



School of Engineering and Technology

GURU GHASIDAS VISHWAVIDYALAYA

(A CENTRAL UNIVERSITY ESTABLISHED BY THE UNIVERSITIES ACT, 2009)

BILASPUR (C.G.) 495009



STUDENT'S HANDBOOK

2019-20

Bachelor of Technology Programme

Department of Computer Science & Engineering

Preface

The Institute of Technology under Guru Ghasidas Vishwavidyalaya (now a Central University since 15th Jan., 2009), Bilaspur (C.G.), was set up in the year 1997 with an objective of making available the facilities of quality higher education in the field of Engineering and Technology to the students of, particularly, the Central region of country where the rural and tribal population still remain deprived of such facilities. The Institute, remaining fully conscious of its objectives and responsibilities, is growing towards the level of a centre of excellence for quality engineering education in the country. Especially, after up-gradation of the University as a Central University, there has been many fold enhancements in infrastructural facilities as well as faculty and staff. Today, the Institute has well equipped laboratories with latest equipment, a good library, adequate computational facilities and smart E-classrooms needed for ensuring quality in higher education and research. The mission of the Institute is to create an ambiance in which new ideas, research and scholarship flourish and to engender the leaders and innovators of tomorrow.

The University campus houses faculties like Arts, Science, Social Science, Humanities, Law and Management etc, our students get opportunities of studying varied nature of elective courses from other faculties, and are groomed to work not only with a group of technically trained people but also with persons having knowledge in different domains of education.

The Institute on an average, admits around 400 students annually for the 4 - year undergraduate B. Tech programme in seven branches. Admissions are made through Joint Entrance Examination (JEE) (main) or the entrance examination conducted as per the directions of MHRD, Govt. of India. Presently, M.Tech. programme is being run by two departments (Mechanical and Chemical Engineering) and the students who are Graduate Aptitude Test in Engineering (GATE) qualified get admitted. To keep pace with new developments and changes in the field of technology, the Institute revises its Undergraduate and Postgraduate Programmes syllabi from time to time. Institute follows semester system of teaching (odd- July - December; and even- January – June).

Ours is a student-centric Institution and, therefore, the endeavor is always to ensure that students are offered the information on the existing Rules and Regulations governing the B.Tech. Programmes. The students and parents/ guardians are, therefore, advised in their own interest to get fully familiar with the academic system of the Institute and rules and regulations. Students' attention is particularly drawn to the attendance requirement, regular assessment procedures, conditions of promotion to higher semesters and grading system, etc.

Thank you for your interest in the Institute of Technology, Guru Ghasidas Vishwavidyalaya, Bilaspur. We wish all our students a very bright future and successful career.

Dean (SOS, Engg. & Tech.)

CONTENTS

	PAGES
1. ABOUT THE DEPARTMENT	4
2. ACADEMIC CALENDAR	6
3. FACULTY OF THE DEPARTMENT	8
4. B.TECH. ORDINANCE (New & Old)	14
5. CODE OF CONDUCT FOR STUDENTS	38
6. DISCIPLINE AMONG STUDENTS IN UNIVERSITY EXAMINATION	40
7. REGULATION FOR THE DISPOSAL OF CASES OF "USE OR ATTEMPT TO USE UNFAIR MEANS" AND DISORDERLY CONDUCT AT AN EXAMINATION BY A CANDIDATE	46
8. ABOUT RAGGING	52
9. UNIVERSITY TELEPHONE DIRECTORY	65
10. DEPARTMENT TELEPHONE DIRECTORY	70
11. COURSE STRUCTURE AND SYLLABUS (Old & New)	72

ABOUT THE DEPARTMENT

The Department of Computer Science & Engineering was established in 1997. The department offers B.Tech. in Computer Science & Engineering and Ph.D. in Computer Science & Engineering. The faculty of the Department is highly qualified and experienced. The Department has specialized laboratories such as Digital Image Processing Lab, DLD Lab, Networking Lab, Network Security Lab, Project Lab, Basic Programming Lab, Advance Programming Lab, Database Lab, Graphics Lab and Operating System Lab. The Department has licensed copies of DB2 Universal Database, Visual age for JAVA and web server applications. The Department provides opportunities to the students to carry out projects under joint supervision of the faculty and the experts from industries.

The Department also arranges training to students in reputed government and public sectors like DRDO Delhi, Microsoft Hyderabad, CMC Kolkata, Orbit IT Hyderabad, SECL, BSNL, Indian Railways, Bokaro Steel Plant and Bhilai Steel Plant. Students have been placed in reputed private, public and government organizations like Infosys, Wipro, Persistent, International Business Machines (IBM), TCS, Mahindra BT, Syntel, Satyam, BSNL, NTPC and INFLIBNET

Thrust Area

The Department's current research thrusts include:

Algorithms and Complexity

The Department has considerable strength in computational geometry, digital geometry, quantum computing and core areas of computational complexity theory.

Artificial Intelligence and Natural Language Processing

Artificial Intelligence has been a major area of strength in the Department. Areas of established strength include heuristic search, deduction, machine learning, and combinatorial optimization. Recent focus includes ambient intelligence, natural language processing and formal verification.

Parallel and Distributed Computing

Parallel and distributed computing is an area of emerging strength in the Department.

Security and Cryptography

Security and cryptography are areas of emerging focus in the Department. The Department has facilitated the inception of a Centre of Excellence in Security Research in the institute

Software and Systems Engineering

Software Engineering research has been a traditional area of strength of the Department. Systems related areas of strength include databases and networks.

Objectives of the Department

- a) To prepare professionally competent manpower in the field of Computer Science & Engineering.
- b) To educate students in Computer Science & Technology and other areas of scholarship that will best serve the nation and the world in 21st century.
- c) To establish facilities for the education / training in the area of Computer Science & Engineering.
- d) To conduct multidisciplinary programs in Computer Science & Engineering.

Students Achievements of Department :

A. Number of Students Qualified on Various Exams in last year:

Courses	Name of Exam	No. of Students	Run:
	GATE	13	
	CAT	03	

<u>S.No.</u>	<u>Course</u>	<u>Year</u>	<u>Annual Intake</u>
1.	B.Tech.	4 Year	60
2.	PhD.		

ACADEMIC CALENDAR

For Odd Semester:

Academic Calendar (2019-20)
School of Studies, Engineering & Technology
Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur(C.G.)

B. Tech. Odd Semester (2019-2020)

S.N.	Academic Plans	I Semester(Course A/B), as per CBCS	III & V & VII Semester, as per CBCS
01	Registration/Admission/Orientation	01/08 /2019 (Thursday) To 14/08 /2019 (Wednesday) Tentative, as per GOI/CSAB/University notification.	01/07 /2019 (Monday) to 05/07 /2019 (Friday) Deposition of late fees after due date will be as per the Ordinance No.23 notified by GGV
02	Commencement of Classes	19/08 /2019 (Monday) (Tentative)	02/07 /2019 (Tuesday)
03	Class Test-I/Class Test (Internal Assessment)	30/09 /2019 (Monday) to 04/10/2019(Friday)	16/08 /2019 (Friday) to 23/08 /2019 (Friday)
04	Class Test-II/Mid Semester Examination (MSE) (Internal Assessment)	18/11 /2019 (Monday) to 21/11/2019 (Friday)	26/09 /2019 (Thursday) to 04/10/2019 (Friday)
05	Last date for submission of End Semester Examination (ESE) form	As per the University notification	
06	Last date of classes	02/12 /2019 (Monday)	21/10 /2019 (Monday)
07	Preparation leave	03/12 /2019 (Tuesday) to 08/12 /2019 (Sunday)	22/10 /2019 (Tuesday) to 27/10 /2019 (Sunday)
08	End Semester Examination (ESE)/Practical Examinations	09/12/2019 (Monday) to 23/12/2019 (Monday)	28/10 /2019 (Monday) to 18/ 11 /2019 (Monday)
09	Last date for showing the answer scripts of End Semester Examination (ESE)	06/01/2020 (Monday)	25/11/2019 (Friday)
10	Declaration of End Semester Results	20/01/2020 (Monday)	06/12 /2019 (Friday)
11	Winter vacation	25/12/2019 (Wednesday) to 31/12/2019 (Tuesday)	25/12/2019 (Wednesday) to 31/12/2019 (Tuesday)

Practical examination will be conducted prior to preparation leave.


*Only for students





For Even Semester:

S.N.	Academic Plans	II Semester (Course A/B)	IV VI& VIII Semester
01	Registration	01/01 /2020 (Wednesday) to 08/01/2020 (Wednesday)	19/ 11/2019 (Tuesday) to 22/11/2019 (Friday)
		Deposition of late fees after due date will be as per the Ordinance No.23 notified by GGV	
02	Commencement of Classes	01/01/2020 (Wednesday)	19/ 11/2019 (Tuesday)
03	Tech-Fest / Equilibrio-20	16/ 01/2020 (Thursday) & 17/01/2020 (Friday)	
04	Class Test-I/Class Test (Internal Assessment)	10/02/2020 (Monday) to 14/02/2020 (Friday)	06/01 /2020 (Monday) to 13/01 /2020 (Monday)
05	CT-II/Mid Semester Examination (MSE) (Internal Assessment)	30/03/2020 (Monday) to 03/04/2020 (Friday)	09/03/2020 (Monday) to 16/03/2020 (Monday)
06	Last date for submission of End Semester Examination (ESE) form	As per university notification from time to time	
07	Last date of classes	22/04/2020 (Wednesday)	06/04/2020 (Monday)
08	Preparation leave	23/04/2020 (Thursday) to 28/04/2020 (Tuesday)	07/04 /2020 (Tuesday) to 12/04/2020 (Sunday)
09	End Semester Examination (ESE)/Practical Examinations	29/04/2020 (Wednesday) to 14/05/2020 (Thursday)	13/04 /2020 (Monday) to 30/04 /2020 (Thursday)
10	Last date for showing the answer scripts of End Semester Examination (ESE)	21/05/2020 (Thursday)	07/05/2020 (Thursday)
11	Declaration of End Semester result	04/06/2020 (Thursday)	15/5/2020 (Friday)
12	Last date for submission of Supplementary Examination forms	As per the University notification	
13	Summer Vacation	16/05/2020 (Saturday) to 30/06/2020 (Tuesday)	

✓ Sports/Cultural activity will be as per the University calendar.

• **FACULTY OF THE DEPARTMENT**

Name	Qualification	Designation	Specialization	Photograph
Dr. Manish Shrivastava	M.Tech., Ph.D.	Assistant Professor	Network Security	
Mr. Devendra Kumar Singh	M.Tech.	Assistant Professor	Network Security	
Mr. Nishant Behar	M.Tech.	Assistant Professor & Head	Network Security	
Mr. Vaibhav kant Singh	M.Tech.	Assistant Professor	Data Mining	
Mrs. Nishi Yadav	M.Tech.	Assistant Professor	MANET	
Mrs. Raksha Sharma	M.Tech.	Assistant Professor	Grid Computing	

Mr. Amit Baghel	M.Tech.	Assistant Professor	Ad-hoc Network	
Mr. Satish Kumar Negi	M.Tech.	Assistant Professor	Ad-hoc Network	
Mr. Pushpendra Kumar Chandra	M.Tech.	Assistant Professor	Optical Network, Network Security	
Mr. Manjit Jaiswal	M.Tech.	Assistant Professor	Parallel Computing	

B.TECH. ORDINANCE

**Proposed Draft of
ORDINANCE No. -12
for
Bachelor of Technology (B.Tech.)
Under Choice Based Credit System(CBCS)
Governing the award for the Degree of Bachelor of Technology (B.Tech.)-4 years
(8 Semester)
Degree Course**

(Ordinance prepared as per the provisions given in Statute 28(1) (b) of
The Central Universities Act, 2009)

1.0 TITLE AND COMMENCEMENT

1.1 The Ordinance shall be called as Ordinance for four years (Eight Semesters) B.Tech. Degree programme.

1.2 The first degree of four years (Eight Semester) programme in Engineering & Technology, hereinafter called 4- year B. Tech degree course, shall be designated as 'Bachelor of Technology' in respective Branches. The conduct of the programme and the performance evaluation of B. Tech. programmes are on the basis of percentage of marks earned as well as credit system.

1.3 This ordinance will come into force from the Academic Session commencing after the date of notification issued by the University and shall replace the existing ordinance.

2.0 DEFINITION & KEY WORDS

2.1 "*Vishwavidyalaya*" or "*University*" means Guru Ghasidas Vishwavidyalaya (A Central University established by the Central Universities Act, 2009 No. 25 of 2009) located at Koni, Bilaspur, Chhattisgarh.

2.2 "*Student*" means one who has been admitted in the four years B.Tech. programme of this University through merit list of Joint Entrance Examination (JEE) (main) or any other procedure decided by Guru Ghasidas Vishwavidyalaya for Admission to B. Tech. degree course time to time.

2.3 The candidate shall be eligible for admission on the basis of the "*Academic Year*" means two consecutive (one odd and one even) semesters.

2.4 "*Choice Based Credit System (CBCS)*" means a program that provides choice for students to select from the prescribed courses (Basic Science, Humanities, Engineering Science, Mandatory Courses, Professional Core, Open Elective, Professional Elective, etc.) as per the guidelines issued by UGC / AICTE / regulatory bodies where ever applicable and as approved by the appropriate bodies of the University.

2.5 "*Course*" means "papers" through different modes of delivery and is a component of a programme as detailed out in the respective program structure.

2.6 "*Credit Point*" means the product of grade point and number of credits for a course.

2.7 "*Credit*" means a unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching

(lecture, seminar or tutorial) per week or two hours of practical work/field work/project etc. per week. The number of credits for each course shall be defined in the respective examination scheme.

2.8 *“Cumulative Grade Point Average (CGPA)”* means a measure of overall cumulative performance of a student in all semesters. The CGPA is the ratio of total credit points secured by a student in various courses registered up to the semester concerned and the sum of the total credits points of all the registered courses in those semesters concerned. It is expressed up to two decimal places.

2.9 *“Grade Point”* means a numerical weight allotted to each letter grade on a 10 point scale or as prescribed by the AICTE/ University from time to time.

2.10 *“Letter Grade”* means an index of the performance of students in a course. Grades are denoted by letters O, A+, A, B+, B, C, P, and F.

2.11 *“Semester Grade Point Average (SGPA)”* means a measure of performance of a student in a particular semester. It is the ratio of total credit points secured by a student in various courses registered in a semester and the total credits of all courses in that semester. It shall be expressed up to two decimal places.

2.12 *“Semester”* means an academic session spread over 15-18 weeks of teaching work with minimum 90 teaching days. The odd semester may normally be scheduled from July to December and even semester from January to June.

2.13 *“Grade Card”* means a certificate based on the grades earned. Grade card shall be issued to all the students registered for the examination after every semester. The grade card will contain the course details (code, title, number of credits, grade secured) along with SGPA of the semester and CGPA earned till that semester. The final semester grade card shall also reflect the cumulative total of marks obtained by the student in all semesters out of maximum marks allocated for which the grades of the program were evaluated. However, the final result will be based on the grades/CGPA.

2.14 *“Transcript”* means a certificate issued to all enrolled students in a program after successful completion of the program. It contains the SGPA of all semesters and the CGPA;

2.15 *“Ex-student”* means a student who fails to clear in the supplementary examination all the backlogs of theory, practical / sessional subjects of the odd and even semesters, he/she will not be promoted to the odd semester of the next higher year, and such student shall be treated as ex-student.

2.16 *“Sessional”* means a subject which is practiced by student in a semester for which there is no end semester exam.

3.0 DURATION

The duration of undergraduate (U.G.) degree programmes leading to B. Tech. degree, shall be normally four years and the maximum duration shall be 7 years from the date of initial

registration in First year B.Tech. course. If a candidate will not be able to complete the course in the maximum duration of 7 years then he / she will not be eligible to continue the course from that point of time itself and he / she will automatically exit from the program.

4.0 ADMISSION PROCEDURE AND ELIGIBILITY

The minimum qualification for admission to the first year B. Tech. shall be the passing of Higher Secondary School Certificate Examination (10+2) scheme with Physics, Chemistry and Mathematics conducted by Central Board of Secondary Education or any other equivalent examination from recognized Board or University. The candidate shall be eligible for admission on the basis of the merit list of Joint Entrance Examination (JEE) (main) or any other procedure decided by Guru Ghasidas Vishwavidyalaya for Admission to B. Tech. degree course time to time. In general the admission to B. Tech. degree course shall be governed by the rules of, MHRD, Government of India (GoI) and Guru Ghasidas Vishwavidyalaya. The reservations in admission, cancellation of admission and fee refund will be as per MHRD, GoI / GGV norms and notifications issued in this regard from time to time.

5.0 ENROLMENT IN THE UNIVERSITY

Every student admitted to the programme shall be enrolled before appearing in the first semester examination through the procedure prescribed by the competent authority from time to time.

6.0 TYPES OF COURSES

Basic Science, Humanities, Engineering Science, Mandatory Courses, Professional Core, Open Elective, Professional Elective, etc. as per the guidelines issued by AICTE / University where ever applicable and as approved by the appropriate bodies of the University.

7.0 ATTENDANCE AND ELIGIBILITY TO APEAR IN THE EXAMINATION

A Student shall be required to attend at least 75% of the classes actually held in the semester which may include theory class, seminars, sessionals, practicals, projects, as may be prescribed.

Provided that the Dean of the School of Engineering & Technology on the recommendations of the concerned Head of the Department may condone the shortage in attendance of those students who have secured at least 65% attendance. This condonation should not exceed 10% on the following satisfactory grounds.

- (a) Illness / Medical leave of the student certified by the University Medical Officer / Government Doctor.
- (b) Unforeseen miss happening with parents.
- (c) For participating in the extra and co-curricular events with prior approval from the university authority.
- (d) For participating in the sports activity with prior approval from the university authority.

(e) For attending in interviews with valid proof and prior permission of the concerned head of department.

(f) Natural calamities.

The application must be supported by such documents as considered to be fit for granting such condonation.

7.1. A student who does not satisfy the requirement of attendance as per clause above, he/she will be detained due to shortage of attendance in a particular semester and he/she will have to repeat the same semester taking re-admission as a regular student in the next commencing academic session by paying fee as per the University norms.

8.0 EXTRA ORDINARY LONG ABSENCE

If a student does not participate in the academic activities of the School of Studies of Engineering and Technology of this Vishwavidyalaya for a period exceeding two years for reasons of ill health or medical grounds only, he / she shall neither be permitted to appear in any subsequent examinations nor shall be admitted or promoted to any semester and he / she shall cease to be a student of B. Tech. Degree Course. Here participation in academic activity means attending Lectures, Tutorials, Practicals/Sessionals and such other activities declared as academic activities.

9.0 MEDIUM OF INSTRUCTION/EXAMINATION

Medium of instruction and examination shall be English only.

10.0 EXAMINATION AND EVALUTION

10.1 *Practical/ Sessional Work* – The student shall be required to complete the Laboratory / Drawing / Design / Job preparation and other academic work assigned for that semester in the session.

10.2 There shall be a full End Semester Examination at the end of each semester consisting of theory papers, practicals/ sessionals.

10.3 There shall be one End Semester Examination (ESE) at the end of each semester conducted by Guru Ghasidas Vishwavidyalaya. Only those students, who will satisfy the attendance requirement to be eligible to appear at the End Semester Examination as per clause 7.0, will be permitted to appear in the End Semester Examination. The examination will consist of theory papers, laboratory practical/sessional and viva-voce as per the scheme of examination of that semester. These examinations shall be designated as follows.

(a). During First year - I & II sem. B. Tech. Examination

(b). During Second year - III & IV sem. B. Tech Examination

(c). During Third year - V & VI sem. B. Tech. Examination

(d). During Fourth year - VII & VIII sem. B. Tech. Examination

10.4 The semester examination will normally be held in the month of November-December and April – May in every academic session, or as decided by the University from time to time.

10.5 Supplementary examination will be held only once in a year (for both even and odd semesters) normally in the month of June/July or as decided by the University from time to time.

10.6 End Semester Examination time table shall be declared by the Controller of Examination before the commencement of examination.

10.7 Basis of Subjects Evaluation

10.7.1 For passing in a subject (theory / practical/sessional) the performance of the candidate in each semester shall be evaluated subject wise. There shall be continuous assessment throughout the semester by conducting class tests, called as Internal Assessment (I.A.) carrying 30% weightage, and End Semester Examination (E.S.E.) carrying 70% weightage. A student has to secure minimum 35% (24 marks) in the particular theory subject and minimum 40% marks in a particular practical subject to pass that subject in the end semester examination. For each practical/sessional subject 60% weightage will be given to the actual practicals /sessionals performed during the semester I.A. and 40% weightage will be given to the End Semester Examination (ESE).

10.7.2 For evaluation of end semester practical/sessional examination of a subject, there shall be two examiners, one internal examiner who has conducted the practical in that semester and other external examiner to be appointed by the Head of the Department from amongst faculty members of the department concerned.

10.7.3 To allot the marks of Internal Assessment (IA), there shall be two Class Tests (CT) I & II each of 15 marks.

10.7.4 For passing a subject the student is required to fulfill the following conditions:

(a) Student has to secure minimum 35% (24 marks) in a particular theory subject to pass that subject in the end semester examination.

(b) Student has to secure minimum 40% marks in a particular practical / sessional subject to pass that subject (practical / sessional) in the end semester examination.

(c) Must have secured minimum 40% marks (Marks of Internal Assessment + Marks of End Semester Examination) for each theory subject.

(d) Must have secured minimum 50% marks (Marks of Internal Assessment + Marks of End Semester Examination) for each project/practical/sessional subject.

(e) Must have scored minimum SGPA of 5.0 in the semester. If a student has cleared all the failed to secure SGPA of 5.0 in the semester or and semesters of a year then he/she will be allowed to re-appear in the supplementary Examination in those subjects in which the student's Grade Points less than 5. If the student fails to secure SGPA of 5.0 even in the supplementary examination, he/she will not be promoted to the odd semester of the next higher year, and such student shall be treated as an ex-student. Other condition of promotion of the ex-student will be applicable as per Clause 11.

(f) If a student has passed a semester examination in all the subjects as per clause 10.7.4 (ae), he/she shall not be permitted to reappear in that examination for improvement in grades/division.

10.7.5 Basis of Credits- Credit of a theory or practical/sessional subject is decided by:

$$\text{Credit} = (L + T + P/2),$$

Where; L = Lecture periods per week,

T = Tutorial period per week,

P = Practical/Sessional periods per week.

Credit in a subject will be an integer, not in a fractional number. If a credit in a subject turns out in fraction, it will be taken as next integer number.

10.7.6 For Theory Subjects-For the assessment of performance of students in a semester, continuous evaluation system will be followed with two components: Internal Assessment (IA), carrying 30% weightage and End Semester Examination (ESE), carrying 70% weightage. There will be two class tests each of 15 Marks, in each theory subject in a semester forming the part of Internal Assessment (IA).

10.7.7 For Projects/Practical/ Sessional Subjects- Evaluation of project/practical/sessional during the semester will carry 60% weightage for Internal Assessment (IA) and the End Semester Examination (ESE) will carry 40% weightage. The internal assessment will carry equal weightage of attendance (20% weightage), practical records (20% weightage) and internal viva – voice examination (20% weightage). The marks for attendance shall be awarded in project/practical/sessional subject as per the following Table.

Percentage of attendance	65 - ≤ 75	> 75 - ≤ 80	>80- ≤ 85	>85- ≤ 90	>90- ≤ 95	>95- ≤ 100
Percent weightage of Marks	10	12	14	16	18	20

10.7.8 Grading System- Percentage as well as absolute grading system will be followed, in every subject, theory or practical/sessional. A student will be awarded a **Letter Grade**, based on his combined performance of Internal Assessment (IA) and End Semester Examination (ESE). These grades will be described by letters indicating a qualitative assessment of the student's performance through a number equivalent called "Grade Point" (GP) as given below. The following is the **Grade Point** pattern. Grade 'F' indicates not clearing (passing) of the subject.

Letter Grade (LG)	O	A+	A	B+	B	C	P	F	Ab
Grade Point	10	9	8	7	6	5	4	0	0

The Letter Grades are O (Outstanding), A+ (Excellent), A (Very Good), B+ (Good), B (Above Average), C (Average), P (Pass), F (Fail) and Ab (Absent in end semester examination). Grades will be awarded for every theory and practical/sessional subject separately.

10.7.9 Absolute Grading System

(a) The Absolute Grading System as explained below will be adopted for theory and project/practical/sessional subjects.

GRADE	Percentage of Marks Obtained	
	THEORY	PRACTICAL/SESSIONAL/PROJECT
O (Outstanding)	>90- ≤100	>90- ≤ 100
A+(Excellent)	>80 - ≤ 90	>80- ≤ 90
A (Very Good)	>70 - ≤ 80	>70 - ≤ 80
B+(Good)	>60 - ≤ 70	>60- ≤ 70
B (Above Average)	>50- ≤ 60	>55- ≤ 60
C (Average)	>40- ≤ 50	>50- ≤ 55
P (Pass)	=40	=50
F (Fail)	00 - <40	0 - < 50

(b) 01 Grace Mark shall be given only once at the time of award of the degree to improve the Grade in overall result.

10.7.10 Semester Grade Point Average (SGPA)- Performance of a student in i^{th} semester is expressed by $[SGPA]_i$ which is a weighed average of course grade points obtained by a student in the semester, and is expressed by

$$[SGPA]_i = \frac{[C_1G_1 + C_2G_2 + \dots]}{[C_1 + C_2 + \dots]} = \frac{[\sum C_j G_j]}{[\sum C_j]} = \frac{N_i}{D_i}$$

Where C_j stands for Credit and G_j stands for Grade points corresponding to j^{th} subject in a semester. SGPA will be calculated up to two places of decimal without rounding off. SGPA will be calculated only when a student clears a semester without failing in any subject, theory or practical/sessional/project.

10.7.11 Cumulative Grade Point Average (CGPA)- This is a weighed average of course grade points obtained by a student for all the courses taken, since his / her admission. Thus, CGPA in the i^{th} semester with " $i \geq 2$ " will be calculated as follows:

$$[CGPA]_i = \frac{\sum_{k=1}^{k=i} N_k}{\sum_{k=1}^{k=i} D_k}$$

If a student repeats a course or is declared fail in a subject, then only the grade points earned in the attempt when he / she cleared the course (subject) are counted towards CGPA. CGPA will be calculated in every semester along with SGPA, so that a student knows his / her latest CGPA.

11 PROMOTION TO NEXT YEAR AND SEMESTER

11.1 Those students who have cleared all the registered theory, practical/sessional subjects prescribed for the B.Tech. first year shall be promoted to the B.Tech. second year. Those students who have cleared all the registered theory, practical/sessional subjects prescribed for the B.Tech. second year shall be promoted to the B.Tech. third year. Those students who have cleared all the registered theory, practical/sessional subjects prescribed for the B.Tech. third year shall be promoted to the B.Tech. fourth year.

11.2 Supplementary examinations will be held only once in a year (for both even and odd semesters) normally in the month of July after declaration of results of even semester examination of the incumbent session, or as decided by the University time to time.

11.3 Those students who would have backlogs in registered theory and/ or practical/sessional subjects in the odd and or even semesters of any academic year will be allowed to appear in the supplementary examinations of the same year.

11.4 Those B.Tech. students who are allowed to appear the supplementary examination (of odd or even or both semester), may be allowed to attend the classes provisionally of the next higher odd semester of the next year. However, such provisionally permitted students will get their regular admission only after passing in all their backlog papers in supplementary examination, if eligible otherwise. The percentage of attendance shall be counted from the date of commencement of the semester classes.

11.5 If a student fails to clear in the supplementary examination all the backlogs of theory, practical/sessional subjects of the odd and even semesters, he/she will not be promoted to the odd semester of the next higher year, and such student shall be treated as ex-student.

11.6 Ex-students, {as per clause 10.7.4(e)}, shall be required to clear their backlog papers (theory and or practical/sessional subjects), in the end semester examination of the corresponding semesters (odd and even) and supplementary examination to be conducted next year (in the following academic session). Such ex-students will be required to deposit the examination fees only.

11.7 If a student fails to appear in the internal assessment / sessional of a semester due to unforeseen incident, a makeup test/examination may be conducted, if required, strictly on the recommendation of the concerned Head of the Department, and approval of the Dean (Engineering & Technology).

12 AWARD OF CLASS OR DIVISION

12.1 The class/division awarded to a student with B. Tech. Degree shall be determined by the student's CGPA after clearing all the subjects of all the eight semesters, as given below:

- First Division with Distinction or **Honours** : $7.5 \leq \text{CGPA} \leq 10.0$
- First Division : $6.5 \leq \text{CGPA} < 7.5$
- Second Division : $5.0 \leq \text{CGPA} < 6.5$

12.2 Division shall be awarded to a student only after clearing all the eight semesters successfully, and having earned at least total credit of **160** for the award of B.Tech. degree. It shall be based on the integrated performance of the candidate for all the eight semesters

as per clause 10.3.

12.3 No student shall be declared to have passed the final B.Tech. course unless he/she has fully passed all the eight semesters. The results of the eighth semester of those students, who have not passed examination in any previous semester, will be withheld. Such students shall be deemed to have passed the final B.Tech. examination in the year in which they pass / clear all the subjects of all the eight semesters, within the limit of the prescribed period of the whole course.

13 TRANSCRIPT

Based on the Letter grades, grade points and SGPA and CGPA, the Vishwavidyalaya shall issue the transcript for each semester and a consolidated transcript indicating the performance in all semesters.

14 CONVERSION OF CGPA / SGPA IN PERCENTAGE

There is no equivalence between the CGPA/SGPA scale and percentage. However notionally,

Percentage of particular semester = (SGPA) × 10

Percentage of B.Tech. Degree = (CGPA) × 10

15 RANKING

Only such candidates who complete successfully all courses in the programme in single attempt shall be considered for declaration of ranks, medals etc declared and notified by the university, if any.

16 DISCIPLINE

- Every student is required to observe discipline and decorous behavior both inside and outside the campus and not to indulge in any activity which will tend to bring down the prestige of the Institute.
- Any act of indiscipline of a student reported to the concerned Head / Dean (Engineering & Technology), will be investigated and necessary action will be taken as per university rules from time to time.
- Ragging of any dimension is a criminal and non-bailable offence in our country. The current State and Central legislations provide for stringent punishment, including imprisonment. Once the involvement of a student is established in ragging, the offending student will be dismissed from the University and will not be admitted into any other Institution. Avenues also exist for collective punishment, if individuals can not be identified in this inhuman act. Every senior student, along with the parent, shall give an undertaking every year in this regard and this should be submitted at the time of admission / registration.

17 REGISTRATION REQUIREMENTS

- Every student is required to be present and register at the commencement of each semester on the day(s) fixed for and notified in the Academic Calendar from time to time.
- Late registration will be permitted with a fine as decided from time to time up to three weeks from the date of commencement of each semester as notified in the

Academic Calendar from time to time. If the student does not register in the specified time he / she has to be registered in the next year in the same semester.

- Percentage attendance for all students will be counted from the date of commencement of the semester, irrespective of his/her date of registration. However, in case of first year first semester, attendance will be counted from date of admission into the School or date of commencement of class work, whichever is later.
- Minimum 4 weeks Industrial training/Internship in during summer break is compulsory after end semester examination of sixth semester. The student has to submit the industrial training / Internship report to the concerned department at the time of registration in the seventh semester and required to defend his/her industrial training/Internship during seventh semester in the department.
- If a student finds his/her academic/course load heavy in any semester, or for any other valid reason, he/she may drop courses within 15 instructional days from the commencement of the semester with the recommendation of his/her Head of Department and approval of the Dean, Engineering & Technology.
- The curriculum for any semester, except for the final semester will normally carry credits between 21 to 29.
- Minimum number of credits that a student can register in any given semester (excepting for final semester) is 15. Maximum number of credits that can be registered in a semester is 29.

However, in the final semester, a student may earn less than 15 credits if it is sufficient for

him/ her to fulfill the requirements for the award of the degree.

- A student who has successfully secured **CGPA** equal and more than 7.0 in his/her First Year courses, can be registered for non credit courses in other departments of the university for his/her higher semesters of study. The registration in non credit courses will be done after recommendation of Head of the Department and approval of the Dean, Engineering & Technology followed by the same of the Head of the Department concerned of the non credit course offered in. The student has to attend the classes of the non credit courses in addition to the fulfilling the requirements of registered regular subjects in his/her department prescribed by the Head of Department. For non credit courses “Satisfactory” or “Unsatisfactory” shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

18 TRANSFER OF CREDITS

With due approval the courses studied through on line / off line like Massive Open online Courses (MOOCS) through National Programme on Technology Enhanced Learning (NPTEL) under Study Webs of Active –Learning for Young Aspiring Minds (SWYAM) in Indian/ Foreign University/Institutions by the students during their study period at GGV Bilaspur (C.G.) may count towards the credit requirements for the award of B.Tech. degree. The credit

transferred will reduce the number of courses to be registered by the student at GGV. The guidelines for such transfer of credits are as follows.

- On successful completion of the courses opted by students under SWYAM, the credits earned by them shall be included in their Grade card.
- Credits transferred will not be used for SGPA/CGPA computations except SWYAM. However, credits transferred will be considered for overall credits requirements of the programme.
- Students can earn credits only from other department of the University (GGV) / IISC/IITs/NITs/Central Universities and other Indian and Foreign Institutions/Universities with which GGV has an MOU (and that MOU must have specific clauses for provisions of credit transfer by students).
- Credit transfer can only be considered for the courses at same level (i.e., UG, PG, etc.).

19 INTERPRETATION OF REGULATION

In case of any dispute in the matter of interpretation of this Ordinance, the decision of the Vice-Chancellor of the University shall be final and binding on the students.

20 POWER TO MODIFY

Notwithstanding all that has been stated above, the Academic Council of the University has the right to propose any modifications or amendments to the Executive Council for final decision of the above regulations and further actions from time to time.

21 Matters not covered in this Ordinance shall be governed by the relevant ordinance of the University.

Draft Ordinance

for Governing the award for the Degree of Bachelor of Technology (B.Tech.)-4 years (8 Semester) Degree Course as per Choice Based Credit System (Old-CBCS)

1.0 GENERAL

The first degree of four years (Eight Semester) Course in Technology, hereinafter called 4-year B.Tech degree course, shall be designated as 'BACHELOR OF TECHNOLOGY' irrespective Branches. The conduct of the programme and the performance evaluation of B. Tech. courses are on the basis of percentage of marks earned as well as credit system.

2.0 ADMISSION

The minimum qualification for admission to the first year B. Tech. shall be the passing of Higher Secondary School Certificate Examination (10+2) scheme with Physics, Chemistry and Mathematics conducted by Central Board of Secondary Education or any other equivalent examination from recognized Board or University. The candidate shall be eligible for admission on the basis of the merit list of Joint Entrance Examination (JEE) (main) or any other entrance examination decided by Guru Ghasidas Vishwavidyalaya for Admission to B. Tech. degree course time to time. In general the admission to B. Tech. degree course shall be governed by the rules of, MHRD, Govrenment of India (GoI) and Guru Ghasidas Vishwavidyalaya.

The reservations in admission, cancellation of admission and fee refund will be as per MHRD, GoI norms and notifications issued from time to time.

3.0 ATTENDANCE REQUIREMENT

3.1 A Student shall be required to attend at least 75% of the classes actually held in the semester which may include theory class, seminars, sessionals / practicals/projects, as may be prescribed.

Provided that the Dean of the School of Engineering & Technology on the recommendations of the concerned Head of the Department may condone the shortage in

attendance of those students who have secured 65% attendance. This condonation should not exceed 10% on the following satisfactory grounds.

- (a) Illness / Medical leave of the student.
- (b) Unforeseen mishappening with parents.
- (c) For participating in the extra co-curricular events with prior approval from the university authority.
- (d) For participating in the sports activity with prior approval from the university authority
- (e) For attending in interviews with valid proof and prior permission of the concerned head of department.

3.2 A student who does not satisfy the requirement of attendance as per clause 3.1, he/she will be detained due to shortage of attendance in a particular semester and he/she will have to repeat the same semester taking re-admission as a regular student in the next commencing academic session.

4.0 DURATION

The duration of undergraduate (U.G.) degree programmes leading to B. Tech. degree, shall be normally four years and the maximum duration shall be 8 years from the date of initial registration in First year B.Tech. course. If a candidate will not be able to complete the course in the maximum duration of 8 years then he / she will not be eligible to continue the course from that point of time itself.

5.0 EXTRA ORDINARY LONG ABSENCE

If a student does not participate in the academic activities of the School of Studies of Engineering and Technology of this Vishwavidyalaya for a period exceeding two years for reasons of ill health or medical grounds only, he / she shall neither be permitted to appear in any subsequent examinations nor shall be admitted or promoted to any semester and he / she shall cease to be a student of B. Tech. Degree Course. Here participation in academic activity means attending Lectures, Tutorials, Practicals/Sessionals and such other activities declared as academic activities.

6.0 DISCIPLINE

- Every student is required to observe discipline and decorous behavior both inside and outside the campus and not to indulge in any activity which will tend to bring down the prestige of the Institute.
- Any act of indiscipline of a student reported to the concerned Head / Dean (Engineering & Technology), will be investigated and necessary action will be taken as per university rules from time to time.
- Ragging of any dimension is a criminal and nonbailable offence in our country. The current State and Central legislations provide for stringent punishment, including imprisonment. Once the involvement of a student is established in ragging, the offending student will be dismissed from the University and will not be admitted into any other Institution. Avenues also exist for collective punishment, if individuals can not be identified in this inhuman act. Every senior student, along with the parent, shall give an undertaking every year in this regard and this should be submitted at the time of admission / registration.

7.0 REGISTRATION REQUIREMENTS

- Every student is required to be present and register / enroll at the commencement of each semester on the day(s) fixed for and notified in the Academic Calendar from time to time.
- Late registration will be permitted with a fine as decided from time to time up to three weeks from the date of commencement of each semester as notified in the Academic Calendar from time to time. If the student does not register in the specified time he / she has to be registered in the next year in the same semester.
- Percentage attendance for all students will be counted from the date of commencement of the semester, irrespective of his/her date of registration. However, in case of first year, first semester, attendance will be counted from date of admission into the Institute or date of commencement of class work, whichever is later.
- Minimum 4 weeks Industrial training during summer break is compulsory after end semester examination of six semester. The student has to submit the industrial

training report to the concerned head of department at the time of registration in the seventh

semester.

- If a student finds his / her academic / course load heavy in any semester, or for any other valid reason, he/she may drop courses within 15 instructional days from the commencement of the semester with the recommendation of his / her Head of Department and approval of the Dean, Engineering & Technology.
- The curriculum for any semester, except for the final semester will normally carry credits between 21 to 29.
- Minimum number of credits that a student can register in any given semester (excepting for final semester) is 15. Maximum number of credits that can be registered in a semester is 29. However, in the final semester, a student may earn less than 15 credits if it is sufficient for him/ her to fulfill the requirements for the award of the degree.
- A student who has successfully secured **Cumulative Performance Index (CPI)** equal and more than 7.0 in his / her First Year courses, can be registered for non credit courses in other departments of the university for his / her higher semesters of study. The registration in non credit courses will be done after recommendation of Head of the Department and approval of the Dean, Engineering & Technology and with the permission of the concerned subject teacher. The student has to attend the classes of the non credit courses in addition to the fulfilling the requirements of registered regular subjects in the his/her department prescribed by the Head of Department. For non credit courses “Satisfactory” or “Unsatisfactory” shall be indicated instead of the letter grade and this will not be counted for the computation of Semester Performance Index (SPI) / CPI.

8.0 EXAMINATIONS

8.1. Medium of Instruction/Examination – Medium of instruction and examination shall be English only.

8.2. Practical/ Sessional Work – The student shall be required to complete the Laboratory / Drawing / Design / Job preparation and other academic work assigned for that semester in the session.

8.3. There shall be a full End Semester Examination at the end of each semester consisting of theory papers, practicals/ sessionals.

8.4. There shall be one End Semester Examination (ESE) at the end of each semester conducted by Guru Ghasidas Vishwavidyalaya. Only those students, who will satisfy the attendance requirement to be eligible to appear at the End Semester Examination as per clause 3.0, will be permitted to appear in the End Semester Examination. The examination will consist of theory papers, laboratory practical/sessional and viva-voce as per the scheme of examination of that semester. These examinations shall be designated as follows.

- (a). During First year - I & II sem. B. Tech. Examination
- (b). During Second year - III & IV sem. B. Tech Examination
- (c). During Third year - V & VI sem. B. Tech. Examination
- (d). During Fourth year - VII & VIII sem. B. Tech. Examination

8.5. The semester examination will normally be held in the month of November-December and April – May in every academic session, or as decided by the University time to time.

8.6. Supplementary examination will be held only once in a year (for both even and odd semesters) normally in the month of July.

8.7. End Semester Examination time table shall be declared by the Controller of Examination before the commencement of examination.

9.0 PASSING OF EXAMINATION

9.1 Basis of Subjects Evaluation

9.1.1. For passing in a subject (theory / practical/sessional) the performance of the candidate in each semester shall be evaluated subject wise. There shall be continuous assessment throughout the semester by conducting quizzes / class tests / surprise test / assignments / seminar, etc. and mid semester examination, called as Internal Assessment (I.A.) carrying 40% weightage, and End Semester

Examination (E.S.E.) carrying 60% weightage. A student has to secure minimum 35% marks in the particular theory subject and minimum 40% marks in a particular practical subject to pass that subject in the end semester examination. For each practical / sessional subject 60% weightage will be given to the actual practicals/sessionals performed during the semester I.A. and 40% weightage will be given to the End Semester Examination(ESE).

- 9.1.2. For evaluation of end semester practical / sessional examination of a subject, there shall be a panel of three examiners appointed by Head of the Department. All the three examiners shall be internal from the concerned department of the Institute of Technology, or external examiners may also be appointed.
- 9.1.3. To allot the marks of Internal Assessment (IA), there will be one Mid Semester Examination (MSE) in each theory subject of that semester, apart from one Class Tests (CT) and surprise test / assignments / quiz.

9.2 Passing Marks in a Subject

For passing a subject the student is required to fulfill the following conditions:

- (a) Student has to secure minimum 35% marks in a particular theory subject to pass that subject in the end semester examination.
- (b) Student has to secure minimum 40% marks in a particular practical / sessional subject to pass that subject (practical / sessional) in the end semester examination.
- (c) Must have secured minimum 40% marks (Marks of Internal Assessment + Marks of End Semester Examination) for each theory subject.
- (d) Must have secured minimum 50% marks (Marks of Internal Assessment + Marks of End Semester Examination) for each project/practical/sessional subject.
- (e) Must have scored minimum Semester Performance Index (SPI) of 5.0 in the semester.

If a student has cleared all the Theory and Practical/Sessional subjects of one or and both semesters of a year, but has failed to secure SPI of 5.0 in the semester or and semesters of a year then he/she will be allowed to re-appear in the supplementary

Examination in those subjects in which the student's Grade Point is less than 5. If the student fails to secure SPI of 5.0 even in the supplementary examination, he/she will not be promoted to the odd semester of the next higher year, and such student shall be treated as an ex- student. Other condition of promotion of the ex-student will be applicable as per Clause 12.

- (f) If a student has passed a semester examination in all the subjects as per clause 9.2 (a-e), he/she shall not be permitted to reappear in that examination for improvement in grades/division.

9.3 Basis of Credits

Credit of a theory or practical/sessional subject is decided by:

Credit = $\{L + (T+P)/2\}$, where L = Lecture periods per week, T = Tutorial period per week, P = Practical/Sessional periods per week. Credit in a subject will be an integer, not in a fractional number. If a credit in a subject turns out in fraction, it will be taken as next integer number.

10.0 ASSESSMENT AND GRADING

10.1. Mode of Assessment and Evaluation

10.1.1. For Theory Subjects

For the assessment of performance of students in a semester, continuous evaluation system will be followed with two components : Internal Assessment (IA), carrying 40% weightage and End Semester Examination(ESE), carrying 60% weightage. There will be one class tests (10 marks), one mid semester examination (20 marks) and teacher assesment (05 marks for attendance and 05 marks on surprise test / assignments /quizes etc.) in each theory subject in a semester forming the part of Internal Assessment (IA). The marks for attendance shall be awarded in a theory subject as per the following Table.

Percentage of attendance	65 - ≤ 75	> 75 - ≤ 80	>80 - ≤ 85	>85- ≤ 90	>90- ≤ 95	>95- ≤ 100
Marks to be awarded	NIL	01	02	03	04	05

10.1.2. For Projects/Practical/ Sessional Subjects

Evaluation of project/practical/sessional during the semester will carry 60% weightage for Internal Assessment (IA) and the End Semester Examination (ESE) will carry 40% weightage. The internal assessment will carry equal weightage of attendance (20% weightage), practical records (20% weightage) and internal viva – voice examination (20% weightage). The marks for attendance shall be awarded in a projects/practical/sessional subject as per the following Table.

Percentage of attendance	65 - ≤ 75	> 75 - ≤ 80	>80- ≤ 85	>85- ≤ 90	>90- ≤ 95	>95- ≤ 100
Percent weightage of Marks	10	12	14	16	18	20

10.1.3. Grading System

Percentage as well as absolute grading system will be followed, in every subject, theory or practical/sessional. A student will be awarded a **Letter Grade**, based on his combined performance of Internal Assessment (IA) and End Semester Examination (ESE). These grades will be described by letters indicating a qualitative assessment of the student's performance through a number equivalent called "Grade Point" (GP) as given below. The following is the **Grade Point** pattern. Grade 'F' indicates not clearing (passing) of the subject.

Letter Grade (LG)	O	A+	A	B+	B	C	P	F	Ab
Grade Point	10	9	8	7	6	5	4	0	0

The Letter Grades are O (Outstanding), A+ (Excellent), A (Very Good), B+ (Good), B (Above Average), C (Average), P (Pass), F (Fail) and Ab (Absent in end semester examination).

Grades will be awarded for every theory and practical/sessional subject separately.

10.2. Absolute Grading System

(a) The Absolute Grading System as explained below will be adopted for theory and project/practical/sessional subjects.

GRADE	Percentage of Marks Obtained	
	THEORY	PRACTICAL/SESSIONAL/PROJECT
O (Outstanding)	90 ≤ 100	90 ≤ 100
A ⁺ (Excellent)	8 0 - < 90	80 - < 90
A (Very Good)	7 0 - < 80	70 - < 80
B ⁺ (Good)	6 0 - < 70	60 - < 70
B (Above Average)	5 0 - < 60	55 - < 60
C (Average)	4 0 - < 50	50 - < 55
P (Pass)	= 40	= 50
F (Fail)	0 0 - < 40	0 - < 50

(b) 01 Grace marks shall be given only once at the time of award of the degree to improve the Grade in overall result.

10.3. Semester Performance Index (SPI)

Performance of a student in i^{th} semester is expressed by $[SPI]_i$ which is a weighted average of course grade points obtained by a student in this semester, and is expressed by

$$[SPI]_i = \frac{[C_1G_1 + C_2G_2 + \dots]}{[C_1 + C_2 + \dots]} = \frac{[\sum C_j G_j]}{[\sum C_j]} = \frac{N_i}{D_i}$$

Where C_j stands for Credit and G_j stands for Grade points corresponding to j^{th} subject in a semester. SPIs will be calculated up to two places of decimal without rounding off. SPI

will be calculated only when a student clears a semester without failing in any subject, theory or practical/sessional.

10.4. Cumulative Performance Index (CPI)

This is a weighted average of course grade points obtained by a student for all the courses taken, since his / her admission. Thus, CPI in the i^{th} semester with “i” greater than 2 will be calculated as follows

$$[CPI]_i = \frac{\sum_{k=1}^{i-1} N_k}{\sum_{k=1}^{i-1} D_k}$$

If a student repeats a course or is declared fail in a subject, then only the grade points earned in the attempt when he / she cleared the course / subject are counted towards CPI. CPI will be calculated in every semester along with SPI, so that a student knows his / her latest CPI.

10.5. Award of Class or Division

10.5.1. The class/division awarded to a student with B. Tech. Degree shall be determined

by the student’s CPI after clearing all the subjects of all the eight semesters, as given below:

☐ First Division with Distinction or Honours	: $7.5 \leq \text{CPI} \leq 10.0$
☐ First Division	: $6.5 \leq \text{CPI} < 7.5$
☐ Second Division	: $5.0 \leq \text{CPI} < 6.5$

10.5.2. Division shall be awarded to a student only after clearing all the eight semesters successfully, and having earned at least a total credit of **190** for the award of B.Tech. degree. It shall be based on the integrated performance of the candidate for all the eight semesters as per clause 10.5.1.

10.5.3. No student shall be declared to have passed the final B.Tech. course unless he/she has fully passed all the eight semesters. The results of the eighth semester of

those students, who have not passed examination in any previous semester, will be withheld. Such students shall be deemed to have passed the final B.Tech. examination in the year in which they pass / clear all the subjects of all the eight semesters, within the limit of the prescribed period of the whole course.

10.6. Conversion of CPI / SPI in Percentage

There is no equivalence between the CPI/SPI scale and percentage. However notionally,

$$\text{Percentage of particular semester} = (\text{SPI}) \times 10$$

$$\text{Percentage of B.Tech. Degree} = (\text{CPI}) \times 10$$

11.0 TRANSFER OF CREDITS

The courses credited in Indian or Foreign University/Institutions by students during their study period at GGV Bilaspur (C.G.) may count towards the credit requirements for the award of B.Tech. degree. The credit transferred will reduce the number of courses to be registered by the student at GGV. The guidelines for such transfer of credits are as follows.

- B.Tech students with consistent academic performance and CPI greater than 7.5 can credit courses approved by the Dean, Engineering & Technology, in other Institutions during 3rd and 4th year and during summer breaks.
- Credits transferred will not be used for SPI/CPI computations. However, credits transferred will be considered for overall credits requirements of the programme.
- Students can earn credits only from other department of the University (GGV) / IISC/IITs/NITs/Central Universities and other Indian and Foreign Institutions/Universities with which GGV has an MOU (and that MOU must have specific clauses for provisions of credit transfer by students).
- Credit transfer can only be considered for the courses at same level (i.e., UG, PG, etc.).
- The maximum number of credits that can be transferred by a student shall be limited to 15.
- A student has to get minimum passing grades/ marks for such courses for which the credits transfer are to be made.

- The credits / grades indicated in the grade sheet obtained from the university in which the student has completed the courses should be used by the student as part of his/her transcripts.
- The GGV transcripts will only indicate the courses, credits and grades completed at GGV and the total no. of credits earned in other Universities in a particular semester.

12.0 PROMOTION TO HIGHER YEAR AND HIGHER SEMESTER

12.1. Those students who have cleared all the registered theory, practical/sessional subjects prescribed for the B.Tech. first year shall be promoted to the B.Tech. second year. Those students who have cleared all the registered theory, practical/sessional subjects prescribed for the B.Tech. second year shall be promoted to the B.Tech. third year. Those students who have cleared all the registered theory, practical/sessional subjects prescribed for the B.Tech. third year shall be promoted to the B.Tech. fourth year-

12.2. Supplementary examinations will be held only once in a year (for both even and odd semesters) normally in the month of July after declaration of results of even semester examination of the incumbent session, or as decided by the University time to time.

12.3. Those students who would have backlogs in registered theory and/ or practical/sessional subjects in the odd and or even semesters of any year will be allowed to appear in the supplementary examinations of the same year.

12.4. Those B.Tech. students who are allowed to appear the supplementary examination (of odd or even or both semester), may be provisionally admitted to attend the classes of the next higher odd semester of the next year. However, such provisionally admitted students will become regular only after passing in all their backlog papers in supplementary examination, if eligible otherwise.

12.5. If a student fails to clear in the supplementary examination all the backlogs of theory, practical/sessional subjects of the odd and even semesters, he/she will not be promoted to the odd semester of the next higher year, and such student shall be treated as ex-student.

12.6. Ex-students, (as per clause 12.5), shall be required to clear their backlog papers (theory and or practical/sessional subjects), in the end semester examination of the

corresponding semesters (odd and even) and supplementary examination to be conducted next year (in the following academic session). Such ex-students will be required to deposit the examination fees only.

12.7. If a student fails to appear in the practical/sessional examination of a semester due to unforeseen incident, a makeup end semester practical/sessional examination may be conducted, if required, strictly on the recommendation of the concerned Head of the Department, and approval of the Dean (Engineering & Technology).

13.0 BRANCH CHANGE AFTER FIRST YEAR RESULT

Students admitted in First Year B. Tech. course of the Institute of Technology having CPI of 08 or above at the end of their First Year course, are allowed to change their branch according to merit and subject to the seat availability in the branch where students want to shift. Only those students will be considered for the branch change who would have cleared all the subjects of First and Second semesters in the first attempt itself in the End Semester Examination.

14.0 TRANSCRIPT

Transcript will be provided to the students as per the University norms.

15.0 INTERPRETATION

In case of any dispute in the matter of interpretation of this Ordinance, the decision of the Vice-Chancellor of the University shall be final and binding on the students.

16.0 POWER TO MODIFY

Notwithstanding all that has been stated above, the Academic Council of the University has the right to propose any modifications or amendments to the Executive Council for final decision of the above regulations and further actions from time to time.

17.0 Matters not covered in this Ordinance shall be governed by the relevant ordinance of the University.

CODE OF CONDUCT FOR STUDENTS

CODE OF CONDUCT FOR STUDENTS

The students are admitted to Guru Ghasidas Vishwavidyalaya to achieve excellence and shape their character to become responsible citizens. They must realize their responsibility towards the Vishwavidyalaya and to its components like faculty, staff and fellow students. Failure to maintain a good standard of conduct shall result in disciplinary action.

Attendance: 75% attendance is compulsory in each subject.

Misconduct: Any of the following activities (but not limited to these only) will be treated as misconduct.

1. Disruption of teaching activities or disturbing the learning process of other students on the campus.
2. Any act on the part of the students, which disrupts functioning of the university, endangers health and safety of campus residents and damages Vishwavidyalaya properties.
3. Cheating in examination and supplying of false documents / information in order to seek any consideration / favour from the University.
4. Possession or consumption of intoxicating beverages on the campus.
5. Failure to return back loaned material, settle University dues.
6. Possession of weapons.
7. Use of unparliamentarily language while in conversation with Vishwavidyalaya Staff and fellow students.

Disciplinary Actions:

Failure to adhere to good conduct may result in disciplinary actions like:

1. A warning by the authorities.
2. Suspension from a particular class.
3. Suspension / expulsion from the University.
4. Suspension of campus privileges e.g. hostel, accommodation etc.
5. Withholding of examination result or withdrawal of awarded diploma / degree certificate.
6. Any other disciplinary action deemed appropriate by the University authorities.

**DISCIPLINE AMONG STUDENTS
IN
UNIVERSITY EXAMINATIONS**

DISCIPLINE AMONG STUDENTS IN UNIVERSITY EXAMINATIONS

I UNIVERSITY END SEMESTER EXAMINATIONS

1. The end –semester examination shall be held under the general supervision of the Head of Department by the faculty member concerned. He/she shall be responsible for the fair and orderly conduct of the examination
2. In case of detection of unfair means (as specified in clause 1 of General Guidelines below), the same shall be brought to the notice of the head of the department concerned for further action specified under clause 5 of the General Guidelines below

II ENTRANCE EXAMINATIONS

1. During an entrance examination the candidates shall be under the disciplinary control of the chief Superintendent of the centre who shall issue the necessary instructions. If a candidate disobeys instructions or misbehaves with any member of the supervisory staff or with any of the invigilators at the centre, he/she may be expelled from the examination for that session.
2. The Chief Superintendent shall immediately report the facts of such a case with full details of evidence to the Controller of Examinations who will refer the matter to the Examination Discipline Committee in terms of clause 4 of General Guidelines below. The committee will make recommendations for disciplinary action as it may deem fit to the Vice-Chancellor as provided under clause 7
3. Everybody, before an examination begins, the invigilators shall call upon all the candidates to search their persons, tables, desks, etc. and ask them to hand over all papers, books, notes or other reference material which they are not allowed to have in their possession or accessible to them in the examination hall. Where a late-comer is admitted this warning shall be repeated to him at the time of entrance to the examination hall. They are also to see that each candidate has his/her identification card and hall ticket with him/her.

III GENERAL GUIDELINES

1. Use of Unfair means:

A candidate shall not use means in connection with any examination. The following shall be deemed to unfair means:

- a. Found in possession of incriminating material related/unrelated to the subject of the examination concerned.
- b. Found copying either from the possessed material or from a neighbor.

- c. Inter-changing of answer scripts.
- d. Change of seat for copying.
- e. Trying to help others candidates.
- f. Found consulting neighbours
- g. Exchange of answer sheets or relevant materilas.
- h. Writing some other candidate's register number in the main answer paper.
- i. Insertion of pre-written answer sheets (Main sheets or Additional sheets)
- j. Threatening the invigilator or insubordinate behavior as reported by the Chief Superintendent and / or Hall Superintendent.
- k. Consulting the invigilator for answering the questions in the examination.
- l. Cases of impersonation
- m. Mass copying
- n. Using electronic devices for the purpose of malpractice.

The Executive Council may declare any other act of omission or commission to be unfair means in respect of any or all the examination.

2. If the Vice-Chancellor is satisfied that there has been mass-scale copying or use of unfair means on a mass-scale at particular center(s), he may cancel the examination of all the candidates concerned and order re-examination.
3. Where the invigilator incharge is satisfied that one third (1/3) or more students were involved in using unfair-means or copying in a particular Examination Hall. It shall be deemed to be a case of mass copying.
 - a) The Chief Superintendent of the examination centre shall report to the Controller of Examinations without delay and on the day of the occurrence if possible, each case where use of unfair means in the examination is suspected or discovered with full details of the evidence in support thereof and the statement of the candidate concerned, if any, on the forms supplied by the Controller of Examination for the purpose.
 - b) A candidate shall not be forced to give a statement but the fact of his /her having refused to make a statement shall be recorded by the Chief Superintendent and shall be got attested by two other members of the supervisory staff on duty at the time of occurrence of the incident.
 - c) A candidate detected or suspected of using unfair means in the examination may be permitted to answer the question paper, but on separate answer-book. The answer-book in which the use of unfair means is suspected shall be seized by the Chief Superintendent, who shall send both the answer-books to the Controller of Examination with his report. This will not affect the concerned candidate appearing in the rest of the examinations.
 - d) All cases of use of unfair means shall be reported immediately to the Controller of the Examination by the Centre Superintendent, examiner, paper-setter, evaluator, moderator,

tabulator or the person connected with the University examination as the case may be, with all the relevant material.

4. Examination Discipline Committee

- a) All the cases of alleged use of unfair means shall be referred to a committee called the Examination Discipline Committee to be appointed by the Vice-Chancellor.
- b) The Committee shall consists of five members drawn from amongst the teachers and officers of the university. One member will be nominated as Chairman from amongstthem by the Vice Chancellor.
- c) A member shall be appointed for a term of two years, and shall be eligible for re-appointment.
- d) Three members present shall constitute the quorum.
- e) Ordinarily, all decisions shall be taken by the Committee by simple majority. If the members cannot reach a consensus, the case shall be referred to the Vice-Chancellor, whose decision shall be final.
- f) All decisions taken by the examination discipline committee will be placed before the Vice-Chancellor for approval
- g) A candidate within one month of the receipt of the decision of the university may appeal to the Vice-Chancellor, in writing for a review of the case. If the Vice-Chancellor is satisfied that the representation merits consideration, he/she may refer the case back to the Examination Discipline Committee for reconsideration.

5 The Examination Discipline Committee may recommend one of the following punishments for cases of unfair means

Nature of unfair means	Scale of Punishment
If the candidate has used unfair means specified in sub-clause (a) to (g) of clause 3	Cancel all the University Examinations registered by the candidate in that session.
If the candidate has repeated the unfair means shown at 3(a) to (g) a second time	Cancel the University Examination of all subjects registered by the candidate in that session and debar him/her for the next examination session (i.e. all university Examinations in the subsequent session)
If the candidate has repeated the unfair means shown at 3(a) to (g) third time	Cancel the University Examination of all subjects registered by the candidate for that session and debar him/her for two years from registering and appearing for the university Examination

<p>If the candidate has used unfair means specified in sub-clause (h) of clause</p>	<p>Cancel the University Examination of all subjects registered by the candidate during that semester only.</p>
<p>If the candidate has used unfair means specified in sub-clause (i) of clause</p>	<p>Cancel the University Examination of all subjects registered by the candidate for that session and debar him/her for two subsequent Examination sessions.</p>
<p>If the candidate has used unfair means specified in sub-clause (j) of clause 3</p>	<p>Cancel the University Examination of all subjects registered by the candidate for that session and debar him/her for two years from registering and appearing for the university Examination</p>
<p>If the candidate has used unfair means specified in sub-clause (k) of clause</p>	<p>Cancel the University Examination of all subjects registered by the candidate for that session</p>
<p>If the candidate has used unfair means specified in sub-clause (l) of clause</p>	<p>Cancel the University Examination of all subjects registered by the candidate for that session and debar him/her for two years from registering and appearing for the examination sessions. Moreover, relevant legal action shall be initiated if an outsider is involved.</p>
<p>If the candidate used unfair means in sub-clause (m) of clause 3</p>	<p>ix) a) In the single Hall: Cancel the relevant examination taken by the students of that Hall. Debar the concerned Hall superintendent and other involved directly or indirectly from the examination work such as invigilation, question paper-setting, valuation, etc. for the next six examination sessions.</p> <p>b) In a Centre: Cancel the relevant examination taken by the students of the center. Debar the Hall Superintendents and the Chief Superintendent and other involved directly or indirectly from the examination work such as invigilation, question paper-setting, valuation, etc. for the next six examination sessions and cancel the examination center for two years</p>

Regulation for the Disposal of cases of "Use or attempt to use Unfair Means" and Disorderly conduct at an examination by a candidate.

{Statue 14(d), Draft Ordinance 26(36)}

1. A candidate shall not use unfair means or behave disorderly in any manner, in connection with any examinations of the University.
2. In every case (Except cases of Internal/Practical examinations) where a candidate appearing for an examination is found using or attempting to use unfair means at the examination or behaving in a disorderly manner, a report accompanied with the candidate's answer books and such documents and articles as were found in his possession and as constitute prima facie evidence of the use of unfair means/disorderly behavior shall be sent immediately to the Controller of Examinations. Provided that in case of Internal/Practical examinations, if any kind of unfair means detected during such examinations, the same shall be brought to the notice of the Head of the Department concerned, who shall submit a full report of the same to the Dean concerned and the Dean concerned shall have full power to decide the case in consultation with Head of the Department concerned at School of Studies / Departmental level only. If an examinee disobeys instructions or misbehaves with any member of the supervisory staff or with any of the invigilators during the examinations, he/she may be expelled by the Dean/HoD from that session of the examination.
3. The Chief Superintendent/Superintendent of the examination centre shall report to the Controller of Examinations without delay and on the day of the occurrence if possible, each case where use of unfair means in the examination conducted by the University is suspected or discovered with full details of the evidence in support thereof and the statement of the candidate concerned, if any, on the forms supplied by the University for the purpose.
4. A candidate shall not be forced to give a statement but the fact of his/ her having refused to make a statement shall be recorded by the Chief Superintendent/Superintendent and shall be got attested by two other members of the supervisory staff on duty at the time of occurrence of the incident.
5. A candidate detected or suspected of using unfair means in the examination conducted by the University may be permitted to answer the question paper, but on separate answer-book. The answer-book in which the use of unfair means is suspected shall be seized by the Chief Superintendent/ superintendent, who shall send both the answer- books to the Controller of Examinations with his report. This will be not affecting the concerned candidate appearing in the rest of the examinations

6. All cases of use of unfair means(Except cases of Internal/Practical examinations) during the examinations conducted by the University, shall be reported immediately to the Controller of Examinations by the Centre Superintendent/ Superintendent, examiner, paper-setter, evaluator, moderator, tabulator or any other person connected with the University examination as the case may be, with all the relevant material.

7. If the Vice-Chancellor is satisfied that there has been mass-scale copying or use of unfair means on a mass-scale at particular center(s)/Building/Hall, he or she may cancel the examination of all the candidates concerned and order re-examination.

8. Where the invigilator in charge is satisfied that one third (1/3) or more students were involved in using unfair-means or copying in a particular Examination Hall, it shall be deemed to be a case of mass copying.

9. UNFAIR MEANS COMMITTEE

a) All the cases of alleged use of unfair means shall be referred to a Committee called the Unfair Means Committee to be appointed by the Vice-Chancellor as prescribed in Ordinance 26(36).

b) Ordinarily, all decisions shall be taken by the Committee by simple majority. If the members cannot reach a consensus, the case shall be referred to the Vice-Chancellor, whose decision shall be final.

c) All decisions taken by the Unfair Means Committee will be placed before the Vice-Chancellor for approval.

d) A candidate, within 10 days of the receipt of the decision of the University, may appeal to the Vice-Chancellor, in writing for a review of his/her case. If the Vice-Chancellor is satisfied that the representation merits consideration, he/she may either decide himself/herself the case finally or may refer the case back to the Unfair Means Committee for reconsideration of the same within next 10

days.

10. The Unfair Means Committee may recommend one of the following punishments for below mentioned cases of unfair means.

	Nature of unfair means	Scale of Punishment
(I)	Found in possession of incriminating material (Like book(s), notes, papers, electronic gadgets or any other like material, in any form.	
(A)	Recovered material not related to the subject or found writing something on the question paper, which is not the answer to the questions being asked on his question paper.	No punishment be imposed on the basis of examiner's report showing irrelevancy of material but a warning be issued for not to repeat the same.
(B)	The Material is relevant to the subject but not used.	Paper be cancelled, examinee be permitted to appear in ATKT / Supp. Exams., if eligible for the same.
(C)	The Material is relevant to the subject and used.	Concerned semester Examination and subsequent semester examination (if any) of the same session be cancelled, examinee be permitted to appear in the next full examination of concerned semester with all subject in next session.
(D)	The Material is relevant to the subject or paper (used/ not used) and the examinee showed indecent Behavior. OR The Material is relevant to the subject or paper and used and the examinee was again found using unfair means subsequently.	Concerned semester Examination and subsequent semester examination (if any) of the same session be cancelled and the examinee be debarred from appearing at all the semester examinations of next full session.
(E)	The Material is relevant to the subject or paper, used and the examinee showed gross indiscipline such as abusing / threatening the invigilators OR using abusive/derogatory language orally or in writing in the Answer Sheet against the Centre Superintendent / Examiner / Invigilator OR threatening / using violence towards Centre Superintendent or other persons connected with the conduct of the examinations OR any other form of gross insubordinate behavior as reported by the Chief Superintendent and / or Hall Superintendent OR found using unfair means in the two or more subsequent papers, found destroying evidence or not depositing the examination answer books .	Concerned semester Examination and subsequent semester examination (if any) of the same session be cancelled and the examinee be debarred from appearing at all the semester examinations of next two full session.

(II)	If an examinee / candidate is found carrying a weapon capable of inflicting injury in the examination rooms / halls. (Note-The Chief Superintendent and / or Centre Superintendent / Hall Superintendent in such a case should ask for seizure of the weapon and report the matter to the concern police station)	Concerned semester Examination and subsequent semester examination (if any) of the same session be cancelled and the examinee be debarred from appearing at all the semester examinations of next three full session.
(III)	If a report is received that an examinee has physically assaulted any person connected with the University Examinations.	Concerned semester Examination and subsequent semester examination (if any) of the same session be cancelled and the examinee be debarred from appearing at all the semester examinations of next four full session.
(IV) (a)	Found receiving or giving assistance in copying from or to other examinees during the course of the examination. OR Trying to help other candidates. OR Found consulting neighbors for the purpose of copying OR Writing questions and answers on any additional paper other than the Answer Sheet.	Paper be cancelled, examinee be permitted to appear in ATKT/ Supp. Exams., if eligible for the same.
(b)	Inter-changing of answer scripts or other relevant material. OR Change of seat for copying including found sitting in a room or at a seat other than the allotted one without permission of the Centre Superintendent. OR Writing some other candidate's register number, intentionally, in the answer sheet.	Concerned semester Examination and subsequent semester examination (if any) of the same session be cancelled.
(c)	If the candidate has repeated the unfair means shown at clause IV (b) above a second time .	Concerned semester Examination and subsequent semester examination (if any) of the same session be cancelled and the examinee be debarred from appearing at all the semester examinations of next full session.
(d)	Insertion of pre- written answer sheets (Main sheets or Additional Sheets) including smuggling in or out of the examination hall of Answer Sheet in whole or part or tampering with it in any way. OR Replacement of Answer Sheet, exchange of Answer Sheet with other student, addition of extra pages in the Answer Sheet, smuggling of Answer Sheet/pages. OR Candidate is	Concerned semester Examination and subsequent semester examination (if any) of the same session be cancelled and the examinee be debarred from appearing at all the semester examinations of next full session.

	caught with a material which he has chewed or swallowed or torn into pieces and the candidate refuses to sign the documents and also misbehave with the invigilation staff.	
(e)	Consulting the invigilator for answering the questions in the examination or communicating with the examiner or any other person connected with the examination for favor.	Cancel the Examination of that Paper for which the examinee was found consulting the invigilator or Cancel the Examinations of all subjects/Papers registered by the candidate for concerned semester for which he was found communicating with the examiner /examiners or any other person connected with the examination for favor.
(f)	Cases of impersonation i.e. sending some other person to take the examination.	Cancel the University Examinations of all subjects registered by the candidate for concerned semester and subsequent semesters (if any) of the same session and debar him/her from all semester examinations for immediate next session. Moreover, relevant legal action shall be initiated if an outsider is involved.
(V)	Cases not covered under any of the above clauses.	The Committee may recommend appropriate action/decision in each case.
(VI)	Mass copying: -	
a)	In the Single Building /Hall/Room: -	Cancel the relevant examination taken by the students of that Building /Hall/Room. Debar the concerned Building /Hall Superintendent and other involved directly or indirectly from the examination work such as invigilation, question paper setting, valuation, etc. for the next six sessions (Three Years) of semester examinations.
b)	In a Centre/Building:	Cancel the relevant examination taken by the students of the Centre/Building. Debar the Superintendents and the Chief Superintendent and other involved directly or indirectly from the examination work such as invigilation, question paper setting, valuation etc. for the next six examination sessions (Three Years) and cancel the examination center for two years.
(VII) Unfair Means cases in Internal/Sessional and Practical Examinations :-		
If any kind of unfair means detected during the Internal/Sessional and /or Practical Examinations the same shall be brought to the notice of the Head of the Department concerned, who shall submit a full report to the Dean, School of Studies concerned. The		

Dean concerned, in consultation with the Head of Department, shall have full power to decide the case at School of Study / Departmental level only.

The maximum penalty for using unfair means in Internal/Sessional and Practical Examinations shall be as follows :-

If the examinee found using any kind of the unfair means during any **Internal/Sessional or Practical examination**, the Dean in consultation with Head of the Department and on the basis of the report of the Head of the Department concerned, the Dean or Under the Order/Instruction of the Dean concerned, the Head of the Department **shall expel the examinee from the Internal/Sessional or Practical Examination.**

If an examinee disobeys instructions or misbehaves with any member of the supervisory staff or with any of the invigilators during such examinations, he/she may be expelled by the Dean/HoD from that session of the examination.

If the examinee repeated the use of unfair means second time in any subsequent **Internal/Sessional Examination or Practical Examination**, the Dean concerned, in consultation with Head of the Department, shall cancel the admission of the examinee in the concerned Department for that session for which he was found using unfair means second time.

Appeal: - A candidate, **within 10 days of the receipt of the decision of the Dean/Head of the Department**, may appeal to the Vice-Chancellor, in writing for a review of his/her case. If the Vice-Chancellor is satisfied that the representation merits consideration, he/she may either decide himself/herself the case finally or may refer the case back to the Dean/Head of the Department, as the case may be, for reconsideration **of the same within next 10 days.**

11. INTERPRETATION OF REGULATION

In any matter of interpretation of the provisions of this regulation, the matter shall be referred to Vice-Chancellor who in the capacity of the chairman of Academic Council and Executive Council shall decide the concerned matter finally.

12. POWER TO REMOVE DIFFICULTIES

If any question arises related to the matters not covered in these provisions, the relevant provisions made in appropriate Act / Statute / Ordinance / Regulations / Rules / Notifications issued by the university shall prevail. In addition to above the Executive Council, on the recommendations of Academic Council, may declare any other act of omission or commission to be unfair means in respect of any or all the examination.

ABOUT RAGGING

ABOUT RAGGING

UGC DRAFT REGULATIONS ON CURBING THE MENACE OF RAGGING IN HIGHER EDUCATIONAL INSTITUTIONS, 2009

In exercise of the power conferred by Clause (g) of Sub-Section (1) of Section 26 of the University Grants Commission Act, 1956, the University Grants Commission hereby makes the following Regulations, namely-

1. Title, commencement and applicability:-

- 1.1. These regulations shall be called the “UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009”.
- 1.2. They shall come into force with immediate effect.
- 1.3. They shall apply to all the universities established or incorporated by or under a Central Act, a Provincial Act or a State Act, to all institutions deemed to be university under Section 3 of the UGC Act, 1956, to all other higher educational institutions, including the departments, constituent units and all the premises (academic, residential, sports, canteen, etc) of such universities, deemed universities and other higher educational institutions, whether located within the campus or outside, and to all means of transportation of students whether public or private.

2. Objective:-

To root out ragging in all its forms from universities, colleges and other educational institutions in the country by prohibiting it by law, preventing its occurrence by following the provisions of these Regulations and punishing those who indulge in ragging in spite of prohibition and prevention as provided for in these Regulations and the appropriate law in force.

3. Definitions:-

For the purposes of these Regulations:-

- 3.1 “college” means any institution, whether known as such or by any other name, which provides for a programme of study beyond 12 years of schooling for obtaining any qualification from a university and which, in accordance with the rules and regulations of such university, is recognized as competent to provide for such programmes of study and present students undergoing such programmes of study for the examination for the award of such qualification.
- 3.2 “Head of the institution” means the ‘Vice-Chancellor’ in case of a university/deemed to be university, ‘Principal’ in case of a college, ‘Director’ in case of an institute.

3.3 “institution” means a higher educational institution (HEI), like a university, a college, an institute, etc. imparting higher education beyond 12 years of schooling leading to a degree (graduate, postgraduate and/or higher level).

3.4 Ragging” means the following: Any disorderly conduct whether by words spoken or written or by an act which has the effect of teasing, treating or handling with rudeness any other student, indulging in rowdy or undisciplined activities which causes or is likely to cause annoyance, hardship or psychological harm or to raise fear or apprehension thereof in a fresher or a junior student or asking the students to do any act or perform something which such student will not in the ordinary course and which has the effect of causing or generating a sense of shame or embarrassment so as to adversely affect the physique or psyche of a fresher or a junior student.

3.5 “University” means a university established or incorporated by or under a Central Act, a Provincial Act or a State Act, an institution deemed to be university under Section 3 of the UGC Act, 1956, or an institution specially empowered by an Act of Parliament to confer or grant degrees

4 Punishable ingredients of Ragging:-

- Abetment to ragging;
- Criminal conspiracy to rag;
- Unlawful assembly and rioting while ragging;
- Public nuisance created during ragging;
- Violation of decency and morals through ragging;
- Injury to body, causing hurt or grievous hurt;
- Wrongful restraint;
- Wrongful confinement;
- Use of criminal force;
- Assault as well as sexual offences or even unnatural offences;
- Extortion;
- Criminal trespass;
- Offences against property;
- Criminal intimidation;
- Attempts to commit any or all of the above mentioned offences against the victim(s);
- All other offences following from the definition of “Ragging”.

5 Measures for prohibition of ragging at the institution level:-

5.1 The institution shall strictly observe the provisions of the Act of the Central Government and the State Governments, if any, or if enacted, considering ragging as a cognizable offence under the law on a par with rape and other atrocities against women and ill-

treatment of persons belonging to the SC/ST, and prohibiting ragging in all its forms in all institutions.

5.2 Ragging in all its forms shall be totally banned in the entire institution, including its departments, constituent units, all its premises (academic, residential, sports, canteen, etc) whether located within the campus or outside and in all means of transportation of students whether public or private.

5.3 The institution shall take strict action against those found guilty of ragging and/or of abetting ragging.

6 Measures for prevention of ragging at the institution level:-

6.1 Before admissions:-

6.1.1 The advertisement for admissions shall clearly mention that ragging is totally banned in the institution, and anyone found guilty of ragging and/or abetting ragging is liable to be punished Appropriately (for punishments, ref. section 8 below).

6.1.2 The brochure of admission/instruction booklet for candidates shall print in block letters these Regulations in full (including Annexures).

6.1.3 The 'Prospectus' and other admission related documents shall incorporate all directions of the Supreme Court and / or the Central or State Governments as applicable, so that the candidates and their parents/ guardians are sensitized in respect of the prohibition and consequences of ragging. If the institution is an affiliating university, it shall make it mandatory for the institutions under it to compulsorily incorporate such information in their 'Prospectus'.

6.1.4 The application form for admission/ enrolment shall have a printed undertaking, preferably both in English/Hindi and in one of the regional languages known to the institution and the applicant (English version given in Annexure I, Part I), to be filled up and signed by the candidate to the effect that he/she is aware of the law regarding prohibition of ragging as well as the punishments, and that he/she, if found guilty of the offence of ragging and/or abetting ragging, is liable to be punished appropriately.

6.1.5 The application form shall also contain printed undertaking, preferably both in English/Hindi and in one of the regional languages known to the institution and the parent/ guardian (English version given in Annexure I, Part II), to be signed by the parent/ guardian of the applicant to the effect that he/ she is also aware of the law in this regard and agrees to abide by the punishment meted out to his/her ward in case the latter is found guilty of ragging and/or abetting ragging.

6.1.6 The application for admission shall be accompanied by a document in respect of the School Leaving Certificate/ Character Certificate which shall include a report on the behavioral pattern of the applicant, so that the institution can thereafter keep intense watch upon a student who has a negative entry in this regard.

- 6.1.7 A student seeking admission to the hostel shall have to submit another undertaking in the form of Annexure I (both Parts) along with his/ her application for hostel accommodation.
- 6.1.8 At the commencement of the academic session the Head of the Institution shall convene and address a meeting of various functionaries/agencies, like Wardens, representatives of students, parents/ guardians, faculty, district administration including police, to discuss the measures to be taken to prevent ragging in the Institution and steps to be taken to identify the offenders and punish them suitably.
- 6.1.9 To make the community at large and the students in particular aware of the dehumanizing effect of ragging, and the approach of the institution towards those indulging in ragging, big posters (preferably multicolored with different colours for the provisions of law, punishments, etc.) shall be prominently displayed on all Notice Boards of all departments, hostels and other buildings as well as at vulnerable places. Some of such posters shall be of permanent nature in certain vulnerable places.
- 6.1.10 The institution shall request the media to give adequate publicity to the law prohibiting ragging and the negative aspects of ragging and the institution's resolve to ban ragging and punish those found guilty without fear or favour.
- 6.1.11 The institution shall identify, properly illuminate and man all vulnerable locations.
- 6.1.12 The institution shall tighten security in its premises, especially at the vulnerable places. If necessary, intense policing shall be resorted to at such points at odd hours during the early months of the academic session.
- 6.1.13 The institution shall utilize the vacation period before the start of the new academic year to launch wide publicity campaign against ragging through posters, leaflets, seminars, street plays, etc.
- 6.1.14 The faculties/ departments/ units of the institution shall have induction arrangements (including those which anticipate, identify and plan to meet any special needs of any specific section of students) in place well in advance of the beginning of the academic year with a clear sense of the main aims and objectives of the induction process.

6.2 On admission:-

- 6.2.1 Every fresher admitted to the institution shall be given a printed leaflet detailing when and to whom he/she has to turn to for help and guidance for various purposes (including Wardens, Head of the institution, members of the anti-ragging committees, relevant district and police authorities), addresses and telephone numbers of such persons/ authorities, etc., so that the fresher need not look up to the seniors for help in such matters and get indebted to them and start doing things, right or wrong, at their behest. Such a step will reduce the fresher's dependence on their seniors.

6.2.2 The institution through the leaflet mentioned above shall explain to the new entrants the arrangements for their induction and orientation which promote efficient and effective means of integrating them fully as students.

6.2.3 The leaflet mentioned above shall also tell the fresher's about their rights as bonafide students of the institution and clearly instructing them that they should desist from doing anything against their will even if ordered by the seniors, and that they have nothing to fear as the institution cares for them and shall not tolerate any atrocities against them.

6.2.4 The leaflet mentioned above shall contain a calendar of events and activities laid down by the institution to facilitate and complement familiarization of juniors with the academic environment of the institution.

6.2.5 The institution shall also organize joint sensitization programmes of 'freshers' and seniors.

6.2.6 Fresher shall be encouraged to report incidents of ragging, either as victims, or even as witnesses.

6.3 At the end of the academic year:-

6.3.1 At the end of every academic year the Vice-Chancellor/ Dean of Students Welfare/ Director/ Principal shall send a letter to the parents/ guardians who are completing the first year informing them about the law regarding ragging and the punishments, and appealing to them to impress upon their wards to desist from indulging in ragging when they come back at the beginning of the next academic session.

6.3.2 At the end of every academic year the institution shall form a 'Mentoring Cell' consisting of Mentors for the succeeding academic year. There shall be as many levels or tiers of Mentors as the number of batches in the institution, at the rate of 1 Mentor for 10 freshers and 1 Mentor of a higher level for 10 Mentors of the lower level.

6.4 Setting up of Committees and their functions:-

6.4.1 The Anti-Ragging Committee:- The Anti-Ragging Committee shall be headed by the Head of the institution and shall consist of representatives of faculty members, parents, students belonging to the freshers' category as well as seniors and non-teaching staff. It shall consider the recommendations of the Anti-Ragging Squad and take appropriate decisions, including spelling out suitable punishments to those found guilty.

6.4.2 The Anti-Ragging Squad:- The Anti-Ragging Squad shall be nominated by the Head of the institution with such representation as considered necessary and shall consist of members belonging to the various sections of the campus community. The Squad will have vigil, oversight and patrolling functions. It shall be kept mobile, alert and active at all times and shall be empowered to inspect places of potential ragging and make surprise raids on hostels and other hot spots. The Squad shall investigate incidents of ragging and make recommendations to the Anti-Ragging Committee and shall work under the overall guidance of the said Committee.

6.4.3 Monitoring Cell on Ragging:- If the institution is an affiliating university, it shall have a Monitoring Cell on Ragging to coordinate with the institutions affiliated to it by calling for reports from the Heads of such institutions regarding the activities of the Anti-Ragging Committees, Squads, and Mentoring Cells, regarding compliance with the instructions on conducting orientation programmes, counseling sessions, etc., and regarding the incidents of ragging, the problems faced by wardens and other officials, etc. This Cell shall also review the efforts made by such institutions to publicize anti-ragging measures, cross-verify the receipt of undertakings from candidates/students and their parents/guardians every year, and shall be the prime mover for initiating action by the university authorities to suitably amend the Statutes or Ordinances or Bye-laws to facilitate the implementation of anti ragging measures at the level of the institution.

6.5 Other measures:-

6.5.1 The Annexure mentioned in 6.1.4, 6.1.5 and 6.1.7 shall be furnished at the beginning of each academic year by every student, that is, by freshers as well as seniors.

6.5.2 The institution shall arrange for regular and periodic psychological counseling and orientation for students (for freshers separately, as well as jointly with seniors) by professional counselors during the first three months of the new academic year. This shall be done at the institution and department/ course levels. Parents and teachers shall also be involved in such sessions.

6.5.3 Apart from placing posters mentioned in 6.1.9 above at strategic places, the institution shall undertake measures for extensive publicity against ragging by means of audio-visual aids, by holding counseling sessions, workshops, painting and design competitions among students and other methods as it deems fit.

6.5.4 If the institution has B.Ed. and other Teacher training programmes, these courses shall be mandated to provide for anti-ragging and the relevant human rights appreciation inputs, as well as topics on sensitization against corporal punishments and checking of bullying amongst students, so that every teacher is equipped to handle at least the rudiments of the counseling approach.

6.5.5 Wardens shall be appointed as per the eligibility criteria laid down for the post reflecting both the command and control aspects of maintaining discipline, as well as the softer skills of counseling and communicating with the youth outside the class-room situations. Wardens shall be accessible at all hours and shall be provided with mobile phones. The institution shall review and suitably enhance the powers and perquisites of Wardens and authorities involved in curbing the menace of ragging.

6.5.6 The security personnel posted in hostels shall be under the direct control of the Wardens and assessed by them.

6.5.7 Private commercially managed lodges and hostels shall be registered with the local police authorities, and this shall be done necessarily on the recommendation of the Head of the institution. Local police, local administration and the institutional

authorities shall ensure vigil on incidents that may come within the definition of ragging and shall be responsible for action in the event of ragging in such premises, just as they would be for incidents within the campus. Managements of such private hostels shall be responsible for not reporting cases of ragging in their premises.

- 6.5.8 The Head of the institution shall take immediate action on receipt of the recommendations of the Anti-Ragging Squad. He/ She shall also take action suo motto if the circumstances so warrant.
- 6.5.9 Freshers who do not report the incidents of ragging either as victims or as witnesses shall also be punished suitably.
- 6.5.10 Anonymous random surveys shall be conducted across the 1st year batch of students (freshers) every fortnight during the first three months of the academic year to verify and cross-check whether the campus is indeed free of ragging or not. The institution may design its own methodology of conducting such surveys.
- 6.5.11 The burden of proof shall lie on the perpetrator of ragging and not on the victim.
- 6.5.12 The institution shall file an FIR with the police / local authorities whenever a case of ragging is reported, but continue with its own enquiry and other measures without waiting for action on the part of the police/ local civil authorities. Remedial action shall be initiated and completed within the one week of the incident itself.
- 6.5.13 The Migration / Transfer Certificate issued to the student by the institution shall have an entry, apart from those relating to general conduct and behaviour, whether the student has been punished for the offence of committing or abetting ragging, or not, as also whether the student has displayed persistent violent or aggressive behaviour or any desire to harm others.
- 6.5.14 Preventing or acting against ragging shall be the collective responsibility of all levels and sections of authorities or functionaries in the institution, including faculty, and not merely that of the specific body/ committee constituted for prevention of ragging.
- 6.5.15 The Heads of institutions other than universities shall submit weekly reports to the Vice-chancellor of the university the institution is affiliated to or recognized by, during the first three months of new academic year and thereafter each month on the status of compliance with anti-ragging measures. The Vice Chancellor of each university shall submit fortnightly reports of the university, including those of the Monitoring Cell on Ragging in case of an affiliating university, to the Chancellor.
- 6.5.16 Access to mobile phones and public phones shall be unrestricted in hostels and campuses, except in class-rooms, seminar halls, library etc. where jammers shall be installed to restrict the use of mobile phones.

6.6 Measures for encouraging healthy interaction between freshers and seniors:-

- 6.6.1 The institution shall set up appropriate committees including the course-in-charge, student advisor, Warden and some senior students to actively monitor, promote and regulate healthy interaction between the freshers and senior students.
- 6.6.2 Freshers' welcome parties shall be organized in each department by the senior students and the faculty together soon after admissions, preferably within the first two weeks of the beginning of the academic session, for proper introduction to one another and where the talents of the freshers are brought out properly in the presence of the faculty, thus helping them to shed their inferiority complex, if any, and remove their inhibitions.
- 6.6.3 The institution shall enhance the student-faculty interaction by involving the students in all matters of the institution, except those relating to the actual processes of evaluation and of faculty appointments, so that the students shall feel that they are responsible partners in managing the affairs of the institution and consequently the credit due to the institution for good work/ performance is due to them as well.

6.7 Measures at the UGC/ Statutory/ Regulatory bodies' level:-

- 6.7.1 The UGC and other Statutory /Regulatory bodies shall make it mandatory for the institutions to compulsorily incorporate in their 'Prospectus' the directions of the Supreme Court and/or the Central or State Governments with regard to prohibition and consequences of ragging, and that noncompliance with the directives against ragging in any manner whatsoever shall be considered as lowering of academic standards by the erring institution making it liable for appropriate action.
- 6.7.2 The UGC (including NAAC and UGC Expert Committees visiting institutions for various purposes) and similar Committees of other Statutory/Regulatory bodies shall cross-verify that the institutions strictly comply with the requirement of getting the undertakings from the students and their parents/ guardians as envisaged under these Regulations.
- 6.7.3 The UGC and other funding bodies shall make it one of the conditions in the Utilization Certificate for sanctioning any financial assistance or aid to the institution under any of the general or special schemes that the institution has strictly complied with the anti-ragging measures and has a blemishless record in terms of there being no incidents of ragging during the period pertaining to the Utilization Certificate.
- 6.7.4 The NAAC and other accrediting bodies shall factor in any incident of ragging in the institution while assessing the institution in different grades.
- 6.7.5 The UGC shall constitute a Board for Coordination consisting of representatives of the AICTE, the IITs, the NITs, the IIMs, the MCI, the DCI, the NCI, the ICAR and such other bodies which have to deal with higher education to coordinate and monitor the anti-ragging movement across the country and to make certain policy decisions. The said Board shall meet once in a year in the normal course.

6.7.6 The UGC shall have an Anti-Ragging Cell within the Commission as an institutional mechanism to provide secretarial support for collection of information and monitoring, and to coordinate with the State level and university level Committees for effective implementation of anti-ragging measures.

6.7.7 If an institution fails to curb ragging, the UGC/ the Statutory/ Regulatory body concerned may stop financial assistance to such an institution or take such action within its powers as it may deem fit and impose such other penalties as provided till such time as the institution achieves the objective of curbing ragging.

7 Incentives for curbing ragging:-

7.1 The UGC shall consider providing special/ additional annual financial grants-in-aid to those eligible institutions which report a blemish-less record in terms of there being no incidents of ragging.

7.2 The UGC shall also consider instituting another category of financial awards or incentives for those eligible institutions which take stringent action against those responsible for incidents of ragging.

7.3 The UGC shall lay down the necessary incentive for the post of Warden in order to attract the right type of eligible candidates, and motivate the incumbent.

8 Punishments:-

8.1 At the institution level:

Depending upon the nature and gravity of the offence as established by the Anti-Ragging Committee of the institution, the possible punishments for those found guilty of ragging at the institution level shall be any one or any combination of the following:

8.1.1 Cancellation of admission

8.1.2 Suspension from attending classes

8.1.3 Withholding/ withdrawing scholarship/ fellowship and other benefits

8.1.4 Debarring from appearing in any test/ examination or other evaluation process

8.1.5 Withholding results

8.1.6 Debarring from representing the institution in any regional, national or international meet, tournament, youth festival, etc.

8.1.7 Suspension/ expulsion from the hostel

8.1.8 Rustication from the institution for period ranging from 1 to 4 semesters

8.1.9 Expulsion from the institution and consequent debarring from admission to any other institution

8.1.10 Fine of Rupees 25,000/-

8.1.11 Collective punishment: When the persons committing or abetting the crime of ragging are not identified, the institution shall resort to collective punishment as a deterrent to ensure community pressure on the potential raggings.

8.2 At the university level in respect of institutions under it:

If an institution under a university (being constituent of, affiliated to or recognized by it) fails to comply with any of the provisions of these Regulations and fails to curb ragging effectively, the university may impose any or all of the following penalties on it:

- 8.2.1 Withdrawal of affiliation/ recognition or other privileges conferred on it
- 8.2.2 Prohibiting such institution from presenting any students then undergoing any programme of study therein for the award of any degree/diploma of the university
- 8.2.3 Withholding any grants allocated to it by the university
- 8.2.4 Any other appropriate penalty within the powers of the university.

8.3 At the UGC level:

If an institution fails to curb ragging, the UGC may impose any or all of the following penalties on it:

- 8.3.1 Delisting the institution from section 2(f) and /or section 12B of the UGC Act
- 8.3.2 Withholding any grants allocated to it
- 8.3.3 Declaring institutions which are not covered under section 2(f) and or 12B as ineligible for any assistance like that for Major/ Minor Research Project, etc.
- 8.3.4 Declaring the institution ineligible for consideration under any of the special assistance programmes like CPE (College with potential for Excellence), UPE (University with Potential for Excellence) CPEPA (Centre with Potential for Excellence in a Particular Area), etc.
- 8.3.5 Declaring that the institution does not have the minimum academic standards and warning the potential candidates for admission accordingly through public notice and posting on the UGC Website.

TELEPHONE DIRECTORY

UNIVERSITY TELEPHONE DIRECTORY

Administration

S.No.	POSITION	NAME	PHONE NO. (07752)
01..	Vice Chancellor(Acting)	Prof. A.Gupta	260283, 260353
02.	Registrar (Acting)	Prof. Shailendra Kumar	260209
03.	Deputy Registrar (Administration)	-----	260036
04.	Deputy Registrar (Academic)	-----	-----
05.	Deputy Registrar (Academic & Engg. Section)	-----	260021
06.	Assistant Registrar (Administration)	Mr. Abhideep Tiwari	260017
07.	Assistant Registrar (Stores)	Mr. Santosh Kumar Tripathi	260017
08.	Assistant Registrar (Academic)	Mr. T. P. Singh	260000
9.	Controller of Exam	Sri H.N.Choubey	260044
10.	Dean Student Welfare (DSW)	Dr. M.N.Tripathi	260204
11.	Finance Officer (In Charge)	Prof.S.Singh	260036 _
12.	HOD, (Anthropology)	Dr. Nilakantha Panigrahi	260203
13.	HOD (Biotechnology)	Dr. Renu Bhatt	260405

Department of Computer Science & Engineering

14.	HOD (Commerce)	Dr. Vineet Singh	260142
15.	HOD (CSIT)	Smt. Pushplata Pujari	260356
16.	HOD (Economics)	Dr. Manisha Dubey	260412
17.	HOD (English)	Dr. Anurag Chouhan	260122
18.	HOD (Forestry, Wild life & Environment Science)	Dr. S.S. Dhuria	260078
19.	HOD (Hindi)	Shri Murli Manohar Singh I/C	07587472641
20.	HOD (History)	Dr. Seema Pandey	220558
21.	HOD, (Journalism and Mass Comm.)	Dr. Gopa Bagchi	94252-22316
22.	HOD (Library and Information Science))	Dr. Brajesh Tiwari	260469
23.	HOD (Pure & Applied Mathematics)	Dr. P. P. Murthy	260144
24.	HOD (Pure & Applied Physics)	Dr. H.S. Tiwari	260159
25.	HOD (Political Science & Public Administration)	Dr. Achyutananda Panda	260461
26.	HOD (Physical Education)	D Prof. V.S. Rathore	260035
27.	HOD (Management)	Dr. B. D. Mishra	260025
28.	HOD (Rural Technology)	Dr.Pushp Raj Singh	260287
29.	HOD (Social Work)	Shri Vikram Singh	260484

Department of Computer Science & Engineering

30.	HOD (Computer Science and Engineering)	Mr.Nishant Behar	260456
31.	HOD (Information Technology)	Mr.Santosh Soni	260454
32.	HOD (Electronics & Comm. Engineering)	Mr.Nipun Mishra	260458
33.	HOD (Industrial & Production Engineering)	Mrs.Arпита Roy Choudhary	260453
34.	HOD (Chemical Engineering)	Dr.Anil Chandrakar	260457
35.	HOD (Mechanical Engineering)	Dr. Rajesh Kumar Bhushan	086024-03633
36.	HOD (Civil Engineering)	Dr..M.C.Rao	260429
37.	HOD (Department of Pharmacy)	Prof. V. D. Rangari	260027
38.	HOD (Education Department)	Dr. C.S.Vazalwar	94252-23875
39..	HOD (Botany)	Dr. Sushil Kumar Shahi	260472
40.	HOD (Zoology)	Dr. Monika Bhadauria	09407567647
41.	HOD (Chemistry)	Dr. Charu Arora	75877-09551
42.	HOD (Law)	Dr. S.S. Singh	94241-63260
43.	HOD (Forensic Science)	Dr. Bharti Ahirwar	25800
45.	Central Library	-----	260041
46.	University Guest House	Dr.R.K.Panday	260024
47.	Assistant Security Officer	-----	0-----

48.	SC / ST Cell	-	07752-260053
49.	DSW (Office)	-	07752-260204, 260013

Other Useful Phone No.:

S. No.	POSITION	PHONE NO. (07752)
1	Police Station, Koni	07752-260039
2	Post Office, Koni	07752-260032
3	Punjab National Bank, Koni	07752-260034
4	Bank of India	07752-260073

DEPARTMENT PHONE DIRECTORY

Name	Designation	Telephone/ Mobile No.	E-mail id
Dr. Manish Shrivastava	Assistant Professor	09827116390	manbsp@gmail.com
Mr. Devendra Kumar Singh	Assistant Professor	98274741404	devendra.singh170@gmail.com
Mr. Nishant Behar	Assistant Professor & Head	07757-260456 9827179525	nishant.itggv@gmail.com
Mr. Vaibhav kant Singh	Assistant Professor	9424174443	vibhu200427@gmail.com
Mrs. Nishi Yadav	Assistant Professor	8103371508	nishidv@gmail.com
Ms. Raksha Sharma	Assistant Professor	9893129840	rakshasharma10@gmail.com
Mr. Amit Baghel	Assistant Professor	9826339264	amit_kumar_baghel@rediffmail.com
Mr. Satish Kumar Negi	Assistant Professor	9575111882	satish_kumar_negi@yahoo.co.in
Mr. Pushpendra kumar Chandra	Assistant Professor	9098505754	pushpendrachandra@gmail.com
Mr. Manjit Jaiswal	Assistant Professor	9685713546	manjit.jaiswal222@gmail.com

OFFICE STAFF PHONE NO.

Name	Postion	Telephone/Mobile No.
Mr.Shiv Kumar Koushik	Technical Assistant	9977018188
Mr.B.S.Kshatri	Lab Attendant	9755508501
Mr.Praveen Kaser	Junior Office Assistant	-----
Mr.Chandan Nanet	Peon	8817696941

COURSE STRUCTURE AND SYLLABUS

(AICTE-COURSE)

CBCS

SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
SECOND YEAR, COMPUTER SCIENCE AND ENGINEERING
SEMESTER -I Session 2019-20

Branch :- Computer Science & Engg.

Year : I

Sem- I

EFFECTIVE FROM SESSION 2018-19										
SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/WEEK			EVALUATION SCHEME			CREDITS	
			L	T	P	IA	ESE	TOTAL		
THEORY										
1	CS01TBS01	PHYSICS	3	1	0	30	70	100	4	
2	CS01TES01	BASIC ELECTRICAL ENGINEERING	3	1	0	30	70	100	4	
3	CS01TBS02	MATHEMATICS-I	3	1	0	30	70	100	4	
4	CS01THS01	ENGLISH	3	0	0	30	70	100	3	
5	CS01TMC01	ENVIRONMENTAL SCIENCES	3	0	0	0	
PRACTICAL										
1	CS01PBS01	PHYSICS LAB	0	0	3	30	20	50	1.5	
2	CS01PES01	BASIC ELECTRICAL ENGINEERING LAB	0	0	2	30	20	50	1	
3	CS01PES02	ENGINEERING GRAPHICS & DESIGN <i>LMB</i>	1	0	3	30	20	50	2.5	
4	CS01PMC01	INDUCTION TRAINING PROGRAMME	0	0	2	-	-	-	-	
TOTAL									20	
IA – INTERNAL ASSESSMENT ESE – END SEMESTER EXAM. L- LECTURE T- TUTORIAL P-PRACTICAL										

SCHEME OF EXAMINATION									
B.TECH (FOUR YEARS) DEGREE COURSE									
FIRST YEAR , COMPUTER SCIENCE AND ENGINEERING									
SEMESTER II (COURSE-B)									
EFFECTIVE FROM SESSION 2018-19									
SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/WEEK			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	TOTAL	
THEORY									
1	CS 02TBS03	MATHEMATICS-II	3	1	0	30	70	100	4
2	CS 02TBS04	CHEMISTRY	3	1	0	30	70	100	4
3	CS 02TES02	PROGRAMMING FOR PROBLEM SOLVING	3	0	0	30	70	100	3
4	CS 02THS03	HUMANITIES-I	3	1	0	30	70	100	4
PRACTICAL									
1	CS02PBS02	CHEMISTRY LAB	0	0	3	30	20	50	1.5
2	CS02PES03	PROGRAMMING FOR PROBLEM SOLVING LAB	0	0	3	30	20	50	1.5
3	CS02PES04	WORKSHOP & MANUFACTURING PRACTICES	1	0	3	30	20	50	2.5
TOTAL									20.5
IA – INTERNAL ASSESSMENT ESE – END SEMESTER EXAM. L- LECTURE T-TUTORIAL P-PRACTICAL									

SUBJECT CODE/SUBJECT	L	T	P	Credit
CS01TBS01/PHYSICS	3	1	0	4

Unit - 1: Optics: Interference and Diffraction

Introduction, Young's experiment, theory of interference, Coherent and non-coherent sources, Fresnel's Bi-prism and Newton's ring experiment.

Diffraction of light, Fresnel and Fraunhofer's diffraction, diffraction due to plane diffraction grating.

Unit - 2: Electromagnetic Theory

Coulomb's law, electrostatics field and potential, electric flux, Gauss' law, Poisson's and Laplace's equation, Equation of continuity for charge conservation, Ampere's and Faraday's laws, Maxwell's Electromagnetic equations.

Unit - 3: Laser and Fiber optics

Introduction, elementary idea of spontaneous and stimulated emission, active medium, population inversion, Einstein's coefficients, Types of lasers and important applications of lasers.

Introduction to optical fibers, basic principles of optical fiber, critical angle, numerical aperture, maximum acceptance angle, classification of optical fiber.

Unit -4: Semiconductor Physics and Devices

Formation of energy in solids, Energy band gap of metals, insulators and semiconductors, classification of semiconductor: Intrinsic and Extrinsic semiconductors, Fermi levels in intrinsic and extrinsic semiconductors, Electrical conductivity in conductors and semiconductors, working of P-N Junction diodes and Bipolar Junction transistor.

Unit - 5: Introduction to Quantum Mechanics

Introduction to Quantum Mechanics, Photoelectric effect, Compton effect, wave-particle duality, uncertainty principle, wave function, De-Broglie waves, Phase and Group velocity, Davisson and Germer experiment, Schrodinger wave equation, particle in a box (1-Dimensional).

Text Books and References

- 1) Applied Physics – I and II by Navneet Gupta, Dhanpat Rai & Co.
- 2) Engg. Physics by S. K. Srivastava and R. A. Yadav, New Age Pub. New Delhi
- 3) Engg. Physics by Uma Mukherjee, Narosa Publication
- 4) Engg. Physics by M. N. Avadhanulu, S. Chand Pub.
- 5) Electricity and Magnetism by Rangwala and Mahajan, Tata McGraw Hill, 1998
- 6) Concepts of Physics Part -II by H. C. Verma, BharatiBhawan (P&D), 1998
- 7) Modern Physics by Beiser, McGraw Hill Inc. New York, Publication 1995
- 8) Modern Physics by Mani and Mehta, East-West Press Pvt. Ltd. 1998
- 9) Introduction to Electrodynamics, David Griffith
- 10) J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
- 11) B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., 2007).
- 12) S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).
- 13) Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).
- 14) P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
- 15) Online course: "Semiconductor Optoelectronics" by M R Shenoy on NPTEL
- 16) Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Gupta on NPTEL

SUBJECT CODE/NAME	L	T	P	Credit
CS01 TES01/ BASIC ELECTRICAL ENGINEERING	3	1	0	4

Module 1 : DC Circuits (8 hours)

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

Module 2: AC Circuits (8 hours)

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase Balanced circuits, voltage and current relations in star and delta connections.

Module 3: Transformers (6 hours)

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Module 4: Electrical Machines (8 hours)

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

Module 5: Power Converters (6 hours)

DC-DC bucks and boost converters, duty ratio control. Single-phase and three-phase voltage source inverters; sinusoidal modulation.

Module 6: Electrical Installations (6 hours)

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Suggested Text / Reference Books

- (i) D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
- (ii) D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
- (iii) L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
- (iv) E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
- (v) V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

Subject code	L	T	P	Credit
CS01THS01/ ENGLISH	3	0	0	3

1. Vocabulary Building

The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives. Synonyms, antonyms, and standard abbreviations.

2. Basic Writing Skills

Sentence Structures , Use of phrases and clauses in sentences , Importance of proper punctuation , Creating coherence , Organizing principles of paragraphs in documents , Techniques for writing precisely

3. Identifying Common Errors in Writing

3.1 Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés

4. Nature and Style of sensible Writing

Describing, Defining, Classifying, Providing examples or evidence, Writing introduction and conclusion.

5. Writing Practices

Comprehension, Précis Writing, Essay Writing.

6. Oral Communication (This unit involves interactive practice sessions in Language Lab)

- Listening Comprehension
- Pronunciation, Intonation, Stress and Rhythm
- Common Everyday Situations: Conversations and Dialogues
- Communication at Workplace
- Interviews
- Formal Presentations

Suggested Readings:

- (i) Practical English Usage. Michael Swan. OUP. 1995.
- (ii) Remedial English Grammar. F.T. Wood. Macmillan.2007
- (iii) On Writing Well. William Zinsser. Harper Resource Book. 2001
- (iv) Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
- (v) Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
- (vi) Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

CODE/SUBJECT	L	T	P	CREDIT
CS01TMC01/ENVIRONMENTAL SCIENCES	3	0	0	0

ENVIRONMENTAL STUDIES

~~GR4~~ NC 04C

Introduction to environmental studies: Multidisciplinary nature of environmental studies; Scope and importance; Concept of sustainability and sustainable development. Ecosystems: Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). Natural Resources Renewable and Non-renewable Resources: Land resources and land use change; Land degradation, soil erosion and desertification. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies. Biodiversity and Conservation: Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India;

Biodiversity patterns and global biodiversity hot spots. India as a mega-biodiversity nation. Endangered and endemic species of India. Threats to biodiversity: Habitat loss, poaching of wildlife, man wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and informational value. Environmental Pollution: Environmental pollution: types, cause effects and controls; Air, water, soil and noise pollution. Nuclear hazards and human health risks. Solid waste management: Control measures of urban and industrial waste. Pollution case studies: Environmental Policies & Practices. Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture. Environment Laws: Environment Protection Act Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD). Nature reserves, tribal populations and rights, human wildlife conflicts in Indian context. Human Communities and the Environment, Human population growth: Impacts on environment, human health and welfare. Resettlement and rehabilitation of project affected persons; case studies. Disaster management: floods, earthquake, cyclones and landslides. Environmental movements Chipko, silent valley, Bishnois of Rajasthan. Environmental ethics: role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness, case studies (e.g. CNG vehicles in Delhi). Field work: Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc. Visit to a local polluted site- Urban/Rural/Industrial/Agricultural. Study of common plants, insects, birds and basic principles of identification. Study of simple ecosystems-pond, river etc.

Suggested Readings:

1. Gleick, P. H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
2. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
3. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
4. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.

SUBJECT CODE/SUBJECT	L	T	P	Credit
CS01PBS01/PHYSICS LAB	0	0	3	1.5

List of Experiments:

1. To determine the wavelength of sodium light with help of Fresnel's Bi-prism.
2. To determine the refractive index and dispersive power of the material of prism with the help of spectrometer.
3. To determine the sodium light by Newton's ring method.
4. To determine the wavelength of sodium light by plane diffraction grating using spectrometer.
5. To demonstrate the diffraction pattern and determine the wavelength of different colors of mercury (white) light using plane diffraction grating and spectrometer.
6. To determine the wavelength and number of lines per cm on a diffraction grating using semiconductor laser diode.
7. To determine the specific rotation of sugar solution with the help of polarimeter.
8. Determine the width of the single slit and diameter of circular aperture using Fraunhofer diffraction pattern produced by semiconductor laser diode.
9. To determine the Energy band gap (E_g) of a semiconductor material using P-N junction diode.
10. To determine the e/m ratio by Thomson's method
11. To study the P-N junction diode characteristics, in forward and reverse bias conditions.
12. To study the Zener diode characteristics.
13. To study the characteristics and gain of Transistor in C-B and C-E mode.
14. Determine the Planck's constant.

SUBJECT CODE/NAME	L	T	P	Credit
CS01PES01/ BASIC ELECTRICAL ENGINEERING LAB	0	0	2	1

List of experiments/demonstrations:

- Basic safety precautions. Introduction and use of measuring instruments–voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
- Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storage oscilloscope).
- Sinusoidal steady state response of R-L, and R-C circuits–impedance calculation and verification. Observation of phase differences between current and voltage. Resonance in R-L-C circuits.
- Transformers: Observation of the no-load current waveform on an oscilloscope (non-sinusoidal wave-shaped due to B-H curve nonlinearity should be shown along with a discussion about harmonics). Loading of a transformer: measurement of primary and secondary voltages and currents, and power.
- Three-phase transformers: Star and Delta connections. Voltage and Current relationships (line-line voltage, phase-to-neutral voltage, line and phase currents).
- Phase-shifts between the primary and secondary side. Cumulative three-phase power in balanced three-phase circuits.
- Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winding - slip ring arrangement) and single-phase induction machine.
- Torque Speed Characteristic of separately excited dc motor.
- Synchronous speed of two and four-pole, three-phase induction motors. Direction reversal by change of phase-sequence of connections. Torque-Slip Characteristic of an induction motor. Generator operation of an induction machine driven at super synchronous speed.
- Synchronous Machine operating as a generator: stand-alone operation with a load. Control of voltage through field excitation.
- Demonstration of (a) dc-dc converters (b) dc-ac converters–PWM waveform (c) the use of dc-ac converter for speed control of an induction motor and (d) Components of LT switchgear.

SUBJECT CODE/SUBJECT	L	T	P	Credit
CS01PES02/ENGINEERING GRAPHICS & DESIGN LAB	1	0	3	2.5

ENGINEERING GRAPHICS & DESIGN

UNIT-I

Introduction to Engineering Drawing

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales.

UNIT-II

Orthographic Projections

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes.

Projections of Regular Solids

Inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale.

UNIT-III

Sections and Sectional Views of Right Angular Solids

Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic view of geometrical solids, objects from industry and dwellings (foundation to slab only)

UNIT-IV

Isometric Projections covering,

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

UNIT-V

Overview of Computer Graphics

listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids].

Suggested Text/Reference Books:

- (i) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
- (ii) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
- (iii) Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
- (iv) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
- (v) (Corresponding set of) CAD Software Theory and User Manuals

Subject code	L	T	P	Credit
02TBS03/ MATHEMATICS-II CS02TBS03	3	1	0	4

Probability and Statistics

Module 1: Basic Probability: (12 lectures)

Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality.

Module 2: Continuous Probability Distributions: (4 lectures)

Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

Module 3: Bivariate Distributions: (4 lectures)

Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.

Module 4: Basic Statistics: (8 lectures)

Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression - Rank correlation.

Module 5: Applied Statistics: (8 lectures)

Curve fitting by the method of least squares - fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

Module 6: Small samples: (4 lectures)

Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

Suggested Text/Reference Books

- (i) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- (ii) P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
- (iii) S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
- (iv) W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
- (v) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
- (vi) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
- (vii) Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.

SUBJECT CODE/NAME	L	T	P	Credit
CS02TBS04/CHEMISTRY	3	1	0	4

Unit-I Concept of Quantum Energy and Spectroscopy: Quantization of Energy, Regions of spectrum. Electronic Spectroscopy: Electronic Transition, Woodward Fiesher rules for calculating λ_{\max} of conjugated dienes & α,β -unsaturated carbonyl compound, various shifts in λ_{\max} and intensities. Infra Red Spectroscopy: Conditions for Infra Red Spectroscopy, Molecular vibrations & factors affecting Infra Red frequencies. [8 L]

Unit-II Chemical Bonding in Molecules: Introduction of chemical bonding, VSEPER Theory, V.B.Theory and Molecular Orbital Theory. Energy level diagrams of diatomic molecules and ions. [16 L]

Unit-III Concept of Chirality, Enantiomers, Diastereomers, Meso-compounds and Racemic mixtures. Conformation of Acyclic hydrocarbons (Ethane, Propane & n-Butane) and Cyclic hydrocarbon (Cyclohexane), Plane of symmetry, Center of symmetry, Absolute and Relative Configuration (R & S, D & L and E & Z). [8 L]

Unit-IV Reactivity of Organic Molecules, Factors influencing acidity, basicity and nucleophilicity of molecules, kinetic vs thermodynamic control of reactions. [12 L]

Unit-V Strategy for Synthesis of Organic Compounds: Reaction intermediates: Stability of Free Radical, Carbocation and Carbanion. Introduction to reaction involving Addition, Elimination, Substitution and Ring opening and Cyclization. [16 L]

SUBJECT CODE/NAME	L	T	P	Credit
CS02PES03/PROGRAMMING FOR PROBLEM SOLVING LAB	0	0	3	1.5

[The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.]

Tutorial 1: Problem solving using computers:

Lab1: Familiarization with programming environment

Tutorial 2: Variable types and type conversions:

Lab 2: Simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions:

Lab 3: Problems involving if-then-else structures

Tutorial 4: Loops, while and for loops:

Lab 4: Iterative problems e.g., sum of series

Tutorial 5: 1D Arrays: searching, sorting:

Lab 5: 1D Array manipulation

Tutorial 6: 2D arrays and Strings

Lab 6: Matrix problems, String operations

Tutorial 7: Functions, call by value:

Lab 7: Simple functions

Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):

Lab 8 and 9: Programming for solving Numerical methods problems

Tutorial 10: Recursion, structure of recursive calls

Lab 10: Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation

Lab 11: Pointers and structures

SUBJECT CODE / SUBJECT	L	T	P	Credit
CS02 TH503 Humanities -I	3	1	0	4

Module 1: Information Design and Development- Different kinds of technical documents, Information development life cycle, Organization structures, factors affecting information and document design, Strategies for organization, Information design and writing for print and for online media.

Module 2: Technical Writing, Grammar and Editing- Technical writing process, forms of discourse, Writing drafts and revising, Collaborative writing, creating indexes, technical writing style and language. Basics of grammar, study of advanced grammar, editing strategies to achieve appropriate technical style. Introduction to advanced technical communication, Usability, Human factors, Managing technical communication projects, time estimation, Single sourcing, Localization.

Module 3: Self Development and Assessment- Self assessment. Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning, Self-esteem. Managing Time; Personal memory, Rapid reading, Taking notes; Complex problem solving; Creativity

Module 4: Communication and Technical Writing- Public speaking, Group discussion, Oral; presentation, Interviews, Graphic presentation, Presentation aids, Personality Development. Writing reports, project proposals, brochures, newsletters, technical articles, manuals, official notes, business letters, memos, progress reports, minutes of meetings, event report.

Module 5: Ethics- Business ethics, Etiquettes in social and office settings, Email etiquettes, Telephone Etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Work culture in jobs, Personal memory, Rapid reading, Taking notes, Complex problem solving, Creativity.

Text/Reference Books:

1. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
5. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
6. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
7. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

SUBJECT CODE/SUBJECT	L	T	P	Credit
CS02PBS02/CHEMISTRY LAB	0	0	3	1.5

List of Experiments:

Group – A:

1. Standardization of sodium thiosulphate solution by standard potassium dichromate solution.
2. To determine the Normality and Strength (g/L) of given Ferrous Ammonium Sulphate solution 'A' using standard Ferrous Ammonium Sulphate (N/30) solution 'B' taking KMnO₄ solution as an intermediate.
3. To determine the concentration of hypo solution (Na₂S₂O₃.5H₂O) iodimetrically with given Iodine (N/50) solution.
4. Find out the Temporary hardness of given water sample using 0.01M EDTA solution, buffer solution (pH-10) and EBT as an indicator.
5. To determine chloride ion in a given water sample by Argentometric method (Mohr's method)

Group – B:

6. Preparation of Urea Formaldehyde resin.
7. Acetylation of Primary Amine: Preparation of Acetanilide.
8. Base Catalyzed Aldol Condensation: Synthesis of Dibenzalpropanone.
9. [4+2] Cycloaddition Reaction: Diels-Alder reaction.
10. Preparation of Aspirin and calculate its yield.

Group – C:

11. To calculate the λ_{\max} of a given compound using UV-visible spectrophotometer.
12. To separate the metallic ions by paper chromatography.
13. To determine the surface tension of a liquid by stalagmometer.
14. To determine the percentage composition of the given mixture consisting of two liquids A and B (non interacting system) by viscosity method.
15. To determine the relative viscosity of given liquids by Ostwald's viscometer.

Note: At least two Experiments from each group must be performed.

Subject code/NAME	L	T	P	Credit
CS02TES02/PROGRAMMING FOR PROBLEM SOLVING	3	0	0	3

Unit 1

Introduction to Programming (3 lectures)

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

Idea of Algorithm (3 lectures): steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples.

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

Unit 2

Arithmetic expressions and precedence (12 lectures)

Conditional Branching and Loops

Writing and evaluation of conditionals and consequent branching

Iteration and loops

Arrays (6 lectures) Arrays (1-D, 2-D), Character arrays and strings

Unit 3

Basic Algorithms (6 lectures)

Searching ,concept of binary search etc , Basic Sorting Algorithms Bubble sort etc, Finding roots of equations, introduction of Algorithm complexity

Unit 4

Function (5 lectures)

Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference binary search etc

Recursion functions (5 lectures) Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, etc.

Unit 5

Structure (4 lectures)

Structures, Defining structures and Array of Structures

Pointers (3 lectures) Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Suggested Text Books

- (i) Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- (ii) E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

Suggested Reference Books

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

SUBJECT CODE/NAME	L	T	P	Credit
CS02PES04/ WORKSHOP & MANUFACTURING PRACTICES	1	0	3	2.5

Lectures & videos 10 hours)

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods (3 lectures)
2. CNC machining, Additive manufacturing (1 lecture)
3. Fitting operations & power tools (1 lecture)
4. Electrical & Electronics (1 lecture)
5. Carpentry (1 lecture)
6. Plastic moulding, glass cutting (1 lecture)
7. Metal casting (1 lecture)
8. Welding (arc welding & gas welding), brazing (1 lecture)

Suggested Text/Reference Books:

- (i) Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
- (ii) Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4Th edition, Pearson Education India Edition, 2002.
- (iii) Gowri P. Hariharan and A. Suresh Babu,"Manufacturing Technology–I" Pearson Education, 2008.
- (iv) Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998.
- (v) Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.

**SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
SECOND YEAR, COMPUTER SCIENCE AND ENGINEERING
SEMESTER -III Session 2019-20**

Branch :- Computer Science & Engg.

Year : II

Sem- III

S.NO	CODE NO.	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	TOTAL	
1	CS03TES03	Computer Organization Architecture	3	1	0	30	70	100	4
2	CS03TPC01	Digital logic & Design	3	1	0	30	70	100	4
3	CS03TPC02	IT workshop (C++ /python)	3	1	0	30	70	100	4
4	CS03TPC03	Computer Network	3	1	0	30	70	100	4
5	CS03TBS05	Mathematics III	3	1	0	30	70	100	4
PRACTICAL									
1	CS03PPC01	IT workshop (C++ /python)	-	-	4	30	20	50	2
2	CS03PPC02	Digital Logic & Design Lab	-	-	4	30	20	50	2
3	CS03PES05	Computer Network	-	-	4	30	20	50	2
Total									26

Year : II

Sem.- IV

S.NO	CODE NO.	SUBJECT	PERIODS			EVALUATION SCHEME			CR EDI TS
			L	T	P	IA	ESE	TOTAL	
1	CS04TPC04	Discrete Mathematics	3	1	-	30	70	100	4
2	CS04TES04	Electronic Device & Circuits	3	0	--	30	70	100	3
3	CS04TPC05	Operating System	3	1	--	30	70	100	4
4	CS04TPC06	Data Structure & Algorithms	3	1	--	30	70	100	4
5	CS04TPC07	System Software	3	1	-	30	70	100	4
PRACTICAL									
1	CS03PPC01	Data Structure & Algorithms	--	--	4	--	-	--	2
2	CS03PPC02	Operating System	--	--	4	--	--	--	2
3	CS03PES05	Electronic Device & Circuits	--	--	4	--	--	--	2
Total									25

SUBJECT CODE /NAME	L	T	P	Credit
CS03TES03/Computer Organization Architecture	3	1	0	4

UNIT-I

Basic of Computer Organization & Architecture: Introduction, Computer Organization vs. Computer architecture, Von Neumann Architecture vs. Harvard Architecture.

Input & Output Organization: Introduction, Simple Bus Architecture, Types of Buses, I/O Communication Methodologies: Programmed I/O (Polling), Interrupt-driven I/O & Direct Memory Access (DMA), I/O channel & I/O Processor, Accessing I/O device: Memory Mapped I/O, Isolated or I/O Mapped.

UNIT-II

Computer Arithmetic: Introduction, Addition & Subtraction: Addition & Subtraction with Signed-Magnitude Data, Hardware Implementation & Algorithm, Addition & Subtraction with Signed-2's Complement Data, Multiplication Algorithm: Hardware Implementation for Signed-Magnitude Data, Hardware Algorithm, Booth Multiplication Algorithm, Array Multiplier, Division Algorithms: Hardware Implementation for Signed-Magnitude Data & Algorithm, Carry Look Ahead Adder.

UNIT-III

Memory Organization: Introduction, Types of Memory, Memory Hierarchy, Main Memory, Cache Memory, Virtual Memory, Associative Memory.

Processor Organization: Introduction, Control Unit: Hardwired Control Unit, Micro programmed Control Unit, Instruction Set Computer: Reduced Instruction Set Computer (RISC) vs. Complex Instruction Set Computer (CISC).

UNIT-IV

Pipelining: Introduction, Concept of Instruction Pipeline, Design Problems with Pipeline: Structural Hazard, Data Hazard & Control Hazard, Extension in Pipeline Designed: Super Pipelining, Superscalar Processor, Very Long Instruction Width (VLIW) Architecture.

UNIT-V

Multiprocessor System: Introduction, Shared Memory Multiprocessor, Distributed Memory Multiprocessor, Flynn's Classification: Single Instruction Single Data (SISD), Single Instruction Multiple Data (SIMD), Multiple Instruction Single Data (MISD), Multiple Instruction Multiple Data (MIMD), Cache Coherence, Message Passing Model, Cluster Computing, Distributed Computing.

Text Books:

1. Computer System Architecture, M. Morris Mano, Pearson Education India.
2. Computer Organization & Architecture, W. Stalling, Pearson Education India.
3. Computer Architecture & Organization, J. P. Hayes, McGraw-Hill India.
4. Computer System Organization, Naresh Jotwani, Mc Graw Hill, India.
5. Computer System Architecture, P. V. S. Rao, PHI India.
6. Advanced Computer Architecture, Rajiv Chopra, S. Chand India.
7. Computer Organization & Architecture, Lalit K. Arora, Anjali Arora, S. K. Kataria & Sons, India.
8. Computer Fundamentals Architecture & Organization, B Ram, Sanjay Kumar, New Age International, India.

SUBJECT CODE /NAME	L	T	P	Credit
CS03TPC01/ Digital logic & Design	3	1	0	4

UNIT-I BINARY SYSTEM

Binary Number , Number Base conversion , Octal and Hexadecimal Numbers Complements, Binary Codes Binary Storage and Registers , Binary Logic , Integrated Circuits

BOOLEAN ALGEBRA AND LOGIC GATES:

Basic Definitions Axiomatic Definition of Boolean algebra .Basic Theorems and Properties of Boolean algebra Boolean Functions Canonical and Standard Forms .Other Logic Operations Digital Logic Gates . IC Digital Logic Families. NAND, NOR, EOR gates.

UNIT II BOOLEAN FUNCTIONS COMBINATION LOGIC

The map method Two and Three Variable Maps, Four Variable Map Product of sums Simplification, NAND and NOR implementation, Don't Care Conditions, The Tabulation Method
 COMBINATIONAL LOGIC Introduction, Design procedure Adders, Sub tractors .Code Conversion, Analysis Equivalence Functions

UNIT III COMBINATIONAL LOGIC WITH MSI AND LSI

Introduction Binary Parallel Adder, Decimal, Adder, Magnitude Comparator, Decoders, Multiplexers, Read – Only Memory (ROM), Programmable Logic Array (PLA) Concluding Remarks

UNIT IV SEQUENTIAL LOGIC

Introduction, Flip –Flops, triggering of Flips –Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment. Flip –Flop Excitation Tables Design Procedure. Design of Counters, Design with State Equations.

UNIT V REGISTERS, COUNTERS, MEMORY UNIT & FPGA PROGRAMING

Introduction, Registers, shift Registers .Ripple Counters, Synchronous Counters. Timing Sequences, The Memory Unit Examples of Random Access Memories, FPGA: Introduction, FPGA Programming

REFERENCES:

- Digital Logic & Computer Design PH1 M Mano
- Switching Circuit & Finite automata –ZVI Kohavi (TMH)
- Fletcher W.I.: An engineering approach to Digital design PH1

UBJECT CODE /NAME	L	T	P	Credit
CS03TPC02/ IT workshop (C++ /python)	3	1	0	4

Unit 1 : Abstract data types and programming environment.

TC++ Environment, variables, Compilation and Linking steps, functions and parameters Object identity, concept of Classes. arrays, control statements.C++ in different plate forms DOSBOX etc.

Unit 2 : Object-oriented programming

Programming using Class and objects, Encapsulation, Constructors, Destructors ,Copy constructor ,memory management operators.

Unit 3: Advance concepts of Object-oriented programming

Pointers, Polymorphism operator and function overloading, Inheritance in object oriented design, Brief concepts of Aggregation ,Generalization, Specification. Design concepts Flowchart , Decision table

Unit 4:File handling

Streaming and File input and output handling

Unit 5 : Introduction to Research tool

Introduction of Python Programming , applications of python for research ,Programming Environment, installation , Data representation ,Forms of learning, Elementary Basic programming in python. Overview of WEKA

Text books :

Object Oriented Programming with C++ by E Balaguruswami, TMH
 Object Oriented Programming with C++ by Robert Lafore, Waite Group
 Introduction to python by Bill Luboveni by O'Relly

Reference Books :

Object Oriented Programming with C++ by M P Bhawe S,A. Patekar, Pearson Education
 The Complete reference by Herbit Schildt,Mc Graw Hill
 The C++ Programming Language,Bajanstroustrup ,Addition Wesley
 C++ premier by F.B. Lippman, Addition Wesley
 Machine Learning Tom M. Michell,Mc Graw Hill ,Indian addition
 Applied Machine Learning by M. Gopal ,McGraw Hill Education

SUBJECT CODE /NAME	L	T	P	Credit
CS03TPCO3/ Computer Network	3	1	0	4

UNIT I OVERVIEW OF DATA COMMUNICATION AND NETWORKING:

Introduction; Data communications: components, data representation, direction of data flow(simplex, half duplex, full duplex)

Networks: distributed processing, network criteria, physical structure (type of connection, topology), categories of network (LAN, MAN,WAN);Internet: brief history, internet today; Protocols and standard

Reference models: OSI reference model, TCP/IP reference model, their comparative study

PHYSICAL LAYER:

Overview of data(analog & digital), signal(analog & digital), transmission (analog & digital)& transmission media (guided & non-guided); TDM, FDM, WDM

UNIT-II DATA LINK LAYER:

Types of errors, framing(character and bit stuffing), error detection & correction methods; Flow control; Protocols: Stop & wait ARQ, Go-Back- N ARQ, Selective repeat ARQ

Medium access sub layer: Point to point protocol, token ring, Reservation, polling, concentration; Multiple access protocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, FDMA, TDMA, CDMA

UNIT III NETWORK LAYER:

Internetworking & devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway; Addressing : Internet address, classful address, subnetting

Routing : techniques, static vs. dynamic routing , routing table for classful address; Routing algorithms: shortest path algorithm, flooding, distance vector routing, link state routing;

Protocols: ARP, RARP, IP, ICMP, IPV6

UNIT IV TRANSPORT LAYER:

Process to process delivery; UDP; TCP; Congestion control algorithm: Leaky bucket algorithm, Token bucket algorithm, choke packets; Quality of service: techniques to improve Qos.

UNIT V APPLICATION LAYER:

DNS; SMTP, SNMP, FTP, HTTP & WWW;

Security: Cryptography, user authentication, security protocols in internet, Firewalls. Modern topics

Text Books:

1. B. A. Forouzan – “Data Communications and Networking (3rd Ed.)” – TMH
 2. S. Tanenbaum – “Computer Networks (4th Ed.)” – Pearson Education/PHI
 3. W. Stallings – “Data and Computer Communications (5th Ed.)” – PHI
 4. Zheng & Akhtar, Network for Computer Scientists & Engineers, OUP
-

Reference Books:

1. Kurose and Rose – “ Computer Networking -A top down approach featuring the internet” – Pearson Education
2. Comer – “Internetworking with TCP/IP, vol. 1, 2, 3(4 th Ed.)” – Pearson Education/PHI

SUBJECT CODE /NAME	L	T	P	Credit
CS03TBS05/ Mathematics III (Numerical Methods)	3	1	0	4

UNIT- I Introduction of Errors and their Analysis, types of errors, numerical problems on error analysis, curve fitting: method of least squares, fitting of exponential curves $y = ae^{bx}$, fitting of the curve $y = ab^x$, fitting of the curve $y = ax^b$. Method of moments

UNIT- II Numerical Solution of Algebraic and Transcendental Equations: Graphical method bisection Method, Secant Method, Regula-falsi Method, Newton Raphson Method, Solution of a system of simultaneous linear algebraic Equations Direct methods: Gauss elimination Method, Gauss Jordan method, Iterative methods .Jacobi Iterative Method, Gauss Seidel Iterative method.

UNIT- III The Calculus of Finite Differences: Finite differences, Difference formula, operators and relation between operators. Inverse Operator, Interpolation with equal intervals: - Newton's forward and backward interpolation formula. Interpolation with Unequal intervals: - Lagrange's interpolation Newton's difference formula, inverse interpolation.

UNIT- IV Numerical Differentiation and Integration: - Numerical Differentiation Newton's forward and Backward difference interpolation formula. Maxima and Minima of a Tabulated function, Numerical Integration :-Trapezoidol rule, simpson's (1/3) rd and (3/8) th rule, Boole's rule, weddle rule.

Difference Equations: Definition ,order and degree of a difference equation, Linear difference equations, Difference equations reducible to Linear form, simultaneous difference equations with constant coefficients.

UNIT- V Numerical solution of ordinary differential equation : Taylor series method, Euler's method, Modified Euler method Runge's method Runge-Kutta method, numerical method for solution of partial differential equations. General linear partial differential equation. Laplace equation and Poisson equation.

Books Recommended :

1. JAIN & IYNGAR Numerical Methods for Scientific and Engineering Computations.
2. RAO G.S. Numerical Anlysis.
3. Grewal B S Numerical Methods In Engineering and Science.
4. Das K K Advance Engineering Methods.
5. Rajaraman V Computer Oriented Numerical Methods
6. P. Kandasamy K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
7. S. S. Sastry, Introduction methods of Numerical Analysis, PHI, 4th Edition, 2005.
8. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

SUBJECT CODE /NAME	L	T	P	Credit
CS04TPC04/ Discrete Mathematics	3	1	0	4

Module 1:

Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem.

Module 2:

Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination. Principle of Mathematical Induction, The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor, Euclidean Algorithm, The Fundamental Theorem of Arithmetic.

Module 3:

Propositional Logic: Basic Connectives and Truth Tables, Logical Equivalence, The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers.

Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

Module 4:

Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form

Module 5:

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Four colour conjecture, trees and rooted trees, binary trees.

Suggested books :

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill
2. Susanna S. Epp, Discrete Mathematics with Applications, 4th edition, Wadsworth Publishing Co. Inc.
3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill.

Suggested reference books:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science", TMG
Edition, TataMcgraw-Hill
2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum's Outlines Series, Seymour
Lipschutz, Marc Lipson,
3. Discrete Mathematics, Tata McGraw - Hill

SUBJECT CODE /NAME	L	T	P	Credit
CS04TES04/ Electronic Device & Circuits	3	0	0	3

UNIT –I JUNCTION DIODE AND ITS APPLICATION:

Properties of P-N Junction, Open Circuited P-N Junction, Current component of PN Diode, V-I Characteristics, Temperature dependence of V-I Characteristics, Diode resistance, Diode as a rectifier-Half wave & Full wave rectifier, Clipper, Clamper.

UNIT –II BIPOLAR JUNCTION TRANSISTOR AND FET:

Introduction to Bipolar Junction Transistor, Transistor current components. Transistor as an amplifier, Transistor construction, Transistor Circuit Configuration (Common Base , Common Emitter, Common Collector) and Characteristics CE current gain, Analytical expression for transistor characteristics. Introduction to JFET, MOSFET, V-I and Transfer characteristics of JFET.

UNIT – III LOW FREQUENCY TRANSISTOR AMPLIFIER:

Graphical Analysis of CE amplifier, h-parameter Models, Transistor hybrid model, Analysis of Transistor amplifier using H-Parameter for CB, CE, CC configurations, Comparison of Transistor Amplifier Configuration, Darlington Pair.

HIGH FREQUENCY: CE hybrid-pi model: Validity and parameter Variation, Current Gain with Resistive load, frequency response of a single stage CE Amplifier, Gain-Bandwidth product.

UNIT-IV FEEDBACK AMPLIFIER:

Classification of feedback amplifier, Feedback concept, Properties of feedback amplifier, Effect of feedback on gain and impedance, Emitter and Source follower.

OSCILLATOR: Barkhausen criteria, Wien bridge, Tuned, Hartley, Colpitt and RC Phase shift oscillators.

UNIT –V OPERATIONAL AMPLIFIERS:

OPAMP Symbol and terminal characteristics, Block Schematic of OPAMP, Ideal OPAMP Characteristics, Practical OPAMP Characteristics, Inverting Amplifier, Non-Inverting Amplifier, Voltage Follower, Adder, Subtractor, Comparator, Integrator, Differentiator, IC Timer-555, Introduction to Multivibrators, Monostable, Bistable, Astable Multivibrator.

SUGGESTED BOOKS & REFERENCE:-

- Integrated Electronics: Analog & Digital Circuit Systems – Jacob Millman & Halkias, TMH.
- Electronic Devices and Circuit Theory – Boylestad & Nashelsky, 8th Ed. PHI.
- Electronic Devices & Circuits – Allen Mottershead, PHI

SUBJECT CODE /NAME	L	T	P	Credit
CS04TPC05/ Operating System	3	1	-	4

UNIT I

Introduction to Operating System objective and function . system components system services , system structure ,batch interactive , time –Sharing and real time operating system ,Protection. The introduction of window NT,DOS, Window 07, Unix ,Linux (Red hat)

UNIT II

Concurrent Process : Process concepts , principal of concurrency . the producer consumer problem , the critical section problem , semaphore, classical problem in concurrency , inter process communication , process generation , process scheduling .

UNIT III

CPU Scheduling : scheduling concepts , performance criteria scheduling algorithms. algorithm evaluation , multiprocessor scheduling .

I/O management and Disk scheduling I/O devices and organization of the I/O functions. I/O buffering disk I/O operating system design issues .

UNIT IV

Dead Locks system models , deadlock characterization , prevention , avoidance and detection recovery from deadlock , combined approach.

UNIT V

Memory Management : Base machine , Residence monitor , multiprogramming with fixed partition , multiprogramming with variable partitions, multiple base register , paging , segmentation , paging segmentation, virtual memory concepts , demand paging performance , page replacement algorithms , allocation of frames, thrashing , cache memory organization impact on performance .

Reference Books

Milenkovic M. , “Operating System concepts “, MGH

Tanenbaum A. S. “Operating System design and implementation “, PHI

Silberschartz A.and Patterson J.I. , “ Operating system concepts “, Wisley.

Stilling William “ Operating System “, Maxwell McMillan International Edition 1992.

Dectel H.N. , “An introduction to operating system “, Addison Wisley.

SUBJECT CODE /NAME	L	T	P	Credit
CS04TPC06/ Data Structure & Algorithms	3	1	-	4

UNIT I: String algorithms, pattern search and editing, Arrays algorithms, development simple examples of algorithm development, complexity, Divided & conquer, binary search, selection sort, insertion sort, merge sort, quick sort complexity of sorting.

UNIT II: Linear list: Stacks, application of Stacks, arithmetic notations, recursion, queues and circular queues, Linked list definition, insertion and deletion of nodes, circular and doubly linked list, Header nodes.

UNIT III: Trees, AVL trees, Threaded trees, Heap sort, B-tress.

UNIT IV: Graph and representation: graph algorithms, optimization and Greedy methods, minimum spanning tree, shortest path, DFS, BFS search, examples of backtracking sets UNION and FIND operations tables and information retrievals, hashing.

UNIT V: Files: File organization, sequential file, direct file organization, index sequential file organization, Data storage and management.

REFERENCE BOOKS: •

Data Structures and Algorithm Analysis in C++, 2/e by Mark Allen Weiss, Pearson Education • Wirth Niclaus , "Algorithm + Data Structure = Programs " PHI

- Horwitz E. and Sahani S. "Fundamentals and Data Structure ", Computer Science Press.
- Knuth D. "Threat of Computer Programming ", Vol 1-2 Addison - Wesley
- Aho A.V.Hopcraft and Ullman J.E. "Data Structure and Algorithms" addison Wesley "
- Tanonbaum , A. M. and Augenstein , M.J. "Data Structure with Pascal" PHI.
- Trambley and Sorenson "Data Structure using Pascal", MGH.
- Stubbs D. "Data Structure with Abstract Data Type and Modula 2", Brooks & Cole Publication Comp.

SUBJECT CODE /NAME	L	T	P	Credit
CS04TPC07/ System Software	3	1	-	4

UNIT I

Machine architecture, CPU Machine Architecture, Simplified Instruction Computer(SIC),SIC/XE, Traditional CISC Machines, VAX Architecture, Pentium Pro Machine Architecture, RISC Architecture, instruction set, addressing modes, Type of addressing modes with example Programming review of syntax of C with emphasis on features like pointers, bit operations.

UNIT II

DOS: Introduction to interrupts, software interrupts, Hardware interrupt, internal structure of DOS, COM & EXE program's BIOS memory resident programs, Running batch files.

UNIT III

Assemblers, Types of Assembler, PASS-I Assembler, PASS-II Assembler, Cross assemblers, two assembler design data structure and algorithms.

UNIT IV

Macro processors: Definitions, nested macro definitions, macro expansion and conditional macro expansion.

UNIT V

Introduction of Linker, Loader, Types of Loader, loading and relocation, static and dynamic linking, Editors, Types of Editors, Debuggers, Programming environments.

Reference Books

- System Software : An Introduction to Systems Programming, 3/e by Leland L. Beck, Pearson Education
- Donovan J. J. "System Programming ", TMH
- Dhamdhare D.M. " Introduction to system software's" ,TMH 1986
- Michael Tischer , " PC System Programming ", Abacus.
- Cooper Mullish, " The Sprit of C, An Introduction to modern programming ", Jaico publication New Delhi 1987.
- Dhamdhare " System Programming And Operating System ", TMH
- Gottfried , " Programming with C, Schaum Series ", TMGH.

COURSE STRUCTURE AND SYLLABUS

(OLD-COURSE)

CBCS

Semester- V

SN	Subject Code	Subjects	Period /week			Evaluation Scheme			Total Credit
			L ¹	T ²	P ³	IA	ESE	TOTAL	
1	CS5TPC01	RDBMS	3	1	0	40	60	100	4
2	CS5TPC02	Foundation of Computer Science	3	1	0	40	60	100	4
3	CS5TPEXX	PE Choice-I Vth Semester	3	1	0	40	60	100	4
4	CS5TPEXX	PE Choice-II Vth Semester	3	1	0	40	60	100	4
5	CS5TOEXX	OE-I Vth Semester	3	0	0	40	60	100	3
PRACTICAL									
1	CS5LPC01	RDBMS Lab	0	0	3	30	20	50	2
2	CS5LPC02	Advance Programming Lab	0	0	3	30	20	50	2
3	CS5LPR01	Mini Project Lab-I in VB.NET	0	0	3	30	20	50	2
						Total Credits	650	25	

Open Elective Subjects Vth Semester				Credit	Professional Elective Subject Vth Semester			Credit
SN	Subject Code	Subject	SN		Subject Code	Subject		
1	CS5TOE01	Management Information System	3	1	CS5TPE01	VB.NET	4	
2	CS5TOE02	Embedded System	3	2	CS5TPE02	Parallel Computing	4	
3	CS5TOE03	Principle of Management	3	3	CS5TPE03	Grid Computing	4	
4	CS5TOE04	Computer Oriented Numerical Methods	3	4	CS5TPE04	Mobile Communication	4	

IA- Internal Assessment , ESE – End Semester Examination

Class: **Bachelor of Technology Fifth Semester Computer Science and Engineering**

Subject Name: **RDBMS**

Subject Code: **CS5TPC01**

UNIT- I [INTRODUCTION]

An overview of Database Management System, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure. Data Modelling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

UNIT- II [RELATIONAL DATA MODEL AND LANGUAGE]

Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus, Introduction to SQL: Characteristics of SQL. Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL.

UNIT- III [DATA BASE DESIGN & NORMALIZATION]

Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

UNIT- IV [TRANSACTION PROCESSING CONCEPTS]

Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

UNIT- V [CONCURRENCY CONTROL TECHNIQUES]

Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction.

Text Books:

1. Date C J, *An Introduction To Database System*, Addison Wesley.

2. Korth, Silbertz, Sudarshan, *Database Concepts*, McGraw Hill.
3. Elmasri, Navathe, *Fundamentals Of Database Systems*, Addison Wesley.
4. Leon & Leon, *Database Management System*, Vikas Publishing House.

Reference Books:

1. Bipin C. Desai, *An introduction to Database Systems*, Galgotia Publication.
2. Majumdar & Bhattacharya, *Database Management System*, TMH.
3. Ramakrishnan, Gehrke, *Database Management System*, McGraw Hill.
4. Kroenke, *Database Processing: Fundamentals, Design and Implementation*, Pearson Education.
5. Maheshwari Jain, *DBMS: Complete Practical Approach*, Firewall Media, New Delhi.

Class: **Bachelor of Technology Fifth Semester Computer Science and Engineering**

Subject Name: **Foundation of Computer Science**

Subject Code: **CS5TPC02**

UNIT I

Deterministic and non-deterministic finite automata , Regular Expression , Two way finite automata , finite automata with output , properties of regular set , pumping lemma , closure properties.

UNIT II

Context Free Grammars (CFG), derivation trees, Simplification of normal forms, CNF,GNF, Regular Grammars, Unrestricted Grammars and Relations between Classes of languages.

UNIT III

Push Down Automata: Definitions relationship between PDA and Context Free Languages, properties of CGL's, Decision Algorithms.

UNIT IV

Turing Machine: The Turing machine model, Computable languages and functions, Modification of Turing machines, Church's Hypothesis.

UNIT V

Properties of recursive and recursive enumerable languages, Universal Turing machine, Undesirability Post correspondence problem, introduction to Recursive function theory.

Reference Books:

1. Hopcroft and Ullman, *Introduction to Automata Theory Languages and Computation*, Narosa.
2. Mishra and Chandrashekharan, *Theory of Computer Science* , PHI.
3. Kohan, *Theory of Computer Science*.
4. Korral, *Theory of Computer Science*.

Class: **Bachelor of Technology Fifth Semester Computer Science and Engineering**

Subject Name: **Visual Basic.NET**

Subject Code: **CS5TPE01**

UNIT-I

Introduction to .NET, .NET Framework features & architecture, CLR, Common Type System, MSIL, Metadata, Assemblies : Public and Private. Introduction to visual studio, Project basics, types of project in .Net, IDE of VB.NET- Menu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser.

UNIT-II

The VB.NET Language- Variables -Declaring variables, Data Type of variables, Forcing variables declarations, Scope & lifetime of a variable, Constants, Arrays, types of array, control array, Collections, Subroutines, Functions. Control flow statements: conditional statement, loop statement. MsgBox & Inputbox.

UNIT - III

Working with Forms : Loading, showing and hiding forms, controlling One form within another. GUI Programming with Windows Form: Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, RadioButton, Panel, scroll bar, Timer Properties, Methods and events. Dialog Control: OpenFileDialog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog. Link Label.

UNIT-IV

Object oriented Programming: Classes & objects, fields Properties, Methods & Events, constructor, inheritance. Access Specifiers: Public Private, Protected. Overloading and overriding, My Base & My class keywords, Interface, Polymorphism: Interface based polymorphism and Inheritance based polymorphism

UNIT-V

Database programming with ADO.NET – Overview of ADO, from ADO to ADO.NET, Accessing Data using Server Explorer. Creating Connection, Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Data on data bound controls, display data on data grid.

Generate Reports Using CrystalReportViewer.

Text and Reference Books:

1. Stevenholzner, *VB.NET Programming Black Book*, Dreamtech publication.
2. Evangelospetroustos, *Mastering VB.NET*, BPB publications.
3. *Introduction to .NET framework*, Worx publication.
4. msdn.microsoft.com/net/ %0

Class: **Bachelor of Technology Fifth Semester Computer Science and Engineering**

Subject Name: **Parallel Computing**

Subject Code: **CS5TPE02**

UNIT I [INTRODUCTION OF PARALLELISM]

Introduction -parallelism in Uniprocessor systems, Principles of Scalable Performance, architectural classification schemes, SISD, SIMD, MISD, MIMD architectures, multiprocessor and multicomputer, UMA, NUMA, COMA, NORMA model.

UNIT II [PARALLEL MODELS & INTERCONNECTION NETWORK]

System Interconnect architecture – static, dynamic, multistage interconnection networks, design considerations throughputs, delay, blocking and non-blocking properties interconnected memory organization - C-Access, S-Access, C-S access.

UNIT III [PIPELINE & VECTOR PROCESSING]

Principal of Pipelining - Over lapped parallelism, principal of Liner pipelining processor, General pipelining and reservation tables, arithmetic pipelining, Design of pipeline Instruction units, arithmetic pipelining design example, hazard detection and resolution, JOB sequencing and collision prevention, vector processing function organization of instructions in IBM 360/91.

UNIT IV [ADVANCED PROCESSOR AND PARALLELISM]

Advanced processor technology – RISC & CISC computers, super scalar architecture, principles of multithreading, multithreaded architectures of MP systems. Context switching policies, shared variables, locks, semaphores, monitor, multitasking and Cray multiprocessor.

UNIT V [MULTIPROCESSOR ARCHITECTURE AND PROGRAMMING]

CPU parallelism, GPU parallelism- program, Exploiting parallelism in programme- multidimensional arrays, directed acyclic graphs, distance and direction vectors, data flow computer and data flow graphs.

Text Books:

1. Kai Hwang and Briggs, *Computer Architecture & Parallel processing*, MGH.
2. K. Hwang, *Advanced Computer Architecture with Parallel Programming*, MGH.

Reference Books:

1. Rajaraman & Siva Ram Murthy, *Parallel Computers: Arch.& Prog.*, PHI.
2. Michael J Quinn, *Parallel computing- Theory and practice*, Mc-Graw Hill.

Class: **Bachelor of Technology Fifth Semester Computer Science and Engineering**

Subject Name: **Grid Computing**

Subject Code: **CS5TPE03**

Unit - I [Cluster Computing]

Basic concept of distributed and parallel computing, shared memory, Scheduling Concept, Cluster computing-Introduction, Grid server and practical uses: Cluster and cluster Grids, cluster Vs Grid.

UNIT-II [Grid Computing]

Grid Computing: History of grid computing, Basic concept, benefits of grid computing, Grid vs. other Related Technologies, Grid Architecture, various kinds of Grids, and different topologies of the Grid, Grid Applications, Grid Components.

UNIT - III [Scheduling]

High performance Grid, HPC Grids; Data Grids; Alternatives to Data Grid – Data Grid architecture. Grid scheduler and a local resource scheduler, Grid Scheduling: Job Scheduling, Resource Scheduling, Various factors of Scheduling, Scheduling Procedure. Challenges in Grid Scheduling.

UNIT - IV [Implementation: Grid Simulation tool kit]

The open Grid services Architecture -- Overview – implementing OGSA based Grids – Creating and Managing services – Services and the Grid – Service Discovery – Tools and Toolkits .Installation of Pre-requisites and Necessary Component, Installation of GridSim Toolkit, Salient Feature of GridSim, GridSim Architecture

UNIT - V

Application integration- Application classification – Grid requirements – Integrating applications with Middleware platforms – Grid enabling Network services – Managing Grid environments – Managing Grids – Management reporting – Monitoring – Data catalogs and replica management – portals – Different application areas of Grid computing.

Text Books

1. Ahmar Abbas, *Grid Computing, A Practical Guide to Technology and Applications*, Firewall Media.
2. Joshy Joseph and Craig Fellenstein, *Grid Computing*, Pearson Education.

Reference Books

1. Ian Foster and Carl Kesselman, *Grid Blue Print for New Computing Infrastructure*, Morgan Kaufmann.
2. Fran Berman, Geoffrey Fox and Anthony J. G. Hey, *Grid Computing: Making the Global Infrastructure a Reality*, Willy Publisher.

Class: **Bachelor of Technology Fifth Semester Computer Science and Engineering**

Subject Name: **Mobile Communication**

Subject Code: **CS5TPE04**

UNIT – I

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: airinterface, channel structure, location management: HLR-VLR, Hierarchical, handoffs, and channel allocation in cellular systems, CDMA, GPRS.

UNIT –II

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Bluetooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

UNIT –III

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

UNIT –IV

Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

UNIT –V

Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

Suggested Books & Reference:-

1. J. Schiller, *Mobile Communications*, Addison Wesley.
2. A. Mehrotra , *GSM System Engineering*.
3. M. V. D. Heijden, M. Taylor, *Understanding WAP*, Artech House.
4. Charles Perkins, *Mobile IP*, Addison Wesley.
5. Charles Perkins, *Ad hoc Networks*, Addison Wesley.

Class: **Bachelor of Technology Fifth Semester Computer Science and Engineering**

Subject Name: **Management Information System**

Subject Code: **CS5TOE01**

UNIT I

Introduction of Information System, Fundamentals of Information System, Strategic Role of Information in Organization and Management, Three dimensions of Information System, Information System and Organization, Business Process Re-Engineering, Traditional and Computer based information system.

UNIT II

Integration of Information, Types of Decision making in Organization, Decision Making Process, Models and Decision Support, Decision in business Areas, Strategic Analysis.

UNIT III

Information System Planning, Types of Controlling Information System, Development of MIS Methodology and Tools/Techniques for Systematic Identification, Evaluation, Modification of MIS, Information System Success and Failure Implementation.

UNIT IV

Information System for Business Operations: Cross Functional Information System, A study of major Financial, Production, Human Resource Information System and Marketing Information System.

UNIT V

Management of Information System and End - User Computing, Security and Ethical issues of Information System, Major issues in Information System, Auditing of Information System.

Reference Books:

1. Gerald V., Post and David L. Anderson, *Management Information System: Solving Business Problems with Information Technology*, Tata McGraw - Hill Edition.
2. James A. O'Brien, *Management Information System: Managing Information Technology in the Internet worked Enterprise*, Tata McGraw -Hill Edition.
3. Kenneth C. Laudon and Jane Price Loudon, *Management Information System: A Contemporary Perspective*, Maxwell Macmillan International Editions.

Class: **Bachelor of Technology Fifth Semester Computer Science and Engineering**

Subject Name: **Embedded System**

Subject Code: **CS5TOE02**

UNIT I

Hardware Fundamentals :- Gates , timing diagram , memory , microprocessor , buses , DMA, Interrupts:- Microprocessor architecture , interrupt basics, interrupt latency, shared data problem . System partitioning building the architectural model, Input and output processing, Hard ware and software partitioning Timing requirements.

UNIT II

Microprocessor selection , Microprocessor versus Micro- controller analysis CISC versus RISC Study of major embedded processor architectures Memory design , system optimization . Architecture for embedded software : Round robin, round robin with interrupts , function queue scheduling real time operating system.

UNIT -III

Real time operating system :- Tasks and task states, task and data, semaphores and shared data, Operating system services :- Inter task communication , timer services. Memory management ,event and interaction between interrupt routines and real time operating system . Software selection issues , selecting an RTOS TROS performance metrics . RTOS scalability and tool support ,compiler selection.

UNIT -IV

Embedded system design using a real time operating system : Encapsulating semaphores and queues hard real time scheduling considerations saving memory space.

UNIT V

Development tools and debugging: - Host and target machines, linker / locators, target system, testing instruction set, assert, macro. Establishing a software development environment C runtime environments embedded debuggers cross, Development methods embedded file formats, readers Creating object files the process loading software into remote targets.

References:

1. David E Simon, *An embedded software primer*, ISBN 0201- 61569-X.
2. Around S. Berger, *Embedded system Design*, ISBN 1- 57820-073-3.

Class: **Bachelor of Technology Fifth Semester Computer Science and Engineering**

Subject Name: **Principle of Management**

Subject Code: **CS5TOE03**

UNIT – I

Management concepts, Nature, Scope, Significance, Function and Principle of Management Concepts. Evolution of Management: Early Contribution, Taylor and Scientific management, Fayol’s administrative management, Bureaucracy, Hawthorne Experiments and Human Relations.

UNIT – II

Planning- Concepts, Objectives, Goals, Components and Steps involved in planning process, MBO, Decision making process, Individual and Group Decision Making.

UNIT – III

Organizing- principles, Organization theories, Line & Staff Authority, Centralization, Decentralization, Delegation, Employee’s empowerment, Span of control, Departmentation, Authority and Responsibility.

UNIT – IV

Staffing: Recruitment & Selection, Training & Development, Performance Appraisal Directing: Concept, Direction and Supervision, Co-ordination.

UNIT – V

Communication: Communication Process, Importance of Communication, Barriers to Communication, Controlling: nature, scope, functions, steps and process, control techniques.

Suggested Books & References:

1. Stoner & Freeman, *Management*, PHI.
2. Koontz, O’Donnell Wehrich, *Principles of Management*, McGraw Hill.
3. P F Drucker, *The Practice of Management*, Allied Pub.
4. Massie, *Essentials of Management*, AITBS.
5. Terry and Franklin, *Principles of Management*, AITBS.
6. R D Agarwal, *Organization and Management*, TMH.
7. H Koontz, *Management*, McGraw Hill.
8. Robbins & Dinzo, *Fundamentals of Management*, Pearson India.

Class: **Bachelor of Technology Fifth Semester Computer Science and Engineering**

Subject Name: **Computer Oriented Numerical Methods**

Subject Code: **CS5TOE04**

UNIT I

NUMERICAL SOLUTIONS OF ALGEBRIC AND TRANSCENDENTAL EQUATIONS: Bolzano method, RegulaFalsi method, Newton Raphson method, Secant method and iteration method.**NUMERICAL SOLUTIONS OF SIMULTANEOUS LINEAR EQUATIONS:** Gauss Elimination method, Crout'smethod , Gauss Jordan method, Gauss Siedal method.

UNIT II

MATRIX INVERSION A Gauss Elimination method , Gauss Jordan method, Crout'striangularisation method & Partition method, **INTROPOLATION WITH EQUAL & UNEQUAL INTERVALS** -Newton's Forward & Backward Difference Formula , Stirling's and Bessel's Interpolation Central Difference Formula , Lagrange's Formula and Newton's Divided Difference Formula.

UNIT III

NUMERICAL DIFFERENTIATION AND INTEGRATION: Derivatives using Forward, Backward, Central & Divided difference Formula, Maxima & Minima of a tabulated Function . Numerical Integration - Newton - Cotes Quadrature Formula, Trapezoidal rule, Simpson's one-third rule, Simpson's three-eight rule.**NUMERICAL SOLUTION OF ORDINARY AND PARTIAL DIFERENTIAL EQUATIONS:** Taylors Series, Euler's method and RungeKutta's IV order method.Classification of Partial Differential Equations, Solution of Elliptic(Laplace &Poisson's equations) and Parabolic equation.

UNIT-IV

LINEAR PROGRAMMING: Formulation of the problem , Graphical method , General LPP, Standard & General form , Simplex method , Artificial variable technique , Primal (Dual) & Dual(Primal) method , Big M method , Two Phase method , Duality Concept and Dual Simplex method.

UNIT V-

PREPARATION OF FLOW CHART AND PROGRAMMING: Bolzano method, Regular -Falsi method & Newton-Raphson method, Matrix Inversion and solution of Simultaneous Equation by Gauss Elimination Method &Crout's Method, Interpolation by Newton Forward Method & Lagrange's Method, &RungeKutta's IV Order Method, Integration by Trapezoidal Rule , Simpson's 1/3rd rule & Simpson's 3/8th Rule.

Reference Books:

1. Computer Oriented Numerical Methods by V. Rajaraman.
2. Numerical Methods for Scientific and Engineering Computation by Jain ,Lyengar& Jain.
3. Numerical Analysis by G. ShankerRao.
4. Numerical Methods in Engineering and Science by B.S.Grewal
5. C.Mead and L.Conway Introduction to VLSI

Semester- VI

SN	Subject Code	Subjects	Period /week			Evaluation Scheme			Total Credit	
			L ¹	T ²	P ³	IA	ESE	TOTAL		
1	CS6TPC01	Operating System	3	1	0	40	60	100	4	
2	CS6TPC02	Design and Analysis of Algorithm	3	1	0	40	60	100	4	
3	CS6TPEXX	PE Choice-I VI th Semester	3	1	0	40	60	100	4	
4	CS6TPEXX	PE Choice-II VIth Semester	3	1	0	40	60	100	4	
5	CS6TOEXX	OE-I VIth Semester	3	0	0	40	60	100	3	
PRACTICAL										
1	CS6LPC01	Operating System Lab	0	0	3	30	20	50	2	
2	CS6LPC02	Design and Analysis of Algorithm Lab	0	0	3	30	20	50	2	
3	CS6LPR01	Mini Project Lab	0	0	3	30	20	50	2	
								Total Credits	650	25
Open Elective Subjects VI th Semester			Credit	Professional Elective Subject VI th Semester			Credit			
SN	Subject Code	Subject		SN	Subject Code	Subject				
1	CS6TOE01	Computer Graphics	3	1	CS6TPE01	Microprocessor and Interfaces	4			
2	CS6TOE02	Robotics	3	2	CS6TPE02	Software Engineering	4			
3	CS6TOE03	Operation Research	3	3	CS6TPE03	UNIX Operating System	4			
4	CS6TOE04	Geo-Informatics and GIS Application	3	4	CS6TPE04	Multimedia System Design	4			

Class: **Bachelor of Technology Sixth Semester Computer Science and Engineering**

Subject Name: **Operating System**

Subject Code: **CS6TPC01**

UNIT-I

Introduction to Operating Systems, Objectives of an Operating System, Major facilities of Operating System, Evolution of Operating System, Functions of Operating System (Steps of Memory Management function, Steps of Processor Management function, Steps of Device Management function, Steps of File Management function), Components of Computer System, Components of Operating System, Operating System Services, Operating System Structures, Batch Processing System, Multi-User Time Sharing Systems, Multi-tasking Systems, Real Time Operating System, Distributed Operating System, Network Operating System, Embedded Operating Systems, Hardware Protection for Multi-Programming/Multi-Tasking, Spooling, File Concept(File Attributes, File Operations, File Types, File Structure, Internal File Structure), Access Methods in File System(Sequential Access, Direct Access), Directory Structure(Single-Level Directory, Two-Level Directory, Tree-Structured Directories, Acyclic-Graph Directories, General Graph Directory), Consistency Semantics in File System(UNIX Semantics, Session Semantics, Immutable-Shared-Files Semantics).

Unit-II

Process, Process State, Five State Process Diagram, Process Control Block (PCB), Process Scheduling Queues, Schedulers, Context Switch, Operations on Process, Cooperating Processes (Reasons for Process Cooperation, Producer Consumer Problem), Threads, Life Cycle of a thread, Processes and Thread, Interprocess Communication, The Critical Section Problem, Two-Process Solutions to Critical Section Problem, Multiple-Process Solution (Bakery Algorithm), Semaphores, Classical Problems of Synchronization (The Bounded-Buffer Problem, Readers and Writers Problem, The Dining-Philosophers Problem).

Unit-III

CPU Scheduling Concepts (CPU-I/O Burst Cycle, CPU Scheduler, Preemptive Scheduling, Dispatcher), Scheduling Criteria (CPU Utilization, Throughput, Turnaround time, Waiting time, Response time), Scheduling algorithms (FCFS, SJF, Priority, Round-Robin, Multilevel Queue, Multilevel Feedback Queue), Algorithm Evaluation (Deterministic Modeling, Queueing Models, Simulations, Implementation), I/O Devices(Human Readable, Machine Readable, Communication), Organization of the I/O Function(Programmed I/O, Interrupt-driven I/O, Direct Memory Access), I/O Buffering (Single Buffer, Double Buffer, Circular Buffer), Disk

Structure, Disk Performance Parameter(Seek Time, Rotational Delay, Transfer Time), Disk Scheduling Algorithms (FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK).

Unit-IV

Introduction to Dead Locks, System Model, Deadlock Characterization (Necessary Conditions, Resource-Allocation Graph), Methods for Handling Deadlocks, Deadlock Prevention, Introduction of Deadlock Avoidance, Safe State, Resource-Allocation Graph Algorithm, Banker's Algorithm (Safety Algorithm, Resource-Request Algorithm), Deadlock Detection(Wait for Graph for Single Instance of Each Resource Type, Deadlock Detection Algorithm for Several Instances of a Resource Type), Recovery from Deadlock(Process Termination, Resource Preemption), Combined Approach to Deadlock Handling.

Unit-V

Basic Concepts of Memory Management(Address Binding, Static and Dynamic Allocation, Logical and Physical Addresses, Swapping, Relocation, Protection and Sharing, Fixed and Variable Memory Partitioning, Fragmentation), Contiguous Memory Allocation, Memory Allocation Techniques (First-fit Allocation, Best-fit Allocation, Worst-fit Allocation), Non-Contiguous Memory Allocation, Paging Concept, Paging Implementation and Hardware Requirements, Segmentation, Segmentation Implementation and Hardware Requirements, Need for Virtual Memory, Principle of Locality, Virtual Memory System, Demand Paging, Page Replacement Algorithms (FIFO Page-replacement Algorithm, Optimal Page-Replacement Algorithm, Least Recently Used Page-Replacement Algorithm), Thrashing, Allocation of Frames(Minimum Number of Frames, Allocation Algorithms, Global Versus Local Allocation).

Text Book:

1. A. Silberschatz, G. Galvin and P. E. Gagne, *Operating System Concepts*, Seventh Edition, Wiley, 2004.
2. W Stallings, *Operating Systems Internals and Design Principles*, Sixth Edition, Pearson, 2009.

Other Reference:

1. M Milenkovic, *Operating Systems Concepts and Design*, Second Edition, Tata McGraw Hill, 1997.
2. S Das, *UNIX Concepts and Applications*, Fourth Edition, Tata McGraw Hill, 2009.

Class: **Bachelor of Technology Sixth Semester Computer Science and Engineering**

Subject Name: **Design and Analysis of Algorithm**

Subject Code: **CS6TPC02**

UNIT I ALGORITHMS ANALYSIS

Space and Time Complexity, Asymptotic Notations, mathematical foundations: growth functions, complexity analysis of algorithms, Recursive algorithms, analysis of non-recursive and recursive algorithms, Recurrences equation and their solution. Master method, recursive tree and backward substitution method.

UNIT II DIVIDE & CONQUER AND GREEDY METHOD

Divide and conquer-Finding Maxima and Minima Binary search, Merge Sort, Quick Sort, and selection sort. Strassen's Matrix multiplication.

Greedy method-introduction, Knapsack problem, traveling sales man problem, Minimum Spanning trees- Kruskal's algorithm, Prim's algorithm, Single source shortest path-Dijkstra's algorithm, Huffman codes.

UNIT III DYNAMIC PROGRAMMING AND SEARCH TECHNIQUES

Dynamic Programming: Introduction, Matrix chain multiplication, Single source shortest path-Bellman-Ford, all pairs shortest path, optimal binary search tree, 0/1 knapsack problem, traveling sales man problem, longest common subsequences.

Search techniques: Techniques for binary trees, techniques for graphs -DFS and BFS, connected components, Bi-connected components, and Strongly-connected components, Topological sorting. Heap Data Structure: Min and Max Heap, Fibonacci Heap, Binomial heap, Amortized Analysis, Heap sort.

UNIT IV BACK TRACKING AND BRANCH AND BOUND

Backtracking: Back tracking and Recursive back tracking, applications of back tracking paradigm, the 8-queen problem, graph coloring, Hamiltonian cycles.

Branch and bound: introduction, 0/1 knapsack problem, traveling sales person problem, Least Cost (LC) search - the 15- puzzle problem.

UNIT V PATTERN MATCHING NP HARD AND NP COMPLETE PROBLEM

Basic concept of pattern reorganization and algorithms. problem classes, P, NP, NP hard, NP complete problem, deterministic and non-deterministic polynomial time algorithm, Cook's theorem, Approximation algorithms for some NP-hard problems, sum of subsets, clique problem, vertex cover.

Text Book:

1. T.H.Cormen, C.E.Leiserson, R.L.Rivest, C. Stein, *Introduction to Algorithms*, Prentice-Hall India.
2. J. Kleinberg and E. Tardos, *Algorithm Design*, Pearson International Edition.

References:

1. <http://www.iitb.ac.in/asc/Courses>
2. <http://iitbhu.ac.in>

Class: **Bachelor of Technology Sixth Semester Computer Science and Engineering**

Subject Name: **Microprocessor and Interfaces**

Subject Code: **CS6TPE01**

UNIT-I

Microprocessor Architecture -8086, Register organization of 8086, Signal descriptions of 8086 chip, Physical Memory organization, Introduction to Maximum and Minimum mode operation, Processor 8088.

UNIT-II

Instruction formats, Addressing modes, Instruction Set of 8086 : Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Shift and rotate instructions, String Manipulation instructions, Machine Control Instruction, Flag Manipulation Instruction, Assembler Directive and Operators Programming with an Assembler, Programming examples.

UNIT-III

Introduction to Stack, Stack Structure of 8086, Interrupt, Interrupt and Interrupt Service Routines, Non Maskable Interrupt, Maskable Interrupt. Subroutine, MACROS: Defining a MACRO, Passing Parameters to MACRO.

UNIT-IV

Memory Interfacing, Interfacing I/O Ports, Programmable Interval Timer 8253: Architecture and Signal Description, Operating modes, Programming and Interfacing 8253, DMA Controller 8257: Architecture and Signal Description, Keyboard/Display Controller 8279: Architecture and Signal Description, Mode of Operation, Floppy Disk Controller 8272: Architecture and Signal Description, Commands.

UNIT-V

Multimicroprocessor System: Numeric Processor 8087, IO Processor 8089. 80386: Features, Architecture and Signal Description, Register Organization, Real Mode, Protected Mode, Virtual Mode, Paging, Segmentation.

Reference Books:

1. A.K.Ray, K.M. Bhurchandi, *Advanced Microprocessors and Peripherals - Architecture, Processing and Interfacing.*

2. Y Liu and G. A. Gibson, *Microcomputer System 8086/8088 Family - Architecture Programming and design*, Prentice Hall.
3. C.H. Pappas and W. H. Murray, *80386 Microprocessor Handbook*, Osborne McGraw Hill.
4. R.C. Gaonkar, *Microprocessor Architecture Programming and Application*, Wiley Eastern.
5. Barry B. Brey, *Microprocessor 8086 , 80386 & Pentium*.

Class: **Bachelor of Technology Sixth Semester Computer Science and Engineering**

Subject Name: **Software Engineering**

Subject Code: **CS6TPE02**

UNIT-I

Software Engineering –What is software, Evolution of Software, Characteristics of software, Types of Software, Applications of software, Layered Technology , Software Process Models - Linear Sequential model, Prototype model, RAD model, Incremental model, Spiral Model ,Component Based Development Model.

UNIT-2

MANAGING SOFTWARE PROJECT

The Management Spectrum-People, Product, Process, Project. Software Process and Project Metrics – Measures and Metrics , Software Measurement-Size Oriented Metrics, Function Oriented Metrics, Metrics for Quality-Overview, Measuring Quality, DRE. Software Requirement Specification-Problem Analysis, Requirement Specification. Validation and verification, The Make /Buy Decision.

UNIT-3

System Design -:Introduction, design principles, Problem partitioning, abstraction, top-down and bottom-up design, Low level Design:-Modularization, Structure Chart, Flow chart, Functional versus Object oriented approach, design specification, Design verification, monitoring and control.

UNIT-4

Coding: Top-down and bottom-up structured programming, information hiding, programming style, internal documentation, verification, monitoring and control.

Software testing – Software Testing fundamentals, white box testing, Basis path testing, Cyclomatic Complexity, A strategic Issues, Unit testing , Integration testing, validation testing, System Testing.

UNIT 5

Software Project Management - Cost estimation, project scheduling, Software configuration management, Quality assurance, Project Monitoring, Risk management.

Reference Books:

1. Pressman, *Software Engineering*.
2. Pankaj Jalote, *Software Engineering*.
3. Shaum's Outline Series, *Software Engineering*.
4. Bharat Bhushan Agrawal, Sumit Prakash Tayal, *Software Engineering*.

Class: **Bachelor of Technology Sixth Semester Computer Science and Engineering**

Subject Name: **UNIX Operating System**

Subject Code: **CS6TPE03**

UNIT-I

The Operating System, The UNIX Operating System, Knowing Your Machine, A Brief Session [Logging in with Username and Password, The Command, Displaying Both Date and Time, Clearing the Screen, The Calendar, Viewing Processes, Listing Files, Directing Output to a File, Counting Number of Lines in a File].

UNIT-II

The UNIX Architecture [Division of Labor : Kernel and Shell, The File and Process, The System Calls], Features of UNIX [Multiuser System, Multitasking System, Building Block Approach, UNIX Toolkit, Pattern Matching, Programming Facility, Documentation], Locating Commands [The PATH], Internal and External Commands, Command Structure [Options, Filename Arguments, Exceptions], Flexibility of Usage, Browsing the Manual Pages [man].

UNIT-III

General Purpose Utilities [The Calendar, Displaying The System Date, Displaying A Message, An Alternative To Echo, The Calculator, Recording Your Session, Email Basics, The Universal Mailer, Changing Your Password, Who, Uname, Tty, Stty, Changing The Settings]

UNIT-IV

The File [Ordinary, Directory, Device], The Parent Child Relationship, The Home Directory, Checking Your Current Directory, Changing The Current Directory, Making Directories, Removing Directories, Absolute Path Names, Relative Pathnames, Listing Directory Contents.

UNIT-V

Displaying And Creating Files, Copying A File, Deleting Files, Renaming Files, Paging Output, Printing A File, Knowing The File Types, Counting Lines/Words/Characters, Displaying Data In Octal, Comparing Two Files, Comm, Converting One File To Other, Compressing And Archiving Files, Compressing And Decompressing Files.

Text Book

1. S. Das, *UNIX CONCEPTS AND APPLICATIONS*, TMH.

Reference

1. H. Hahn, *HARLEY HAHN'S STUDENT GUIDE TO UNIX*, McGraw Hill Companies.
2. S.M. Sarwar, R. Korektsy AND S.A. Sarwar, *UNIX : THE TEXTBOOK*, Addison-Wesley Longman.

Class: **Bachelor of Technology Sixth Semester Computer Science and Engineering**

Subject Name: **Multimedia System Design**

Subject Code: **CS6TPE04**

UNIT I:

An introduction, Multimedia elements, Multimedia Applications, Multimedia System Architecture, Evolving Technologies for Multimedia Systems, Defining Objects for Multimedia systems, Multimedia Data Interface Standard, The need for data Compression, Multimedia databases.

UNIT II:

Compression and Decompression, Types of compression, Binary Image Compression schemes, Color, Gray Scale, Still-video image Compression, Video Image Compression, Audio Compression, Fractal Compression.

UNIT III:

Data and Format Standards, Rich-text Format, TIFF File Format, Resource Interchange File Format (RIFF), MIDI File Format, JPEG DIB File Format for still and Motion Images, MPEG standards Pen Input, Video and Image Display systems, Print Output Technologies, Image Scanners, Digital Voice and Audio, Digital Camera, Video Images and Animation, Full-Motion Video.

UNIT IV:

Storage and Retrieval Technologies, Magnetic Media Technology, Optical Media, Hierarchical Storage Management, Cache management for storage systems, Multimedia Application Design, Multimedia application classes, Types of multimedia systems, Components of multimedia systems, Organizing multimedia databases,

UNIT V:

Unified Communication, video conferencing and Chat, Multimedia Authoring and User Interface, Multimedia authoring system, Hypermedia application design consideration, User interface design, Object display/playback issues, Multimedia Operating Systems Introduction, real time, Resource management, process management, file systems.

Reference Books:

1. PrabhatK.Andleigh&KiranThakrar, *Multimedia System Design*, Prentice PTR, NJ.
2. Ralf Steinmetz and KlaraNahrstedt, *Multimedia Computing Communications and Applications, Innovating Technology*, Pearson Edu. Asia.

3. Jerry D.Gibson, *Multimedia Communications Directions & Innovations*, Harcourt India Pvt.Ltd.
4. Borko, *Handbook of multimedia computing*, CRC Press.
5. Mark J.Bunzel Sandra K.Morris, *Multimedia Applications Development*, McGraw Hill.
6. Ze-Nian Li, Mark S.Drew, *Fundamentals of Multimedia*, Pearson Edu. Asia.

Class: **Bachelor of Technology Sixth Semester Computer Science and Engineering**

Subject Name: **Computer Graphics**

Subject Code: **CS6TOE01**

UNIT I

Line Generation Points, lines, Planes Vector, pixels and frame buffers, Vector and character generation. Graphics Primitives, Display devices , Primitive operation , Display- file structure, Display control text.

UNIT II

Polygons: Polygons representation, Entering polygons, Filling Polygons. Transformation: Matrices Transformation, transformation routines Display procedures.

UNIT III

Segments: Segments table, Creating Deleting and renaming a segment Visibility, Image transformation. Windowing and Clipping : Viewing transforming, Clipping, Generalized clipping , multiple windowing.

UNIT IV

Three Dimensions: 3-D Geometry Primitives, Transformation, Projection, Clipping, Hidden line and Surfaces Back-face Removal Algorithms, Hidden line methods.

UNIT V

Rendering and Illumination: Introduction to curve generation. Bezier. Hermit and B-spline algorithms and their comparisons.

Reference book:

1. Hearn Baker, *Computer Graphics*, PHI.
2. Rogers , *Procedural Elements of Computer Graphics* , McGraw- Hill.
3. Newman & Sproule , *Principles of Interactive Computer Graphics*, MGH.
4. Harringtons S., *Computer Graphics A Programming Approach*, MGH.
5. Rogers & Adams, *Mathematical Elements of Computers Graphics*, MGH.
6. Henary Baper , *Computer Graphics*.

Class: **Bachelor of Technology Sixth Semester Computer Science and Engineering**

Subject Name: **Robotics**

Subject Code: **CS6TOE02**

UNIT – I

Introduction to Robotics Evolution of robots and robotics, progressive advancement in robots, definitions and classifications, laws of robotics, robot anatomy and related attributes, human arm characteristics, robot control system, manipulation and control, sensors in robotics, robots programming, the future prospects.

UNIT – II

Coordinate Frames, Mapping and Transforms Robot specification and notations, Coordinate frames, description of objects in space, transformation of vectors, inverting a homogeneous transform, fundamental rotation matrices, yaw pitch and roll, yaw pitch and roll transformation, equivalent angle.

UNIT – III

Symbolic Modelling of Robots – Direct Kinematic Model Mechanical structure and notations, description of links and joints, kinematic modelling of the manipulator, Denavit – Hartenberg notation, kinematic relationship between adjacent links, manipulator, transformation matrix, introduction to inverse kinematic model, Artificial Intelligence in robotics.

UNIT – IV

Robotic Sensors and Vision The meaning of sensing, sensors in robotics, kinds of sensors used in robotics, robotic vision, industrial applications of vision-controlled robotic systems, process of imaging, architecture of robotic vision systems, image acquisition, description of other components of vision system, image representation, image processing.

UNIT – V

Robot Applications Industrial applications, material handling, processing applications, assembly applications, inspection, application, principles for robot application and application planning, justification of robots, robot safety, non-industrial applications, robotic application for sustainable development & social issues.

Text Books:

1. R.K. Mittal & I.J. Nagrath, *Robotics & Control*, TMH Publications.
2. Yoram Korean, *Robotics for engineers*, McGraw Hill Co.

3. M.P.Groover, M.Weiss, *Industrial Robotics Technology programming and Applications*.
4. K.S.Fu, R.C.Gonzalez, C.S.G.Lee, *Robotics Control Sensing, Vision and Intelligence*, McGraw Hill Book co.
5. Hartenberg and Denavit, *Kinematics and Synthesis of linkages*, McGraw Hill Book co.
6. A.S. Hall, *Kinematics and Linkage Design*, Prentice Hall.
7. J.Hirchhorn, *Kinematics and Dynamics of Machinery*, McGraw Hill Book co.

Class: **Bachelor of Technology Sixth Semester Computer Science and Engineering**

Subject Name: **Operation Research**

Subject Code: **CS6TOE03**

UNIT-I

Introduction to Operation Research, Origin and Development of Operation Research, Nature and Features of Operation Research, Scientific Method in Operation Research, Modelling in Operation Research, Advantages and Limitation of Models, General Solution Methods for Operation Research Models, Methodology of Operation Research, Operation Research and Decision-making, Applications of Operation Research, Opportunities and Shortcomings of Operation Research.

Unit-II

Introduction to Decision Analysis, Decision-making Problem, Decision-making Process, Decision-making Environment, Decisions Under Uncertainty, Decisions Under Risk, Decision-Tree Analysis, Decision-making with Utilities.

Unit-III

Introduction to Simulation, Why Simulation?, Process of Simulation, Simulation Models, Event Type Simulation, Generation of Random Numbers, Monte-Carlo Simulation, Simulation of Inventory Problems, Simulation of Queueing System, Simulation of Maintenance Problems, Simulation in Investment and Budgeting, Simulation of Job Sequencing, Simulation of Networks, Advantages and Limitations of Simulation.

Unit-IV

Introduction to Network Routing Problems, Network Flow Problems, Minimal Spanning Tree Problem, Shortest Route Problems, More Applications of Shortest Route Problem, Maximal Flow Problems, Minimum Cost Flow Problems, More Network Flow Problems, Insights into Big Networks.

Unit-V

Introduction to PERT and CPM, Network: Basic Components, Logical Sequencing, Rules of Network Construction, Concurrent Activities, Critical Path Analysis, Probability Considerations in PERT, Distinction between PERT and CPM, Applications of Network Techniques, Advantages of Network Techniques, Limitations and Difficulties in Using Network.

Reference Books:

3. N.D. Vohra, *Operation Research*, TMH Publication.
4. H. Gillette, *Operation Research*, TMH Publication.
5. M. Taha, *Operation Research*, TMH Publication.

Class: **Bachelor of Technology Sixth Semester Computer Science and Engineering**

Subject Name: **Geo-Informatics and GIS Application**

Subject Code: **CS6TOE04**

UNIT-I

Introduction to Data base systems - Data base system levels of abstraction in DBMS principles of data base. Model of real world. Introduction to data organization, information management system preliminary study of INGRES, ORACLE, RDBMS and DBASE. Introduction to Geographical Information Systems: Introduction maps and spatial information. Computer assisted mapping and map analysis. Geographic Information Systems. The components of geographical Information System. Future directions and trends in GIS.

UNIT-II

Data structures for Thematic maps. Data structures for Geographic Information Systems. Points, lines and areas. Definition of a map Geographic data in the computer. File and data processing, data base structures, perceived structures and computer representation and geographical data. Raster data structure, Vector data structures for geographical entities. Data structures for thematic maps - The choice between raster and vector. Digital Elevation Models: The need of DEMs, methods of representing DEMs. Image methods, data sources and sampling methods for DEMs. Products that can be derived from a DEM. Automated landform delineation from DEMs. Map projections in GIS.

UNIT-III

Data Quality, Errors and Natural Variation: Sources of error, Errors resulting from natural variation of from original measurements. Errors arising through processing, problem; and errors arising from overlay and boundary intersections. Errors resulting from rasterizing a vector map. Errors associated with overlaying two or more polygon networks. The nature of boundaries. The statistical nature of boundaries. Combining attributes from overlaid maps.

UNIT-IV

Classification methods: Classification, Multivariate analysis and classification, allocating individuals to existing classes. Expert systems for Geographical Information Systems. Classification methods in geographical information systems.

UNIT-V

Methods of Spatial interpolation. The available methods for interpolation, global methods of interpolation, location interpolators, optimal interpolation methods using spatial auto covariance. Extensions of crigging to large areas. Comparing crigging with other interpolation

techniques. Choosing a Geographic Information System. Designing the needs for GIS. The procedure to following when setting up a geographical information system. Tools for Map analysis: Single maps, Map reclassification, operations and attribute tables, spatial topological and geometric modeling and operations on spatial Neighborhood. Tools for map Analysis: Map pairs, map overlay and map modeling correlation between two maps. Tools for map analysis: Multiple maps, types of models, Boolean logic models, Index overlay models, Fuzzy logic methods.

Text books

1. P.A. Burrough , *Principles of Geographical Information System for Land Resource Assessment*, Clarendon Press, Oxford.
2. T.R. Smith & Piqent, *Geographic Information Systems*, London Press.
3. J.D. Ullman , *Principles of data base systems*, Computer Science Press.

Semester- VII

S. No	Subject Code	Subjects	Period /week			Evaluation Scheme			Total Credit
			L ¹	T ²	P ³	IA	ESE	TOTAL	
1	CS7TPC01	Compiler Design	3	1	0	40	60	100	4
2	CS7TPC02	Artificial Intelligence	3	1	0	40	60	100	4
3	CS7TPEXX	PE Choice –I VIIth Semester	3	1	0	40	60	100	4
4	CS7TPEXX	PE Choice –II VIIth Semester	3	1	0	40	60	100	4
5	CS7TOEXX	OE-I VII th Semester	3	0	0	40	60	100	3
PRACTICAL									
1	CS7LPC01	Compiler Design Lab	0	0	3	30	20	50	2
2	CS7LPC02	Artificial Intelligence Lab	0	0	3	30	20	50	2
3	CS7LPR01	Seminar	0	0	3	30	20	50	2
4	CS7LPR02	Minor Project Lab	0	0	3	30	20	50	2
						Total Credits		700	27

IA- Internal Assessment , ESE – End Semester Examination

Open Elective Subjects VIIth Semester			Credit	Professional Elective Subject VII th Semester			Credit
S N	Subject Code	Subject		S N	Subject Code	Subject	
1	CS7TOE01	Web Technologies	3	1	CS7TPE01	Data Mining	4
2	CS7TOE02	Information Theory and Coding	3	2	CS7TPE02	Wireless Sensor Network	4
3	CS7TOE03	Swarm Intelligence, Co-evolution and Rough Sets	3	3	CS7TPE03	Intrusion Detection System	4
4	CS7TOE04	Digital Image Processing	3	4	CS7TPE04	Cyber Crime and Security	4

Class: **Bachelor of Technology Seventh Semester Computer Science and Engineering**

Subject Name: **Compiler Design**

Subject Code: **CS7TPC01**

UNIT-I

Overview of translation process., Definition, Phases of Compiler, Lexical analysis: Introduction, Functions of lexical Analysis, automatic generation of lexical analyzers.

UNIT-II

Parsing theory: Introduction, Difference between Top Down and bottom up parses. Different Types of Parsers : Predictive Parser, Shift-Reduce Parser, LR Parsers(SLR, CLR, LALR), Operator Precedence Parser Automatic generation of parsers.

UNIT-III

Intermediate code generation: Different intermediate forms: Syntax tree , TAC , Quadruples, Triples, . Indirect Triples, Syntax directed translation mechanism and attributed definition.

Code Optimization: Global data flow analyses, A few selected optimizations like command sub expression removal, loop invariant code motion, strength reduction etc.

UNIT-IV

Code generation: DAG , Machine model, order of evaluation, registers allocation and code selection, Code generation algorithm.

UNIT-V

Run time theory management: static memory allocation and stack based memory allocation schemes. Symbol table management.

References:

1. A.V.Aho, Ravi Sethi, J.D.Ullman, *Compilers tools and Techniques*, Addison Wesley.
2. D.M.Dhamdhare, *Compiler Construction-Principles and practice*, Macmillan, India.
3. Tremblay J.P. and Sorenson, *P.G. the theory and practice of compiler writing*, McGraw Hill.
4. Waite W.N. and Goos G., *Compiler construction*, Springer Verlag.
5. Gulshan Goyal, *Compiler Design* , Sun India publication.
6. Anamika Jain, *Compiler Design*.

Class: **Bachelor of Technology Seventh Semester Computer Science and Engineering**

Subject Name: **Artificial Intelligence**

Subject Code: **CS7TPC02**

UNIT-I

Introduction of Artificial Intelligence(AI), Difference between Intelligence and Artificial Intelligence, Definitions of AI, Strong AI and Weak AI, Application areas of AI, Comparison of Conventional and AI Computing, History of AI, Turing Test, Branches of AI, Intelligent Agents, State Space Representation, Production System, Heuristic Search, Search Methods (Uninformed Search and Informed Search), Breadth First Search, Depth First Search, Difference between Breadth First Search and Depth First Search, Hill Climbing, Best First Search.

Unit-II

Role of Knowledge Representation in AI, Types of Knowledge, Properties of Knowledge Representation System, Categories of Knowledge Representation Scheme, First Order Predicate Calculus, Well Formed Formula in Predicate Logic, Conversion to Clausal Form, Resolution in Predicate Logic, Semantic Nets, Properties of Semantic Nets, Frames, Scripts, Advantages and Disadvantages of Scripts.

Unit-III

Introduction of Expert System, Comparison between Human Expert and Expert System, Comparison between Expert System and Software System, Difference between Knowledgebase and Database, Basic Components of an Expert System, Characteristics of Expert System, Life Cycle Development of Expert System, Advantages of Expert System, Limitation of Expert System, Expert System Tools, Existing Expert Systems (DENDRAL and MYCIN).

Unit-IV

Introduction to LISP : Syntax and Numeric Functions, Working with GNU CLISP, Basic Data Objects in GNU CLISP, Basic List Manipulation Functions in GNU CLISP (setq, car, cdr, cons, list, append, last, member, reverse), User Defined Functions in GNU CLISP, Predicates (atom, equal, evenp, numberp, oddp, zerop, >=, <=, listp, null) and Conditionals (cond and if) in GNU CLISP, Logical Functions (not, or, and) in GNU CLISP, Input / Output and Local Variables (read, print, princ, terpri, format, let, prog) in GNU CLISP, Recursion and Iteration(do) in GNU CLISP, Arrays in GNU CLISP.

Unit-V

Introduction to PROLOG, Term, Ground Term, Function, Predicate, Features of PROLOG, Program Clause, Unit Clause, Logic Program, Goal Clause, Empty Clause, Simple Query, Conjunctive Query, Structure of PROLOG Program, Working with SWI-Prolog, General Syntax of PROLOG, Execution of a Query in Logic Program (Ground Query and Non-Ground Query), Law of Universal modus ponens, Ground Reduction, PROLOG Control Strategy, Search Tree and Proof Tree, Relational and Arithmetic Operators, Recursion in PROLOG, Lists manipulation in PROLOG, Iterative programming in PROLOG.

Recommended books:

Text Book:

6. E. Rich and K. Knight, *Artificial Intelligence*, Forty Sixth Edition, Tata McGrawHill, 2007.
7. D.W. Patterson, *Introduction to Artificial Intelligence and Expert Systems*, Tenth Edition, Prentice Hall of India, 2001.
8. S. Kaushik, *Logic and Prolog Programming*, New Age International Limited, 2006.

Other Reference:

3. www.wikipedia.org
4. www.tutorialspoint.com

Class: **Bachelor of Technology Seventh Semester Computer Science and Engineering**

Subject Name: **Data Mining**

Subject Code: **CS7TPE01**

UNIT-I

Data Ware Housing :- Introduction, Multidimensional data model, OLAP Operation , Warehouse schema ,Data Ware Housing Architecture, Warehouse Server, Metadata , OLAP , engine. Data Mining:- Introduction, KDD Vs. Data mining, DBMS Vs DM , DM Techniques , Other mining problem , Issues & Challenges in DM , DM Application Areas.

UNIT-II

Association rules: -Introduction, methods to discover association rules, A Priori Algorithm, Partition Algorithm, Pincer –Search algorithm , Dynamic Item set counting algorithm , FP-tree Growth algorithm , Incremental algorithm, Border algorithm.

UNIT-III

Clustering Techniques :- Introduction , clustering paradigms , partitioning algorithms, k-Medoid Algorithm, CLARA ,CLARANS , Hierarchical clustering , DBSCAN , BIRCH, CURE, Categorical clustering algorithms , STIRR, ROCK , CACTUS.

UNIT -IV

Decision Trees:-Introduction, Tree construction principal , Best split splitting indices, splitting criteria , Decision tree construction algorithm, CART, ID3, C4.5 , CHAID , Decision tree construction with presorting , Rainforest , CLOUDS, BOAT .

UNIT-V

Web Mining: - Web mining, Web content mining, Web structure mining, Web usage mining, Textmining, Episode rule discovery for texts, Hierarchy of categories, text clustering.

Books & References:-

1. Arun K Pujari , *Data Mining techniques*, Universities press.
2. Jiaweihan , Michelinekamber , *Data Mining concepts & techniques*, Morgan Kaufmann publisher Elsevier India.
3. Cios , Pedrycz , swiniarski , *Data Mining methods for knowledge Discovery*, Kluwer academic publishers London.

Class: **Bachelor of Technology Seventh Semester Computer Science and Engineering**

Subject Name: **Wireless Sensor Network**

Subject Code: **CS7TPE02**

UNIT- I

Wireless Sensor Network: Introduction, Architecture, Hardware and Software used in Wireless Sensor Network.

UNIT- II

Sensor network application: Motion monitoring, Environmental monitoring, Generic Architecture, Sensor network Evolution.

UNIT- III

Wireless Sensor Network : Design , Goals and Issues , Sensor deployment, Scheduling and coverage issues, self-configuration and topology control, Querying, data collection and processing, Collaborative information processing and group connectivity.

UNIT- IV

Wireless Sensor Routing Protocols: Data Centric, Hierarchical, Location based, Energy efficient routing

UNIT- V

Sensor Network Challenges- Miniaturization, power management, scalability, remote management, usability, standardization and security, System Challenges- Tiny OS, Network Sensor Platforms.

Books & References:-

1. Robert Faludi Binding , *Building Wireless Sensor Networks* , Paperback Publisher: O'reilly.
2. Zhao Feng, Guibas Leonidas, *Wireless Sensor Networks*, Binding: Paperback Publisher: Elsevier India.
3. C. S Raghavendra, Krishna M. Sivalingam, TaiebZnati , *Wireless Sensor Networks*, Binding: Paperback Publisher: Springer/bsp Books.

Class: **Bachelor of Technology Seventh Semester Computer Science and Engineering**

Subject Name: **Intrusion Detection System**

Subject Code: **CS7TPE03**

UNIT-I

History of Intrusion detection, Audit, Concept and definition , Internal and external threats to data, attacks, Need and types of IDS, Information sources Host based information sources, Network based information sources.

UNIT-II

Intrusion Prevention Systems, Network IDS protocol based IDS , Hybrid IDS, Analysis schemes, thinking about intrusion. A model for intrusion analysis , techniques Responses requirement of responses, types of responses mapping responses to policy Vulnerability analysis, credential analysis non credential analysis

UNIT-III

Introduction to Snort, Snort Installation Scenarios, Installing Snort, Running Snort on Multiple Network Interfaces, Snort Command Line Options. Step-By-Step Procedure to Compile and Install Snort Location of Snort Files, Snort Modes Snort Alert Modes

UNIT-IV

Working with Snort Rules, Rule Headers, Rule Options, The Snort Configuration File etc. Plugins, Preprocessors and Output Modules, Using Snort with MySQL.

UNIT-V

Using ACID and Snort Snarf with Snort, Agent development for intrusion detection, Architecture models of IDS and IPS.

Text Books:

1. Rafeeq Rehman, *Intrusion Detection with SNORT, Apache, MySQL, PHP and ACID*, Prentice Hall.

References:

1. Christopher Kruegel, Fredrik Valeur, Giovanni Vigna, *Intrusion Detection and Correlation Challenges and Solutions*, Springer.
2. Carl Endorf, Eugene Schultz and Jim Mellander, *Intrusion Detection & Prevention*, Tata McGraw-Hill.
3. Stephen Northcutt, Judy Novak, *Network Intrusion Detection*, New Riders Publishing.
4. T. Fahringer, R. Prodan, *A Text book on Grid Application Development and Computing Environment*, KhannaPublihsers.

Class: **Bachelor of Technology Seventh Semester Computer Science and Engineering**

Subject Name: **Cyber Crime and Security**

Subject Code: **CS7TPE04**

UNIT-I

Introduction to Cyber Law Evolution of Computer Technology, emergence of Cyber space. Cyber Jurisprudence, Jurisprudence and law, Doctrinal approach, Consensual approach, Real Approach, Cyber Ethics, Cyber Jurisdiction, Hierarchy of courts, Civil and criminal jurisdictions, Cyberspace- Web space, Web hosting and web Development agreement, Legal and Technological Significance of Domain Names

UNIT-II

Information technology Act Overview of IT Act, 2000, Amendments and Limitations of IT Act, Digital Signatures, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature, Certifying Authorities, Cyber Crime and Offences, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication.

UNIT-III

Cyber law and related Legislation Patent Law, Trademark Law, Copyright, Software, Copyright or Patented, Domain Names and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act, Law Relating To Employees And Internet, Alternative Dispute Resolution , Online Dispute Resolution (ODR).

UNIT-IV

Cyber Security: Definition, Architecture, Types, Policies, Prevention and Attacks.

UNIT-V

Application area: business, taxation, electronic payments, supply chain, EDI, E-markets, Emerging Trends

Reference Books:

1. K. Kumar, *Cyber Laws: Intellectual property & E Commerce, Security*, Dominant Publisher
2. *Information Security policy & implementation Issues*, NIIT, PHI

3. Y. Barna and D.P. Dayal , *Cyber CRIME notorious Aspects of the Humans & net Criminals activity in Cyber World*, Dominant Publisher.
4. R.C. Marine , *Cyber Crime Impact in the new millennium*, Auther press.
5. Y. Barna and D.P. Dayal , *Spam Attack, Cyber Stalking & abuse*, Dominant publisher.
6. Y. Barna and D.P. Dayal , *Frauds & Financial criouses in Cyber space*, Dominant publisher.
7. *Information Security*, NIIT, PHI.

Class: **Bachelor of Technology Seventh Semester Computer Science and Engineering**

Subject Name: **Web Technologies**

Subject Code: **CS7TOE01**

UNIT-I

Fundamentals of Web, History of the Web, Growth of the Web in post decade, Web function. Security aspects on the web, Computational features encompassing the Web. Working Web Browsers, concepts of search Engines, Searching the Web, Web Servers.

UNIT-II

Internet: - Networks, Client & Server, WWW, URL, HTTP, Internet requirements, Internet Services, Internet Java Script introduction, operators, statements, loops, object manipulation, function, objects, events handler, always, events.

UNIT-III

HTML: - Introduction, cascading style sheets, content positioning HTML content, Downloadable fonts, using Java Script with positioned content, Layer object, Handling events using localized scripts, Animating images, VB script, Introduction, Adding VB script to Web Page, Working with variables, constants, arrays, objects, conditional statements loop statements, Forms.

UNIT-IV

Active Server Page(ASP)Introduction , Its Internet Information System , Authentication , Basic authentication , NT challenge response , active server page, asp objects , server objects , file system objects , session ,accessing database with an ASP page, create an ODBC ADO connection object, common methods & Properties events , collections ADO record set object.

UNIT-V

XML :- Introduction, TO XML ,XML schemas ,DOM structure model, using XML queries. Building a path , sharing functions. Introduction of personal home page (PHP) design.

References:

1. Achyut S Goldbole and atul khute, *Web Technology*, Tata McGraw Hill.
2. Gopalan NP Akilandeswari, *Web Technology : A developer's perspective* , PHI.
3. C Xavier, *Web Technology & Design*, Tata McGraw Hill.

Class: **Bachelor of Technology Seventh Semester Computer Science and Engineering**

Subject Name: **Information Theory and Coding**

Subject Code: **CS7TOE02**

UNIT-I [Introduction]

Uncertainty, properties of information, Measures of information, Entropy: properties of entropy, information rate, conditional Entropy, Mutual Information.

UNIT-II [Channel Capacity]

Introduction, Shannon's Theorem, Continuous Channel, Capacity of Gaussian Channel: Shannon Hartley Theorem Bandwidth and S/N Trade-off.

UNIT-III [Channel Coding]

Introduction, Shannon-Fano Coding, Huffman Coding, Block Codes, Tree Codes, Cyclic Code, Hamming Codes, Convolutional Code.

UNIT-IV [Compression]

Introduction, Types of Compression, Lossless and Lossy Compression, Binary Image Compression Schemes: Runlength Encoding, CCITT Groups, Video Compression.

UNIT-V [Cryptography]

Introduction, Types of Cryptosystem: Secret-key cryptosystem, Public-key cryptosystem, Encryption, Decryption, Ciphers and Secret Message, Cryptanalysis.

Text Books:

1. Ranjan Bose, *Information Theory, Coding and Cryptography*,Tata McGraw-Hill Education.
2. R. P. Singh, S. D. Sapre ,*Communication System*, Tata McGraw-Hill.
3. J.S. Chitode and P.G. Chilveri, *Information Theory and Coding Techniques*,Technical Publication.

Class: **Bachelor of Technology Seventh Semester Computer Science and Engineering**

Subject Name: **Swarm Intelligence, Co-evolution and Rough Sets**

Subject Code: **CS7TOE03**

UNIT-I

Introduction to Particle Swarm Optimization, Social Network Structure : The Neighbourhood Principle, Particle Swarm Optimization Algorithm [Individual Best, Global Best, Local Best, Fitness Calculation, Convergence].

Unit-II

PSO System Parameters, Modification to PSO [Binary PSO, Using Selection, Breeding PSO, Neighbourhood Topologies], Cooperative PSO, Particle Swarm Optimization versus Evolutionary Computing and Cultural Evolution.

Unit-III

Introduction to ANT Colony Optimization, The “Invisible Manager” Stigmergy, The Pheromone, Ant Colonies and Clustering, Application of ANT Colony Optimization.

Unit-IV

Introduction to Coevolution, Coevolutionary Algorithm, Competitive Fitness, Relative Fitness Evaluation, Fitness Sampling, Hall of Fame, Cooperative coevolutionary Genetic Algorithm.

Unit-V

Introduction to Rough Sets, Concept of Discernibility, Vagueness in Rough Sets, Uncertainty in Rough Sets.

Recommended Books

Text Book:

1. S. Haykin, *Neural Networks : A Comprehensive Foundation*, Second Edition, Prentice Hall International, 1999.

Other Reference:

1. B. Yegnanarayana, *Artificial Neural Networks*, Nineteenth Printing, PHI Learning Private Limited, 2012.
2. G.J. Klir and B. Yuan, *Fuzzy Sets and Fuzzy Logic : Theory and Applications*, Third Edition, PHI, 2000.
3. B. Kosko, *Neural Networks and Fuzzy Systems : A Dynamical Systems Approach to Machine Intelligence*, Sixth Edition, PHI, 2000.

Class: **Bachelor of Technology Seventh Semester Computer Science and Engineering**

Subject Name: **Digital Image Processing**

Subject Code: **CS7TOE04**

UNIT- I

Introduction to Image Processing: Overview, Digital Image Representation, Types of Image, Image Processing steps, Application. Digital Imaging Systems: Overview, Physical Aspects of Image acquisition, sampling, Quantization, Image storage and formats.

UNIT-II

Digital Image Transform: Types of Image transform, Basis for transform, Fourier transform, Discrete Cosine transform, sine transform, Walsh transform, Hadamard transform, Haar transform, Slant transform.

UNIT-III

Image Enhancement : Need for Image Enhancement, Image Enhancement operation, Image Enhancement in Spatial Domain, Histogram based Techniques, Spatial Filtering concept, Image smoothing and sharpening in spatial Domain and Frequency Domain.

UNIT-IV

Image Restoration: Introduction to Degradation, types of Image Degradation, Noise Modeling, Image Restoration in presence of Noise: Mean filters, Geometric mean filter, Median filter, Maximum and Minimum filter, Midpoint filter, Band pass filter. Image Restoration Technique: Unconstrained method and constrained method.

UNIT-V

Image Compression: fundamental of Image compression, Compression Algorithm and its types, lossless compression algorithm and lossy compression algorithm.

References Books:

1. Gonzalez and Woods, *Digital Image Processing*, Pearson Education.
2. S.Sridhar, *Digital Image Processing*, Oxford University Press.
3. Jayaraman, Esakkirajan and Veerakumar, *Digital Image Processing*, TMH.
4. Anil Jain, *Fundamentals of Digital Image Processing*, PHI Learning.
5. Sonka, Hlavac and Boyle, *Digital Image Processing and Computer Vision*, Cengage Learning.

Sem- VIII

S. No.	Subject Code	Subjects	Period /week			Evaluation Scheme			Total Credit	
			L ¹	T ²	P ³	IA	ESE	TOTAL		
1	CS8TPC01	Network Security	3	1	0	40	60	100	4	
2	CS8TPEXX	PE-I VIIIth Semester	3	1	0	40	60	100	4	
3	CS8TOEXX	OE-I VIIIth Semester	3	1	0	40	60	100	4	
PRACTICAL										
1	CS8LPR01	Major Project	0	0	20	150	100	250	10	
2	CS8LPC01	Network Security Lab	0	0	3	30	20	50	2	
Total Credits								600	24	
Open Elective Subjects VIII Semester				Credit	Professional Elective Subject VIII Semester					Credit
S N	Subject Code	Subject	S N		Subject Code	Subject				
1	CS8TOE01	Enterprise Resource Management	4	1	CS8TPE01	Soft Computing		4		
2	CS8TOE02	Cloud Computing	4	2	CS8TPE02	Introduction to Computational Intelligence		4		
3	CS8TOE03	Internet of Things	4	3	CS8TPE03	Neural Network Learning and Fuzzy Systems		4		
4	CS8TOE04	Distributed Computing	4	4	CS8TPE04	TCP-IP		4		

Class: **Bachelor of Technology Eighth Semester Computer Science and Engineering**

Subject Name: **Network Security**

Subject Code: **CS8TPC01**

UNIT-I

Services , Mechanisms ,and Attacks , The OSI Security Architecture , A Model for Network Security , symmetric cipher model , substitution techniques Transposition techniques, Rotor machines , Steganography .

UNIT-II

Block ciphers and the Data Encryption Standard , simplified DES , Block cipher principles , The data Encryption Standard ,The Strength of DES. Differential and Linear Cryptanalysis ,Block Cipher Design principles ,Block Cipher Modes of Operation , Evaluation Criteria for AES The AES cipher , Triple DES , blowfish , RC5, RC4 Stream Cipher ,

UNIT-III

Principles of Public –Key Cryptosystems , Public –Key Cryptosystems , Applications for public –Key Cryptosystems , Requirements for public –Key Cryptosystems , Public –Key Cryptosystems , The RAS Algorithm , Computational Aspects , The Security of RSA , Key management , Distribution of public keys , public –Key Distribution of Secret Keys , Differ – Hellmann Key Exchange,

UNIT-IV

Web Security :Web Security Threats , Web Traffic Security Approaches , SSL Architecture , SSL Record Protocol , Change Cipher Spec Protocol ,Alert Protocol , Handshake Protocol , Cryptographic Computations ,Transport Layer Security , Secure Electronic Transaction ,

UNIT V

Intruders : Intrusion Techniques ,Intrusion Detection , Audit Records , Statistical Anomaly Detection ,Rule –Based Intrusion Detection ,The Base –Rate Fallacy , Distributed Intrusion Detection , Honeypots , Intrusion Detection Exchange Format Firewall Design principles , Firewall Characteristics , Types of Firewalls , Firewall Configurations .

Reference Books :

1. William Stallings, *Cryptography and Network Security* , Principles and Practice.

Class: **Bachelor of Technology Eighth Semester Computer Science and Engineering**

Subject Name: **Soft Computing**

Subject Code: **CS8TPE01**

UNIT-I

Introduction of Soft Computing, Difference between Hard and Soft Computing, Introduction of Artificial Neural Network (ANN), Features of Biological Neural Networks, Biological Neural Network, Performance Comparison of Computer and Biological Neural Network, Historical Development of Neural Network Principles, Benefits of Neural Networks, Basic Elements of Artificial Neural Network, Basic Representation Techniques of Artificial Neural Network (Block Diagram Representation, Signal Flow Graph, Architectural Graph) , Activation Functions, Network Architectures (Single-Layer Feed-forward, Multi-Layer Feed-forward and Recurrent Network), Examples of Artificial Neural Network Systems.

Unit-II

Mendel and McClaren Definition of Learning in the Context of Neural Network, Error Correction Learning, Hebbian Learning, Competitive Learning, Supervised and Unsupervised Learning, Some Basic Artificial Neural Network Models: McCulloch-Pitts Model and Rosenblatt's Perceptron Model, Delta Learning Rule, Widrow-Hoff Learning Rule, Construction of Logic Gates (AND, OR, NOR, NAND, NOT) using Artificial Neural Network, XOR Problem, Tourtzky and Pomerleau solution to the XOR problem, Backpropagation Algorithm, Multilayer Perceptron, Adaline, Madaline.

Unit-III

Introduction of Fuzzy Logic, Crisp Sets, Operations on Classical Sets, Properties of Crisp Sets, Fuzzy Sets, Membership Function, Fuzzy Set Operations, Properties of Fuzzy Sets, Crisp Relations, Operations on Crisp relations, Fuzzy Relation, Operation on Fuzzy Relations, FAM System Architecture, Similarities and Dissimilarities between Fuzzy Logic and Neural Networks.

Unit-IV

Introduction to Genetic Algorithms(GA), Genetic Algorithms, Flowchart of GA, Some Genetic Representations (Binary Representation, Octal Representation, Hexadecimal Representation), Selection, Genetic Operators, Mutation, Brief Introduction to Evolutionary Programming, Brief Introduction to Swarm Intelligence.

Unit-V

Introduction to Application of ANN, Direct Application (Travelling Salesman Problem), Application Areas (NETtalk, Phonetic Typewriter, Recognition of Handwritten Digits), Neural Truck Backer-Upper Control System, Fuzzy Truck Backer-Upper Control System, Comparison of Fuzzy and Neural Truck Backer-Upper Control Systems.

Recommended Books

Text Book:

9. S. Haykin, *Neural Networks : A Comprehensive Foundation*, Second Edition, Prentice Hall International, 1999.

Other Reference:

5. B. Yegnanarayana, *Artificial Neural Networks*, Nineteenth Printing, PHI Learning Private Limited, 2012.
6. G.J. Klir and B. Yuan, *Fuzzy Sets and Fuzzy Logic : Theory and Applications*, Third Edition, PHI, 2000.
7. B. Kosko, *Neural Networks and Fuzzy Systems : A Dynamical Systems Approach to Machine Intelligence*, Sixth Edition, PHI, 2000.

Class: **Bachelor of Technology Eighth Semester Computer Science and Engineering**

Subject Name: **Introduction to Computational Intelligence**

Subject Code: **CS8TPE02**

UNIT-I [Introduction to Computational Intelligence]

Computational Intelligence Paradigm [ANN, Evolutionary Computing, Swarm Intelligence, Fuzzy Systems].

Unit-II [Artificial Neural Network]

The Artificial Neuron [Calculating the Net Input Signal, Activation Functions, Artificial Neuron Geometry], Artificial Neuron Learning [Augmented Vectors, Gradient Descent Learning Rule, Widrow-Hoff Learning Rule, Generalized Delta Learning Rule, Error-Correction Learning Rule].

Unit-III [Introduction to Evolutionary Computing]

Representation of Solution-The Chromosome, Fitness function, Initial Population, Selection Operators [Random Selection, Proportional Selection, Tournament Selection, Rank-Based Selection, Elitism, Reproduction Operators, General Evolutionary Algorithms.

Unit-IV [Genetic Algorithms]

Random Search, General Genetic Algorithm, Chromosome Representation, Cross-Over, Mutation, Island Genetic Algorithm, Routing Optimization Application.

Unit-V [Genetic Programming]

Chromosome Representation, Initial Population, Fitness Function, Cross-Over Operator, Mutation Operators, Building-Block Approach to Genetic Programming.

Recommended Books

Text Book:

1. S. Haykin, *Neural Networks : A Comprehensive Foundation*, Second Edition, Prentice Hall International, 1999.

Other Reference:

1. B. Yegnanarayana, *Artificial Neural Networks*, Nineteenth Printing, PHI Learning Private Limited, 2012.
2. G.J. Klir and B. Yuan, *Fuzzy Sets and Fuzzy Logic : Theory and Applications*, Third Edition, PHI, 2000.
3. B. Kosko, *Neural Networks and Fuzzy Systems : A Dynamical Systems Approach to Machine Intelligence*, Sixth Edition, PHI, 2000.

Class: **Bachelor of Technology Eighth Semester Computer Science and Engineering**

Subject Name: **Neural Network Learning and Fuzzy Systems**

Subject Code: **CS8TPE03**

UNIT-I [Supervised Learning Neural Networks]

Neural Network Types [Feed-Forward Neural Networks, Functional Link Neural Networks, Product Unit Neural Networks, Simple Recurrent Neural Networks, Time Delay Neural Networks], Supervised Learning Rules [The Learning Problem, Gradient Descent Optimization, Scaled Conjugate Gradient, Leap Frog Optimization, Particle Swarm Optimization], Functionality of Hidden Units, Ensemble Neural Network.

Unit-II[Unsupervised Neural Networks]

Background of Unsupervised Learning Neural Networks, Hebbian Learning Rule, Principal Component Learning Rule, Learning Vector Quantizer-I, Self Organizing Feature Map [Stochastic Training Rule, Batch Map, Growing SOM, Improving Convergence Speed, Clustering and Visualization using SOM].

Unit-III[Reinforcement Learning and Performance Issues of Supervised Learning]

Learning through Awards, Reinforcement Learning, Learning Rule, Performance Measures of Supervised Learning [Accuracy, Complexity, Convergence], Analysis of Performance Factors.

Unit-IV[Introduction to Fuzzy Logic]

Fuzzy Sets, Membership Functions, Fuzzy Operators, Fuzzy Set Characteristics, Linguistic Variables and Hedges, Fuzziness and Probability.

Unit-V[Fuzzy Controllers]

Fuzzy Inference Systems, Fuzzification, Inferencing, Defuzzification, Fuzzy Controllers, Components of Fuzzy Controllers.

Recommended Books

Text Book:

1. S. Haykin, *Neural Networks : A Comprehensive Foundation*, Second Edition, Prentice Hall International, 1999.

Other Reference:

1. B. Yegnanarayana, *Artificial Neural Networks*, Nineteenth Printing, PHI Learning Private Limited, 2012.
2. G.J. Klir and B. Yuan, *Fuzzy Sets and Fuzzy Logic : Theory and Applications*, Third Edition, PHI, 2000.
3. B. Kosko, *Neural Networks and Fuzzy Systems : A Dynamical Systems Approach to Machine Intelligence*, Sixth Edition, PHI, 2000.

Class: **Bachelor of Technology Eighth Semester Computer Science and Engineering**

Subject Name: **TCP-IP**

Subject Code: **CS8TPE04**

UNIT –I [INTRODUCTION]

Introduction to internetworking, Overview of OSI Model TCP/IP protocol suite, Basics of switching technologies and switches, Comparisons of different models, Gateways.

UNIT – II [INTERNET PROTOCOL]

Purpose of Internet Protocol, Internet datagram, Options, Checksum, ARP and RARP Routing Methods: Routing Table, ICMP, IGMP. IP Addresses: Introduction, Address Classification, A sample internet with classful addressing, Subnetting, Supernetting, Classless addressing, Security at the IP Layer, IPSec, IPv4 and IPv6 packet formats.

UNIT –III [ROUTING PROTOCOLS]

Unicast Routing Protocols: Interior and Exterior routing, RIP, OSPF, BGP,

Multicasting: Introduction, Multicast Routing, Multicast Routing Protocols, Multicast Trees, DVMRP, MOSPF, CBT, PIM, MBONE.

UNIT –IV [TRANSPORT CONTROL PROTOCOL]

TCP: TCP operation, Segment, Sliding window, Silly window, Options, TCP state machine, Karn's Algorithm, Congestion control- Leaky bucket and Token bucket algorithms.

UDP: User Datagram, UDP operations, Checksum calculation.

UNIT-V [TCP/IP OVER ATM NETWORKS]

ISDN and B-ISDN, ATM reference model, ATM Switch, Interconnection Network, Virtual circuit in ATM, Paths, Circuits and identifiers, ATM cell transport and adaptation layers, packet type and multiplexing, IP Address binding in an ATM Network, Logical Subnet Concept and Connection Management.

Text Book:

1. Comer , *Internetworking with TCP/IP*, PHI Pub.
2. Behrouz A. Forouzan , *TCP/IP Protocol suite*, TMH Pub.

Reference Book:

1. James F. Kurose, Keith W. Ross , *Computer Networking*, Pearson Education.
2. By Wright and Stevens, *TCP/IP Illustrated*, Pearson Education.
3. Kenneth C. Mansfield Jr. James L , *An Introduction to Computer Networks*.

Class: **Bachelor of Technology Eighth Semester Computer Science and Engineering**

Subject Name: **Enterprise Resource Management**

Subject Code: **CS8TOE01**

UNIT-I

ERP: An Overview, Enterprise – An Overview, Benefits of ERP, ERP-I, ERP-II. Function of Business Organizations: Business Models, Functions and Integrated View of ERP for Accounting Financial Management, Marketing and Sales Management, Manufacturing Managements, Human Resource Management etc., Sales Order Processing.

UNIT-II

Business Functions and Processes ,Mainstream, Supportive and Administrative Processes in Enterprise, ERP and Related Technologies- Business Process Reengineering (BPR) Characteristics, Building Steps, Difference Between Business Improvement and BPR, Types of BPR etc. Electronic Commerce, Brief Introduction of Knowledge Based System, AI and Expert System, Networking and Multi Tier Architecture. Data Warehousing, Data Mining, OLAP, SCM.

UNIT-III

Management Information System: MIS, DSS,EIS and ESS, Data & Information, Levels of Management, Characteristics of Information, Information Attributes, Quality Issues of Information Prevention of Misuse of Information, etc.

UNIT-IV

Information and Planning: MRP, MRP-II, Forecasting and it's Varies Aspects, Qualitative and Quantitative Forecasting, Various Methods in Forecasting, Scheduling Like Single Machine/Job Scheduling etc.

UNIT-V

ERP Implementation: Lifecycle, Software Development Life Cycle, Pre-Evaluation Schemes, Post-Implement Issues, Hidden Costs, , Implementation Methodology, Vendors, Case Studies.

Text Books

1. Leon Alexis, *Enterprise Resource Planning*, McGraw-Hill.
2. Kenneth C. Laudon, J. P. Laudon, *Management Information Systems*, Pearson Education

Reference Book :

1. V.K. Garg and N K Venkitakrishnan, *Enterprise Resource Planning – Concepts and Practice*, PHI.
2. Jerome Kanter, *Management Information Systems* , Prentice-Hall.
3. W.S. Jawadekar, *Management Information System*, Tata McGraw-Hill.
4. Joseph A Brady, Ellen F Monk, Bret Wagner , *Concepts in Enterprise Resource Planning*, Cengage Learning.

Class: **Bachelor of Technology Eighth Semester Computer Science and Engineering**

Subject Name: **Cloud Computing**

Subject Code: **CS8TOE02**

UNIT-I [Introduction]

Introduction to Cloud Computing, Evolution of Cloud, Cloud Computing Characteristics, Benefits and Challenges of Cloud Computing, Emergence of Cloud Computing, Cloud Based Service Offerings, Cloud Computing Application.

UNIT-II [Cloud Models]

Introduction to Cloud Models, Cloud Models: Public Cloud, Private Cloud, Hybrid Cloud, Community Cloud.

UNIT-III [Standard & Security]

Introduction to Cloud Standards, Cloud Security Challenges, Cloud Data Security, Network Security, Host Security, Database Management.

UNIT-IV [Cloud Services]

Introduction to Service, Infrastructure as a Service(IaaS), Platform as a Service(PaaS), Software as a Service(SaaS), Storage as a Service(StaaS), Database as a Service(DaaS), Process as a Service(PaaS), Security as a Service(SecaaS), Different Security issues of Cloud Computing.

UNIT-V [Virtualization]

Introduction, Virtualization Architecture, Types of Virtualization, Pros and Cons of Virtualization, Virtual Machine, Types of Virtual Machine.

Text Book:

1. Rajkumar Byyya, James Broberg, Andrzej M. Goscinski, *Cloud Computing: Principles and Paradigms*, Wiley.
2. M.N. Rao, *Cloud Computing*, PHI.
3. Toby Velte, Anthony Vote and Robert Elsenpeter, *Cloud Computing: A Practical Approach*, McGraw Hill.

Class: **Bachelor of Technology Eighth Semester Computer Science and Engineering**

Subject Name: **Internet of Things**

Subject Code: **CS8TOE03**

UNIT-I [M2M area network Physical layers]

The physical layer,IEEE 802 committee family of protocols ,the physical layer-inferences with other technologies,choice of 802.15.4 communication channel, energy detection link quality information,sending a data frame

Media access control layer-802.15.4 reduced function and full function devices,coordinators and PAN coordinator,association,802.15.4 addresses,802.15.4 frame format,security

Uses of 802.15.4 ,The future of 802.15.4/4e and 802.4g

Unit-II [PLC for M2M applications]

Overview of PLC technologies,history,maturity of PLC,PLC as constrained media-regulation limitations ,power consumption,lossy network power line as shared media and difficult channel. The ideal PLC system for M2M-openess and availability,Range,Power consumption,data rate,robustness,security ,latency ,interoperability with M2M wireless services

Unit-III [8051 Overview & standardization]

8051 Architecture ,its Instruction set, Programming ports, Timer/Counter, Serial communication, types of Interrupts in C ,Technology and tools- Fundamental characteristics and high level requirements of IoT- IoT Reference model-IoT ecosystem and Business models- Introduction to Protocols of IoT: Introductions of BACnet protocol, standardization, technology-physical layer, link layer,network layer, transport and session layers, presentation and application layers,Security, BACnet over web.

Unit-V [Protocols]

Introductions of various protocols ,ZIGbee , and zwave, Modbus- standerization, message framing and transmission modes, ModBus/TCP,KNX ,Lonworks ,plateform- physical layer, link layer, network layer, transport and session layers, presentation and application layers.

Unit-V [Key applications of IoT]

Smart cities-Smart environment-Smart Water- Smart metering- Security and emergencies- Smart agriculture-Techniques for writing Embedded code - Examples for Application development for IoT.etc and case studies

Text Books :

1. *The Internet of Things: Key applications and Protocols*, Wiley Publications.
2. Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin McKinlay , *The 8051 Microcontroller and Embedded Systems: Using Assembly and C*, Pearson Education.
3. Adrian McEwen, Hakim Cassimally, *Designing the Internet of Things*, Wiley Publications.
4. Dr.K.V.K.K.Prasad , *Embedded Real Time Systems: Concepts, Design and Programming*, DreamTech Publication.

Class: **Bachelor of Technology Eighth Semester Computer Science and Engineering**

Subject Name: **Distributed Computing**

Subject Code: **CS8TOE04**

UNIT-I [Fundamentals of Distributed Computing]

Evolution of Distributed Computing Systems, System models, issues in design of Distributed Systems, Distributed computing environment, web based distributed model, computer networks related to distributed systems and web based protocols.

UNIT-II [Message Passing for communication]

Inter process Communication, Desirable Features of Good Message-Passing Systems, Issues in IPC by Message, Synchronization, Buffering, Multidatagram Messages, Encoding and Decoding of Message Data, Process Addressing, Failure Handling, Group Communication.

UNIT-III [Remote Procedure Calls]

The RPC Model, Transparency of RPC, Implementing RPC Mechanism, Stub Generation, RPC Messages, Marshaling Arguments and Results, Server Management, Communication Protocols for RPCs, Complicated RPCs, Client-Server Binding, Exception Handling, Security, Some Special Types of RPCs, Lightweight RPC, Optimization for Better Performance

UNIT-IV [Distributed Shared Memory]

Design and Implementation issues of DSM, Granularity, Structure of Shared memory Space, Consistency Models, replacement Strategy, Thrashing, Other Approaches to DSM, Advantages of DSM.

UNIT-V [Synchronization and Distributed File Systems]

Clock Synchronization, Event Ordering, Mutual Exclusion, Election Algorithms. Desirable Features of a good Distributed File Systems, File Models, File Accessing Models, File-sharing Semantics, Filecaching Schemes, File Replication, Fault Tolerance, Design Principles, Sun's network file system, Andrews file system, comparison of NFS and AFS.

References:

1. P.K. Sinha, *Distributed OS*, PHI.
2. S.Tanenbaum, *Distributed Operating Systems*, Pearson Education.

3. S.Tanenbaum and V.S. Maarten, *Distributed Systems Principles and Paradigms*, Pearson Education.
4. George Coulouris, Jean Dollimore, Tim Kindberg, *Distributed Systems Concepts and Design*.

COURSE STRUCTURE AND SYLLABUS

(OLD-COURSE)

NON-CBCS

SEMESTER- VII

S.N.	Code No.	Subject	Periods			Evaluation scheme			Credits
			L	T	P	IA	ESE	TOTAL	
1	CS4101	Compiler Design	3	1	-	40	60	100	4
2	CS4102	Web Technologies	3	1	-	40	60	100	4
3	CS4103	Network Security	3	1	-	40	60	100	4
4		Open Elective - I	3	1	-	40	60	100	4
5		Professional Elective - I	3	1	-	40	60	100	4
	Practical								
1	CS4104	Compiler Design	-	-	3	30	20	50	2
2	CS4105	Network Security	-	-	3	30	20	50	2
3	CS4106	Project (to be cont. in VIII Sem)	-	-	3	30	20	50	2
4	CS4107	Vocational Training (Viva -Cum-Seminar)					50	50	2
		TOTAL	15	5	9			700	28

IA- Internal Assessment

ESE – End Semester Examination \

Open Elective- I	Professional Elective – I
1. CS4108 MIS	1 CS4114 Digital Signal Processing
2 CS4109 Introduction to Bio – Informatics	2 CS4115 Advanced Database
3 CS4110 Technology Management	3 CS4116 Soft Computing
4. CS4111 Total Quality Management	4. CS4117 Digital Image Processing
5 CS4112 Multimedia System Design.	5. CS4118 Real Time System
6 CS4113 E –Commerce	6. CS4119 Cellular Mobile Communication
	7 CS4120 Embedded system

CS4101 COMPILER DESIGN

UNIT I

Overview of translation process. Lexical analysis: Hand coding and automatic generation of lexical analyzers.

UNIT II

Parsing theory: Top down and bottom of parsing algorithms. Automatic generation of parsers.

Intermediate code generation: Different intermediate forms. Syntax directed translation mechanism and attributed definition.

UNIT III

Run Time Theory Management: static memory allocation and stack based memory allocation schemes.

Symbol table management.

UNIT IV

Code Generation: Machine model, order of evaluation, registers allocation and code selection.

UNIT V

Code Optimization: Global data flow analyses, A few selected optimizations like command sub expression removal, loop invariant code motion, strength reduction etc.

TEXTS/REFERENCES:

- A.V.Aho, Ravi Sethi, J.D.Ullman, Compilers tools and Techniques, Addison Wesley,
- D.M.Dhamdhare, Compiler Construction-Principles and practice Macmillan, India,
- Tremblay J.P. and Sorenson, P.G. the theory and practice of compiler writing, Mc Graw Hil,
- Waite W.N. and Goos G., Compiler construction' springer verlag,

CS4102 WEB TECHNOLOGIES

UNIT I

Fundamentals of Web, History of the Web, Growth of the Web in post decade, Web function. Security aspects on the web, Computational features encompassing the Web. Working Web Browsers, concepts of search Engines, Searching the Web, Web Servers.

UNIT II

Internet: - Networks, Client & Server, WWW, URL, HTTP, Internet requirements, Internet Services, Internet Java Script introduction, operators, statements, loops, object manipulation, function, objects, events handler, always, events.

UNIT III

HTML: - Introduction, cascading style sheets, content positioning HTML content, Downloadable fonts, using Java Script with positioned content, Layer object, Handling events using localized scripts, Animating images, VB script, Introduction, Adding VB script to Web Range, Working with variables, constants, arrays, objects, conditional statements loop statements, Forms.

UNIT IV

Active Server Page(ASP)Introduction , Hs Internet Information System , A authentication , Basic authentication , NT challenge response , active server page, asp objects , server objects , file system objects , session ,accessing database with an ASP page, create an ODBC ADO connection object, common methods & Properties events , collections ADO record set object.

UNIT V

XML :- Introduction, TO XML ,XML schemas ,DOM structure model, using XML queries. Building a path , sharing functions. Introduction of personal home page (PHP) design

Text /References Book:

- NP Akilandeswari “Web Technology” : A neveloper’s perspechive “ PHI”
- C Xavier “Web Technology & Design” Tata Mcgraw Hill

CS4103 NETWORK SECURITY

UNIT I

Services , Mechanisms ,and Attacks , The OSI Security Architecture , A Model for Network Security , symmetric cipher model , substitution techniques Transposition techniques, Rotor machines , Steganography .

UNIT II

Block ciphers and the data encryption standard , simplified DES , Block cipher principles , The data Encryption Standard ,The Strength of DEC. Differential and Linear Cryptanalysis ,Block Cipher Design principles ,Block Cipher Modes of Operation , Evaluation Criteria for AES The AES cipher , Triple DES , blowfish , RC5, Rc4 Stream Cipher ,

UNIT -III

principles of public -Key Cryptosystems , public -Key cryptosystems , Applications for public -Key Cryptosystems , Requirements for public -Key Cryptosystems , Public -Key Cryptosystems , The RAS Algorithm , Computational Aspects , The Security of RSA , Key management , Distribution of public keys , public -Key Distribution of Secret Keys , Differ - Hellmann Key Exchange,

UNIT-IV

Web Security :Web Security Threats , Web Traffic Security Approaches , SSL Architecture , SSL Record Protocol , Change Cipher Spec Protocol ,Alert Protocol , Handshake Protocol , Cryptographic Computations ,Transport Layer Security , Secure Electronic Transaction ,

UNIT V

Intruders : Intrusion Techniques ,Intrusion Detection , Audit Records , Statistical Anomaly Detection ,Rule -Based Intrusion Detection ,The Base -Rate Fallacy , Distributed Intrusion Detection , Honeypots , Intrusion Detection Exchange Format Firewall Design principles , Firewall Characteristics , Types of Firewalls , Firewall Configurations .

Books :

- Cryptography and Network Security, Principles and Practice Third edition , William Stallings .

CS4108 Management Information System

UNIT I

Introduction Of Information System, Fundamentals of Information System, Strategic Role of Information in Organisation and Management, Information System and Organisation , Business Process Re-Engineering .

UNIT II

Integration of Information, Decision Making Process , Models and Decision Support , Decision in business Areas , Strategic Analysis .

UNIT III

Information System Planning, Controlling Information System , Development of MIS Methodology and Tools/Techniques for Systematic Identification, Evaluation , Modification of MIS . Information System Success and Failure Implementation .

UNIT IV

Information System for Business Operations : Cross Functional Information System , A study of major Financial , Production , Human Resource Information System and Marketing Information System , Inventory, Management Information System.

UNIT V

Management of Information System and End - User Computing , Security and Ethical issues of Information System , Major issues in Information System , Auditing of Information System.

REFERENCE BOOKS

- Management Information System : Solving Business Problems with Information Technology by Gerald V. Post and David L. Anderson [Tata McGraw - Hill Edition]
- Management Information System : Managing Information Technology in the Internet worked Enterprise by James A. O'Brien [Tata Mcgraw -Hill Edition , Fourth Edition]
- Management Information System : A Contemporary Perspective by Kenneth C. Laudon and Jane Price Laudon [Maxwell Macmilan International Editions]

CS4109 INTRODUCTION TO BIOINFORMATICS

UNIT I

Introduction The dawn of sequencing , What is bio informatics ? , The biological sequence/ structure deficit ,Genome projects , Status of the human genome project , why is bio informatics important.? Pattern recognition and prediction , The role of chaperones , Sequence analysis , Homology and analogy , the devil is in the detail , Further reading . Information networks

What is the Internet , How do computers find each other ? ,Facilities used on the Internet ,what is the World Wide Wed ? , web browsers , HTTP, HTML ,and URLs , The European Molecular Biology network –EM B net, the National Center for Biotechnology Information – NCBI ,Virtual tourism , Further reading , Web addresses .

UNIT I I

Protein information resources Biological databases , primary sequence databases , Composite protein sequence databases , Secondary databases , Composite protein pattern databases ,Structure classification databases , Further reading , Web addresses. Genome information resources

DNA sequence databases , Specialized genomic resources , Further reading , Web addresses

UNIT III

DNA Sequence Analysis Why analysis DNA ? , Gene structure and DNA sequences , features of DNA sequence analysis , Issues in the interpretation of EST searches , Two approaches to gene hunting , The expression profile of a cell , cDNA libraries and EST s ,Different approaches to EST analysis , Effects of EST data on DNA databases , A practical example of EST analysis Pair wise alignment techniques Databases searching , alphabets and complexity , Algorithms and programs , Comparing two sequences –a simple case , Sub-sequences , Identity and similarity , The Detplot , Local and global similarity ,Global alignment : the needle man and Wunsch algorithm ,Local alignment : the Smith –Waterman algorithm ,Dynamic programming , pair wise databases searching .

UNIT IV

Multiple sequence alignment The goal of multiple sequence alignment , Multiple sequence : a definition , The consensus , Computational complexity , Manual methods , Simultaneous methods , Progressive methods , Databases of multiple alignments , Searching databases with multiple alignments .Secondary a sequence search protocol Why bother with secondary database searches ? What's in a secondary databases.

UNIT V

Building a sequence search protocol ,A practical approach , When to believe a result , Structural and functional interpretation, Analysis packages What's in an analysis package ? , Commercial databases , Commercial software , Comprehensive packages, packages special sing in DNA analysis , Intranet packages , Internet packages Further reading , Web addresses

Reference Books

- Gopal & Tones , BIOINFOMATICS with fundamentals of Genomics & profeomics , TMH pub .
- Rastogi , Bioinformatics – Concepts, Skill & Application CBS Pub
- Bergeron , Bioinformatics Computing PHI

CS4110 TECHNOLOGY MANAGEMENT

UNIT I

Introduction to technology Management , Business Strategy for New Technologies : Adding value, Gaining competitive advantage , timing and capability development

UNIT II

Technology Forecasting Techniques of Forecasting , Technology Forecasting – Relevance , Strategic alliance and practicality , and Technology transfer .

UNIT III

Management of Research , Development and Innovation ,Technology mapping , Comparison of types of R& D projects and development approaches -radical platform and Incremental projects, Innovation process.

UNIT IV

Management of Intellectual property Right Strategic value of patents ,Trade secrets and licensing ,Managing Scientist and Technologists, Identification ,Recruitment, Retention , team work and Result orientation Investment in Technology

Management roles and skills for New technology

UNIT V

Technology for managerial Productivity and Effectiveness , Just – in –Time .

Venture capital and Technology Development .

Laboratory :

- Technology forecasting and technology mapping
- Technology strategy development
- Exercise on Just –in – Time
- Case on venture capital

Recommended Books :

- Technology and management, Cassell Educational Ltd . London
- John Humbleton elsevoer , Management of High Technology Research and development .
- Charles W.L. hill / Gareth R . Jones , Strategic Management, Houghton Mifflin Co.
- S.A. Bergn , R& D Management , Basil Blackwell Inc
- Richard M. Burton & Borge Obel Elsevier, Innovation and Entrepreneurship in Organisations

- spyros Maksidakis & Steven C Wheelwright , The Handbook of Forecasting – A management Guide , John Wiley & Sons
- C. Marle Crawford ,New product Management , IR WIN ,USA
- David Hutchin , Just –in –Time Grower Technical Press

CS4111 TOTAL QUALITY MANAGEMENT

UNIT I

Objectives, The major objectives of this course is to orient the participants in basic concepts and applications of total quality management. This course also aim at developing skills and competencies required for applying TQM in various sectors of economics and industrial development Quality and total quality management –concepts, definition and applications of TQM

UNIT II

Just-In-Time (JIT), JIT manufacturing and waste elimination, layout for JIT, Kanban, MRP Vs. JIT, JIT cause effect chain, JIT implementation and benefits, Total employees Involvement (TEI), Empowering Employee, team building Quality circles, transparent communication, Reward and recognition, Education and training, suggestion and schemes.

UNIT III

Statistical Process Control (SPC) 7 QC tools of problem solving 7 new tools, Advanced TQM tools, Control Charts. Benchmarking: Definition, concept, process and types of benchmarking.

UNIT IV

Quality Systems: Concept of Quality Systems Standard (QSS), Relevance and origin of ISO 9000 and ISO 14000, elements, benefits. Customer Satisfaction ,Internal and External customers, Quality chain, customer focus, satisfaction and delight, customer complain and redresser mechanism.

UNIT V

Quality Planning Process, Policy deployment and implementation plan formulation and implementation.

Process Management, Factors affecting process management, quality function development (QFD), quality assurance system and quality audit

Recommended Books:

- Total Quality Management by Dr.D.D.Sharma, Sultan Chand & Sons, New Delhi.
- Total quality management by Sunder Raju Tata Mcgraw Hill, Delhi.
- TQM for engineers by M. Zairi, Aditya Books.
- Environmental Engineering and Management by Dr. S.K. Dhameja.
- Total Quality Management handbook by JL Hradeky, McGraw Hill.
- M/s S.K. Kataria & Sons, Delhi.

CS4112 MULTIMEDIA SYSTEM DESIGN

UNIT I

An introduction, Multimedia elements, Multimedia Applications, Multimedia System Architecture, Evolving Technologies for Multimedia Systems, Defining Objects for Multimedia systems, Multimedia Data Interface Standard, The need for data Compression, Multimedia databases. Compression and Decompression, Types of compression, Binary Image Compression schemes, Color, Gray Scale, Still-video image Compression, Video Image Compression, Audio Compression, Fractal Compression.

UNIT II

Data and Format Standards, Rich-text Format, TIFF File Format, Resource Interchange File Format (RIFF), MIDI File Format, JPEG DIB File Format for still and Motion Images, MPEG standards, TWIN, Multimedia input/output Technologies, Key Technology Issues, Pen Input, Video and Image Display systems, Print Output Technologies, Image Scanners, Digital Voice and Audio, Digital Camera, Video Images and Animation, Full-Motion Video.

UNIT III

Storage and Retrieval Technologies, Magnetic Media Technology, Optical Media, Hierarchical Storage Management, Cache management for storage systems, Multimedia Application Design, Multimedia application classes, Types of multimedia systems, Virtual reality design, Components of multimedia systems, Organizing multimedia databases, Application workflow design issues, Distributed Application design issues.

UNIT IV

Multimedia Authoring and User Interface, Multimedia authoring system, Hypermedia application design consideration, User interface design, Object display/playback issues, Multimedia Operating Systems Introduction, real time, Resource management, process management, file systems, Additional operating systems issues.

UNIT V

Multimedia Database Systems Multimedia database management systems, Characteristics of MDBMS, Data analysis, Data structure, Operation on data, Integration on database model. Distributed Multimedia Systems Components of distributed multimedia systems, Distributed client server operation, Multimedia object servers, multiserver network Topologies, Distributed multimedia database, Managing distributed objects.

Laboratory

- Familiarization with the multimedia hardware.
- Installation of various multimedia components.
- Recording and playing back the sound at various parameters and judging quality.
- Write a programme which reads various video formats and play it.

- Write a programme which compresses and decompresses data using various compression techniques.
- Write a programme which reads AVI format and plays it.
- Workflow diagram for video conferencing, multimedia system.

Recommended Books :

- Prabhat K.Andleigh & Kiran Thakrar, multimedia system design, Prentice PTR, NJ.
- Ralf Steinmetz and Klara Nahrstedt multimedia computing communications and applications, innovating technology series by Pearson Edu. Asia.
- Jerry D.Gibson, multimedia communications directions & innovations, Harcourt India Pvt.Ltd.
- Borko, Handbook of multimedia computing,CRC Press.
- Mark J.Bunzel Sandra K.Morris, multimedia applications development McGraw Hill.
- Ze-Nian Li, Mark S.Drew, fundamentals of multimedia, by Pearson Edu. Asia

S4113 E-COMMERCE

UNIT I

Electronic Commerce Basics The commerce in e-commerce , Internet Commerce , Models of Electronic Commerce , Managing Internet Marketing Marketing Channels The channels for the Net , Internet branding , A different pitch for the online advertising

UNIT II

CRM & Retailing Steps to make an online purchase Retailing in Internet Marketing E- Commerce is indispensable The supply chain , Electronic Commerce and global business processes , the E- Commerce Eras , Market pricing , what should your e- Commerce site have , A minimum e- commerce site –in five easy steps

UNIT III

Transaction in Electronic Commerce How would you make an e-commerce deal safe ? , online money e cash , The steps to the Anatomy of a Transaction , The latest in e-commerce security , The actors in an electronic commerce transactions , More business through electronic commerce , Applications emerging on the Internet . The future Business –to Business Commerce Opportunity , Internet Commerce , Today and Tomorrow , The beginning : The Internet as a Retail Store , The future

UNIT IV

Legal aspects in Electronic Commerce Legal Issues ,Facilitating e-commerce through legislation ,Does internet commerce beats tax , New laws for e- commerce success in India , The legal future for e- commerce and e- tailing The dotcom world Launching an e-commerce site , A method in the dotcom pricing madness , Going public . The IPO Issue , Dotcom funding ,

UNIT V

Venture capital What is venture capital ? Getting venture funding structuring deal , Stocks and Shares , India venture Capital , Investment conditions and restrictions for a venture capitalist , The global Scenario , Venture Capital Issues , Other financing options
Case studies

•

EXPOPOINT .COM” – An Indian Portal , “e-cGurucool . COM” – An Indian portal .

CS4114 DIGITAL SIGNAL PROCESSING

UNIT I

Classification of Signals and systems Introduction, Classification of signals, Singularity Functions. Amplitude and Phase Spectra, Classification of System, Simple Manipulations of Discrete-time Signals, Representation of Systems, Analog-to-Digital Conversion of Signals. z-Transforms -Introduction, Definition of the z-transform, Properties of z-transform, Evaluation of the Inverse z-transform.

UNIT II

linear time invariant systems Introduction, Properties of a DSP System, Difference Equation and its Relationship with System Function, Impulse Response and Frequency Response, Frequency Response.

UNIT III

discrete and fast fourier transforms.Introduction, Discrete Convolution, Discrete-Time Fourier Transform (DTFT), Fast Fourier Transform (FFT). Computing of Inverse DFT by Direct DFT, Composite-radix FFT, Fast (sectioned) Convolution. Correlation.

UNIT IV

finite impulse response (fir) filters Introduction, magnitude response and phase response of digital filters. Frequency response of Linear phase FIR filters, design techniques for FIR filters, design of optimal linear phase FIR filters.

infinite impulse response (iir) filters Introduction, IIR filter designed by approximation of derivatives, IIR filter design by impulse invariant method, IIR filter design by the bilinear transformation, butter worth filters Chebyshev filters, Inverse Chebyshev filters, Elliptic filters, Frequency Transformation.

UNIT V

Realization of digital linear systems Introduction, basic realisation block diagram, signal-flow graph, basic structures for IIR systems, basic structures for FIR systems applications of digital signal processing ;

Introduction, voice processing, application of radar, applications to image processing , Introduction to Wavelets.

RECOMMENDED BOOKS:

- Digital signal processing- S. Salivahanan, A. Vallavraj, C. Gnanapriya;TMH
- Discrete time signal processing- A.V. Oppenheim, Schaffer.

CS4115 ADVANCED DATABASE DESIGN

UNIT I

Object Oriented Database

Need, object oriented data model, object oriented languages, Procedural programming languages, Procedural C++ and Procedural Java Systems. Object Relational Databases Nested relations, complex types, Inheritance, Reference types, Querying with complex, types, junctions & procedures, object oriented versus object relational.

UNIT II

XML & Web Interfaces

Structure of XML data, XML Document Scheme, Querying and Transformation, Storage of XML data, Applications, Web Interfaces to Database, Performance tuning, performance benchmarks, standardization.

UNIT III

Distributed Databases

Homogeneous and heterogeneous, Distributed data storage, Distributed transactions, Commit protocols, Concurrency control in distributed databases, Distributed query processing, Heterogeneous distributed databases, Directory systems. (10 hrs)

UNIT IV

Parallel Databases Introduction, I/O parallelism, Inter query parallelism, Intra query parallelism, intra operation parallelism, Inter operation parallelism.

UNIT V

Advanced Transaction Processing Transaction processing monitors, Transactional workflows, Main memory databases, Real time transaction systems, Long duration transactions, Transaction management in multi databases.

Recommended Books:

- C.J.Date, Introduction to database systems, Seventh edition, Pearson Education Asia.
- Elmasri & Navathe, Fundamentals of database systems, 3rd Edition, Pearson Education Asia.
- Silberschatz, Korth, Sudarshan, Database system concepts, 4th edition, McGraw Hill.

CS4116 SOFT COMPUTING

UNIT I

Introduction to ANS technology: Elementary Neurophysiology, models of a neuron, neural networks viewed as directed graphs, feedback from neurons to ANS, artificial intelligence and neural networks.

UNIT-II

Learning & Training: Hebbian memory based, competitive, error-correction.

Learning Credit Assignment Problem: supervised and unsupervised learning, memory models, recall and adaptation, network architecture, single layered feed forward networks, multilayered feed forward networks, recurrent networks, topologies

UNIT-III

Activation and Synaptic dynamics, stability and convergence. A survey of neural network models: Single layered perception, least mean square algorithm, multi-layered perceptrons, back propagation algorithm XOR- problem, the generalized delta rule, BPN applications, Adalines and Madalines- Algorithm and applications.

UNIT-IV

Applications: The traveling salesperson problem, talking network and phonetic typewriter: Speech generation and Speech recognition, character recognition and retrieval, handwritten digital recognition.

UNIT-V

Adaptive fuzzy systems: Introduction to Fuzzy sets, and operations, Examples of Fuzzy logic, Fuzzy Associative memories, fuzziness in neural networks, comparison of fuzzy and neural Truck-Backer upper control systems.

Books Recommended:

- Artificial Neural Networks by **B. Yagna Narayan**
- Neural Networks by James A. Freeman and **David M.Strapetus**
- Neural Networks- A comprehensive foundation by **Simon Hay kin (LPE)**

CS4117 DIGITAL IMAGE PROCESSING

UNIT I

Introduction: digital image representation, elements of digital image processing systems, elements of visual perception structure of human eye, simple image model, sampling and quantization, basic relationship between pixels, imaging geometry, photographic films.

UNIT II

Statistical Properties: Histogram means, standard deviation, profile different distributions. IMAGE TRANSFORM: One and two dimensional DFT the discrete cosine transform, hadamard transform, haar transform, slant transform.

UNIT III

Image Enhancement: Spatial and frequency domain methods points operations, contrast stretching, bit extraction, range compression, histogram equalization, modification local enhancement, image smoothing spatial operations, filtering multispectral, color image processing, Pseudo-color image enhancement.

UNIT IV

Image Restoration: degradation model, Restoration in spatial domain geometric transformation spatial transformation, approach to restoration, Inverse & Wiener filtering, image compression: basic of image compression, models, elements of information theory, error free compression, lossy compression, image segmentation, line detection, edge detection, edge linking and boundary detection, thresholding & region oriented segmentation.

UNIT V

Image Analysis: boundary extraction, boundary representation, region representation structure shape feature, texture, scene matching & detection. APPLICATION OF IMAGE PROCESSING: Character recognition, diagram understanding, medical imaging, scientific analysis, military guidance & reconnaissance remote sensing, telecommunication.

Reference Books:

- Gonzales & Woods, digital image processing Addison Wesley, 1992.
- Pratt, digital image processing Wiley Int. 1991.
- Sid Ahmed digital image processing McGraw Hill, 1995.

CS4118 REAL TIME SYSTEM

UNIT I

Typical Real Time:

Application Digital control High-level control, signal processing, Other Real time Application hard versus soft real time system jobs and processors, release times, deadlines, and timing constraints, hard and soft timing constraints, hard real time system, soft real time systems.

UNIT II

A Reference Model Of Real Time Systems:

Processors and resources, temporal parameters of real-time workload, periodic task model, precedence constraints and data dependency, other type of dependencies, functional parameters, resource parameters of jobs and parameters of resources, scheduling hierarchy commonly used approaches to real-time scheduling Clock-driven approach, weighted round robin approach, priority driven, approach, dynamic versus static system, effective release times and deadlines. Optimative of the EDF and LST algorithms, non optimality of the EDF and the LST algorithms, challenges in validating timing constraints, in priority-driven system Off-line versus On-Line Scheduling.

UNIT III

Clock-Driven Scheduling:

Notations and assumptions, static, timer-driven scheduler, general structure of cyclic schedules, cyclic executives, improving the average response time of a periodic jobs, practical considerations and generalizations, algorithm for constructing static schedules, pros and cons of clock-driven scheduling priority-driven scheduling of periodic tasks static assumption, fixed priority versus dynamic priority algorithm maximum schedulable utilization, optimality of the RM and DM algorithms. A schedulability test for fixed priority tasks, with short response times sufficient schedulability condition for the RM and DM algorithm.

UNIT IV

Scheduling Aperiodic And Sporadic Jobs In Priority-Driven Systems:

Assumption and approaches, deferrable server, sporadic server, constant utilisation. Total bandwidth, and weighted, fair-queuing server slackstealing in deadline driven system? Slack stealing in fixed-priority system. Scheduling of sporadic jobs, real-time performance for jobs with soft timing constraints, A two-level scheme for integrated scheduling resources and resource access control assumptions on resources and their usage, effect of resource contention and resource access control, nonpreemptive critical sections, basic priority inheritance protocol, basic priority ceiling protocol, stack based, priority ceiling (ceiling priority) protocol, use of priority ceiling protocol in dynamic priority system, preemption

ceiling protocol, controlling accesses to multiple unit resources, controlling concurrent accesses to data objects.

UNIT V:

Tiprocessor Scheduling, Resource Access Control, And Synchronization:

Model of multiprocessor and distributed system, task assignment, multiprocessor priority ceiling protocol, foment of scheduling algorithm for end-to-end periodic task, schedulability of fixed priority end-to-end periodic task, end-to-end task in heterogeneous system, predictability and validation of dynamic multiprocessor system scheduling flexible computations and tasks with temporal distance constraints.

flexible applications, tasks with temporal distance constraints REAL-TIME communications model of real-time communication. Priority-based service disciplines for switched networks, weighted round-robin service disciplines, medium access control protocol of broad-cast networks, internet and resourse reservation protocols, real-time protocol, communication in multicomputer system.

OPERATING SYSTEM Overview ,time services and scheduling mechanisms, other basic operating system fuctions, processor reserves and resources kernal, open system architecture, capabilities of commercial real-time operating system

Reference Books:

- Jane W.S.Liu.pearson education India.

CS4119 : CELLULAR & MOBILE COMMUNICATION

UNIT 1:

Introduction to cellular mobile system A basic cellular system , performance criteria Uniquences of Mobile radio Environment, Operation of cellular system , planning and cellular system , Analog and digital cellular systems.

Element of cellular radio system design : General description of the problem , Concept of frequency channels, Co channel interface reduction factor , cell splitting , Consideration of the components of cellular systems.

UNIT 2 :

Interface: Introduction to Co-channel interface , Real time Co-channel interface Co-channel measurement , Design of antenna system , Antenna parameter and their effects , diversity receiver non co-channel interface- different types.

UNIT 3 :

Cell Coverage For Signal And Traffic : General introduction , obtaining the mobile point –to –point mode propagation over water or flat open area , foliage loss, propagation near in distance , long distance propagation ,point –to –point predication model –characteristics ,cell site, antenna heights and signal coverage cells, mobile –to mobile propagation.

UNIT 4 :

Cell Site Antennas And Mobile Antennas :

Characteristics , Antennas at cell site , Mobile antennas .

Frequency management and Channel Assignment : Frequency management, fixed channels assignment , non fixed channel assignment, Traffic and channel assignment .

UNIT 5 :

Hand –off , Dropped Calls: Why hand –off , types of hand off and their characteristics , Dropped call rates and their evaluation .

Operational Techniques: Parameters, Converge hole filter, leaky feeders , Cell splitting and small cells , Narrow beam concept.

Reference Books :

- Cellular and mobile Communication by Lee (McGraw Hill)
- Wireless Digital Communication by dr. Kamilo Faher (PHI)

CS4120 EMBEDDED SYSTEMS

UNIT I

Hardware Fundamentals: Gates , timing diagram , memory , microprocessor , buses , DMA, Interrupts:- Microprocessor architecture , interrupt basics, interrupt latency, shared data problem . System partitioning building the architectural model, Input and output processing , Hard ware and software partitioning Timing requirements.

UNIT II

Microprocessor selection, Microprocessor versus Micro- controller analysis CISC versus RISC Study of major embedded processor architectures Memory design , system optimization . Architecture for Embedded software :- Round robin, round robin with interrupts , function queue scheduling real time operating system .

UNIT -III

Real Time Operating System:

Tasks and task states, task and data, semaphores and shared data, Operating system services :- Inter task communication , timer services. Memory management ,event and interaction between interrupt routines and real time operating system . Software selection issues , selecting an RTOS TROS performance metrics . RTOS scalability and tool support ,compiler selection .

UNIT -IV

Embedded System Design Using A Real Time Operating System:

Encapsulating semaphores and queues hard real time scheduling considerations saving memory space .

UNIT- V

Development tools and debugging:

Host and target machines, linker / locators , target system , testing instruction set, assert , macro. Establishing a software development environment C runtime environments embedded debuggers cross – development methods embedded file formats, readers Creating object files the process loading software into remote targets .

References :-

- “an embedded software primer “ by David E Simon ISBN 0201-61569-X
- “Embedded system Design “ by Around S. Berger ISBN 1- 57820-073-3

SEMESTER- VIII

S.N	Code no.	Subject	Periods			Evaluation scheme			Credits
			L	T	P	IA	ESE	TOTAL	
1	CS4201	Data Mining	3	1	-	40	60	100	4
2	CS4202	GUI Programming (using VB.Net)	3	1	-	40	60	100	4
3	CS4203	Artificial Intelligence & Expert Systems	3	1	-	40	60	100	4
4		Professional Elective - II	3	1	-	40	60	100	4
	Practical								
1	CS4204	GUI Programming Net (using VB.Net)	-	-	3	30	20	50	2
2	CS4205	Project	-	-	12	90	60	150	6
		TOTAL	12	4	15			600	24

IA- Internal Assessment

ESE – End Semester Examination

Professional Elective - II

CS4206: ERP

CS4207 : Software Testing & Quality Management

CS4208 : Cyber Crime & Laws

CS4209 : Pattern recognition

CS4210 : Natural Language Processing

CS4211 : Inter Networking TCP/IP

CS4212 : Distributed systems

CS4201 DATA MINING

UNIT-1

Data ware Housing :-

What is a data warehouse ?, definition ,Multidimensional data model, OLAP operation , warehouse schema ,data ware housing architecture, warehouse serve ,metadata , OLAP , engine,Data warehousing backend process, other features.

Data Mining:- what is data mining ? KDD Vs. data mining ,DBMS Vs DM other related areas , DM techniques , other mining problem , issues & challenges in DM , Dm application areas.

UNIT-II

Association rules:- what is an association rule ? , methods to discover association rules, a priori algorithm ,partition algorithm, pincer –search algorithm , Dynamic Itemset counting algorithm, FP-tree Growth algorithm , Incremental algorithm, Border algorithm , generalized association rules, Association rules with item constraints .

UNIT-III

Clustering Techniques:-

Introduction , clustering paradigms , partitioning algorithms, k-Medoid Algorithm, CLARA ,CLARANS , Hierarchical clustering , DBSCAN , BIRCH, CURE, Categorical clustering algorithms , STIRR, ROCK , CACTUS,

UNIT -IV

Decision Trees: - what is a Decision tree? Tree construction principal , Best split splitting indices, splitting criteria , Decision tree construction algorithm, CART, ID3, C4.5 , CHAID , Decision tree construction with presorting , rainforest, approximate method , CLOUDS, BOAT , pruning technique , integration of pruning & construction .

UNIT-V

What is neural network ? Learning in NN, unsupervised learning , data mining using NN , genetic algorithm ,Rough sets, Support Vector machines.

Web Mining :- Web mining ,web content mining ,web structure mining ,web usage mining ,text mining , unstructured text , Episode rule discovery for texts , Hierarchy of categories , text clustering .

Books & References :-

- Data Mining Techniques – Arun K Pujari Universities Press
- Data Mining Concepts & Techniques – Jiawei Han , Micheline Kamber Morgan Kaufmann Publisher Elsevier India

- Data Mining Methods For Knowledge Discovery –Cios , Pedrycz , Swiniarski Kluwer Academic Publishers London

CS4202 GUI Programming (using VB.Net)

UNIT -I

Introduction to .Net Framework , Understanding web programming web browser and web server , How to create HTML page and HTML forms .Role of Net in web development , NET framework and platform base classes , XML as Dot Net Meta language , relation with COM , overview OF CLR , Dot NET class frame , an overview of DOT NET components .

IDE OF VB.NET –menu bar , toolbars, project Explorer , toolbox , properties window , from designer, from layout , Immediate window , visual Development and Event –Driven Programming –Event Driven programming method and events , Concept of VB.NET project, types of VB .NET project , opening and saving the projects, Elements of the user interface, Designing the interface , Creating forms and code modules ,Running the application, Grouping controls, Customizing The Environment –Editor tab ,format tab general tab ,docking tab ,environment tab , working with forms, loading , showing and hiding forms, Controlling one form within another .

UNIT -II

Variables – Declaring variables , Types of variables Converting variables types, User- defined data types, special values ,Forcing variables declarations , Scope and lifetime of a variables , Constants ,Arrays ,Types of array ,control array ,collections ,procedures, subroutines ,Functions. Control flow statements and conditional statements, Loop statements, Designing menus and popup menus , programming menu commands ,using access and shortcut keys , Using message box and input , Using standard modules .

UNIT -III

The text box control –Tex selection, Search and replace operations, The List box Combo controls, Indexing with the List box controls, Searching a Sorted list , The scroll bar and slider controls, using the common dialog controls, Color common dialog box , Font common dialog box , the file open and save common dialog boxes, print dialog box , Help common dialog box , The file controls,

UNIT -IV

Classes , instances , objects, Encapsulation and abstraction , Derived classes and lose classes , classes in Object linking and embedding (OLE) OLE at runtime , OLE control, Graphics , with visual Basic . NET , from , picture box and image box controls sizing images , loading saving

images, coordinate systems, scale properties and methods. The drawing methods : drawing text ,drawing , drawing boxes filling, Drawing curves , manipulating pixels , specifying colors, using timer controls, Multiple Document Interface (MDI) , MDI- built -in capabilities , Parents -child menus , Objects and instances , Loading and unloading of child forms, New and open commands .

UNIT- V

Windows management , Graphics device interface , Accessing the win 32 API from VB.NET , Dynamic -link - libraries (DLL) ,Declaring a DLL procedure , calling a DLL Procedure ,Special considerations when calling DALL with special data types, the bitmaps and graphics API functions system API functions

Programming and interfacing with Office 97 -

Programmer with objects, the New VB for applications (VBA) Editor . Automating office applications spell- checking documents , working with excel objects .

Text & Reference Books:-

- Applications Development using visual Basic . NET by Robert J. Oberg peter Thorsteinson , Dana L. Wyatt
Other book will be recommend at the beginning of the semester .

CS4203 ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

Unit I

Basic Problem solving methods: Production systems-state space search, control strategies, Heuristic search, forward and backward reasoning, Hill climbing techniques, Breadth first search, Depth first search, Best search, staged search.

Unit II

Knowledge Representation: Predicate logic, Resolution question Answering, Nonmonotonic Reasoning, statistical and probabilistic reasoning, Semantic Nets, Conceptual Dependency, frames and scripts.

Unit III

AI languages: Important characteristics of AI languages - PROLOG, LISP.

Unit IV

Introduction to Expert Systems: Structure of an Expert system interaction with an expert, Design of an Expert system.

Unit V

Neural Network: Basic Structure of a neuron, Perception Feed forward, Back propagation, Hopfield Network.

Reference Books:

- Rich E and Knight K - Artificial Intelligence, TMH New Delhi.
- Nelsson N.J. - Principles of Artificial Intelligence, Springer Verlag, Berlin.
- Barr A, Fergenbaub E.A. and Cohen PR. Artificial Intelligence, Addisonwesley, Reading (Mars) 1989.
- Waterman D.A. A guide to Expertsystem, Adision - Wesley, Reading (Mars) 1986.
- Artificial Intelligence Hand book, Vol. 1-2, ISA, Research Triangle Park 1989.
- Kos Ko B Neural Networks and Fuzzy system -pH.
- Neural Network Design, Martin Hagar, Vikas-Thomson Learning, Vikas Pub. House Pvt. Ltd., Delhi.
- Expert Systems: Principals & Programming, Joseph Giarrantons & Rilay, Vikas – Thomson Learning, Vikas Pub. House Pvt. Ltd., Delhi.

CS4206 ENTERPRISE RESOURCE MANAGEMENT (ERP)

UNIT I

Function of Business Organizations : Personnel management, Financial management, marketing management, Sales order Processing , Manufacturing managements , Human Resource Management etc , data and information , Operation of functional areas. Integrated view of ERP

UNIT II

Technologies of ERP : knowledge based system , Decision support system , Executive information system , Electronic commerce, , Databases system , Business Engineering , Business process Engineering , Networking , 3 tier and 2 tier architecture.

UNIT III

Management information system : MIS ,data & information . levels of Management , information requirement , objectives of information channels, information strategies

UNIT IV

Information and planning : Resource management benefit of management planning process objective and its characteristic , policy and procedures ,forecasting and its varies aspects . Scheduling , MRP , MRP-II

UNIT V

ERP implement issues : software development life cycle , pre Evaluation schemes , post implement issues case studies .

Reference Book :

- Management Information Systems : Louden & Louden
- ERP by Garg and Ravichandran
- Information System and MIS : J Kanter
- Management Information System : Jawardekar

CS4207- SOFTWARE TESTING AND QUALITY MANAGEMENT

UNIT I

Software Quality

Ethical Basis for software Quality , Total quality Management Principles, Software Processes and Methodologies , Quality Standards , Practices & conventions

UNIT II

Software management

Reviews and Audits . Enterprise Resource Planning Software , Measurement Theory , Software Quality Metrics, designing Software Measurement Programs , Organizational Learning.

UNIT III

Improving Quality with methodologies

Structured information Engineering , Object-Oriented Software , Reverse Engineering , Measuring Customer Satisfaction Defect Prevention , Reliability Models , Reliability Growth Models .

UNIT IV

Software Quality Engineering

Defining Quality Requirements Management , Complexity Metrics and Models, Management issues for software Quality , Project Tracking and Oversight , Use of CASE tool Technology , Role of Groupware , data Quality Control.

UNIT V

Project Configuration management

Configuration Management Concepts, Configuration Management Process, Document Control, Configuration Management plan of the WAR Project.

Software Testing

Unit , Integration & System testing , Benchmarking and Certification .

Recommended Books:

- Stephan Kan, Metrics and Models in Software quality, Addison Wesley.
- Mark Paulik, The capability Maturity Model-guidelines for Improving the software Process, Addison Wesley.
- Michael, Deutsch, Willis, Ronald r-Software Quality Engineering- A Total Technical and Management approach, Prentice Hall.
- Ginac, Frank P, Customer Oriented Software Quality Insurance, Prentice Hall.

- Wilson, Rodney C, Software RX secrets of Engineering Quality Software, Prentice Hall.
- Pressman, Software Engineering-A practitioner's approach
- Pankaj Jalote, CMM Project

CS4208 : CYBER CRIME AND LAWS

Unit I

Introduction to Cyber Law Evolution of Computer Technology, emergence of Cyber space. Cyber Jurisprudence, Jurisprudence and law, Doctrinal approach, Consensual approach, Real Approach, Cyber Ethics, Cyber Jurisdiction, Hierarchy of courts, Civil and criminal jurisdictions, Cyberspace-Web space, Web hosting and web Development agreement, Legal and Technological Significance of domain Names, Internet as a tool for global access.

Unit II

Information technology Act Overview of IT Act, 2000, Amendments and Limitations of IT Act, Digital Signatures, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature, Certifying Authorities, Cyber Crime and Offences, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication.

Unit III

Cyber law and related Legislation Patent Law, Trademark Law, Copyright, Software – Copyright or Patented, Domain Names and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act, Law Relating To Employees And Internet, Alternative Dispute Resolution , Online Dispute Resolution (ODR).

Unit IV

Electronic Business and legal issues: Evolution and development in E-commerce, paper vs paperless contracts E-Commerce models- B2B, B2C, E security.

Unit V

Application area : business, taxation, electronic payments, supply chain, EDI, E-markets, Emerging Trends

Text Book:

- 1 Cyber Laws: Intellectual property & E Commerce, Security- Kumar K, dominant Publisher
- 2 Information Security policy & implementation Issues, NIIT, PHI

REFERENCE BOOKS:

- Cyber CRIME notorious Aspects of the Humans & net Criminals activity in Cyber World Barna Y Dayal D P Dominant Publisher
- Cyber Crime Impact in the new millennium, Marine R.C. Auther press
- Spam Attack, Cyber Stalking & abuse, Barna Y, Dayal D P Dominant publisher
- Frauds & Financial criouses in Cyber space, Barna Y, Dayal D P , Dominant publisher
- Information Security , NIIT: PHI

S4209 PATTERN RECOGNITION

UNIT I

Introduction; Probability- Probability of events, Random Variables, Joint distributions and density, Moments of Random Variables, estimation, Minimum Risk Estimator.; Matrix Algebra – Eigen values & Eigen Vectors.

UNIT II

Statistical Decision Making- Bayes' Theorem, Multiple features, Conditional independent features, Decision boundaries, Unequal cost of errors, Leaving- one-out technique, Characteristics curves Nonparametric Decision making- Histograms, Kernel & window estimation, Nearest neighbor classification technique, Adaptive Decision boundaries & Discriminate Function, choosing a decisionmaking Technique; Clustering.

UNIT III

Artificial Neural Networks- Introduction, Nets without hidden layers, Nets with hidden layers, The Back-Propagation Algorithm, Hopfield Nets, Classifying Sex from facial Images. Pattern recognition using SAS.

UNIT IV

Processing of Waveforms and Images- Introduction, Gray level scaling Transformation, Equalization, Interpolation, Edge detection, Line detection & Template Matching, The Statistical Significance of Image Features.

UNIT V

Image Analysis- Scene segmentation & labeling, Counting Objects, Perimeter measurement, Representing boundaries, Projection, Hough transformation, shapes of regions, texture, color, system design, the classification of white blood cell, Image Sequence

Text Books:

- Pattern Recognition And Image Analysis By Earl Gose ; Prentice- Hall Of India
- M. I. Schlesinger, V. Hlavác, *Ten Lectures On Statistical And Structural Pattern Recognition*, Kluwer Academic Publishers, 2002.

References:

- S. Theodoridis, K. Koutroumbas, *Pattern recognition*, Academic Press, 1999
- J. Sklanski and G.N. Wassel, *Pattern Classifiers and Trainable Machines*, Springer, New York
- Foryth, *Computer Vision*, PHI

CS4210 NATURAL LANGUAGE PROCESSING

Unit-I

Introduction to Natural Language Understanding: The study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English syntax.

Unit-II

Introduction to semantics and knowledge representation, Some applications like machine translation, database interface.

Unit-III

Grammars and Parsing: Grammars and sentence Structure, Top-Down and Bottom-Up Parsers, Transition Network Grammars, Top-Down Chart Parsing. Feature Systems and Augmented Grammars: Basic Feature system for English, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks.

Unit-IV

Grammars for Natural Language: Auxiliary Verbs and Verb Phrases, Movement Phenomenon in Language, Handling questions in Context-Free Grammars. Human preferences in Parsing, Encoding uncertainty, Deterministic Parser.

Unit-V

Ambiguity Resolution: Statistical Methods, Probabilistic Language Processing, Estimating Probabilities, Part-of-Speech tagging, Obtaining Lexical Probabilities, Probabilistic Context-Free Grammars, Best First Parsing. Semantics and Logical Form, Word senses and Ambiguity, Encoding Ambiguity in Logical Form.

Reference Books:

- Akshar Bharti, Vineet Chaitanya and Rajeev Sangal, *NLP: A Paninian Perspective*, Prentice Hall, New Delhi
- James Allen, *Natural Language Understanding*, 2/e, Pearson Education, 2003
- D. Jurafsky, J. H. Martin, *Speech and Language Processing*, Pearson Education, 2002
- L.M. Ivasca, S. C. Shapiro, *Natural Language Processing and Language Representation*
- T. Winograd, *Language as a Cognitive Process*, Addison-Wesley

CS4211 INTERNETWORKING TCP/IP

UNIT -I

INTRODUCTION

Introduction to internetworking, Overview of OSI Model TCP/IP protocol suite, Basics of switching technologies and switches, Comparisons of different models, Gateways.

UNIT - II

INTERNET PROTOCOL

Purpose of Internet Protocol, Internet datagram, Options, Checksum, ARP and RARP, Routing Methods: Routing Table and Routing module, ICMP, IGMP.

IP Addresses: Introduction, Address Classification, A sample internet with classful addressing, Subnetting, Supernetting, Classless addressing, Security at the IP Layer, IPSec, IPv4 and IPv6 packet formats.

UNIT -III

ROUTING PROTOCOLS: UNICAST ROUTING PROTOCOLS

Interior and Exterior routing, RIP, OSPF, BGP, **Multicasting:** Introduction, Multicast Routing, Multicast Routing Protocols, Multicast Trees, DVMRP, MOSPF, CBT, PIM, MBONE.

UNIT -IV

TRANSPORT CONTROL PROTOCOL: TCP

TCP operation, Segment, Sliding window, Silly window, Options, TCP state machine, Karn's Algorithm, Congestion control- Leaky bucket and Token bucket algorithms.

UDP: User Datagram, UDP operations, Checksum calculation.

UNIT-V

TCP/IP OVER ATM NETWORKS

ISDN and B-ISDN, ATM reference model, ATM Switch, Interconnection Network, Virtual circuit in ATM, Paths, Circuits and identifiers, ATM cell transport and adaptation layers, packet type and multiplexing, IP Address binding in an ATM Network, Logical Subnet Concept and Connection Management.

Text Book:

- Internetworking with TCP/IP by Comer (Vol. 1)(PHI Pub.)
- TCP/IP Protocol suite by Behrouz A. Forouzan.(TMH Pub.)

Reference Book:

- Computer Networking by James F. Kurose, Keith W. Ross (Pearson Education)
- TCP/IP Illustrated By Wright and Stevens (Vol.2) (Pearson Education)
- An Introduction to Computer Networks by Kenneth C. Mansfield Jr. James L. Antonakes (PHI)

