creating Views, Writing Assertions Triggers. **5.** To write a program for Creating Forms, Reports etc. **6.** To write codes for generating read and update operator in a transaction using different situations. **7.** To write a program to Implement 2PL concerning central algorithm. **8.** To develop code for understanding of distributed transaction processing. Students are advised to use Developer 2000 Oracle 8+ version for above experiments. However, depending on the availability of Software's students may use power builder/SQL Server/DB2 for implementation.	

Course Code: EEC351	Laboratory Course-10 B.Tech (CSE) Semester III **DIGITAL LOGIC CIRCUIT (LAB)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Applying the concept of basic gates to design combinational circuits and verify using truth table.	
CO2.	Applying the concept of flip-flops to design sequential circuits and verify using truth table.	
CO3.	Applying the concepts to design registers	
CO4.	Applying the concepts to design counters.	
CO5.	Applying the concepts of AND & OR Gate.	
	LIST OF EXPERIMENTS	
	1) To study of following combinational circuits: Multiplexer, Demultimplexer and Encoder. Verify truth tables of various logic functions. 2) To study of various combinational circuits based on: AND/NAND Logic blocks and OR/NOR Logic blocks. 3) To study various waveforms at different points of a transistor bi-stablemulti-vibrator and its frequency variation with different parameters. 4) To design a frequency divider using IC-555 timer. 5) To study various types of registers and counters. 6) To study Schmitt trigger circuit. 7) To study transistor as table multi-vibrator. 8) Experimental study of characteristics of CMOS integrated circuits. 9) Interfacing of CMOS to TTL and TTL to CMOS. 10) BCD to binary conversion on digital IC trainer. 11) Testing of digital IC by automatic digital IC trainer. 12) To study OP-AMP as Current to Voltage & Voltage to Current converters & comparator.	

Course Code: TMUGE301	**Humanities and Social Sciences including Management Course-4** **B.Tech (CSE) Semester III** **English Communication -III**	**L-2 T-0 P-2 C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Remembering and understanding the English grammar and vocabulary	
CO2.	Understanding the art of public speaking and strategies of reading comprehension.	
CO3.	Applying correct vocabulary and sentence construction during public speaking or professional writing.	
CO4.	Aanalyzing different types of sentences like simple, compound and complex.	
CO5.	Creating skills for Drafting notice, agenda and minutes of the meeting.	
Course Content:		
Unit-1:	**English Grammar & Vocabulary** • Correction of Common Errors (with recap of English Grammar with its usage in practical context.) • Synthesis : Simple , complex and compound sentence • Commonly used Idioms & phrases (Progressive learning whole semester)	**14 Hours**
Unit-2:	**Speaking Skills** • Art of public speaking • Common coversation • Extempore • Power Point Presentation (PPt) Skills**:** Nuances of presenting PPTs	**10 Hours**
Unit-3:	**Comprehension Skills** • Strategies of Reading comprehension: Four S's • How to solve a Comprehension (Short unseen passage: 150-200 words)	**6 Hours**
Unit-4:	**Professional Writing** a) Preparing Notice,Agenda & Minutes of the Meeting	**3 Hours**
Unit-5:	**Value based text reading:** Short story a) The Barber's Trade Union – Mulk Raj Anand	**7Hours**
Text Books:	Singh R.P., An Anthology of Short stories, O.U.P. New Delhi	
Reference Books:	**1.** Allen, W. *"Living English Structure"* Pearson Education, New Delhi. **2.** Joseph, Dr C.J. & Myall E.G. "*A Comprehensive Grammar of Current English*" Inter University Press, Delhi **3.** Wren & Martin "*High School English Grammar and Composition*" S.Chand&Co.Ltd., New Delhi. **4.** Norman Lewis "*Word Power Made Easy*" Goyal Publications & Distributers, New Delhi. **5.** Media (P) Ltd. Meerut. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	1 https://www.youtube.com/watch?v=6xFaXIwwq0s&list=PLzJaFd3A7DZtnTdtOxvjO3GLPd1WVe6oq 2 https://www.youtube.com/watch?v=0AM35Nu5McY&list=PLwytTXNlljX6cEAsR1TsbKpE	

	wGSJieaQ9 3 https://www.youtube.com/watch?v=ZrG_IE8IrgU&list=PLbMVogVj5nJSEQYH2dVtcXN9I4n8hF0VY	

Methodologies:

1. Idiom & Phrases and exercises, usage in sentences.
2. Language Lab software.
3. Power Point presentation.
4. Newspaper reading, short articles from newspaper to comprehend and short movies.
5. Modern Teaching tools (PPT Presentation & Motivational videos with sub-titles) will be utilized.
6. Text reading : discussion in detail, Critical appreciation by reading the text to develop students' reading habits with voice modulation.

Note:

- Class (above 30 students) will be divided in to two groups for effective teaching.
- For effective conversation practice, groups will be changed weekly.

Evaluation Scheme

Internal Evaluation			External Evaluation		Total Marks
40 Marks			60 Marks		
20 Marks (Best 2 out of Three CTs) ***(From Unit- I, III,IV & V)***	10 Marks (Oral Assignments) ***(Unit –II)***	10 Marks (Attendance)	40 Marks (External Written Examination) ***(From Unit- I, III,IV & V)***	20 Marks (External Viva)* ***(Unit –II)***	**100**

*Parameters of External Viva

Content	Body Language	Communication skills	Confidence	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

Note: External Viva will be conducted by 2-member committee comprising

a) One Faculty teaching the class
b) One examiner nominated by University Examination cell.
Each member will evaluate on a scale of 20 marks and the average of two would be the 20 marks obtained by the students.

Course Code: EGP311	DGP-3 B.Tech (CSE) Semester III **DISCIPLINE & GENERAL PROFICIENCY**	L-0 T-0 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Understanding*** the social responsibilities toward the institute and humanity.	
CO2.	***Understanding*** the need of participations in different events to groom the personality.	
CO3.	***Understanding*** the discipline and follow them during academics and institutional activities.	
CO4.	***Understanding*** Social awareness towards society.	
CO5.	***Applying*** actively towards various institution activities like workshop, seminar and other events	
	There shall be continuous evaluation of the student on the following broad parameters:	
	1. Observance of dress code. **2.** Participation in Conferences /Workshops / Seminars. **3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time. **4.** Participation in community projects including NSS. **5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time. **6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel. **7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level. **8.** General behavior **9.** Any extraordinary achievement. The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).	

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special	Participation in community Services	Participation in Culture & extra curriculum activities,	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement

						technical sessions		Department Club Activities			
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Course Code: TMUGA-301	Value Added Audit Course-1 BTech- Semester-III **Foundation in Quantitative Aptitude**	L-2 T-1 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Solving complex problems using Criss cross method, base method and square techniques.	
CO2.	Applying the arithmetical concepts of Average, Mixture and Allegation.	
CO3.	Evaluating the different possibilities of various reasoning based problems in series, Blood relation and Direction.	
CO4.	Operationalizing the inter-related concept of Percentage in Profit Loss and Discount, Si/CI and Mixture/Allegation.	
Course Content:		
Unit-1:	**Speed calculations** Squares till 1000,square root, multiplications: base 100, 200 300 etc., 11-19, crisscross method for 2X2, 3X3, 4X4, 2X3, 2X4 etc., cubes, cube root	**3 Hours**
Unit-2:	**Percentages** Basic calculation, ratio equivalent, base, change of base, multiplying factor, percentage change, increment, decrement, successive percentages, word problems	**5 Hours**
Unit-3:	**Profit Loss Discount** Basic definition, formula, concept of mark up, discount, relation with successive change, faulty weights	**5 Hours**
Unit-4:	**SI and CI** Simple Interest, finding time and rate, Compound Interest, difference between SI and CI, Installments	**4 Hours**
Unit-5:	**Averages** Basic Averages, Concept of Distribution, Weighted Average, equations	**3 Hours**
Unit-6:	**Mixtures and allegations** Mixtures of 2 components, mixtures of 3 components, Replacements	**5 Hours**
Unit-7:	**Blood relations** Indicating type, operator type, family tree type	**3 Hours**
Unit-8:	**Direction sense** Simple statements, shadow type	**2 Hours**
Reference Books:	• R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude • R2:-Quantitative Aptitude by R.S. Agrawal • R3:-M Tyra: Quicker Maths • R4:-Nishith K Sinha:- Quantitative Aptitude for CAT • R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com • R6:-Logical Reasoning by Nishith K Sinha • R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal *** Latest editions of all the suggested books are recommended.**	

Evaluation Scheme for Quantitative Aptitude:-

The students will be evaluated on the score of 100 for the semester. Detailed scheme for the course is as follows.

a. 20 marks each for CT1 + CT2 + CT3
b. 30 marks for final external exams.
c. 10 marks for attendance, at the end of semester, will be provided in the following manner.
d. Attendance criterion for appearing in the exams and campus placements is 80%.

S No	% Attendance <	Marks
1	30	0
2	30-40	2
3	40-50	4
4	50-60	5
5	60-70	6
6	70-80	7
7	80-90	8
8	90-100	10

So for CT1 (20) + CT2 (20) + CT3(20) + Final External exam (30) + Attendance (10) = 100 marks

References:

- M Tyra: Quicker Maths
- Reference website:- Indiabix.com
- Verbal and Non Verbal Reasoning by R.S. Agrawal

Course Code: ECS401	**Professional Core Course-4** **B.Tech (CSE) Semester IV** **THEORY OF COMPUTATION**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the fundamentals of Computational theory and basic terminology used.	
CO2.	Understanding basics of various machines used for computations like FSM, PDA, TM.	
CO3.	Understanding the grammar, language, formation of regular expression in FA, minimization of FA and CFG.	
CO4.	Applying the concepts to design various machines like FSM, PDA etc.	
CO5.	Analyzing the efficiency of various machines based upon their functionality and limitations.	
Course Content:		
Unit-1:	**Fundamentals:** Strings, Alphabet, Language, Operations, Finite state machine, Definitions, Finite automaton model, acceptance of strings and languages, Deterministic finite automaton and non deterministic finite automaton, Transition diagrams and language recognizers, Chomsky hierarchy of languages.	**8 Hours**
Unit-2:	**Finite Automata:** NFA with NULL (€) transitions-Significance, Acceptance of languages. Conversions and Equivalence, Equivalence between NFA with and without null transitions, NFA to DFA conversion, Minimization of finite state machine (FSM), Equivalence between two FSM`s, Finite Automata with output-Moore and Mealy machines	**8 Hours**
Unit-3:	**Regular Languages:** Regular sets, Regular expressions, Identify rules, Constructing finite Automata for a given regular expressions, Conversion of finite automata to regular expressions, Pumping lemma of regular sets. **Grammar Formalism:** Regular grammars-right linear and left linear grammars, Equivalence between regular linear grammar and FA, Context free grammar, Derivation trees, Sentential forms, Rightmost and leftmost derivation of strings.	**8 Hours**
Unit-4:	**Context Free Grammars:** Ambiguity in context free grammars. Minimization of context free grammars, Chomsky normal form, Greiback normal form, Pumping lemma for context free languages.	**8 Hours**
Unit-5:	**Push Down Automata:** Push down automata, Definition, Model, Acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, Introduction to Tuning Machine (TM), TM Definition, TM Model, Design of TM.	**8 Hours**
Text Books:	1. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science (Automata, Languages and Computation)", PHI	
Reference Books:	1. Martin J. C., "Introduction to Languages and Theory of Computations", TMH 2. Papadimitrou, C. and Lewis, C.L., "Elements of theory of Computations", PHI 3. Cohen D. I. A., "Introduction to Computer theory", John Wiley & Sons 4. Kumar Rajendra, "Theory of Automata (Languages and Computation)", PPM***** **Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	1 https://www.youtube.com/watch?v=-aIRqNnUvEg&list=PL85CF9F4A047C7BF7 2 https://www.youtube.com/watch?v=al4AK6ruRek&list=PLbMVogVj5nJSd25WnSU144ZyGmsqjuKr3 3	

	https://www.youtube.com/watch?v=CwihAY_fgRE&list=PLEAYkSg4uSQ1cnL10WUDWnO6O3sZdRDdy	

Course Code: ECS407	**Professional Core Course-5** **B.Tech (CSE) Semester IV** **JAVA PROGRAMMING**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the object-oriented approach of programming, basic building blocks of java programming, java development environment, datatypes, class, methods, and various predefine packages.	
CO2.	Understanding the various predefine classes, interfaces, which deals with networking, understanding the basic approach of graphical user interface design using Abstract window toolkit and Applet.	
CO3.	Understanding the basic concept of Event handling, Applying the concept of thread and multithreading.	
CO4.	Understanding the Database connectivity using java, along with the classes and methods of java.sql package and creating basic programs using this package.	
CO5.	Applying the graphical user interface design concept using Swing.	
CO6.	Analyzing the predefine methods and interfaces of Swing package and creating basic user interface using swing.	
Course Content:		
Unit-1:	**Core Java:** Operators, Data types, Variables, Arrays, Control Statements, Methods &Classes, Constructors, Introducing Methods, Method Overloading, The this Keyword, Garbage Collection, Introducing Final, Understanding static, Variable Length Arguments, and Ambiguity, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Networking, Event handling,java collection framework. **Abstract Window Toolkit (AWT):** Controls, Layout managers, Menus, Images, Graphics.	**8 Hours**
Unit-2:	**Java Swing:** Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box, Progress Bar, Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner frame.	**8 Hours**
Unit-3:	**JDBC:** Connectivity Model, JDBC/ODBC Bridge, java.sql package, Connectivity to remote database, navigating through multiple rows retrieved from a database. Introduction to Hibernate.	**8 Hours**
Unit-4:	**Java Beans:** Application Builder tools, Bean developer kit (BDK), JAR files, Introspection, Developing a simple bean, Using Bound properties, Java Beans API, Session Beans, Entity Beans, Enterprise Java beans (EJB), RMI (Remote Method Invocation), A simple client-server application using RMI.	**8 Hours**
Unit-5:	**Java Servlets:** Type of Servlets: Generic and HTTP Servlet, Life cycle, Running, Debugging,servlet API, Running a servlet on Apache Tomcat Server,Request Dispatchers: Forward and Include Thread-safe, HTTP Redirects, Cookies, Java Server pages (JSP),Java Server Pages - Understanding the working of Server side Scripting, JSP Components, Java beans and JSP concepts, JDBC and JSP, Configuring JSP Server (Apache Tomcat), Using JSP Implicit objects, JSP Actions, JSP-Java bean Scope, JSP and MVC,JSTL, A sample website using JSP and	**8 Hours**

	Servlets. Introduction to Struts2 Framework, Interceptors and Validation.Struts2 and AJAX.	
Text Books:	**1.** Margaret, L. Y., *The Complete Reference- Internet*, Tata McGraw Hill.	
Reference Books:	**1.** Balagurusamy, E., *Programming in JAVA*, Tata McGraw Hill. **2.** Dustin, R. Callway*Inside Servlets*, Addison-Wesley. **3.** Steven, H., *Java2 Black Book*, Dreamtech. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	1. https://www.youtube.com/watch?v=J_d1fJy90GY&list=PLbRMhDVUMngcx5xHChJ-f7ofxZI4JzuQR 2. https://www.youtube.com/watch?v=0GkqhLcym48&list=PL3618681FEEDA821F 3. https://www.youtube.com/watch?v=DeL-OoWyNrE	

Course Code: ECS404	**Professional Core Course-6** **B.Tech (CSE) Semester IV** **SOFTWARE ENGINEERING**	**L-3 T-0 P-0 C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the basic concepts of software development life cycle and various process models of software development.	
CO2.	Understanding the concepts of agile software development and the basics of requirements engineering.	
CO3.	Understanding the concepts of software design	
CO4.	Understanding the concepts of coding approach, software testing and software reliability.	
CO5.	Understanding the concepts of software maintenance & its types, reverse engineering and CASE tools.	
CO6.	Applying software design techniques with the help of flow charts, ERD and DFD.	
Course Content:		
Unit-1:	**Introduction:** Evolution and impact of Software Engineering, Software Development Life Cycle (SDLC) Models: Waterfall Model, Prototype Model, Spiral Model, agility and Agile Process model, Extreme programming, other process models of agile development and Tools, Layered Approach.**Software Requirements Analysis and Specifications** Feasibility Study, Functional and Non-Functional Requirements, Requirements Gathering, Requirement Analysis and Specifications using DFD, Data Dictionaries and ER Diagrams, Requirements documentation, Characteristics and Organization of Software Requirement Specifications (SRS)	**8 Hours**
Unit-2:	**Software-Design and Coding:** Principles; Problem Partitioning; Abstraction; Top-Down and Bottom-Up design; Structured Approach; Functional vs. Object Oriented Approach; UML, Design Specifications and Verification; Cohesion; Coupling. Distributed Software Design, User Interface Design, Coding standards and Code Review Techniques	**8 Hours**
Unit-3:	**Software Testing :**Software Testing Fundamentals, SDLC Testing : Unit Testing, Integration Testing, System Testing, Regression Testing, Smoke Testing, Security Test, Stress Test, Performance Test, Functional Testing or Black Box Testing: Boundary Value Analysis, Alpha Testing, Beta Testing, and Acceptance Testing, Structural Testing or White Box Testing: Basis Path Testing, DD-Paths, Cyclomatic Complexity, Data Flow Testing, Mutation.	**8 Hours**
Unit-4:	**Test Management:** Test Cycle, Test Estimation, Test Cases, Test Scenarios **Testing Tools:** Static, Dynamic, Characteristics of Modern Tools and Automation.	**8 Hours**
Unit-5:	**Software Maintenance:** Updates-Upgrades-Patches-Versions,Error Reporting, Customer Support, Maintenance Process, **Software Reliability**: Importance, Hardware Reliability and Software Reliability, Failure and Faults, Reliability Models, Software Reuse,**CASE (Computer Aided Software Engineering):** Scope; Architecture; CASE Support in SDLC; Documentation; Reverse Software Engineering.	**8 Hours**
Text Books:	**1.** Agarwal, K.K., *Software Engineering*, New Age International. .	
Reference Books:	**1.** Sommerville, I., *Software Engineering*, Addison-Wesley. **2.** Aggarwal, K.K. & Singh, Y., *Software Engineering*, New Age	

	International Publishers. **3.** Boris, B., *Software Testing Techniques*, Van Nostrand Reinhold. **4.** Boris, B., *Black-Box Testing – Techniques for Functional Testing of Software and Systems*, John Wiley & Sons. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	1. https://www.youtube.com/watch?v=Ln_LP7c23WM&list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt&index=1 2. https://www.youtube.com/watch?v=Z6f9ckEElsU&list=PL8751DA481F0F0D17 3. https://www.youtube.com/watch?v=KMj49syT8JM&list=PLJ5C_6qdAvBHiqw9Yc7-_vyfbBG1Bmfg_	

Course Code: ECS405	**Professional Core Course-7** **B.Tech (CSE) Semester IV** **COMPUTER BASED NUMERICAL & STATISTICAL TECHNIQUES**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the importance of curve fitting, regression and frequency charts and its applications to solve problems.	
CO2.	Understanding the importance of time series and forecasting models, Statistical Quality Control and Testing of Hypothesis to apply various test and its applications to solve problems.	
CO3.	Applying numerical methods to find our solution of algebraic linear equations using different methods under different conditions, and numerical solution of system of algebraic linear equations.	
CO4.	Applying numerical methods to find our solution of non linear equations using different methods under different conditions, and numerical solution of system of non linear equations. Also work out numerical differentiation and integration whenever and wherever routine methods are not applicable.	
CO5.	Applying various interpolation methods and finite difference concepts.	
Course Content:		
Unit-1:	**Linear Equations**: Direct Method; Gauss Jordan and Gauss Elimination Methods; Pivoting; Iterative methods; Jacobi and Gauss Seidel methods;	**8 Hours**
Unit-2:	**Non-Linear Equations:** Bisection Method, Regula-Falsi Method, Newton-Raphson Method, Rate of Convergence, Numerical Integration and Differentiation; Trapezoidal and Simpson's rule, Derivatives from Newton's Forward polynomial.	**8 Hours**
Unit-3:	**Interpolation:** Finite Difference; Newton's Forward and Backward Interpolation Formulae; Central Difference Formulae; Gauss Forward and Backward Difference Formulae; Newton's Divided Difference Formula; Lagrange's Interpolation Formula.	**8 Hours**
Unit-4:	**Representation and Analysis:** Curve Fitting; Cubic Spline and Approximation: Method of Least Squares, Fitting of Straight Lines, Polynomials and Exponential Curves.**Frequency Chart:** Histogram, Frequency Curve, Pi-chart.**Regression analysis:** Linear and Non-linear, Multiple Regression.	**8 Hours**
Unit-5:	**Time Series and Forecasting:** Moving Averages; Smoothening of curves; Forecasting Models and Methods; Statistical Quality Controls Methods, **Testing of Hypothesis:** Test of Significance; Chi-square Test; T-Test; ANOVA; F-Test; Application to Medicine; Agriculture.	**8 Hours**
Text Books:	**1.** Raman, R., *Computer Oriented Numerical Methods*, Prentice Hall of India.	
Reference Books:	**1.** Veerarajan, T. Ramachandran, T., *Theory and Problems in Numerical Method*, Tata McGraw Hill. **2.** Niyogi, P., *Numerical Analysis and Algorithms*, Tata McGraw Hill. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/111/107/111107105/ https://nptel.ac.in/courses/11/107/1107105/ https://nptel.ac.in/	

Course Code: ECS406	**Professional Core Course-8** **B.Tech (CSE) Semester IV** **OPERATING SYSTEM**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the concepts and states of process, also evaluating the use of various scheduling algorithms and finding the suitability for their usage.	
CO2.	Understanding and Analyzing various issues in Inter Process Communication (IPC) and the role of OS in IPC, also understanding the various characteristics of deadlock and applying the learnt concepts and algorithm to avoid and recover from the deadlock.	
CO3.	Understanding the concepts and implementation of various Memory management policies and usage of the virtual memory.	
CO4.	Applying the basics of operating system along with the types and main functionalities of the operating system	
CO5.	Applying the file management policies and disk structure along with scheduling algorithm for applying it to solve the disk scheduling problems.	
Course Content:		
Unit-1:	**Operating System:** History, Types: Batch System, Time Sharing System, Real Time System, Multiprogramming, Distributed System; Functions; Services; System calls; System programs; Virtual machines.	**8 Hours**
Unit-2:	**Process Management:** Concept, States, Control Block, Scheduling; CPU, Criteria, Algorithms, Preemptive& Non Preemptive.	**8 Hours**
Unit-3:	**Process Synchronization:** Critical Section, Race Condition, Synchronization Hardware, Semaphores, Classical Problems of Synchronization. **Deadlocks:** Characterization, Avoidance, Detection & Recovery.	**8 Hours**
Unit-4:	**Memory Management:** Contiguous Allocation, External and Internal Fragmentation, Paging &Segmentation. **Virtual Memory:** Concept, Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.	**8 Hours**
Unit-5:	**File Management:** Directory Structure, Allocation Methods; Contiguous; Linked; Indexed: Free Space Management; Disk: Structure, Scheduling Algorithms, Disk Management. **Linux:** Basics of Linux, Introduction to Linux - History, Architecture, , Basic commands in Linux, Files and File Structure	**8 Hours**
Text Books:	**1.** Silbershatz, A. and Galvin, P., *Operating System Concept*, Addison-Wesley.	
Reference Books:	**1.** Flynn, M., *Understanding Operating System*, Thomson Press. **2.** Tannenbaum, O., *Operating System Concept*, Addison-Wesley. **3.** Joshi, R.C., and Tapaswi, S., *Operating Systems*, Wiley-Dreamtech. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference	https://nptel.ac.in/courses/106/105/106105214/ https://nptel.ac.in/courses/106/106/106106144/ https://nptel.ac.in/courses/106/102/106102132/	

Material:		

Course Code: **EHM403**	**Humanities and Social Sciences including Management** **Course-5** **B.Tech (CSE) Semester IV** **Management Concepts & Organizational Behavior**	**L-2** **T-0** **P-0** **C-2**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the Concept and importance of management and its functions, organizational behavior, challenges for management	
CO2.	Understanding flow and formation of powers and politics in organizational groups	
CO3.	Analyzing Perception and Thinking process of individual, personality traits and its importance	
CO4.	Analyzing Theories of motivation and leadership and its importance and applicability into business	
CO5.	Analyzing change in organization and Conflict management.	
Course Content:		
Unit-1:	Introduction to Management: Meaning, nature and importance of management; Management functions; Managerial Skills. Planning: Introduction, Importance of Planning, Types of Plans, Planning & Decision Making Process	**8 Hours**
Unit-2:	Organizing and staffing: Meaning, Importance & Process of Organizing, Organizational Structure & its types, Delegation of Authority, Staffing: Meaning & importance. Directing: Importance & Functions, Controlling: Importance and Process, Measures for Effective Control & Control Techniques.	**8 Hours**
Unit-3:	Organizational Behaviour (OB): Concept, Characteristics, Key Elements of OB, Models of OB. Perception: Concept, Process & Importance. Attitudes & Job Satisfaction. Personality: Concept, Types & Theories, Learning: Concept & Theories of Learning.	**8 Hours**
Unit-4:	Motivation: Concepts, Principles, Theories. Leadership: Concept, Function & Style. Group Dynamics: Definition, Stages of Group Development, Types & Group Decision Making. Power and Politics: Concept, Sources, Approaches to Power, Political Implications of Power.	**8 Hours**
Unit-5:	Organizational Change: Concept, Resistance to change & its Management, Implementation of Change. Conflict: Concept, Sources, Types and Resolution of Conflict, Stress: Meaning, Causes, Consequences & Managing Stress. Culture: Concept, Characteristics, Elements of Culture.	**8 Hours**
Text Books:	**1.** Prasad L.M., Principles and Practice of Management, Sultan Chand	
Reference Books:	**1.** Robbins Stephen P., Organizational Behavior Pearson Education **2.** Koontz, Harold, Cyril 'O' Donnell, And Heinz Weihrich,	

	Essentials of Management, Fourth Edition, McGraw-Hill, Singapore **3.** Srivastava & Chunawalla, Management Principles and Practices, Macmillan **4.** Koontz, Principles of Management, Tata McGraw Hill. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/110/105/110105033/ https://freevideolectures.com/course/3502/organizational-behaviour-i https://nptel.ac.in/courses	

Course Code: ECS456	Laboratory Course-11 B.Tech (CSE) Semester IV **JAVA PROGRAMMING (LAB)**	L-0 T-0 P-4 C-2
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Applying knowledge to solve real world problems based on object-oriented principles.	
CO2.	Applying the basic approach of graphical user interface design using Abstract window toolkit, Applet and swing packages, create some application that are based upon some real world scenario	
CO3.	Analyzing the concept of database handling and creating application that are able to communicate with various database.	
CO4.	Analyzing the web architecture for creating applications using servlets and java server pages.	
CO5.	Analyzing the Client server architecture, Understanding the Remote method invocation architecture and creating basic application using Remote method invocation.	
	LIST OF EXPERIMENTS	
	1. To write a program in Java for illustrating, overloading, over riding and various forms of inheritance. **2.** To write programs to create packages and multiple threads in Java. **3.** To write programs in Java for event handling Mouse and Keyboard events. **4.** To create different applications using Layout Manager. **5.** To write programs in Java to create and manipulate Text Area, Canvas, Scroll Bars, Frames and Menus using swing/AWT. **6.** To create Applets using Java. **7.** To write program for Client Server Interaction with stream socket connections. **8.** To write a program in java to read data from disk file.	

Course Code: ECS453	**Laboratory Course-12** **B.Tech (CSE) Semester IV** **COMPUTER BASED NUMERICAL & STATISTICAL TECHNIQUES (LAB)**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding floating point arithmetic operations.	
CO2.	Understanding various Algebraic and transcendental equations.	
CO3.	Applying various interpolation formula's for solving mathematical problems.	
CO4.	Applying linear and non linear regression methods with the help of least square.	
CO5.	Applying various formulae's of numerical integration and differentiations techniques to solve problems.	
	LIST OF EXPERIMENTS	
	1. To write a program implementing floating point arithmetic operations i.e., addition, subtraction, multiplication and division. **2.** To write a program to deduce errors involved in polynomial interpolation. **3.** To write programs implementing Algebraic and transcendental equations using Bisection, Newton-Raphson, Iterative, method of false position, rate of conversions of roots in tabular form for each of these methods. **4.** To write a program implementing formulae by Bessel's, Newton, Sterling, and Lagrange's. **5.** To write a program implementing method of least square curve fitting. **6.** To write a program implementing numerical differentiation. **7.** To write a program implementing numerical integration using Simpson's 1/3 and 3/8 rules, trapezoidal rule. **8.** To write a program showing frequency chart, regression analysis, Linear square fit, and polynomial fit.	

Course Code: ECS455	**Laboratory Course-13** **B.Tech (CSE) Semester IV** **OS lab with Software Engineering (LAB)**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding various methods to perform the basic operations on a UNIX based operating system.	
CO2.	Applying the concept to implement and simulate the various CPU scheduling and Page replacement algorithms.	
CO3.	Applying the file read, write and access methods and perform the operations on a file in UNIX.	
CO4.	Analyzing the methods for creating SRS and various diagrams using software engineering paradigms	
CO5.	Analyzing the methods for creating flowchart to show process flow.	
	LIST OF EXPERIMENTS	
	1. To implement CPU Scheduling Algorithms • FCFS • SJF • SRTF • PRIORITY • ROUND ROBIN 2. Simulate all Page Replacement Algorithms • FIFO • LRU 3. Simulate Paging Technique of Memory Management Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner. **SOFTWARE ENGINEERING LAB** For any given case/ problem statement do the following; 1. Prepare a SRS document in line with the IEEE recommended standards. 2. Draw the use case diagram and specify the role of each of the actors. Also state the precondition, post condition and function of each use case. 3. Draw the activity diagram. 4. Identify the classes. Classify them as weak and strong classes and draw the class diagram. 5. Draw the sequence diagram for any two scenarios. 6. Draw the collaboration diagram. 7. Draw the state chart diagram. 8. Draw the component diagram. 9. Perform forward engineering in java. (Model to code conversion) 10. Perform reverse engineering in java. (Code to Model conversion) 11. Draw the deployment diagram.	

Course Code: **TMUGE401**	**Humanities and Social Sciences including Management Course-6 B.Tech (CSE) Semester IV English Communication –IV**	**L-2 T-0 P-2 C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Remembering and understanding the English grammar and vocabulary.	
CO2.	Understanding the essentials of effective listening and speaking.	
CO3.	Understanding the corporate expectations and professional ethics.	
CO4.	Applying correct vocabulary and sentence construction during professional writing or job interviews.	
CO5.	Aanalyzing different types of interviews.	
CO6.	Developing the skills to create resume, C.V. or cover letter.	
Course Content:		
Unit-1:	**Vocabulary & Grammar** Homophones and Homonyms Correction of Common Errors (with recap of English Grammar with its usage in practical context.) Transformation of sentences	**12 Hours**
Unit-2:	**Essence of Effective listening & speaking** Listening short conversation/ recording (TED talks / Speeches by eminent personalities) Critical Review of these abovementioned Impromptu	**5 Hours**
Unit-3:	**Professional Writing** Proposal: Significance, Types, Structure & AIDA Report Writing: Significance ,Types, Structure& Steps towards Report writing	**8 Hours**
Unit-4:	**Job Oriented Skills** a) Cover Letter b) Preparing Rèsumè and Curriculum-Vitae c) Interview: Types of Interview, Tips for preparing for Interview and Mock Interview d) Corporate Expectation & Professional ethics: Skills expected in corporate world	**10 Hours**
Unit-5:	**Value based text reading:** Short story A Bookish Topic – R.K. Narayan	**5 Hours**
Text Books:	Singh R.P., An Anthology of Short stories, O.U.P. New Delhi	
Reference Books:	• Raman Meenakshi & Sharma Sangeeta, *"Technical Communication-Principles & Practice"* Oxford University Press, New Delhi.	

	• Mohan K. & Sharma R.C., "*Business Correspondence of Report Writing",*TMH, New Delhi. • Chaudhary, Sarla "Basic Concept of Professional Communication" Dhanpat Rai Publication, New Delhi. • Kumar Sanjay &Pushplata "*Communication Skills*" Oxford University Press, New Delhi. • Agrawal, Malti "*Professional Communication*" KrishanaPrakashan Media (P) Ltd. Meerut. *** Latest editions of all the suggested books are recommended.**	

Methodology:

1. The content will be conveyed through Real life situations, Pair Conversation, Group Talk and Class Discussion.
2. Language Lab software.
3. Sentence transformation on daily activities and conversations.
4. Conversational Practice will be effectively carried out by Face to Face & Via Media (Audio-Video Clips)
5. Modern Teaching tools (PPT Presentation & Motivational videos with sub-titles) will be utilized.

Note:

- Class (above 30 students) will be divided in to two groups for effective teaching.
- For effective conversation practice, groups will be changed weekly.

Evaluation Scheme

Internal Evaluation			**External Evaluation**		**Total Marks**
40 Marks			**60 Marks**		**100**
20 Marks (Best 2 out of Three CTs) ***(Unit –I, III,IV & V)***	10 Marks (Oral Assignments) ***(Unit –II& IV)***	10 Marks (Attendance)	40 Marks (External Written Examination) ***(Unit –I, III,IV & V)***	20 Marks (External Viva)* ***(Unit –II& IV)***	

*Parameters of External Viva

Content	Body Language	Communication skills	Confidence	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

***Note**:External Viva will be conducted by 2-member committee comprising*

- ***a)*** *One Faculty teaching the class*
- ***b)*** *One examiner nominated by University Examination cell.*

Each member will evaluate on a scale of 20 marks and the average of two would be the 20 marks obtained by the students.

Course Code: EGP411	DGP-4 B.Tech (CSE) Semester IV **DISCIPLINE & GENERAL PROFICIENCY**	L-0 T-0 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Understanding*** the social responsibilities toward the institute and humanity.	
CO2.	***Understanding*** the need of participations in different events to groom the personality.	
CO3.	***Understanding*** the discipline and follow them during academics and institutional activities.	
CO4.	***Understanding*** Social awareness towards society.	
CO5.	***Applying*** actively towards various institution activities like workshop, seminar and other events	
	There shall be continuous evaluation of the student on the following broad parameters:	
	1. Observance of dress code. **2.** Participation in Conferences /Workshops / Seminars. **3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time. **4.** Participation in community projects including NSS. **5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time. **6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel. **7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level. **8.** General behavior **9.** Any extraordinary achievement. The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).	

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Course Code: **TMUGA-401**	**Value Added Audit Course-2** **BTech- Semester-IV** **Analytical Reasoning**	**L-2** **T-1** **P-0** **C-0**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Applying the arithmetical concepts in Ratio Proportion Variation.	
CO2.	Employing the techniques of Percentage; Ratios and Average in inter related concepts of Time and Work, Time Speed and Distance.	
CO3.	Identifying different possibilities of reasoning based problems of Syllogisms and Venn diagram.	
CO4.	Examining the optimized approach to solve logs and Surds.	
Course Content:		
Unit-1:	**Ratio, proportions and variations** Concept of ratios, proportions, variations, properties and their applications	**5 Hours**
Unit-2:	**Time and Work** Same efficiency, different efficiency, alternate work, application in Pipes and Cisterns	**6 Hours**
Unit-3:	**Time Speed Distance** Average speed, proportionalities in Time, Distance, trains, boats, races, circular tracks	**6 Hours**
Unit-4:	**Logs and Surds** Concept and properties of logs, surds and indices	**4 Hours**
Unit-5:	**Coding and decoding** Sequential coding, reverse coding, abstract coding	**3 Hours**
Unit-6:	**Syllogisms** Two statements, three statements	**4 Hours**
Unit-7:	**Venn diagram** Basic concept and applications	**2 Hours**
Reference Books:	• R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude • R2:-Quantitative Aptitude by R.S. Agrawal • R3:-M Tyra: Quicker Maths • R4:-Nishith K Sinha:- Quantitative Aptitude for CAT • R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com • R6:-Logical Reasoning by Nishith K Sinha • R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal *** Latest editions of all the suggested books are recommended.**	

Course Code: ECS511	Professional Core Course-9 B.Tech (CSE) Semester V **COMPUTER ARCHITECTURE**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the theory and architecture of central processing unit.	
CO2.	Understanding the concepts of parallel processing, pipelining and interprocessor communication.	
CO3.	Understanding the impact of instruction set architecture on cost-performance of computer design.	
CO4.	Understanding dynamic scheduling methods and their adaptation to contemporary microprocessor design.	
CO5.	Analyzing microprocessor architecture and apply assembly language programming.	
Course Content:		
Unit-1:	**Parallel Computing:** Concepts, Architecture, Classification Schemes, Applications, Parallelism in Uni-processor Systems, Parallel Computer structures. **Pipelining Processing:** An overlapped Parallelism, Instructions and Arithmetic.	**8 Hours**
Unit-2:	**Principles of Designing Pipelined Processors**: Internal forwarding and register tagging, Hazard detection and resolution, Job sequencing and collision prevention, Characteristics of Vector processing, multiple vector task dispatching, SIMD array processors, Masking and Data routing.	**8 Hours**
Unit-3:	**SIMD Interconnection Network:** Static, Dynamic networks, Cube interconnection network, ShuffleExchange and Omega Network, SIMD matrix multiplication. **Multiprocessor Architecture:** Tightly and loosely coupled multiprocessors.	**8 Hours**
Unit-4:	**Multiprocessor Scheduling**: Strategies and Deterministic Scheduling Models, Data Flow computing and Data Flow Graph, 8 Bit and 16 Bit Intel Microprocessor Architecture and Register set.	**8 Hours**
Unit-5:	**Assembly Language Programming Based on Intel 8085: Instructions:** Data Transfer, Arithmetic, Logic, Branch operations; Looping Counting, Indexing, Programming Techniques, Counters and Time Delays, Stacks and Subroutines, Conditional call and Return Instructions, Advanced Subroutine Instructions.	**8 Hours**
Text Books:	**1.** Hwang, K., *Computer Architecture and parallel processing*, McGraw Hill	
Reference Books:	**1.** Tabak, D., *Advanced Microprocessor*, McGraw Hill. **2.** Hall, D.V, *Microprocessor and Interfacing, Program and hardware*, Tata McGraw Hill. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/105/106105163/ https://nptel.ac.in/courses/106/102/106102062/ https://www.youtube.com/watch?v=msqxkEKFg8I	

Course Code: ECS503	Professional Core Course-10 B.Tech (CSE) Semester V **ANALYSIS AND DESIGN OF ALGORITHM**	L-3 T-1 P-0 C-4
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the basic concept of algorithm design, algorithm efficiency, run time complexity computation, divide and conquer concept of algorithm design, binary search algorithm analysis, divide and conquer approach analysis.	
CO2.	Understanding concept of greedy method in problem solving, exact optimization solution for minimum cost spanning tree, approximate solution for knapsack problem, single shortest path computation.	
CO3.	Applying concept of dynamic programming in problem solving, dynamic programming vs divide and conquer, shortest path computation application, matrix multiplication application, traveling salesman problem application, longest common subsequence application.	
CO4.	Applying basic concept of branch and bound method, LC searching bounding, FIFO branch and bound, 0/1 knapsack problem, travelling salesman problem, complexity measures, polynomial vs non-polynomial time complexity, NP-hard and NP-complete problem.	
CO5.	Analyzing concept of graph problem to get solution of depth first search method, breadth first search method, back tracking, 8-queen problem, knapsack problem.	
Course Content:		
Unit-1:	**Introduction:** Algorithms, Analysis of Algorithms, Design of Algorithms, Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences and their solution methods. **Sorting in polynomial Time:** Insertion sort, Merge sort, Heap sort, and Quick sort. **Sorting in Linear Time:** Counting sort, Radix Sort, Bucket Sort.	**8 Hours**
Unit-2:	**Advanced Design and Analysis Techniques:** Dynamic programming: Assembly Line Scheduling, Matrix Chain Multiplication, Longest Common Sequence, Traveling salesman Problem (TSP). **Greedy Algorithm:** Activity Selection Problem, Knapsack problem. Backtracking, Branch and Bound.	**8 Hours**
Unit-3:	**Advanced Data Structure:** Red Black Trees, Augmenting Data Structure, Binomial Heap, B-Tree and Fibonacci Heap. **Branch and Bound:** LC searching Bounding, FIFO branch and bound, LC, Applications, 0/1Knapsack problem, Traveling Salesman Problem.	**8 Hours**
Unit-4:	**Graph Algorithms:** Elementary Graph Algorithms, Breadth First Search, Depth First Search, Topological Sort, Strongly Connected Components, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Traveling Salesman Problem.	**8 Hours**

Unit-5:	**Randomized Algorithms, String Matching:** Naïve String Matching, Rabin-Karp, String matching with finite automata, KMP string matching algorithm, Polynomial vs. Non-polynomial Time complexity, NP-Hard and NP-Complete problems.	**8 Hours**
Text Books:	**1**Coremen, L.,*Introduction to Algorithms*, Prentice Hall of India.	
Reference Books:	**1.** Bratley, B., *Fundamental of Algorithms*, Prentice Hall of India. **2.** Goodrich, M.T., *Algorithms Design*, John Wiley. **3.** Aho, A.V., *The Design and analysis of Algorithms*, Pearson Education. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/101/106101060/ https://nptel.ac.in/courses/106/106/106106131/ https://nptel.ac.in/courses/106/105/106105164/	

Course Code: ECS510	Professional Core Course-11 B.Tech (CSE) Semester V **COMPUTER NETWORK**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the fundamentals of computer networks, their types, transmission modes, and various reference models.	
CO2.	Understanding error-free transmission of data along with data collision.	
CO3.	Understanding addressing techniques and transmission modes of a network.	
CO4.	Understanding the working of application layer protocols and the impact of network security tools on an existing systems.	
CO5.	Applying various routing and congestion control algorithms over a network and Identify Quality of service parameters and addressing techniques.	
Course Content:		
Unit-1:	**Network:** Goals, Applications, Components; Direction of Data flow networks, Categories, Types of Connections, Topologies, Protocols and Standards, ISO / OSI model, Transmission Media, Types, ISDN, Routers.	**8 Hours**
Unit-2:	**Medium Access Sub-Layer:** Channel Allocations, ALOHA protocols, Error detection and correction: Parity, LRC, CRC, Hamming code, Flow Control and Error control; Stop and wait, Go back-N, ARQ, Selective repeat ARQ, Sliding Window, HDLC, Ethernet: IEEE-802.3, 802.4, 802.5, 802.11, FDDI, SONET , Bridges.	**8 Hours**
Unit-3:	**Network Layer:** Internet works, Packet Switching and Datagram Approach, IP addressing methods, Sub netting, Routing: Distance Vector, Link State.	**8 Hours**
Unit-4:	**Transport Layer:** Duties, Multiplexing, Demultiplexing, Sockets. **Protocols:** User Datagram Protocol (UDP), Transmission Control Protocol (TCP),Congestion Control, Quality of Services (QOS), Integrated Services.	**8 Hours**
Unit-5:	**Application Layer:** Domain Name Space (DNS), File Transfer Access and Management, Electronic Mail, Virtual Terminals, WWW, Security, Cryptography.	**8 Hours**
Text Books:	**1.** Forouzan, B.A., *Data Communication and Networking*, Tata McGraw Hill	
Reference Books:	**1.** Stallings, W., *Data and Computer Communication*, Macmillan Press. **2.** Keshav, S., *An Engineering Approach on Computer Networking*, Addison-Wesley. **3.** Larry, L.P. and Peter, S.D., *Computer Network*, Harcourt Asia. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/105/106105081/ https://nptel.ac.in/courses/106/105/106105080/ https://www.youtube.com/watch?v=3DZLItfbqtQ	

Course Code: ECS552	**Laboratory Course-14** **B.Tech (CSE) Semester IV** **ANALYSIS AND DESIGN OF ALGORITHM (LAB)**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Applying divide and conquer concept of algorithm in binary search, quick sorting and merge sorting.	
CO2.	Applying concept of greedy method in exact optimization solution for minimum cost spanning tree, approximate solution for knapsack problem, single shortest path computation.	
CO3.	Applying concept of dynamic programming in shortest path computation application, matrix multiplication application, traveling salesman problem application, longest common subsequence application.	
CO4.	Applying concept of graph in to find solution of depth first search method, breadth first search method, back tracking, 8-queen problem, and knapsack problem.	
CO5.	Analyzing backtracking concept in connected components computation in graph	
	LIST OF EXPERIMENTS	
	1. To write a program in C/C++ for insertion and deletion into binary search tree. **2.** To write a program in C/C++ for creation of a Red Black tree and all the associated operations. **3.** To write a program in C/C++ for implementing an AVL tree and all the associated operations. **4.** To write a program in C/C++ for multiplication of two matrices using Stassen's matrix multiplication method. **5.** To write a program in C/C++ to solve Knapsack problem. **6.** To write a program in C/C++ to implement shortest path algorithms (Dijkastra's and Bellman's Algorithms). **7.** To write a program in C/C++ for finding the minimum cost Spanning Tree in a connected graph. **8.** To write a program in C/C++ for solving 8-Queen's problem. **9.** To write a program in C/C++ for finding the number of connected components in a Graph.	

Course Code: ECS556	Laboratory Course15 B.Tech (CSE) Semester IV **PYTHON (LAB)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the concepts of different collections - list, Tuple, dictionaries and dataframe.	
CO2.	Understanding the concepts to built-in functions in Python and their usage.	
CO3.	Applying the concept of database connectivity with python to perform some operations in database.	
CO4.	Applying the programming construct to perform various matrix operations.	
CO5.	Developing own packages in python with different functionalities	
	LIST OF EXPERIMENTS	
	Based on the content: Introduction History, Features, Setting up path, Working with Python, Basic Syntax ,Variable and Data Types , Operator Conditional Statements If ,If- else ,Nested if-else Looping For, While ,Nested loops Control Statements Break, Continue . String Manipulation Accessing Strings ,Basic Operations ,String slices ,Function and Methods Lists Introduction ,Accessing list ,Operations ,Working with lists ,Function and Methods Tuple Introduction ,Accessing tuples ,Operations ,Working ,Functions and Methods. Dictionaries Introduction,Accessing values in dictionaries, Working with dictionaries, Properties ,Functions Functions Defining a function , Calling a function, Types of functions ,Function Arguments ,Anonymous functions ,Global and local variables. Modules Importing module ,Math module ,Random module ,Packages ,Composition Input-Output Printing on screen ,Reading data from keyboard ,Opening and closing file ,Reading and writing files ,Functions. Exception Handling Exception ,Exception Handling ,Except clause ,Try, finally clause ,User Defined Exceptions, OOPs concept class and object , Attributes ,Inheritance ,Overloading ,Overriding ,Data hiding	
	Write a Python program to: - 1. Demonstrate the working of 'id' and 'type' functions 2. To find all prime numbers within a given range. 3. To print 'n terms of Fibonacci series using iteration. 4. To demonstrate use of slicing in string 5.	

	a. To add 'ing' at the end of a given string (length should be at least 3). If the given string already ends with 'ing' then add 'ly' instead. If the string length of the given string is less than 3, leave it unchanged. Sample String : 'abc' Expected Result : 'abcing' Sample String : 'string' Expected Result : 'stringly' b. To get a string from a given string where all occurrences of its first char have been changed to '$', except the first char itself. 6. a. To compute the frequency of the words from the input. The output should output after sorting the key alphanumerically. b. Write a program that accepts a comma separated sequence of words as input and prints the words in a comma-separated sequence after sorting them alphabetically. 7. Write a program that accepts a sequence of whitespace separated words as input and prints the words after removing all duplicate words and sorting them alphanumerically. 8. To demonstrate use of list & related functions 9. To demonstrate use of Dictionary& related functions 10. To demonstrate use of tuple, set& related functions 11. To implement stack using list 12. To implement queue using list 13. To read and write from a file 14. To copy a file 15. To demonstrate working of classes and objects 16. To demonstrate class method & static method 17. To demonstrate constructors 18. To demonstrate inheritance 19. To demonstrate aggregation/composition 20. To create a small GUI application for insert, update and delete in a table using Oracle as backend and front end for creating form	

Course Code: ECS555	Laboratory Course16 B.Tech (CSE) Semester IV **COMPUTER NETWORK (LAB)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the working of network simulation tool (Packet Tracer)	
CO2.	Understanding about basic network connectivity. Understand IOS used for networking devices	
CO3.	Understanding about ARP table. Analyzing some trouble shooting commands	
CO4.	Applying the knowledge to Configure the initial switch and router setting, Understand TCP/IP and OSI models	
CO5.	Analyzing MAC and IP addresses, Learn about TCP and UDP communications.	
	LIST OF EXPERIMENTS	
	1. To write a program in C illustrating use of TCP Sockets. 2. To write a program in C illustrating use of simple UDP. 3. To write a program in C illustrating use of Raw Sockets (like packet capturing and filtering). 4. To write a program in C illustrating concept of Sliding Window Protocol. 5. To write a program in C for Address Resolution Protocol. 6. To write a program in C for implementing Routing Protocols. 7. To write a program in C illustrating for Open Shortest Path first Routing Protocol.	

Course Code: ECS591	Project / Industrial Training/ Seminar-1 B.Tech (CSE) Semester IV **INDUSTRIAL TRAINING**	L-0 T-0 P-0 C-2
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding knowledge through research and development on latest technology.	
CO2.	Developing greater clarity about academic and career goals	
CO3.	Understanding of administrative functions and company culture	
CO4.	Applying critical reasoning and independent learning	
CO5	Developing ability to effectively communicate solution to problems (oral, visual, written).	
	There shall be continuous evaluation of the student on the following broad parameters:	
	Students will attend Industrial training of six weeks in any industry or reputed organization after the IV semester examination in summer vacation. The evaluation of this training shall be included in the V semester evaluation. The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the IV semester and shall be the nodal officer for coordination of the training. Students will also be required to prepare an exhaustive technical report of the training undertaken during the V semester which will be duly signed by the officer under whom training was taken in the industry/ organization. The covering format shall be signed by the concerned office in-charge of the training in the industry. The officer-in-charge of the trainee would also give his rating of the student in the standard University format in a sealed envelope to the Principal of the college. The student at the end of the V semester will present his report about the training before a committee constituted by the Director of the College which would be comprised of at least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director. The marks by the external examiner would be based on the report submitted by the student which shall be evaluated by the external examiner and cross examination done of the student concerned. Not more than three students would form a group for such industrial training/ project submission.	

The marking shall be as follows.

Internal: 50 marks
By the Faculty Guide - 25 marks
By Committee appointed by the Director – 25 marks

External: 50 marks
By Officer-in-charge trainee in industry – 25 marks
By External examiner appointed by the University – 25 marks

Course Code: ECS506	Professional Elective Courses (PEC)-I B.Tech (CSE) Semester V **ERP SYSTEMS**	L-3 T-0 P-0 C-3
Course Outcomes :	**On completion of the course, the students will be :**	
CO1.	Applying the waterfall model in the development of ERP applications.	
CO2.	Analyzing the design and implementation of an e-commerce application with a shopping cart.	
CO3.	Analyzing the user-centered design guidelines in developing user-friendly websites.	
CO4.	Analyzing the bullwhip effect in a supply chain, analyze the causes, and recommend possible solutions.	
CO5.	Analyzing different types of portal technologies and deployment methodologies commonly used in the industry.	
Course Content:		
Unit-1:	**ERP & related technologies:** Overview (evolution, Definition , Advantages),Business process Re-Engineering; Systems: Management information, Decision support, Executive information, Supply chain management, Implementation life cycle, future description of ERP.	**8 Hours**
Unit-2:	**ERP - Modules** "An Overview": Functions and Processes of Resource Management, Basic Modules of ERP System-HRD, Personnel Management, Training and Development, Skill Inventory , Reason for the growth of ERP market.	**8 Hours**
Unit-3:	**ERP - Resource Management Perspective**: Material Planning and Control, Inventory, Forecasting, Manufacturing, Production Planning, Production Scheduling, Production Control, Sales and Distribution, Finance, Resource Management In global scenario, dynamic data management in complex global scenario.	**8 Hours**
Unit-4:	**ERP** – Information System Perspective: Evolution of Application Software Technology Management, Technology Partners, Supply Chain Management, Customer Relationship Management, Information Communication Technology, E-Business, EDI	**8 Hours**
Unit-5:	ERP-Key Managerial Issues: Concept Selling, IT Infrastructure, Implication of ERP Systems on Business Organization, Critical success factors in ERP System, ERP Culture Implementation Issues, Resistance to change, Public Service and Organizations (PSO) Project, ERP Selection issues, Return on Investment, Pre and Post Implementation Issues.	**8 Hours**
Text Books:	Leon, A., *Enterprise Resource Planning*, Tata McGraw Hill.	
Reference Books:	Sadagopan, S. *Enterprise Resource Planning*, Tata McGraw Hill.*** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://www.youtube.com/watch?v=y0FIMuhZ7BI https://youtube.videoken.com/embed/NzyhYxUCjlg https://youtube.videoken.com/embed/NzyhYxUCjlg	

Course Code: EHM504	**Professional Elective Courses (PEC)-I** **Professional Elective Courses (PEC)-I** **B.Tech (CSE) Semester V** **Managerial Economics and Engineering**	**L-3 T-0 P-0 C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding meaning of Economics/Managerial Economics and its applicability	
CO2.	Understanding theories of consumer behavior, demand & supply analysis	
CO3.	Understanding Demand forecasting in business, Law of production and returns	
CO4.	Understanding market, structures and evaluation of price mechanism in different conditions	
CO5.	Understanding Correlation of macro and microeconomics concepts and business practices	
Course Content:		
Unit-1:	**Introduction:** Meaning, Nature & Scope of Economics, Meaning of Science, Engineering & Technology; Open, Closed & Mixed Economy. Microeconomics vs Macroeconomics, Managerial Economics and its Scope in Engineering Perspective.	**8 Hours**
Unit-2:	**Consumer Behavior:** Utility Analysis & Indifference Curve Analysis, Demand Analysis - Concepts, Determinates & Law of Demand. Elasticity of Demand-Concepts, Types & Importance of Elasticity of Demand in Managerial Decisions. Concepts of Supply	**8 Hours**
Unit-3:	**Demand Forecasting:** Meaning, Significance and Methods of Demand Forecasting; Production & Cost: Production Function, Fixed Cost, Variable Cost, Average Cost, Marginal Cost, Laws Of Returns To Scale; Law Of Diminishing Returns To Scale; Market Equilibrium.	**8 Hours**
Unit-4:	**Market Structure:** Perfect Competition; Imperfect Competition: Monopolistic, Oligopoly, Duopoly and Price Determination in Various Market Conditions. **Macroeconomics:** Introduction to GDP, GNP, FDI, BOP, Foreign Exchange, Fiscal Policy, Monetary Policy.	**8 Hours**
Unit-5:	**Inflation:** Meaning, Types, Causes & Preventive Methods; National Income: Concept & its Measurement, Business Cycles: Meaning & Phases Of Business Cycle. Government Budget, Parallel Economy, Indian Sectoral Economy, Agriculture in the National Economy	**8 Hours**
Text Books:	1. Koutsoyiannis, A : Modern Microeconomics, ELBS	
Reference Books:	1. Dwivedi, D.N., Managerial Economics, Vikas Publishing 2. Maheshwari, Y., Managerial Economics, Prentice Hall of India. 3. Mishra S.K. & Puri, V.K., Modern Macro Economic Theory, Himalayan Publishing House, 4. Edward Shapiro, Macro-Economic analysis, Tata Mc Graw Hill *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference	https://nptel.ac.in/courses/110/101/110101005/ https://nptel.ac.in/courses/110/105/110105075/	

Material:	https://nptel.ac.in/content/storage2/courses/110101005/downloads/Lecture%2001.pdf	

Course Code: ECS512	Professional Elective Courses (PEC)-I B.Tech (CSE) Semester V **E-COMMERCE**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the term 'e-commerce' and the need of ecommerce.	
CO2.	Understanding the role of information systems in organizations, the strategic management processes, and the implications for the management.	
CO3.	Understanding about the importance of managing organizational change associated with information systems implementation.	
CO4.	Applying the application software skills such as analyzing spreadsheets, creating database, and Web browsing, that they have learned in other courses to apply to real-world business problems.	
CO5.	Analyzing the importance of managing organizational change associated with information systems implementation.	
Course Content:		
Unit-1:	**E-Commerce:** Definition, History, Advantages and Disadvantages, Types, E-business vs. E-commerce, E-Commerce: technology and prospects, incentives for engaging in electronic commerce, needs of e-commerce, E-commerce models.	**8 Hours**
Unit-2:	**Network Infrastructure for E-Commerce:**IndustryFramework, Internet and Intranet based E- commerce- Issues, problems and prospects, Network Infrastructure, Network Access Equipment; Broad band telecommunication(ISDN, ATM, FRAMERELAY).	**8 Hours**
Unit-3:	**Mobile Commerce:** **Introduction: Mobile** commerce, advantages and disadvantages, e-commerce vs m-commerce, Mobile computing: Framework, Applications; Wireless application protocol, WAP technology; Mobile Information devices.	**8 Hours**
Unit-4:	**Electronic Payment Systems:** Overview, SET protocol, payment gateway, certificate, Types; Digital tokens: Smart cards, Credits Cards, Magnetic strip cards, E-cheques based EPS; online bank Risk. **On-line Commerce Environments**: Servers and commercial environments; Netscape product line; Netscape commerce server; Microsoft internet explorer and servers; open market.	**8 Hours**
Unit-5:	**EDI:** Applications in business, Legal: E-commerce law, Forms of agreement, Government policies and Agenda, EDI vs. E-Commerce, Value added network, EDI versus Internet and EDI over Internet. **Electronic Commerce Providers:** On-line Commerce options: Company profiles.	**8 Hours**
Text Books:	**1.** Kalakota, R., *Frontiers of E-Commerce*, Addison-Wesley.	
Reference Books:	**1.** Sadagopan, S. *Enterprise Resource Planning*, Tata McGraw Hill. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/110/105/110105083/ https://www.youtube.com/watch?v=xKJjyn8DaAw https://nptel.ac.in/content/storage2/courses/106108103/pdf/PPTs/mod13.pdf	

Course Code: ECS513	Professional Elective Courses (PEC)-I B.Tech (CSE) Semester V **SOFTWARE PROJECT MANAGEMENT**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the processes that exist primarily for supporting the management of software development, and are generally skewed toward addressing business concerns	
CO2.	Understanding the concepts to address specific management needs at the individual, team, division and/or organizational level	
CO3.	Applying a strong working knowledge of ethics and professional responsibility. Understanding effective organizational leadership and change skills for managing projects, project teams, and stakeholders.	
CO4.	Analyzing the leadership effectiveness in organizations ,team-building skills required to support successful performance	
CO5.	Analyzing the selection and initiation of individual projects and of portfolios of projects in the enterprise.	
CO6.	Analyzing project planning activities that accurately forecast project costs, timelines, and quality. Implement processes for successful resource, communication, and risk and change management.	
CO7.	Developing Practical applications of project management to formulate strategies allowing organizations to achieve strategic goals	
Course Content:		
Unit-1:	**Project Management:** Introduction to Software Project Management, Need identification, Project Management Life Cycle, Project Initiation, Project Evaluation, Project Plan, Types of Project Plan, Milestones- Major and Minor **Software Metrics**: What and Why, Role of Metrics and Measurement, Scope of Software Metrics, Types of Software Metrics: Project Metrics, Process Metrics, Product Metrics, and Function based Metrics	**8 Hours**
Unit-2:	**Life Cycle Phases:** Project Life Cycle and Product Life Cycle**,** Engineering and Production Stages: Inception, Elaboration, Construction, Transition Phases. **Project Management Artifacts::**The Artifact Sets: Management Artifacts, Engineering Artifacts, Programmatic Artifacts. **Project Planning:** Objective, Milestone based planning, Resource Allocation, Critical Path, Project Elements, Size Estimation – Lines of Code (LOC), Work Breakdown Structures (WBS) and Function Point (FP), Effort Estimation, Cost Estimation	**8 Hours**
Unit-3:	**Project Scheduling:** CPM, PERT, Gantt Chart, Cost-Time Relations, Re-works **Project Monitoring and Control:** Dimensions of Project Monitoring and Control, Software Reviews, Type of Reviews – Inspections, Walkthroughs, Code Reviews **Improving Software Economics:** Reducing Software Product Size; Improving Software Processes: Improving Team, Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.	**8 Hours**
Unit-4:	**Risk Management:** Software Risks, Risk Identification, Risk Mitigation, Monitoring and Management **Change Management**: Exploring Challenges, Risking Comfort Zone, Managing Change **Configuration Management:** Baseline, Configurations Items(CIs), SCM Process, Version Control, Configuration Audit	**8 Hours**

Unit-5:	**Quality Management:** Quality Concept, Quality Control, Quality Assurance, ISO 9000 certification for software industry; SEI capability maturity model (CMMI); ISO vs. SEI CMMI, Six-Sigma Overview, Software Reviews, Software Measurements and metrics for Quality	**8 Hours**
Text Books:	Walker, R., *Software Project Management*, Pearson Education.	
Reference Books:	Shere, K. D., *Software Engineering and Management*, Prentice Hall***** **Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/105/106105218/ https://www.youtube.com/watch?v=eOTcPOvT-H4 https://www.youtube.com/watch?v=Wk607ruc8P0	

Course Code: ECS514	Professional Elective Courses (PEC)-I B.Tech (CSE) Semester V **Software Testing**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding software testing	
CO2.	Understanding Basic concepts of Test Management	
CO3.	Applying Agile Methodology of software testing. Understanding how to author a software testing plan. Analyzing software Maintenance	
CO4.	Analyzing Black Box Techniques	
CO5.	Analyzing Control Flow & Data Flow. White Box Techniques: Cyclomatic Complexity	
Course Content:		
Unit-1:	**Software Testing:** Overview of Software Testing, Software Testing History, Importance of Software Testing, Software Test Life Cycle (STLC) and it's phases, Verification & Validation. Overview of Static & Dynamic Testing, Functional & Non-Functional Testing. Levels of Testing - Unit Testing, Integration Testing, System Testing, Acceptance Testing, Stubs & Drivers.	**8 Hours**
Unit-2:	**Functional Testing (Black Box Testing):** Overview, Black Box Techniques: Error Guessing, Decision Tables (DT), Cause Effect Graphing Technique, Boundary Value Analysis, Equivalence Class. Advantages & Disadvantages of Black Box Testing, Limitation of Black Box Testing.	**8 Hours**
Unit-3:	**Structural Testing (White Box Testing):** Overview, Control Flow & Data Flow. White Box Techniques: Cyclomatic Complexity, Basis Path Testing, DD-Paths, Graph Metrics, Mutation Testing, Mutation Score, Mutation Operands, Data Flow, Advantages & Disadvantages of White Box Testing, Limitation of White Box Testing**.**	**8 Hours**
Unit-4:	**Software Test Management & Test Planning:** Basic concepts of Test Management, Test Planning-Test Plan, Test Strategy, Test Estimation, Test Schedule. Test Design Techniques, Test Case Structure & preparation, Characteristics of a good Test Case, Test Case vs. Test Scenario. Test Environment. Test Execution. Test Closure & Test Report.Creating Test Cases from Requirements. Overview of Test Automation & Testing Tools.	**8 Hours**
Unit-5:	**Non-Functional Testing**: Alpha & Beta Testing, Regression Testing, Security Testing, Usability Testing, Load Testing, Stress Testing. Bug; Error; Fault; Failure. Prevention vs. Detection. Incident Management.**Software Quality Assurance**:Overview of Software Quality, Concept of Quality Standards (ISO 9001 and SEI Capability Maturity Model)	**8 Hours**
Text Books:	1.Software Testing and Quality Assurance: Theory and Practice", Sagar Naik, University of Waterloo, Piyu Tripathy, Wiley , 2008	
Reference Books:	1. "Effective methods for Software Testing "William Perry, Wiley.	

	2. “Software Testing - A Craftsman’s Approach”, Paul C. Jorgensen, CRC Press, 1995. 3. “Software Testing”, Srinivasan Desikan and Gopalaswamy Ramesh - Pearson Education 2006. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/105/106105150/ https://www.youtube.com/watch?v=T3q6QcCQZQg	

Course Code: ECS559	**Project / Industrial Training/ Seminar-2** **B.Tech (CSE) Semester V** **MOOC COURSE**	**L-0** **T-0** **P-0** **C-2**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding various resources and platform of online learning.	
CO2.	Understanding the credit utilities to be earn from online platform	
CO3.	Understanding the current trends in the technology around the world.	
CO4.	Applying themselves in a competitive environment, weekly assignments and quiz.	
CO5:	Evaluating Various latest AI models and technologies in real world to shape the career.	
	Evaluation Scheme for MOOC (Massive open online course)	
	University allows students to undertake additional subjects/course(s) (In-house offered by the university through collaborative efforts or courses in the open domain by various internationally recognized universities) and to earn credits on successful completion of the same. Each course will be approved in advance by the University following the standard procedure of approval and will be granted 2 credits as per the approval. In the pilot phase it is proposed that a student undertaking and successfully completing a MOOC course through edX, Coursera, IIRS and NPTEL will be given a maximum credit of two with the course with minimum duration of 8 weeks in Mandatory to Pass Category. For smooth functioning and monitoring of the scheme the following shall be the guidelines for MOOC courses, Add-on courses carried out by the Institution / University from time to time. 1. There shall be a MOOC co-ordination committee in the College with a faculty at the level of Professor heading the committee and all Heads of the Department/ Program coordinators/Principal being members of the Committee. 2. The Committee will list out courses to be offered during the semester, which could be requested by the department or the students and after deliberating on all courses finalise a list of courses to be offered with credits defined for each course and the mode of credit consideration of the student. The complete process including the approval of the Vice Chancellor shall be obtained by the College before the starting of MOOC/NPTEL courses. In case of MOOC course the approval will be valid only for the semester offered.	

	3. Students will register for the course and the details of the students enrolling under the course along with the approval of the committee, and will be forwarded to the Examination department within thirty days of start of the MOOC Course by the Coordinator MOOC through the Principal of the College. 4. Internal and external marks will be same as offered by the MOOC course. 5. Where the MOOC course or Add-on on courses are only offering certificate of successful completion, and credit has been assigned to the course. If in case student did not clear the examination, further he/she can enroll for MOOC Course under SWAYAM in next semester / year with the same pattern stated in above points.	

Course Code: EGP511	DGP-5 B.Tech (CSE) Semester V **DISCIPLINE & GENERAL PROFICIENCY**	L-0 T-0 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Understanding*** the social responsibilities toward the institute and humanity.	
CO2.	***Understanding*** the need of participations in different events to groom the personality.	
CO3.	***Understanding*** the discipline and follow them during academics and institutional activities.	
CO4.	***Understanding*** Social awareness towards society.	
CO5.	***Applying*** actively towards various institution activities like workshop, seminar and other events	
	There shall be continuous evaluation of the student on the following broad parameters:	
	1. Observance of dress code. **2.** Participation in Conferences /Workshops / Seminars. **3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time. **4.** Participation in community projects including NSS. **5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time. **6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel. **7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level. **8.** General behavior **9.** Any extraordinary achievement. The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).	

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special	Participation in community Services	Participation in Culture & extra curriculum activities,	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement

						technical sessions		Department Club Activities			
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Course Code: TMUGA-501	Value Added Audit Course-4 BTech- Semester-V **Modern Algebra and Data Management**	L-2 T-1 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Applying the concepts of modern mathematics Divisibility rule, Remainder Theorem, HCF /LCM in Number System.	
CO2.	Relating the rules of permutation and combination, Fundamental Principle of Counting to find the probability.	
CO3.	Applying calculative and arithmetical concepts of ratio, Average and Percentage to analyze and interpret data.	
CO4.	Correlating the various arithmetic concepts to check sufficiency of data	
Course Content:		
Unit-1:	**Number theory** Classification of Numbers, Divisibility Rules, HCF and LCM, Factors, Cyclicity(Unit Digit and Last Two digit), Remainder Theorem, Highest Power of a Number in a Factorial, Number of trailing zeroes	**8 Hours**
Unit-2:	**Data interpretation** Data Interpretation Basics, Bar Chart, Line Chart, Tabular Chart, Pie Chart, DI tables with missing values	**7 Hours**
Unit-3:	**Data Sufficiency** Introduction of Data Sufficiency, different topics based DS	**5 Hours**
Unit-4:	**Permutations and combinations** Fundamental counting, and or, arrangements of digits, letters, people in row, identical objects, rank, geometrical arrangements, combination: - basic, handshakes, committee, selection of any number of objects, identical and distinct, grouping and distribution, de-arrangements	**6 Hours**
Unit-5:	**Probability** Introduction, Probability based on Dice and Coins, Conditional Probability, Bayes Theorem	**4 Hours**
Reference Books:	• R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude • R2:-Quantitative Aptitude by R.S. Agrawal • R3:-M Tyra: Quicker Maths • R4:-Nishith K Sinha:- Quantitative Aptitude for CAT • R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com • R6:-Logical Reasoning by Nishith K Sinha • R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal *** Latest editions of all the suggested books are recommended.**	

Course Code: **TMUGS-501**	**Value Added Audit Course-3** **BTech- Semester-V** **Managing Self**	**L-2** **T-1** **P-0** **C-0**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Utilizing effective verbal and non-verbal communication techniques in formal and informal settings	
CO2.	Understanding and analyzing self and devising a strategy for self growth and development.	
CO3.	Adapting a positive mindset conducive for growth through optimism and constructive thinking.	
CO4.	Utilizing time in the most effective manner and avoiding procrastination.	
CO5.	Making appropriate and responsible decisions through various techniques like SWOT, Simulation and Decision Tree.	
CO6.	Formulating strategies of avoiding time wasters and preparing to-do list to manage priorities and achieve SMART goals.	
Course Content:		
Unit-1:	**Personal Development:** Personal growth and improvement in personality Perception Positive attitude Values and Morals High self motivation and confidence Grooming	**10 Hours**
Unit-2:	**Professional Development:** Goal setting and action planning Effective and assertive communication Decision making Time management Presentation Skills Happiness, risk taking and facing unknown	**8 Hours**
Unit-3:	**Career Development:** Resume Building Occupational Research Group discussion (GD) and Personal Interviews	**12 Hours**
Reference Books:	1. Robbins, Stephen P., Judge, Timothy A., Vohra, Neharika, Organizational Behaviour (2018), 18th ed., Pearson Education 2. Tracy, Brian, Time Management (2018), Manjul Publishing House 3. Hill, Napolean, Think and grow rich (2014), Amazing Reads 4. Scott, S.J., SMART goals made simple (2014), Createspace Independent Pub	

	5. https://www.hloom.com/resumes/creative-templates/ 6. https://www.mbauniverse.com/group-discussion/topic.php 7. Rathgeber, Holger, Kotter, John, Our Iceberg is melting (2017), Macmillan 8. Burne, Eric, Games People Play (2010), Penguin UK 9. https://www.indeed.com/career-advice/interviewing/job-interview-tips-how-to-make-a-great-impression *** Latest editions of all the suggested books are recommended.**	

Evaluation Scheme: Faculty led Continuous Evaluation

- Students will be evaluated on the score of 100 in every course.
- Evaluation of soft skill will follow continuous evaluation method.

Details are as follows:

1) Total Marks for each semester 100

a) **Internal:** 60 marks for Class Performance (Every class activity will carry 6 marks; each students can participate in maximum of 10 activities).

b) **External:** 30 marks for External evaluation at the time of external exams (Based on GD and PIs).

c) **Attendance:** 10 marks for Attendance in the training sessions

S No	% Attendance <	Marks
1.	30	0
2.	30-40	2
3.	40-50	4
4.	50-60	5
5.	60-70	6
6.	70-80	7
7.	80-90	8
8.	90-100	10

In a summary,

100 marks = 60(Class performance) + 30(External) + 10(Attendance)

Course Code: ECS601	**Professional Core Course-12** **B.Tech (CSE) Semester VI** **ARTIFICIAL INTELLIGENCE**	**L-3** **T-1** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding of the history of AI and different classical AI algorithms	
CO2.	Applying basic principle of AI in solutions that require problem solving, inference, perception, knowledge representation and learning.	
CO3.	Understanding awareness and fundamental understanding the various concepts of Prolog and Symbolic and Monotonic and non monotonic reasoning	
CO4.	Understanding the concept of knowledge representation techniques called slot, filler and Natural Language processing	
CO5.	Understanding the concept of Expert System and its Components and demonstrate the working of MYCIN AND DENDRAL expert system tools	
Course Content:		
Unit-1:	**Artificial Intelligence:** Issues, Techniques, Problems, Importance and areas of AI, Problem solving state space search; DFS, BFS Production: System, Problem characteristics; Heuristic Search Techniques, Generate and Test, Hill Climbing, Best First Search, Problem reduction, Constraint satisfaction,Crypt arithmetic and problems.	**8 Hours**
Unit-2:	**Knowledge representation**: Mapping, Approaches, Issues, Representing simple facts in logic, Representing instance and relationships, Resolution and natural deduction, Representing knowledge using rules, Procedural vs. Declarative knowledge, Logic programming, Forward vs. Backward chaining, Matching & control knowledge.	**8 Hours**
Unit-3:	**AI programming language:** Prolog: Objects, Relationships, Facts, Rules, Variables, Syntax and Data Structures; Representing objects & Relationships by using "trees" and "lists"; Use of cut; I/O of characters and structures; Symbolic reasoning under uncertainty; Monotonic Reasoning: Logics for Non-Monotonic reasoning; Implementation issues; Implementation: DFS & BFS.	**8 Hours**
Unit-4:	**Slot and Filler Structures:** Semantic nets, Frames, Conceptual dependency, Scripts, CYC Natural languages and NLP, Syntactic processing parsing techniques, Semantic analysis case grammar, augmented transition net, Discourse & pragmatic processing, Translation	**8 Hours**
Unit-5:	**Expert System:** Definition and Characteristics, Representing and using Domain Knowledge,Expert system shells Knowledge Engineering, Knowledge acquisition, Expert system life cycle & Expert system tools, MYCIN & DENDRAL.	**8 Hours**
Text Books:	Rich, E. and Knight, K., *Artificial Intelligence*, Tata McGraw Hill.	
Reference Books:	**1.** Cloksin, W.F., Mellish, C.S., *Programming In Prolog*, Narosa Publishing House. **2.** Janakiraman, V.S., Sarukesi, K., *Foundation of Artificial Intelligence & Expert System*, Macmillan. *** Latest editions of all the suggested books are recommended.**	
Additional	https://nptel.ac.in/courses/106/105/106105077/	

Electronic Reference Material:	https://www.youtube.com/watch?v=JMUxmLyrhSk	

Course Code: ECS611	**Professional Core Course-13** **B.Tech (CSE) Semester VI** **DATA WAREHOUSING AND DATA MINING WITH R-PROGAMMING**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the various components of data warehousing.	
CO2.	Understanding the constructs and usage of R-Programming language for developers.	
CO3.	Understanding how to design the physical model of data warehouse.	
CO4.	Understanding various algorithms of Data Mining and its process.	
CO5.	Applying the programming concept to solve problems using R-Programming.	
CO6.	Analyzing the concept of data mining using R-Programming.	
Course Content:		
Unit-1:	**Introduction**: Motivation (for Data Mining), Data Mining-Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data,(Binning, Clustering, Regression, Computer and Human inspection),Inconsistent Data, Data Integration and Transformation. Data Reduction:-Data Cube Aggregation, Dimensionality reduction, Data Compression, Numerosity Reduction, Clustering, Discretization and Concept hierarchy generation.	**8 Hours**
Unit-2:	**Concept Description:** Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Mining Association Rules in Large Databases, Association rule mining, mining Single-Dimensional Boolean Association rules from Transactional Databases– Apriori Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi-Dimensional Association rules from Relational Databases	**8 Hours**
Unit-3:	**Classification and Predictions**: What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward Neural Network, Back propagation Algorithm, Classification methods KNN classifiers, Genetic Algorithm. **Cluster Analysis**: Data types in cluster analysis, Categories of clustering methods, Partitioning methods. Hierarchical Clustering-CURE and Chameleon. Density Based Methods-DBSCAN, OPTICS. Grid Based Methods- STING, CLIQUE. Model Based Method –Statistical Approach, Neural Network approach, Outlier Analysis.	**8 Hours**
Unit-4:	**Overview of R programming** : Introduction to R, The S Philosophy, Basic Features of R, Free Software Design of the R , System Limitations of R, R Resources, Installation and getting started with the R interface. **Data Manipulation (dplyr, reshape2 packages) and Scoping Rules of R**: Data Frames, The dplyr Package, dplyr Grammar,	**8 Hours**

	Installing the dplyr package, select(), filter(), arrange(), rename(), mutate(), group_by(), Lexical Scoping: Why Does It Matter?, Lexical vs. Dynamic Scoping	
Unit-5:	**Data Warehousing:** Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Aggregation, OLAP Servers: ROLAP, MOLAP, HOLAP, Process Architecture, 3 Tier Architecture, Data Mart.	**8 Hours**
Text Books:	**1.** Paul R. P., *Fundamentals Of Data Warehousing*, John Wiley and Sons.	
Reference Books:	**1.** Anahony S., *Data Warehousing In the Real World: A Practical Guide for Building DecisionSupport Systems*, John Wiley and Sons. 2.Kamber and Han, "Data Mining Concepts and Techniques", Hartcourt India P. Ltd., 3. R Programming for Data Science, by Roger D. PengUsing R for Introductory Statistics, by John Verzani, Chapman & Hall/CRC, 2004, ISBN 1584884509 Advanced R, by Hadley Wickham, ISBN 9781466586963 *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/110/107/110107092/ https://www.youtube.com/watch?v=J326LIUrZM8	

Course Code: ECS612	Professional Core Course-14 B.Tech (CSE) Semester VI **MOBILE COMMUNICATION**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the basic concept of mobile computing, wireless networks, structure of mobile computing based application.	
CO2.	Understanding various schemes like Fixed Assignment Schemes, Random Assignment Schemes, Reservation Based Schemes**.**	
CO3.	Understanding the mobile IP, Key functionality of IP, Choose the required functionality at each layer for given application.	
CO4.	Understanding the hand-off process in mobile communication	
CO5.	Analyzing solution for each functionality at each layer x Use simulator tools and design Ad hoc networks	
Course Content:		
Unit-1:	**Introduction**: Issues in mobile computing, Study of Electromagnetic Spectrum: Radio wave, Microwave, Infrared, Overview of wireless communication, Cellular concept, sharing of Wireless channels: FDMA, TDMA, CDMA.	**8 Hours**
Unit-2:	**Global System for Mobile Communication (GSM):** Architecture, Mobility Management, and Network signaling; General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes	**8 Hours**
Unit-3:	**Mobile Data Communication:** WLANs (Wireless LANs); IEEE 802.11 standard; Mobile IP; Wireless Application Protocol (WAP); Mobile Internet Standards; WAP Gateway and Protocols Wireless Markup Languages (WML).	**8 Hours**
Unit-4:	**Third Generation (3G) Mobile Services:** International Mobile Telecommunications 2000 (IMT 2000) vision; Wideband Code Division Multiple Access (W-CDMA); and CDMA 2000: Quality of services in 3G.	**8 Hours**
Unit-5:	**Wireless Local Loop (WLL):** Architecture, Technologies; Global Mobile Satellite Systems; Case studies of Iridium and Global star systems; Bluetooth technology and Wi-Max.	**8 Hours**
Text Books:	**1.** Lin, Y. B. and Chlamatac, I, *Wireless and mobile Networks Architecture,* John Wiley & Sons	
Reference Books:	**1.** Talukdar, A. K. and Yaragal, R., *Mobile Computing,* Tata McGraw Hill. **2.** Theodore, S. R., *Wireless Communication- Principles and Practices,* Pearson Education. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/117/102/117102062/ https://www.youtube.com/watch?v=Ibaqg6P2-8k	

Course Code: ECS651	Laboratory Course-17 B.Tech (CSE) Semester VI **ARTIFICIAL INTELLIGENCE (LAB)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the role of PROLOG for implementation of solutions of AI problems	
CO2.	Understanding the architecture and evaluation scheme of PROLOG	
CO3.	Applying the PROLOG for solving trivial problems	
CO4.	Applying the solutions for Water Jug problem, Eight Puzzle problem, Monkey Banana problem using PROLOG	
CO5.	Applying the various knowledge representation structures.	
	LIST OF EXPERIMENTS	
	1. To write a LISP Program to solve the water-jug problem using heuristic function. **2.** To create a compound objects using Turbo Prolog. **3.** To write a Prolog Program to show the advantage and disadvantage of green and red cuts. **4.** To write a prolog program to use of BEST-FIRST SEARCH applied to the eight puzzle problem. **5.** To write a program to implementation of the problem solving strategies: Forward Chaining, Backward Chaining, and Problem Reduction. **6.** To write a Lisp Program to implement the STEEPEST-ASCENT HILL CLIMBING. **7.** To write a Prolog Program to implement COUNTE PROPAGATION NETWORK.	

Course Code: ECS654	**Laboratory Course-18** **B.Tech (CSE) Semester VI** **DATA WAREHOUSING AND DATA MININGWITH R-PROGAMMING (LAB)**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding Modeling and design of data warehouse.	
CO2.	Understanding how to Install and Configure R Tool and R Studio.	
CO3.	Applying the concept to design a star and snowflake schema.	
CO4.	Analyzing R Explorer, Mining techniques and Attribute Relation File	
CO5.	Developing basic data warehouse applications along with the data visualization using R.	
	LIST OF EXPERIMENTS	
	1. To develop an application to implement defining subject area, design of fact dimension table, data mart. 2. To develop an application to construct a multidimensional data. 3. To develop an application to implement data generalization and summarization technique. 4. To develop an application to extract association rule of data mining. 5. To develop an application for classification of data. 6. To develop an application for decision tree. 7. To develop an application to implement R PROGRAMMING loops. 8. To develop an application to implement structure and components of an R-Programming	

Course Code: ECS606	Professional Elective Courses (PEC)-II B.Tech (CSE) Semester VI **REAL TIME OPERATING SYSTEM**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding fundamentals of IEEE standards.	
CO2.	Understanding the concept of communications among processes in RTOS.	
CO3.	Understanding the concept of CPU module and peripheral interfaces.	
CO4.	Applying the concept of Synchronization	
CO5.	Analyzing the architecture and salient features deadlock and fault tolerance.	
Course Content:		
Unit-1:	**Real Time System:** Concept; Priorities; Embedded Systems; Task; Classification &Requirements; Deadlines; Soft and Hard Real Time Systems.	**8 Hours**
Unit-2:	**Real Time Operating System:** Evolution, Firm Real Time Systems, Task Management, Inter Process Communication, Case Studies: Maruti II, HART OS, VRTX.	**8 Hours**
Unit-3:	**Scheduling:** Characterizing Real Time Systems and Tasks, Task Assignment, Fixed and Dynamic Priority, Unprocessed (RM and EDF), Multiprocessor (Utilization Balancing, Next-fit for RM &Bin-Packing Assignment for EDF).	**8 Hours**
Unit-4:	**Tools:** Programming Languages, Real Time Databases. **Applications:** Real Time Communication, FDDI, Specification and Verification using Duration Calculus, Flow Control, Protocols for Real Time (VTCSMA, Window, IEEE 802.3, IEEE 802.4, IEEE 802.5, Stop and Go Protocol, Media Access Protocol)	**8 Hours**
Unit-5:	**Fault:** Concept, Classes, Fault Tolerant Real Time System, Clock; Need, Synchronization, Issues inReal Time Software Design.	**8 Hours**
Text Books:	**1.** Krishna, C.M., *Real Time Systems*, McGraw Hill.	
Reference Books:	**1.** Levi, S. T. and Agarwal K., *Real Time Systems*, McGraw Hill. 2. Joseph, M., *Real Time System: Specification, Validation & Analysis*, Prentice Hall of India. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://www.digimat.in/nptel/courses/video/106105172/L19.html https://www.youtube.com/watch?v=HlU5cYqGLZE	

Course Code: ECS607	Professional Elective Courses (PEC)-II B.Tech (CSE) Semester VI **SOFT COMPUTING**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the architecture and algorithms for artificial neural network.	
CO2.	Understanding the classical and fuzzy set along with membership function.	
CO3.	Applying the learnt concept for solving the numerical problems using fuzzy operations.	
CO4.	Applying fuzzy arithmetic and approximate reasoning on fuzzy sets.	
CO5.	Developing the uncertainty and non specificity for fuzzy and crisp set.	
Course Content:		
Unit-1:	**Neural Networks:** History, Overview of Biological Neuro-system, Mathematical Models. **Artificial Neural Networks: A**rchitecture, Learning: Rules, Paradigms, Supervised, Unsupervised and Reinforcement Learning; Training Algorithms: Perceptions, Training rules, Back Propagation Algorithm, Multilayer Perception Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.	**8 Hours**
Unit-2:	**Fuzzy Logic:** Fuzzy Logic, Classical and Fuzzy Sets, Membership Function; Fuzzy rule generation.	**8 Hours**
Unit-3:	**Operations on Fuzzy Sets:** Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.	**8 Hours**
Unit-4:	**Fuzzy Arithmetic:** Numbers, Linguistic Variables, Arithmetic Operations on Intervals &Numbers, Lattice, Equations, Logic: Classical, Multi-valued, Propositions; Qualifiers, Linguistic Hedges.	**8 Hours**
Unit-5:	**Uncertainty based Information:** Information & Uncertainty, Non specificity of fuzzy & crisp sets, Fuzziness of Fuzzy Sets.	**8 Hours**
Text Books:	**1.** Simon, H., *Neural Networks*, Prentice Hall of India.	
Reference Books:	Kazuo, T., *An Introduction to Fuzzy Logic for Practical Applications*, Springer. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://www.digimat.in/nptel/courses/video/106105173/L01.html https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-cs23/	

Course Code: EEC606	Professional Elective Courses (PEC)-II B.Tech (CSE) Semester VI **MICROPROCESSOR & APPLICATION**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding fundamentals of microprocessor 8085 and microprocessor 8086.	
CO2.	Understanding the concept of assembly language programming.	
CO3.	Understanding the concept of CPU module and peripheral interfaces.	
CO4.	Applying the concept of assembly language to solve problems.	
CO5.	Analyzing the architecture and salient features of microprocessor and microcontrollers.	
Course Content:		
Unit-1:	**Introduction to Microprocessor:** 8085 Evolution of Microprocessor, Register Structure, ALU, Bus Organization, Timing and Control, Instruction set. Architecture of 16-bit Microprocessors: Architecture of 8086; (Bus Interface Unit, Execution unit) Register Organization, Bus operation, Memory segmentation.	**8 Hours**
Unit-2:	**Assembly Language Programming:** Addressing Modes and instruction set of 8086, Arithmetic and Logic instructions, Program Control Instructions (jumps, conditional jumps, and subroutine call), Loop and string instructions, Assembler Directives.	**8 Hours**
Unit-3:	**CPU Module:** Signal Description of pins of 8086 and 8088, Clock generator, Address and Data bus De multiplexing, Buffering Memory Organization, Read and Write cycle Timings, Interrupt Structures, Minimum Mode and Maximum Mode Operations	**8 Hours**
Unit-4:	**Peripheral Interfacing:** Programmed I/O, Interrupt Driven, I/O, DMA, Parallel I/O, (8255-PPI, Parallel port), 8253/8254 programmable Timer/Counter Interfacing with ADC	**8 Hours**
Unit-5:	**Peripheral Interfacing (Contd.)**: 8259 Programmable Interrupt controller, 8237 DMA controller Concept of Advanced 32 bit Microprocessors: Pentium Processor.	**8 Hours**
Text Books:	1. Gaonkar Ramesh S., *Microprocessor Architecture, Programming, and Applications with the8085*, Pen Ram International Publishing.	
Reference Books:	1. Liu and Gibson G.A., *Microcomputer Systems: The 8086/8088 Family*, Prentice Hall (India). 2. Brey, Barry B., *INTEL microprocessors*, Prentice Hall (India). Ram B., *Advanced Microprocessor & Interfacing*, Tata McGraw Hill *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/108/107/108107029/ https://nptel.ac.in/courses/108/105/108105102/	

Course Code: ECS603	Professional Elective Courses (PEC)-II B.Tech (CSE) Semester VI **COMPUTER GRAPHICS**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the basics concepts of computer graphics	
CO2.	Understanding output primitives generating algorithms	
CO3.	Understanding 2d and 3d transformation techniques	
CO4.	Understanding the concepts of window/viewport transformation	
CO5.	Understanding the concept of computer animation	
Course Content:		
Unit-1:	**Computer Graphics:** Areas, Overview of Graphic systems, Graphics primitives, Video-display devices, Raster-scan and Random-scan systems, Plasma displays, LCD, Plotters, Printers, Graphics monitors, Workstations and devices, Input techniques.	**8 Hours**
Unit-2:	**Output Primitives:** Points and lines, Line drawing algorithms, Circle and Ellipse algorithms. **Filled Area Primitives:** Scan line polygon fill algorithm, Boundary-fill and Flood-fill algorithms.	**8 Hours**
Unit-3:	**2-D Geometrical Transforms:** Translation, Scaling, Rotation, Reflection and Shear, Matrix representations and Homogeneous coordinates, Composite transforms, Transformations between coordinate systems. **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.	**8 Hours**
Unit-4:	**3-D Object Representation:** Polygon surfaces, Quadric Surfaces, Spline representation, Hermit curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces, Basic illumination models, polygon-rendering methods. **3-D Geometric Transformations:** Translation, Rotation, Scaling, Reflection and shear transformations, Composite transformations, 3-D viewing, Viewing pipeline, Viewing coordinates, View volume, General projection transforms and clipping.	**8 Hours**
Unit-5:	**Visible Surface Detection Methods:** Classification, Back-face detection, Depth buffer, Scan-line, Depth sorting, BSP-tree methods, Area sub-division and Octree methods. **Computer Animation:** Design of animation sequence, general computer animation functions, Raster animation, Computer animation languages, Key frame systems, Motion specifications.	**8 Hours**
Text Books:	**1.** Hearn, D. and Pauline, B. M., *Computer Graphics C Version*, Pearson Education.	
Reference Books:	**1.** Zhigand, X., Roy, P., *Computer Graphics*, Tata McGraw Hill. **2.** Rogers, D. F., *Procedural Elements for Computer Graphics*, McGraw Hill. **3.** Neuman, W. M. and Sprou,l R. F., *Principles of Interactive Computer Graphics*, McGraw Hill. **4.** Harrington, S., *Computer Graphics*, McGraw Hill. *** Latest editions of all the suggested books are recommended.**	

Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/106/106106090/ https://nptel.ac.in/courses/106/102/106102065/	

Course Code: ECS610	Professional Elective Courses (PEC)-II B.Tech (CSE) Semester VI **CYBER LAW & INFORMATION SECURITY**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding of the information system architecture and the involved components.	
CO2.	Understanding of the basic principles of Information Security, Online payment systems and related security issues along with the rules of E Governance.	
CO3.	Applying and regulating Cyber Laws dealing with Cyber Ethics by implementation of Intellectual Property Right in the areas of Copyright, Patent, Piracy and Plagiarism.	
CO4.	Analyzing the security of Cryptographic System and design and implementation issues related with Firewalls, Virtual Private Networks and Intrusion Detection Systems.	
CO5.	Analyzing the need of physical security in Information System, need of Biometric Security System and related challenges.	
Course Content:		
Unit-1:	Information Security, Evolution of Information Security; Basics Principles of Information Security; Critical Concepts of Information Security; Components of the Information System, Information Classification and their Roles, Information System Threats and attacks, The system Development Life cycle, Security Challenges in Mobile Devices.	**8 Hours**
Unit-2:	**Risk Management :** Definition of risk management, risk identification, and risk control, Identifying and Accessing Risk, Assessing risk based on probability of occurrence and likely impact, the fundamental aspects of documenting risk via the process of risk assessment, the various risk mitigation strategy options, the categories that can be used to classify controls.	**8 Hours**
Unit-3:	**Physical Security:** Needs, Disaster and Controls, Basic Tenets of Physical Security and physical Entry Controls. Access Control- Biometrics, Factors in Biometrics Systems, Benefits, and Criteria for selection of Biometrics, Design Issues in Biometric Systems.	**8 Hours**
Unit-4:	Model of Cryptographic Systems, Issues in Documents Security, System of Keys, Public Key Cryptography, Digital Signature, Requirement of Digital Signature System, Firewalls, **Network Security:** Basic Concepts, Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring and Detection, Intrusion Detection. Virtual Private Networks: Need, Use of Tunneling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN.	**8 Hours**
Unit-5:	**Laws, Investigation and Ethics:** Cyber Crime, Information Security and Law, Types &Overview of Cyber Crimes, Cyber Law Issues in E-Business Management, Overview of Indian IT Act, Ethical Issues in Intellectual property rights, Copy Right, Patents, Data privacy and Protection, Domain Name, Software piracy, Plagiarism, Ethical hacking.	**8 Hours**
Text Books:	1. Godbole," Information Systems Security", Willey	

Reference Books:	1. Yadav, "Foundations of Information Technology", New Age, Delhi 2. Schou, Shoemaker, " Information Assurance for the Enterprise", Tata McGraw Hill 3. Sood,"Cyber Laws Simplified", McGraw Hill *Latest editions of all the suggested books are recommended.	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/106/106106129/ https://www.youtube.com/watch?v=BvWvFAS1iP0	

Course Code: ECS614	Professional Elective Courses (PEC)-II B.Tech (CSE) Semester VI **MULTIMEDIA AND ANIMATION**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding multimedia, it's applications, supporting hardware and hardware tools which provide basic information about multimedia	
CO2.	Applying various tools on image and video standards using JPEG, MPEG, MHEG along with color models and multimedia monitor bitmaps to properly represent a multimedia application.	
CO3.	Applying the multimedia drawing tools and techniques with the effect of animation using multi layer concepts supported by flash incorporating text, audio, video and graphics.	
CO4.	Applying the different compression approaches like lossy and lossless with the specifications of sampling variables associated with digital audio	
CO5.	Analyzing the basic information about the phase performing planning and production of a multimedia application using it's objects like text, sound and their specifications like MIDI with proper capturing.	
Course Content:		
Unit-1:	**Multimedia:** History, Objects, Scope in Business and Work, Production and Planning of Multimedia applications, Hardware, Memory and Storage devices, Communication devices, Software, Tools: Presentation and Object gen7eration, Video, Sound, Image capturing, Authoring, Card and Page based authoring.	**8 Hours**
Unit-2:	**Production and Planning:** Multimedia building blocks, Text, Sound (MIDI), Digital Audio File Formats, MIDI under windows environment, Audio and Video capture.	**8 Hours**
Unit-3:	**Multimedia Techniques:** Basic drawing, Advance animations, Macromedia products, Creating multilayer, Combining interactivity and multiple scenes, Creating transparency effects using text in Flash, Flash animation.	**8 Hours**
Unit-4:	**Digital Audio**: Concepts, Sampling variables, Compression of sound: Loss-Less, Lossy and silence compressions.	**8 Hours**
Unit-5:	**Representation and Compression:** Multimedia monitor bitmaps, Vector drawing, Lossy graphic compression, Colors, Image file formatted animations image standards: JPEG compression, Video representation, Video compression, MPEG standards, MHEG standards; Multimedia Applications, Planning and Costing proposal preparation, and Financing, Case study of a typical industry.	**8 Hours**
Text Books:	**1.** Andreas H., *Multimedia Basics*, Firewall Media.	
Reference Books:	**1.** Agarwal R. and Tiwari B.B., *Multimedia Systems*, Excel Books. **2.** Rosch W. L., *Multimedia Bible*, Sams Publishing. **3.** Ken M.,Croteau J., *Flash 4 Web Special Effects, Animation And Design Handbook*, Dreamtech. **4.** Villamil-Casanova J., Molina L., *Multimedia-Production, Planning And Delivery*, Pearson Education. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference	https://nptel.ac.in/content/storage2/courses/117105083/pdf/ssg_m1l1.pdf https://cse.iitkgp.ac.in/~pb/pb-graphics-2018.pdf	

Material:		

Course Code: ECS613	**Professional Elective Courses (PEC)-II** **B.Tech (CSE) Semester VI** **COMPILER DESIGN AND CONSTRUCTION**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the structure along with the lexical and syntactic analysis phase of a compiler.	
CO2.	Understanding various parsing techniques.	
CO3.	Understanding the intermediate code paradigms and apply them for solving various translation schemes.	
CO4.	Applying the various code optimization techniques and study code generation.	
CO5.	Analyzing the memory allocation schemes and the error detection on phases of compilation.	
Course Content:		
Unit-1:	**Compiler Structure:** Compilers and Translators, Phases, Pass Structure,Bootstrapping. **ProgrammingLanguages:** High level languages, Lexical and syntactic structure, Data elements, Data Structure, Operations, Assignments, Program unit, Data Environments, ParameterTransmission. **Lexical Analysis:** Lexical Analyzer, Role, Design Approach, Implementation, LEX Capabilities. **Regular Expressions:** Transition Diagrams, Finite state Machines. **Syntactic Specifications of Programming Languages:** CFG, Derivation, Parse tree, Ambiguity, Capabilities.	**8 Hours**
Unit-2:	**Parsing Techniques:** Bottom–Up, Shift-Reduce, Operator Precedence, Top-Down with backtracking, Recursive Descent, Predictive, LR (SLR, Canonical LR, LALR), Syntax Analyzer Generator, YACC.	**8 Hours**
Unit-3:	**Intermediate Code Generation:** Forms**,** Three Address Code, Quadruples & Triples,Syntax Directed translation mechanism and attributed definition, Translation of Declaration, Assignment, Control flow, Boolean expression, Array References in arithmetic expressions, Procedure Calls, Case Statements, Postfix Translation.	**8 Hours**
Unit-4:	**Run Time Memory Management:** Static and Dynamic storage allocation, Stack based memory allocation schemes, Symbol Table management.**Error:** Semantic, Detection and Recovery for Lexical Phase, Syntactic phase.	**8 Hours**
Unit-5:	**Code Optimization and Code Generation:** Local Optimization, Loop Optimization, Peephole Optimization, Basic blocks and flow graphs, DAG (Directed Acyclic Graph), Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection.	**8 Hours**
Text Books:	**1.** Alfred, V.A., Ullman, J.D., *Principles of Compiler Design*, Narosa Publishing House.	
Reference Books:	**1.** Holub, H.C., *Compiler Design in C*, Prentice Hall. **2**. Apple, A.W., *Modern Compiler Implementation in C: Basic Design*, Cambridge press. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/108/106108052/ https://nptel.ac.in/courses/128/106/128106009/	

Course Code: ECS692	Project / Industrial Training/ Seminar-3 B.Tech (CSE) Semester VI **Seminar (Field Project)**	L-0 T-0 P-0 C-2
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Understanding*** the format of report writing.	
CO2.	***Understanding*** knowledge to write seminar report in own words.	
CO3.	***Understanding*** the contents which has to be added into the report.	
CO4.	***Applying*** the knowledge to write a survey/review research paper.	
CO5.	***Applying*** content writing and papers writing.	
	Selection of topic:	
	All students pursuing B.Tech. Shall submit the proposed topic of the seminar (Field Project) in the first week of the semester to the course coordinator. Care should be taken that the topic selected does not directly relate to the subject of the courses being pursued. The course coordinator shall then forward the list to the concerned Seminar Committee. The topics will then be allocated to the students along with the name of the faculty guide. Preparation of the seminar 1. The student shall meet the guide for the necessary guidance for the seminar (field project) work. 2. During the next two to four weeks the student should read the primary literature germane to the seminar topic. Reading selection should continuously be informed to the guide. 3. After necessary collection of data and literature survey, the students must prepare a report. The report shall be arrange in the sequence consisting of the following:- a. Top Sheet of transparent plastic. b. Top cover. c. Preliminary pages. (i) Title page (ii) Certification page. (iii) Acknowledgment. (iv) Abstract.	

	(v) Table of Content. (vi) List of Figures and Tables. d. Chapters (Main Material). e. Appendices, If any. f. Bibliography/ References. g. Back Cover (Blank sheet). h. Back Sheet of Plastic (May be opaque or transparent).	

For Guide

If you choose not to sign the acceptance certificate , please indicate reasons for the same from amongst those given below:

i) The amount of time and effort put in by the student is not sufficient;
ii) The amount of work put in by the student is not adequate

iii) The report does not represent the actual work that was done / expected to be done;

iii) Any other objection (Please elaborate)

General points for the seminar

1. The report should be typed on A4 sheet. The Paper should be of 70-90 GSM.

2. Each page should have minimum margins as under

a. Left 1.5 inches

b. Right 0.5 Inches

c. Top 1 Inch

d. Bottom 1 Inch (Excluding Footer, If any)

3. The printing should be only on one side of the paper

4. The font for normal text should Times New Roman, 12 size for text and 14 size for heading and should be typed in double space. The references may be printed in Italics or in a different font.

5. The Total Report should not exceed 30 pages including top cover and blank pages.

6. One copy completed in all respect as given above is to be submitted to the guide. That will be kept in departmental/University Library.

7. The power point presentation should not exceed 15 minutes which include 5 minutes for discussion/Viva.

Seminar will be evaluated out of total 100 marks. In Internal Evaluation marks will be awarded out of 50 and in external evaluation also marks will be awarded out of 50 on the basis of viva voce. Internal evaluation will be exercised by the Internal Evaluation Committee of college.

Course Code: EHM601	**Professional Core Course** **Specialization- Artificial Intelligence, Machine Learning & Deep Learning** **B.Tech (CSE) Semester VI** **ENTREPRENEURSHIP**	**L-3 T-0 P-0 C-3**
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	Understanding the meaning and concepts of Entrepreneurship	
CO2.	Understanding and applying the concepts and theories of motivation Analyzing different facet and forms of business	
CO3.	Understand, apply and evaluate different financing options	
CO4.	Understanding the government support policies and its applications	
CO5.	Understanding and applying remedies to sick businesses	
Course Content:		
Unit-1:	**Entrepreneurship:** Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth.	**8 Hours**
Unit-2:	**Motivation:** Major Motives Influencing an Entrepreneur – Achievement Motivation Training, Self-Rating, Business Games, Thematic Apperception Test – Stress Management, Entrepreneurship Development Programs – Need, Objectives.	**8 Hours**
Unit-3:	**Business:** Small Enterprises – Definition, Classification – Characteristics, Ownership Structures – Project Formulation – Steps involved in setting up a Business – identifying, selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment – Preparation of Preliminary Project Reports – Project Appraisal – Sources of Information – Classification of Needs and Agencies.	**8 Hours**
Unit-4:	**Financing and Accounting:** Need – Sources of Finance, Term Loans, Capital Structure, Financial Institution, Management of working Capital, Costing, Break Even Analysis, Taxation – Income Tax, Excise Duty – Sales Tax.	**8 Hours**
Unit-5:	**Support to Entrepreneurs:** Sickness in small Business – Concept, Magnitude, Causes and Consequences, Corrective Measures – Business Incubators – Government Policy for Small Scale Enterprises – Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Sub Contracting.	**8 Hours**
Text Books:	1. Khanka. S.S., "Entrepreneurial Development" S. Chand & Co. Ltd., Ram Nagar, New Delhi.	
Reference Books:	1. Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw-Hill. 2. Mathew J Manimala, "Entrepreneurship theory at cross roads: paradigms and praxis" 2nd Edition Dream tech.	

	3. Rajeev Roy, 'Entrepreneurship', Oxford University Press. 4. EDII "Faulty and External Experts – A Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development", Institute of India, Ahmadabad. ***Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/110/106/110106141/ https://www.youtube.com/watch?v=QoqohmccTSc	

Evaluation Scheme:

Internal Evaluation	External Evaluation	Total Marks
40 Marks	**60 Marks**	**100**
The Internal evaluation will be performed by the internal faculty on the basis of the below mentioned parameters: • Problem Identification • Data Collection and Data Analysis • Case study • Proposal of innovative Business idea (All Above mentioned parameters contains 30 marks and 10 marks for Attendance)	External evaluation will be performed by the external examiner on the basis of following parameters: • Report • Presentation • VIVA (All Above Category contains 20 marks each)	

Course Code: EGP611	DGP-6 B.Tech (CSE) Semester VI **DISCIPLINE & GENERAL PROFICIENCY**	L-0 T-0 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Understanding*** the social responsibilities toward the institute and humanity.	
CO2.	***Understanding*** the need of participations in different events to groom the personality.	
CO3.	***Understanding*** the discipline and follow them during academics and institutional activities.	
CO4	***Understanding*** Social awareness towards society.	
CO5.	***Applying*** actively towards various institution activities like workshop, seminar and other events	
	There shall be continuous evaluation of the student on the following broad parameters:	
	1. Observance of dress code. **2.** Participation in Conferences /Workshops / Seminars. **3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time. **4.** Participation in community projects including NSS. **5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time. **6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel. **7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level. **8.** General behavior **9.** Any extraordinary achievement. The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).	

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S		Enroll	Student	Dress	Participation	Participation	Participation	Participation	Participation	General	Any Extra

No		No.	Name	code	in Conferences /Workshops / Seminars	in guest lectures, invited talks and special technical sessions	in community Services	in Culture & extra curriculum activities, Department Club Activities	in sports/ co-curricular activities	Behavior	Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Course Code: TMUGA-601	Value Added Audit Course-6 BTech- Semester-VI **Advance Algebra and Geometry**	L-2 T-1 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Recognizing the rules of Crypt-arithmetic and relate them to find out the solutions.	
CO2.	Illustrating the different concepts of Height and Distance and Functions.	
CO3.	Employing the concept of higher level reasoning in Clocks, Calendars and Puzzle Problems.	
CO4.	Correlating the various arithmetic and reasoning concepts in checking sufficiency of data.	
Course Content:		
Unit-1:	**Clocks and calendars** Introduction , Angle based , faulty Clock, Interchange of hands, Introduction of Calendars, Leap Year , Ordinary Year	**5 Hours**
Unit-2:	**Set theory** Introduction , Venn Diagrams basics, Venn Diagram – 3 sets, 4-Group Venn Diagrams	**4 Hours**
Unit-3:	**Heights and Distance** Basic concept, Word problems	**3 Hours**
Unit-4:	**Functions** Introduction to Functions, Even and Odd Functions, Recursive	**3 Hours**
Unit-5:	**Problem Solving** Introduction, Puzzle based on 3 variable, Puzzle based on 4 variable	**6 Hours**
Unit-6:	**Data Sufficiency** Introduction, Blood relation based, direction based, ranking based	**5 Hours**
Unit-7:	**Crypt Arithmetic** Introduction of Crypt Arithmetic, Mathematical operations using Crypt Arithmetic, Company Specific Pattern	**4 Hours**
Reference Books:	• R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude • R2:-Quantitative Aptitude by R.S. Agrawal • R3:-M Tyra: Quicker Maths • R4:-Nishith K Sinha:- Quantitative Aptitude for CAT • R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com • R6:-Logical Reasoning by Nishith K Sinha • R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal *** Latest editions of all the suggested books are recommended.**	

Evaluation Scheme for Quantitative Aptitude:-

The students will be evaluated on the score of 100 for the semester. Detailed scheme for the course is as follows

a. 15 marks each for CT1 + CT2 + CT3
b. 30 marks for final external exams.
c. 15 marks for Online Tests
d. 10 marks for attendance and practice sheets, at the end of semester, will be provided in the following manner.

S No	% Attendance <	Marks
1	30	0
2	30-40	2
3	40-50	4
4	50-60	5
5	60-70	6
6	70-80	7
7	80-90	8
8	90-100	10

So for CT1 (20) + CT2 (20) + CT3(20) + Final External exam (30) + Attendance (10) = 100 marks

References:

- Arun Shrama:- How to Prepare for Quantitative Aptitude
- Nishith K Sinha:- Quantitative Aptitude for CAT
- Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba,
- Logical Reasoning by Nishith K Sinha
- Verbal and Non Verbal Reasoning by R.S. Agrawal

Course Code: **TMUGS-601**	**Value Added Audit Course-5** **BTech- Semester-VI** **Managing Work and Others**	**L-2** **T-1** **P-0** **C-0**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Communicating effectively in a variety of public and interpersonal settings.	
CO2.	Applying concepts of change management for growth and development by understanding inertia of change and mastering the Laws of Change.	
CO3.	Analyzing scenarios, synthesizing alternatives and thinking critically to negotiate, resolve conflicts and develop cordial interpersonal relationships.	
CO4.	Functioning in a team and enabling other people to act while encouraging growth and creating mutual respect and trust.	
CO5.	Handling difficult situations with grace, style, and professionalism.	
Course Content:		
Unit-1:	**Intrapersonal Skills:** Creativity and Innovation Understanding self and others (Johari window) Stress Management Managing Change for competitive success Handling feedback and criticism	**8 Hours**
Unit-2:	**Interpersonal Skills:** Conflict management Development of cordial interpersonal relations at all levels Negotiation Importance of working in teams in modern organisations Manners, etiquette and net etiquette	**12 Hours**
Unit-3:	**Interview Techniques:** Job Seeking Group discussion (GD) Personal Interview	**10 Hours**
Reference Books:	1. Robbins, Stephen P., Judge, Timothy A., Vohra, Neharika, Organizational Behaviour (2018), 18th ed., Pearson Education 2. Burne, Eric, Games People Play (2010), Penguin UK 3. Carnegie, Dale, How to win friends and influence people (2004), RHUK 4. Rathgeber, Holger, Kotter, John, Our Iceberg is melting (2017), Macmillan	

	5. Steinburg, Scott, Nettiquette Essentials (2013), Lulu.com 6. https://www.hloom.com/resumes/creative-templates/ 7. https://www.mbauniverse.com/group-discussion/topic.php 8. https://www.indeed.com/career-advice/interviewing/job-interview-tips-how-to-make-a-great-impression *** Latest editions of all the suggested books are recommended.**	

Evaluation Scheme: Faculty led Continuous Evaluation

- Students will be evaluated on the score of 100 in every course.
- Evaluation of soft skill will follow continuous evaluation method.

Details are as follows:

2) Total Marks for each semester 100

d) **Internal:** 60 marks for Class Performance (Every class activity will carry 6 marks; each students can participate in maximum of 10 activities).

e) **External:** 30 marks for External evaluation at the time of external exams (Based on GD and PIs).

f) **Attendance:** 10 marks for Attendance in the training sessions

S No	% Attendance <	Marks
1.	30	0
2.	30-40	2
3.	40-50	4
4.	50-60	5
5.	60-70	6
6.	70-80	7
7.	80-90	8
8.	90-100	10

In a summary,

100 marks = 60(Class performance) + 30(External) + 10(Attendance)

Course Code: ECS701	**Professional Core Course-15** **B.Tech (CSE) Semester VII** **WEB-TECHNOLOGY (DESIGN & ARCHITECTURE USING .NET)**	**L-3** **T-1** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding basic components of a Web Technology (Design And Architecture Using .NET).	
CO2.	Understanding various categories of programs, Web, Window and Console Application. Organize and work with many projects.	
CO3.	Applying skills and concepts to built small real life applications using Web Technology (Design And Architecture Using .NET) standards.	
CO4.	Analyzing the usage of the Web Technology (Design And Architecture Using .NET) programs to create professional, academic, business and many software projects.	
CO5.	Developing personal, academic and business documents by following the current professional and/or industry standards.	
Course Content:		
Unit-1:	**Basics of Web-Technology:** Web Pages; HTML; Designing static HTML Pages using tags: Textbox, Button, Radio Button, Check Box, Text Area, Image, Links, Anchors, Table, Lists, Dropdown List; Form Submission using Get and Post Methods; JavaScript: Adding JavaScript to static HTML pages; Publishing a website.	**8 Hours**
Unit-2:	**Architecture of the ·Net Framework Development Platform:** Compiling Source Code into Managed Modules; Parts of a Managed Module: PE Header, CLR Header, Metadata, Intermediate Language (IL), Combining Managed Modules into Assemblies Loading the CLR; Executing the Assembly Code; The ·Net Framework: Class Library, Common Type System, Common Language Specifications, Building, Packaging, Deploying, and Administering Applications and Types.	**8 Hours**
Unit-3:	**Visual Studio ·Net:** Installing .Net Framework (2.0, 3.0 &4) and the Visual Studio .NET IDE. **ASP ·Net:** Web Forms; Applications; Application Configurations; Server Controls: Using standard controls, Using Rich Controls, Using Validation Controls, Data Bound Controls, Data Source Controls.	**8 Hours**
Unit-4:	**Designing ASP ·Net Websites**: Using Standard Controls on Master Pages; Designing Websites with Themes; Creating Custom Controls; ADO ·Net, Connected vs. Disconnected Data Access;	**8 Hours**
Unit-5:	**Site Navigation:** Navigation Control; Site Maps.**Security Mechanism:** Login Controls; Session Management; Localization and Globalization of yoursite; designing a Sample e-mail web application: Using Master Page, Standard Controls, JavaScript, AJAX; Cookies and Sessions; Uploading files and Data Bound Controls such as Grid View and Repeaters.	**8 Hours**
Text Books:	**1.** Hejsberg, A. and Wiltamuth, S., *C# Developers Guide*, Addison-Wesley. .	

Reference Books:	**1.** Greg, H., Jason, W., Saurabh, N., *C#·Net Developers Guide*, SyngRess. **2.** Robinson, S., Jay, G., *C#*, Wrox Press Professional. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/106/106106156/ https://www.youtube.com/channel/UCvtT19MZW8dq5Wwfu6B0oxw	

Course Code: ECS703	**Professional Core Course-16** **B.Tech (CSE) Semester VII** **CRYPTOGRAPHY AND NETWORK SECURITY**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding vulnerability and the weaknesses of unsecured network	
CO2.	Understanding information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of network security.	
CO3.	Applying different encryption and decryption techniques to solve problems related to confidentiality and authentication	
CO4.	Analyzing the performance of different encryption algorithms for verifying the integrity of varying message sizes.	
CO5.	Analyzing different digital signature algorithms to achieve authentication and create secure applications	
CO6.	Developing a secure network system using cryptographic utilities and authentication mechanisms.	
Course Content:		
Unit-1:	**Network Security:** Attacks; Services & Mechanisms; Conventional Encryption: Classical Encryption Techniques, Model and Steganography.	**8 Hours**
Unit-2:	**Encryption Schemes:** DES: Standard, Strength; Block Cipher Design Principles; Block Cipher Modes of Operation: Triples DES; Placement & Encryption Function: Key Distribution, Random Number Generation, Placement of Encryption Function.	**8 Hours**
Unit-3:	**Public-Key Cryptography:** Principles; RSA Algorithm; Key Management; Fermat's &Euler's Theorems; Primarily Miller Test; Chinese Remainder Theorem.	**8 Hours**
Unit-4:	**Message Authentication & Hash Functions:** Authentication: Requirements, Protocol, Functions, Message Authentication Codes, Hash Functions, Birthday Attacks, Security Of Hash Function & MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA). **Digital Signatures**: Digital Signature Standard (DSS), Proof of Digital Signature Algorithm.	**8 Hours**
Unit-5:	**IP Security:** Electronic Mail Security, Pretty Good Privacy (PGP), S/MIME, Authentication Header, Encapsulating Security Payloads, Combining Security Associations; Key Management. **Web Security:** Secure Socket Layer & Transport Layer Security, Secure Electronic Transaction (Set) **System Security**: Intruders; Viruses; Firewall Design Principles; Trusted Systems.	**8 Hours**
Text Books:	**1.** Stallings, W., *Cryptography and Network Security: Principles and Practice*, Prentice Hall.	
Reference Books:	Johannes, A. B., *Introduction to Cryptography*, Springer. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/108/108/108108123/ https://nptel.ac.in/courses/106/105/106105195/	

Course Code: ECS709	**Professional Core Course-17** **B.Tech (CSE) Semester VII** **CLOUD COMPUTING**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the Cloud Computing and its role in current scenario.	
CO2.	Understanding the different models of Cloud Computing and their limitations	
CO3.	Understanding the importance of Cloud services and economic factors related to them	
CO4.	Analyzing various risk factors involved in Cloud Computing and to tackle them using risk management techniques	
CO5.	Evaluating the virtual data centre architecture, governance strategy, security mechanism and contingency plans.	
Course Content:		
Unit-1:	**Fundamentals:** Cloud Computing definition, Essential characteristics, principals, Usage, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery	**8 Hours**
Unit-2:	**Cloud Storage, Security and Design:** Virtualized Data Center Architecture, concept, planning and design, disaster recovery principles, Managing VDC environments and infrastructures, Storage strategy and governance; security and regulations, Designing secure solutions, Securing storage in virtualized and cloud environments, Monitoring and management; security auditing and SIEM.	**8 Hours**
Unit-3:	**Cloud Services and Economics:** Introduction to cloud services, Reliability, availability and security of services deployed, performance and scalability of services, tools and technologies used to manage cloud services deployment; Cloud Economics : Availability of infrastructure, choosing a Cloud platform for an organization, application requirements, economic constraints & business needs,	**8 Hours**
Unit-4:	**Governance and Enterprise Risk Management**: Information security governance processes, Governance and enterprise risk management in Cloud Computing, Governance Recommendations, Enterprise Risk Management Recommendations, Information Risk Management Recommendations and Third Party Management Recommendations	**8 Hours**
Unit-5:	**Storage Network Design:** Architecture of storage, analysis and planning. Storage network design considerations; NAS and FC SANs, hybrid storage networking technologies (iSCSI, FCIP, FCoE), design for storage virtualization in cloud computing, host system design considerations.	**8 Hours**
Text Books:	1. David, E.Y. Sarna, Implementing and Developing Cloud Computing Applications, CRC Press.	
Reference Books:	1. Mather, T., Cloud Security and Privacy: An Enterprise Perspective On Risks And Compliance, O'Relly 2. Volker Herminghaus, Albrecht Scriba, "Storage	

	Management in Data Centers" Springer; editioN[ISBN: 978-3540850229]. 2009. 3. Gautam Shroff, "Enterprise Cloud Computing Technology Architecture Applications", Cambridge University Press; 1 edition, [ISBN: 978-0521137355], 2010. 4. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach" McGraw-Hill Osborne Media; 1 edition [ISBN: 0071626948], 2009. 5. Dimitris N. Chorafas, "Cloud Computing Strategies" CRC Press; 1 edition [ISBN: 1439834539],2010 ***Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/105/106105167/ https://www.youtube.com/watch?v=EN4fEbcFZ_E	

Course Code: ECS751	**Laboratory Course-19** **B.Tech (CSE) Semester VII** **WEB TECHNOLOGY(DESIGN AND ARCHITECTURE USING .NET) (LAB)**	**L-0** **T-0** **P-4** **C-2**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding basic components of a Web Technology (Design And Architecture Using .NET).	
CO2.	Understanding various categories of programs, Web, Window and Console Application. Organize and work with many projects.	
CO3.	Applying skills and concepts to built small real life applications using Web Technology (Design And Architecture Using .NET) standards.	
CO4.	Analyzing the usage of the Web Technology (Design And Architecture Using .NET) programs to create professional, academic, business and many software projects.	
CO5.	Developing personal, academic and business documents by following the current professional and/or industry standards.	
	LIST OF EXPERIMENTS	
	1. To write HTML/Java scripts to display your CV in Web Browser. **2.** To Create and annotate of static web pages using any HTML editor. **3.** To write a program to use XML and JavaScript for creation of your homepage. **4.** To write a program in XML for creation of DTD which specifies a particular set of rules? **5.** To create a Style sheet in CSS/XSL and display the document in Web Browser. **6.** To write a Java Servlet for HTTP Proxy Server. **7.** To write a program to use JSP pages for sharing session and application data of HTTP Server. **8.** To write a program to use JDBC connectivity program for maintaining database by sending queries.	

Course Code: ECS752	**Laboratory Course-20** **B.Tech (CSE) Semester VII** **CRYPTOGRAPHY AND NETWORK SECURITY (LAB)**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Applying the knowledge of symmetric cryptography to implement simple ciphers.	
CO2.	Applying the concept to implement public key algorithms like RSA.	
CO3.	Applying symmetric cryptography and asymmetric cryptography tools like Diffie Hellman algorithm and Digital Signature to check the integrity of varying message sizes.	
CO4.	Analyzing performance of hashing algorithms.	
CO5.	Analyzing the different network reconnaissance tools to gather information about networks	
	LIST OF EXPERIMENTS	
	1. To write a program in C to implement Caesar cipher. 2. To write a program in C to implement "Vigenere Cipher" technique. 3. To write a program in C to implement Extended Euclid Algorithm. 4. To write a program in C to implement Chinese remainder theorem. 5. To write a program in C to implement Diffie Hellman algorithm 6. To write a program in C to implement Play-fair Cipher. 7. To write a program in C to implement RSA algorithm. 8. To configure a mail agent to Digital Signature and send a mail and verify the correctness of this system. 9. To configure the Windows Firewall feature in Windows XP Service Pack 2.	

Course Code: ECS713	Professional Elective Courses (PEC)-III B.Tech (CSE) Semester VII **DATA COMPRESSION**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the concept of loss less and lossy data compression techniques.	
CO2.	Understanding the methods of loss less image compression, text compression, and audio compression.	
CO3.	Understanding statistical basis and performance metrics for lossless as well as lossy compression	
CO4.	Analyzing the operation of a range of commonly used Compression techniques	
CO5.	Applying loss less and lossy data compression techniques in real-world applications.	
Course Content:		
Unit-1:	Introduction Compression Techniques: Loss less compression, Lossy Compression, Measures of performance, Modeling and coding, Mathematical Preliminaries for Lossless compression: A brief introduction to information theory, Models: Physical models, Probability models, Markov models, composite source model, Coding: uniquely decodable codes, Prefix codes.	**8 Hours**
Unit-2:	Huffman coding The Huffman coding algorithm: Minimum variance Huffman codes, Adaptive Huffman coding: Update procedure, Encoding procedure, Decoding procedure. Golomb codes, Rice codes, Tunstall codes, Applications of Hoffman coding: Loss less image compression, Text compression, Audio Compression.	**8 Hours**
Unit-3:	Arithmetic Coding a sequence, Generating a binary code, Comparison of Binary and Huffman coding, Applications: Bi-level image compression-The JBIG standard, JBIG2, Image compression. Dictionary Techniques: Introduction, Static Dictionary: Diagram Coding Adaptive Dictionary. The LZ77 Approach, The LZ78 Approach, Applications: File Compression-UNIX compress, Image Compression: The Graphics Interchange Format (GIF), Compression over Modems: V.42 bits, Predictive Coding: Prediction with Partial match (ppm): The basic algorithm, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The BurrowsWheeler Transform: Move-to-front coding, CALIC, JPEG-LS, Multi-resolution Approaches, Facsimile Encoding, Dynamic Markoy Compression.	**8 Hours**
Unit-4:	Mathematical Preliminaries for Lossy Coding Distortion criteria, Models, Scalar Quantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Non uniform Quantization.	**8 Hours**
Unit-5:	Vector Quantization Advantages of Vector Quantization over Scalar Quantization, The Linde-BuzoGray Algorithm, Tree structured Vector Quantizer. Structured VectorQuantizer.	**8 Hours**
Text Books:	Khalid Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers	
Reference Books:	1. Rafael C. Gonzalez and Richard E. Woods: Digital Image Processing, Addison-Wesley. 2. Gilbert Held: Data and Image Compression, John Wiley &	

	Sons Ltd. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://www.youtube.com/watch?v=5wRPin4oxCo http://www.nptelvideos.com/video.php?id=989	

Course Code: ECS716	Professional Elective Courses (PEC)-III B.Tech (CSE) Semester VII **DIGITAL IMAGE PROCESSING**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the different types of image transforms and their properties	
CO2.	Understanding the different techniques employed for the enhancement of images	
CO3.	Understanding the concept of image restoration & degradation models.	
CO4.	Understanding various image compression and color models like RGB, CMY.	
CO5.	Analyzing various image segmentation techniques to segment the digital image into sub-images.	
Course Content:		
Unit-1:	**Digital Image Fundamentals:** Representation; Elements of visual perception; Simple image formation model; Image sampling and quantization; Basic relationships between pixels; Imaging geometry; Review of matrix theory results: Row and Column ordering, Toeplitz, Circulant and Block matrices; Review of image transforms: 2D-DFT, FFT, WALSH, HADAMARD, HAAR, DCT and wavelet transforms	**8 Hours**
Unit-2:	**Image Enhancement:** Spatial domain methods: Point processing, Intensity transformations, histogram processing; Image subtraction and averaging; Spatial filtering: Smoothing, Sharpening, Frequency domain methods; Filtering: Low pass, High pass filtering, Homomorphic filtering; Generation of spatial masks from frequency domain specifications.	**8 Hours**
Unit-3:	**Image Restoration:** Degradation model; Diagonalization of circulant and block Circulant matrices;Algebraic approaches: Inverse filtering, Wiener filtering, Constrained least squares restoration, Interactive restoration, Geometric transformations; Fundamentals of color image processing: Color models; RGB, CMY, YIQ, HIS; pseudo color image processing, intensity slicing, Gray level to color transformation.	**8 Hours**
Unit-4:	**Image Compression:** Redundancy: Coding, Inter Pixel, Psycho Visual; Fidelity criteria; Models; Elements of information theory; Error free compression: Variable length, Bit plane, Lossless predictive, Lossy compression, Lossy predictive, Transform coding. JPEG, MPEG, fractals.	**8 Hours**
Unit-5:	**Image Segmentation:** Detection of discontinuities: Point, Line and Edge and Combined detection; Edge linking and Boundary description; Local and global processing using HOUGH transform; Thresholding; Region oriented segmentation: Basic formulation, Region growing by pixel aggregation, Region splitting and merging; Use of motion in segmentation; Representation and description.	**8 Hours**
Text Books:	**1.** Gonzalez R. C., Woods R. E., *Digital Image Processing*, Pearson Education.	
Reference Books:	**1.** Pratt W. K., *Digital Image Processing*, John Wiley and Sons. **2.** Boyle R., Sonka M., Hlavac V., *Image Processing, Analysis And Machine Vision*, Vikas Publishing House. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic	https://nptel.ac.in/courses/106/105/106105032/	

Reference Material:	https://www.youtube.com/watch?v=i8RjituGfrQ	

Course Code: ECS717	Professional Elective Courses (PEC)-III B.Tech (CSE) Semester VII **Android Programming**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the android framework	
CO2.	Understanding the various application components	
CO3.	Understanding view and viewgroup objects	
CO4.	Understanding custom views	
CO5.	Understanding different classes and interfaces which deals with database	
CO6.	Developing small android applications related to specific domain	
Course Content:		
Unit-1:	**Overview:** What is Android, Features of Android, Setting up Android Environment, Android Architecture, Application Framework. Application components (activities, services, Broadcast receivers, content providers). First sample application, Anatomy of Android application, Main activity file, Manifest file, Strings file, R file, Layout file, Running the application.	**8 Hours**
Unit-2:	**Emulator**-Android Virtual Device, Organizing and accessing the resources, Fragments, Intents & Filters, Basic UI Design, Form widgets, Text Fields, UI Controls, UI Layouts.	**8 Hours**
Unit-3:	**Event Handling**: Event Listeners and Handlers, Event Listeners Registration. Preferences, Menus, Custom Components, Tabs and Tab Activity	**8 Hours**
Unit-4:	Styles and Themes, Drag and Drop, Content Provider (SQLite Programming, SQLiteOpenHelper, SQLiteDatabase, Cursors).	**8 Hours**
Unit-5:	Location Based Services, Sending Emails, Sending SMS **Other developing platform** Intro to Objective-C Objective-C and Smalltalk,Objective-C, C , C++ and Mac OS X ,Objective-C and iPhone/iPad/iOS **Introduction iOS and SDK** iOS SDK: iPhone, iPod Touch, Xcode,Interface Builder iPhone Simulator, DebuggerClasses, Objects, Methods and Properties id, null, @interface,@end,@implementation,Archiving ,@property, @synthesizee, @dynamic,Data Types, control flow statement, More about Classes, More about Variables and Data Types Inheritance,Polymorphism, Dynamic Typing, and Dynamic BindingCocoa and Touch Cocoa Framework and Cocoa Classes Subclassing Xcode Simulator Interface Builder Nib files File's Owner Outlet Connections Action Connections Inspector.	**8 Hours**
Text Books:	1Carmen Delessio., *Sams Teach Yourself Android Application Development in 24 Hours*, SAMS	
Reference Books:	Jonathan Simon, *Head First Android Development*, O'Reilly *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference	https://nptel.ac.in/courses/106/106/106106147/ https://developer.android.com/studio/archive	

Material:		

Course Code: **ECS754**	**Laboratory Course** **B.Tech (CSE) Semester VII** **Data compression (LAB)**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Applying Huffman Coding algorithm in data compression.	
CO2.	Applying LZ77 approach in data compression.	
CO3.	Applying LZ78 approach in data compression.	
CO4.	Applying binary code algorithm for compression.	
CO5.	Applying partial match in prediction.	
	LIST OF EXPERIMENTS	
	1. To write a program in C for implementing Huffman coding. 2. To write a program in C for implementing The LZ77 Approach. 3. To write a program in C for The LZ78 Approach. 4. To write a program in C for binary code. 5. To write a program in C for Prediction with Partial match	

Course Code: ECS756	**Laboratory Course** **B.Tech (CSE) Semester VII** **DIGITAL IMAGE PROCESSING USING SCI-LAB (LAB)**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Applying the spatial and frequency domain image enhancement techniques to enhance the brightness and contrast of the blurred images	
CO2.	Applying the image enhancement and Image restoration.	
CO3.	Applying the loss less and lossy image compression techniques to reduce the number of required bits as much as possible without losing image visual quality	
CO4.	Applying the image segmentation techniques to divide the images into sub-images.	
CO5.	Applying degradation models to improve the quality of blurred images.	
	LIST OF EXPERIMENTS	
	1. To Write Program To Implement The Spatial Image Enhancement Functions On A Bitmap Image – (a) Mirroring (Inversion) (b) Rotation (Clockwise) (c) Enlargement (Double Size) **2.** To Write Program To Implement (a) Low Pass Filter (b) High Pass Filter **3.** To Write Program To Implement (a) Arithmetic Mean Filter (b) Geometric Mean Filter **4.** To Write Program To Implement Smoothing And Sharpening Of An Eight Bit Color Image **5.** To Write Program To Implement (a) Boundary Extraction Algorithm (b) Graham's Scan Algorithm **6.** To Write Program To Implement (a) Edge Detection (b) Line Detection	

Course Code: ECS757	Laboratory Course B.Tech (CSE) Semester VII **ANDROID PROGRAMMING (LAB)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding Activity	
CO2.	Understanding view system	
CO3.	Understanding menu and its types	
CO4.	Applying the web services and map based activity	
CO5.	Developing small android based applications.	
	LIST OF EXPERIMENTS	
	1. Creating Applications with Multiple Activities and a Simple Menu using ListView 2. Creating Activities For Menu Items and Parsing XML Files 3. Writing Multi-Threaded Applications 4. Using WebView and Using the Network 5. Graphics Support in Android 6. Preferences and Content Providers 7. Location Services and Google Maps in Android	

Course Code: ECS791	Project / Industrial Training/ Seminar-4 B.Tech (CSE) Semester VII INDUSTRIAL TRAINING & PRESENTATION	L-0 T-0 P-0 C-4
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding research and development on latest technology.	
CO2.	Understanding greater clarity about academic and career goals	
CO3.	Understanding of administrative functions and company culture	
CO4.	Analyzing a capacity for critical reasoning and independent learning	
CO5.	Developing ability to effectively communicate solution to problems (oral, visual, written).	
	Description	
	Students will have to undergo industrial training of eight weeks in any industry or reputed organization after the VI semester examination in summer. The evaluation of this training shall be included in the VII semester evaluation. The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the VI semester and shall be the nodal officer for coordination of the training. Students will prepare an exhaustive technical report of the training during the VII semester which will be duly signed by the officer under whom training was undertaken in the industry/ organization. The covering format shall be signed by the concerned office in-charge of the training in the industry. The officer-in-charge of the trainee would also give his rating of the student in the standard University format in a sealed envelope to the Principal of the college. The student at the end of the VII semester will present his report about the training before a committee constituted by the Director of the College which would comprise of at least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director. The marks by the external examiner would be based on the report submitted by the student which shall be evaluated by the external examiner and cross examination done of the student concerned.	

	Not more than three students would form a group for such industrial training/ project submission.	

Internal: 50 Marks
By the faculty guide - 25 marks
By committee appointed by the director – 25 marks

External: 50 Marks
By officer-in-charge trainee in industry – 25 marks
By external examiner appointed by the university – 25 marks

Course Code: ECS799	**Project / Industrial Training/ Seminar-5** **B.Tech (CSE) Semester VII** **PROJECT WORK PHASE- 1** **(Synopsis, Literature Survey & Presentation)**	**L-0** **T-0** **P-8** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the phases of SDLC and performing initial investigation about project.	
CO2.	Understanding to design ER-Diagram and DFD of the project.	
CO3.	Applying the designing procedures to design database.	
CO4.	Developing SRS Document for the project..	
CO5.	Developing Forms and Front end of the Project.	
	Description	
	A group of students, not more than three, will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified in the starting of the VII semester. The group will carry out the literature search and collect required material for carrying out the project. The group will prepare a report not exceeding 15 pages at the end of semester. The assessment of performance of students should be made at least twice in each semester i.e. VII and VIII. In this semester the student shall present the progress of project live as also using overheads project or power point presentation on LCD to the internal committee as also the external examiner. The evaluation committee shall consist of faculty members constituted by the college which would comprise of at-least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Principal.	

The marking shall be as follows.

Internal: 50 Marks

By The Faculty Guide - 25 Marks

By Committee Appointed By the Director – 25 Marks

External: 50 Marks

By External Examiner Appointed By the University – 50 Marks

Course Code: EGP711	DGP-7 B.Tech (CSE) Semester VII **DISCIPLINE & GENERAL PROFICIENCY**	L-0 T-0 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Understanding*** the social responsibilities toward the institute and humanity.	
CO2.	***Understanding*** the need of participations in different events to groom the personality.	
CO3.	***Understanding*** the discipline and follow them during academics and institutional activities.	
CO4	***Understanding*** Social awareness towards society.	
CO5.	***Applying*** actively towards various institution activities like workshop, seminar and other events	
	There shall be continuous evaluation of the student on the following broad parameters:	
	1. Observance of dress code. **2.** Participation in Conferences /Workshops / Seminars. **3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time. **4.** Participation in community projects including NSS. **5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time. **6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel. **7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level. **8.** General behavior **9.** Any extraordinary achievement. The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).	

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S		Enroll	Student	Dress	Participation	Participation	Participation	Participation	Participation	General	Any Extra

No		No.	Name	code	in Conferences /Workshops / Seminars	in guest lectures, invited talks and special technical sessions	in community Services	in Culture & extra curriculum activities, Department Club Activities	in sports/ co-curricular activities	Behavior	Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Course Code: EHM801	**Humanities and Social Sciences including Management** **Course -8** **B.Tech (CSE) Semester VIII** **Project Management for Engineers**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding Project Management & its evaluation	
CO2.	Understanding and analysis the technical feasibility of a project	
CO3.	Understanding financial system and analyze the use of funding mechanism	
CO4.	Understanding the application of laws related to business and project execution	
CO5.	Understanding Financial Accounting and Financial Statements for business	
Course Content:		
Unit-1:	**Project Management & Sources of Funds:** Project Management- Introduction, Need, Phases and Processes of Project Management. **Financial Markets as Sources of Funds:** Money Market & Capital Market. Overview of Regulatory Framework of Financial System in India- SEBI, RBI, and NABARD.	**8 Hours**
Unit-2:	**Project Feasibility & Analysis:** Project Identification, Generation Of Ideas, SWOT Analysis, Screening and Project Rating Index. Market & Demand Analysis: Collection of Data, Market Survey, Project Risk Analysis.	**8 Hours**
Unit-3:	**Project Technical Analysis:** Selection of Technology, Plant Capacity, Structures and Civil Work. Location- Factors, Costs, Availability of Resources. Environmental Aspects, Project Implementations. **Financial Analysis:** Project Cost, Cost of Production, Cost of Capital, Time Value of Money.	**8 Hours**
Unit-4:	**Regulatory Framework for Project:** Legal Environment of Business, Law of Contract- Meaning and Concepts, Contract of Agent and Agency, Power of Attorney, Consumer Protection Law- Introduction, Rights of Consumers, Complaints & its Remedies, Intellectual Property Law- Introduction, Rights from Patents & Copyright, Infringement its Remedies, Overview of Companies Act, Foreign Exchange Management Law, Labour Laws in India, Various Project Approvals from Local, State & Central Government.	**8 Hours**
Unit-5:	**Basics of Accounting for Project:** Introduction, Meaning of Account & Accountancy, Book-keeping, Accounting Process, Users of accounting information, Double Entry Accounting, Accounting Equation. Introduction to Trial Balance, Trading Account, Profit and Loss Account, Balance Sheet, Cash Flow and Fund Flow. Budget- Meaning of a Budget & Budgeting, Budgetary Control, Types of Budgets.	**8 Hours**
Text Books:	1. Chaudhary, S., Project Management, Tata Mc Graw Hill Publications	
Reference Books:	1. Bhole L.M., Financial Institutions and Markets, Tata McGraw-Hill	

	2. Srivastava, R.M & Nigam Divya, Management of Financial Institutions, Himalaya 3. Goyal B.B., Project Management: A Development Perspective, Deep & Deep Publications. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/110/104/110104073/ https://www.youtube.com/watch?v=gEhr0ZAL2zE	

Course Code: ECS812	Professional Core Course-18 B.Tech (CSE) Semester VIII **Big Data Analytics**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Understanding*** the requirement of Big data with respect to 5 V's .	
CO2.	***Understanding*** the basic storage structure used in Big data with respect to clusters.	
CO3.	***Understanding*** the Hadoop Ecosystem and its components.	
CO4.	***Analyzing*** the data processing in Big data with HIVE , PIG and HBASE.	
CO5.	***Analyzing*** the functionality and working of Zookeeper for monitoring Servers in Cluster.	
Course Content:		
Unit-1:	**INTRODUCTION TO BIG DATA:** Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.	**8 Hours**
Unit-2:	**INTRODUCTION HADOOP:** Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.	**8 Hours**
Unit-3:	**HADOOP ARCHITECTURE:** Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.	**8 Hours**
Unit-4:	**HIVE AND HIVEQL, HBASE:**Hive Architecture and Installation, Comparison with Traditional Database, HiveQL – Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Subqueries, HBase conceptsAdvanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper	**8 Hours**
Unit-5:	**Big Data Analytics:** Introduction to Big data Business Analytics - State of the practice in analytics role of data scientists - Key roles for successful analytic project - Main phases of life cycle - Developing core deliverables for stakeholders.	**8 Hours**
Text Books:	Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.	

Reference Books:	1. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012. 2. Vignesh Prajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013. 3. Tom Plunkett, Brian Macdonald et al, "Oracle Big Data Handbook", Oracle Press, 2014 4. Jy Liebowitz, "Big Data and Business analytics",CRC press, 2013. Chris Eaton, Dirk Deroos, Tom Deutsch et al., "Understanding Big Data", McGrawHIll, 2012 *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/104/106104189/ https://www.youtube.com/watch?v=3SK9iJNYehg	

Course Code: ECS809	Professional Elective Courses (PEC)-5 B.Tech (CSE) Semester VIII **PATTERN RECOGNITION**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the concept of a pattern and the various approaches of pattern recognition.	
CO2.	Understanding the basic methods of feature extraction, feature evaluation, and dimension reduction of feature vectors.	
CO3.	Understanding various supervised and unsupervised learning approaches.	
CO4.	Understanding machine learning concepts and range of problems that can be handled by machine learning.	
CO5.	Applying both supervised and unsupervised classification methods to detect and characterize patterns in real-world data.	
Course Content:		
Unit-1:	Introduction: Basics of pattern recognition, Design principles of pattern recognition system, Learning and adaptation, Pattern recognition approaches, Mathematical foundations – Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chi squared test.	**8 Hours**
Unit-2:	Statistical Patten Recognition: Bayesian Decision Theory, Classifiers, Normal density and discriminate functions.	**8 Hours**
Unit-3:	Parameter estimation methods: Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods - Principal Component Analysis (PCA), Fisher Linear discriminate analysis, Expectation-maximization (EM), Hidden Markov Models (HMM), Gaussian mixture models.	**8 Hours**
Unit-4:	Nonparametric Techniques: Density Estimation, Parzen Windows, K-Nearest Neighbor Estimation, Nearest Neighbor Rule, Fuzzy classification.	**8 Hours**
Unit-5:	Unsupervised Learning & Clustering: Criterion functions for clustering, Clustering Techniques: Iterative square - error partitional clustering – K means, agglomerative hierarchical clustering, Cluster validation.	**8 Hours**
Text Books:	1Richard O. Duda, Peter E. Hart and David G. Stork, "Pattern Classification",	
Reference Books:	S. Theodoridis and K. Koutroumbas, "Pattern Recognition", 4th Edition, Academic Press, 2009. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/117/105/117105101/ https://www.youtube.com/watch?v=ZGUlaomeJ-k	

Course Code: ECS810	Professional Elective Courses (PEC)-5 B.Tech (CSE) Semester VIII NEURAL NETWORK	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the human brain, role of neurons, neuroscience, neuro-computing and learning process in neurons	
CO2.	Understanding the basic models and functions of neurons & perceptrons	
CO3.	Analyzing the role of mean square and gradient descent algorithm for non linearly separable problems	
CO4.	Analyzing the model consisting of multilayer neurons using back propagation for better reliability and approximation	
CO5.	Applying the principal component, features of Recurrent network and temporal feed forward network and display their computer simulation	
Course Content:		
Unit-1:	Neuro computing and Neuroscience Historical notes, human Brain, neuron Mode, Knowledge representation, N.N Learning process: Supervised and unsupervised learning, Error correction learning, competitive learning, adaptation.	**8 Hours**
Unit-2:	Basic Models of Artificial neurons, activation Functions, aggregation function, single neuron computation, multilayer perceptron, least mean square algorithm, gradient descent rule, nonlinearly separable problems in NN.	**8 Hours**
Unit-3:	Multilayered network architecture, back propagation algorithm, heuristics for making BP algorithm performs better, approximation properties of RBF networks and comparison with multilayer perceptron.	**8 Hours**
Unit-4:	Recurrent network and temporal feed-forward network, implementation with BP, self organizing map and SOM algorithm, properties of feature map and computer simulation. Principal component and Independent component analysis.	**8 Hours**
Unit-5:	Analyticity of activation function, Complexity analysis of network models, Soft computing, Neuro-Fuzzy-genetic algorithm Integration.	**8 Hours**
Text Books:	**1.** J.A. Anderson, An Intoduction to Neural Networks, MIT	
Reference Books:	1. R.L. Harvey, Neural Network Principles, PHI 2. Kosko, Neural Network and Fuzzy Sets, PHI *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/106/106106184/ https://www.youtube.com/watch?v=O5xeyoRL95U	

Course Code: ECS811	Professional Elective Courses (PEC)-V B.Tech (CSE) Semester VIII NATURAL LANGUAGE PROCESSING	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the VC dimension and PAC learning models for noise reduction, model selection and generalization	
CO2.	Understanding the role of Bayesian Decision theory for classification	
CO3.	Understanding dimensionality reduction principles for scaling and analysis of models	
CO4.	Understanding the concept of clustering and maximization algorithm	
CO5.	Understanding the back propagation in multilayer neural networks and role of perceptrons in ANN models	
Course Content:		
Unit-1:	Introduction: Machine learning problems, Types of learning, Applications of Machine Learning, Key elements of Machine Learning, Supervised Learning: Vapnik-Chervonenkis (VC) Dimension, Probably Approximately Correct (PAC) Learning, Noise, Learning Multiple Classes, Regression, Model Selection and Generalization.	**8 Hours**
Unit-2:	**Bayesian Decision Theory**:Classification, Losses and Risks, Association Rules, **Dimensionality Reduction:**Subset Selection, Principal Components Analysis, Multidimensional Scaling, Linear Discriminant Analysis.	**8 Hours**
Unit-3:	**Clustering:** Mixture Densities, k-Means Clustering, Expectation-Maximization Algorithm, Supervised Learning after Clustering, Hierarchical Clustering, **Classification:** Decision Trees, Univariate Trees, Pruning, Rule Extraction from Trees, Learning Rules from Data.	**8 Hours**
Unit-4:	**Artificial Neural Networks:**Introduction, neural network representation, perceptrons, multilayer networks and back propogation algorithm.	**8 Hours**
Unit-5:	**Local Models:** Introduction, Competitive Learning, Radial Basis Functions, Incorporating Rule-Based Knowledge, Normalized Basis Functions, Competitive Basis Functions, Learning Vector Quantization, Hierarchical Mixture of Experts.	**8 Hours**
Text Books:	1. Ethem Alpaydin, "Introduction to Machine Learning" 2nd Edition, The MIT Press, 2010. .	
Reference Books:	1. Christopher M. Bishop, "Pattern Recognition and Machine Learning" by Springer, 2007. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/105/106105158/ https://www.youtube.com/watch?v=05ONoGfmKvA	

Course Code: ECS814	Professional Elective Courses (PEC)-V **B.Tech (CSE) Semester VIII** **BLOCK CHAIN TECHNOLOGY**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding of the history of Block-chain ,different models and protocols	
CO2.	Understanding the basic of crypto-currency and different algorithms used in it.	
CO3.	Understanding the concept of Bitcoin and analysis of its properties using mathematical induction	
CO4.	Understanding the concept of Ethereum, Ethereum Virtual Machine (EVM) and smart concepts	
CO5.	Understanding the concept of Zero Knowledge proofs and protocols	
Course Content:		
Unit-1:	The consensus problem - Asynchronous Byzantine Agreement - AAP protocol and its analysis - Nakamoto Consensus on permission-less, nameless, peer-to-peer network - Abstract Models for BLOCKCHAIN - GARAY model - RLA Model - Proof of Work (PoW) as random oracle - formal treatment of consistency, liveness and fairness - Proof of Stake (PoS) based Chains - Hybrid models (PoW + PoS)	**8 Hours**
Unit-2:	cryptographic basics for cryptocurrency - a short overview of Hashing, signature schemes, encryption schemes and elliptic curve cryptography	**8 Hours**
Unit-3:	Bitcoin - Wallet - Blocks - Merkley Tree - hardness of mining - transaction verifiability - anonymity - forks - double spending - mathematical analysis of properties of Bitcoin	**8 Hours**
Unit-4:	Ethereum - Ethereum Virtual Machine (EVM) - Wallets for Ethereum - Solidity - Smart Contracts - some attacks on smart contracts	**8 Hours**
Unit-5:	(Trends and Topics) - Zero Knowledge proofs and protocols in Blockchain - Succinct non interactive argument for Knowledge (SNARK) - pairing on Elliptic curves - Zcash.	**8 Hours**
Text Books:	1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Press, 2016.	
Reference Books:	1. Joseph Bonneau et al, SoK: Research perspectives and challenges for Bitcoin and cryptocurrency, IEEE Symposium on security and Privacy, 2015 (article available for free download) { curtain raiser kind of generic article, written by	

	seasoned experts and pioneers}. 2. J.A.Garay et al, The bitcoin backbone protocol - analysis and applications EUROCRYPT 2015 LNCS VOl 9057, (VOLII), pp 281-310. (Also available at eprint.iacr.org/2016/1048) . (serious beginning of discussions related to formal models for bitcoin protocols). 3. R.Pass et al, Analysis of Blockchain protocol in Asynchronous networks , EUROCRYPT 2017, (eprint.iacr.org/2016/454) . A significant progress and consolidation of several principles). 4. R.Pass et al, Fruitchain, a fair blockchain, PODC 2017 (eprint.iacr.org/2016/916) ***Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/105/106105184/ https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs01/	

Course Code: ECS805	Professional Elective Courses (PEC)-VI B.Tech (CSE) Semester VIII DISTRIBUTED SYSTEM	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding fundamental characteristics of distributed system.	
CO2.	Understanding the concept of distributed objects and remote invocation methods.	
CO3.	Understanding different distributed models for remote communication.	
CO4.	Understanding the security mechanism and protocols for distributed transactions.	
CO5.	Analyzing the concept of distributed algorithms and their performance associated with security issues and distributed deadlock.	
Course Content:		
Unit-1:	Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. System Models: Architectural models, Fundamental Models Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport and vectors logical clocks, Causal ordering of messages, global state, termination detection. Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.	**8 Hours**
Unit-2:	Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms. Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.	**8 Hours**
Unit-3:	Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study. Security: Overview of security techniques, Cryptographic algorithms, Digital signatures Cryptography pragmatics, Case studies: Needham Schroeder, Kerberos, SSL& Millicent. Distributed File Systems: File service architecture, Sun Network File System, The Andrew File System, Recent advances.	**8 Hours**
Unit-4:	Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control. Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed	**8 Hours**

	transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.	
Unit-5:	Distributed Algorithms: Introduction to communication protocols, Balanced sliding window protocol, Routing algorithms, Destination based routing, APP problem, Deadlock free Packet switching, Introduction to Wave & traversal algorithms, Election algorithm.CORBA Case Study: CORBA RMI, CORBA services.	**8 Hours**
Text Books:	**1.** Singhal&Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill	
Reference Books:	1. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Ed. 2. Gerald Tel, "Distributed Algorithms", Cambridge University Press *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/105/106105214/ https://www.youtube.com/playlist?list=PLsylUObW5M3CAGT6OdubyH6FztKfJCcFB	

Course Code: ECS812	Professional Elective Courses (PEC)-VI B.Tech (CSE) Semester VIII **Concepts of IoT (Internet of Things)**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the concepts of IOT	
CO2.	Understanding the architecture, different models and design principles of IOT.	
CO3.	Understanding the different technologies related to IOT.	
CO4.	Understanding the concepts of smart city development in IOT.	
CO5.	Applying IOT concepts in real word scenario like industrial automation, wireless communication etc.	
Course Content:		
Unit-1:	Introduction to Internet in general and Internet of Things: Introduction to Internet: layers, protocols, packets, services; Local Area Networks, MAC level, link protocols such as: point-to-point protocols, Ethernet, WiFi 802.11, cellular Internet access, and Machine-to-Machine (M2M).	**8 Hours**
Unit-2:	**IoT Technology Fundamentals:** IoT definitions: overview, applications, potential & challenges, and architecture; Devices and gateways, Local and wide area networking; Data management, Business processes in IoT, Everything as a Service(XaaS), IoT Analytics, Knowledge Management.	**8 Hours**
Unit-3:	**IoT-An Architectural Overview**– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. IoT examples: Case studies, e.g. sensor body-area-network and control of a smart home.	**8 Hours**
Unit-4:	**IoT Architecture-State of the Art –** Introduction, State of the art, **Architecture Reference Model-** Introduction, Reference Model and architecture, IoT reference Model; IoT Reference Architecture**:** Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.	**8 Hours**
Unit-5:	**Real-World Design Constraints-** Introduction, Technical Design constraints, Data representation and visualization, Interaction and remote control. Uses of IoT in Industrial Automation, Commercial Building Automation, Wireless communication, etc.	**8 Hours**
Text Books:	1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** 1st Edition, Academic Press, 2014.	

Reference Books:	1. Vijay Madisetti and Arshdeep Bahga, **"Internet of Things (A Hands-on-Approach)",** 1st Edition, VPT, 2014. 2. Francis daCosta, **"Rethinking the Internet of Things: A Scalable Approach to Connecting Everything",** 1st Edition, Apress Publications, 2013 *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://www.digimat.in/nptel/courses/video/106105166/L01.html https://www.youtube.com/watch?v=p4xqO_QAv-w	

Course Code: ECS813	Professional Elective Courses (PEC)-VI B.Tech (CSE) Semester VIII **MACHINE LEARNING**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the learning and different types of learning approaches that could be used for implementing Machine Learning problems.	
CO2.	Understanding the key elements of Machine Learning and the importance of model selection and generalization	
CO3.	Understanding the various components of Bayesian Decision Theory and Dimensionality Reduction for solving Machine Learning problems	
CO4.	Understanding the various approaches of Clustering and Classification for improving the learning capability of machine	
CO5.	Understanding the functions based on various rules and parameters for implementing competitive learning in Machine Learning	
CO6.	Understanding the Artificial Neural Network based multilayer networks supporting both forward and backward propagation	
CO7.	Understanding the Deep Learning and how it is different from Machine Learning and areas where Deep Learning is implemented	
CO8.	Evaluating multiple supervised learning algorithms and select the best suitable for a specific problem	
Course Content:		
Unit-1:	**Introduction to Machine Learning:** Introduction; History, Advantages, Scope and Applications; Learning Algorithms: Supervised Learning; Unsupervised Learning; Semi-Supervised Learning; Reinforcement Learning. **Decision Trees:** Introduction, Scope, Advantages; Hunt's algorithm for learning a decision tree; Details of tree induction;	**8 Hours**
Unit-2:	**KNNs, SVMs and Naïve Bayes:** Examples of few text classification problems; Naïve Bayes for text classification; Introduction to KNN algorithm; Decision boundary KNN Vs Decision tree; What is the best K; KNN Problems; Feature selection using KNNs; Linear Classifiers; Learning non-linear patterns.	**8 Hours**
Unit-3:	**ANN and Regression:** Motivation for Artificial Neural Network; Perceptron Algorithm; Decision Boundary for a single Neuron; Introduction to Linear Regression; ***R*^2**: Coefficient of Determination; Logistic regression vs Linear Regression; Can we use Regression Mechanism for Classification?; Logistic Regression – Deriving the Formula; Logistic Regression for Multi-class Classification; Logistic Regression Decision Boundary.	**8 Hours**
Unit-4:	**Feature Selection:** Introduction to feature selection: what, why, how and where?; Feature selection vs feature extraction; Feature subset selection using Filter based methods; Wrapper Methods; Wrapper Methods vs Filter Methods; Model based machine learning	**8 Hours**

	with regularization; Regularization using L2 and L1.	
Unit-5:	**Sequence Labeling, Clustering:** Introduction to Sequence Learning; Sequence Labeling as Classification; Probabilistic Sequence Models; Hidden Markov Model; Three Problems of an HMM. Basics of Clustering; Applications of Clustering; Understanding Distance based Clustering; K-means Algorithm; Hierarchical (Agglomerative) clustering; Evaluation of cluster quality	**8 Hours**
Text Books:	**1.** Brian, O, *Management Information System*, Tata McGraw Hill.	
Reference Books:	**1.** Brian, O., *Introduction to Information System*, McGraw Hill. **2.** Jawadekar, W., *Management Information System*, Tata McGraw Hill. **3.** Jain, S., *Management Information System*, Tata McGraw Hill. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/106/106106139/ https://www.youtube.com/watch?v=CzdWqFTmn0Y	

Course Code: ECS855	Laboratory Course-21 B.Tech (CSE) Semester III **BIG DATA (LAB)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***understanding*** the concept to work with basic linux commands.	
CO2.	***Applying*** the concept to install a standalone Hadoop cluster Node.	
CO3.	***Applying*** the concept to read and write data into HDFS from Linux environment.	
CO4.	***Applying*** the concept to solve a problem using MAP Reduce programming.	
CO5.	***Analyzing*** the concept for data processing using HIVE.	
	LIST OF EXPERIMENTS	
	1. Introduction, use and assessment of most recent advancements in Big Data technology along with their usage and implementation with relevant tools and technologies. 2. Map Reduce application for word counting on Hadoop cluster. 3. Unstructured data into NoSQL data and do all operations such as NoSQL query with API. 4. K-means clustering using map reduce. 5. Page Rank Computation. 6. Data retrieval from AQL. 7. Data Retrieval from JQL 8. Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics	

Course Code: ECS899	Project / Industrial Training/ Seminar-6 B.Tech (CSE) Semester III **PROJECT WORK PHASE-2**	L-0 T-0 P-12 C-6
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the process of Project development.	
CO2.	Applying the knowledge to develop applications based on SRS Document.	
CO3.	Applying the learning to develop applications on different platforms like Window, Web based or Mobile based applications to specific set of problem and their solutions.	
CO4.	Evaluating the test cases results after testing of the project along with different roles.	
CO5.	Developing good quality project to solve real world problems.	
	Students should devote themselves to prepare something tangible, which could be a working model of their thoughts based on their subject of choice. The project shall be finalized by the students based on the VII semester project work report and shall be completed and submitted at least one month before the last teaching day of the VIII semester, date of which shall be notified in the academic calendar. The assessment of performance of students should be made at least twice in each semester i.e. VII and VIII. In this semester student shall present the final project live as also using overheads project or power point presentation on LCD to the internal committee as also the external examiner. The evaluation committee shall consist of faculty members constituted by the college which would comprise of at-least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Principal.	

The marking shall be as follows.
Internal: 50 Marks
By The Faculty Guide - 25 Marks
By Committee Appointed By the Director – 25 Marks
External: 50 Marks
By External Examiner Appointed By the University – 50 Marks

Course Code: EGP811	DGP-8 B.Tech (CSE) Semester VIII **DISCIPLINE & GENERAL PROFICIENCY**	L-0 T-0 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Understanding*** the social responsibilities toward the institute and humanity.	
CO2.	***Understanding*** the need of participations in different events to groom the personality.	
CO3.	***Understanding*** the discipline and follow them during academics and institutional activities.	
CO4	***Understanding*** Social awareness towards society.	
CO5.	***Applying*** actively towards various institution activities like workshop, seminar and other events	
	There shall be continuous evaluation of the student on the following broad parameters:	
	1. Observance of dress code. **2.** Participation in Conferences /Workshops / Seminars. **3.** Attendance in guest lectures, invited talks and special technical sessions organized from time to time. **4.** Participation in community projects including NSS. **5.** Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time. **6.** Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel. **7.** Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level. **8.** General behavior **9.** Any extraordinary achievement. The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).	

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical	Participation in community Services	Participation in Culture & extra curriculum activities, Department	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement

						sessions		Club Activities			
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal