

B.Tech. FOUR YEAR DEGREE COURSE

CSE(CYBER SECURITY)

R22 Regulations

(Applicable for the batches admitted from 2022-2023)



SHRI VISHNU ENGINEERING COLLEGE FOR WOMEN (AUTONOMOUS)

Approved by AICTE & Affiliated to JNTUK, Kakinada

Accredited with 'A+' Grade by NAAC & NBA

Vishnupur, Bhimavaram, West Godavari Dist., Andhra Pradesh, India, PIN - 534202

Email: info@svecw.edu.in, Website: www.svecw.edu.in

**SHRI VISHNU ENGINEERING COLLEGE FOR WOMEN :: BHIMAVARAM
(Autonomous)**



Vision

Transform the society through excellence in Education, Community empowerment and sustained Environmental protection.

Mission

- To achieve Academic excellence through innovative learning practices
- To instill self confidence among rural students by supplementing with co-curricular and extra-curricular activities
- To inculcate discipline and values among students
- To establish centers for Institute Industry partnership
- To extend financial assistance for the economically weaker sections
- To create self-employment opportunities and skill up gradation
- To support environment friendly Green Practices
- Creating innovation hubs

**SHRI VISHNU ENGINEERING COLLEGE FOR WOMEN :: BHIMAVARAM
(Autonomous)**

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Vision

To become a leader in providing academic excellence with career development skills and research abilities in the area of Computer Science & Engineering.

Mission

- To achieve Academic excellence through innovative learning practices.
- To prepare students to adapt to the challenges of an ever changing market needs.
- To build necessary skills required for employability through career development training.
- To create interest among students to pursue higher studies.
- To enrich students with good character, and high integrity to serve the society.
- To promote research and development in the frontier areas of Computer Science & Engineering.
- To inculcate the spirit of moral values and discipline among students.

ACADEMIC REGULATIONS

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THE DEGREE OF BACHELOR OF TECHNOLOGY – REGULAR/HONORS/MINOR (With effect from 2022-2023)

RB 0.0	TITLE AND DURATION OF THE PROGRAM
	The program shall be called the degree course in Bachelor of Technology, abbreviated as B.Tech.
	The program shall be of four academic years duration divided into eight semesters, each semester having duration of minimum 16 weeks.
	The calendar of events in respect of the program shall be fixed by the Institute from time to time.
	The external examination in all the subjects shall be conducted at the end of each semester for all the eight semesters.
	Students joining the B.Tech. programme shall have to complete the programme in a stipulated time frame of 8 years from the date of joining and students joining the B.Tech. Programme in the third semester directly through Lateral Entry Scheme (LES) shall have to complete the programme in a stipulated time frame of 6 years from the date of joining otherwise; they shall forfeit their seat in B.Tech. Programme and their admission shall stand cancelled. One year extension shall be given to the students who availed the GAP year facility.
RB 1.0	ELIGIBILITY FOR ADMISSION
RB 1.1	Admissions are done as per the norms prescribed by Government. The Government orders issued from time to time in this regard shall prevail.
RB 1.2	The Candidate should have passed the qualifying examination, Intermediate or equivalent on the date of admission.
RB 1.3	Seats in each programme in the college are classified into CATEGORY-A (70% of intake) and CATEGORY – B (30% of intake) besides lateral entry.
RB 1.4	Category 'A' Seats shall be filled by the Convener, EAMCET Admissions. Category 'B' Seats shall be filled by the College as per the guidelines of Andhra Pradesh State Council of Higher Education. 'Lateral Entry' candidates (10% of the intake) shall be admitted into the Third semester directly based on the rank secured by the candidate in Engineering Common Entrance Test (ECET) in accordance with the instructions received from the Convener, ECET and Government of Andhra Pradesh.
RB 2.0	AWARD OF B.TECH. DEGREE
RB 2.1	A Student shall be declared eligible for the award of the B.Tech. Degree, if she pursues a course of study in not less than four and not more than eight academic years (plus maximum of 1 year of GAP year). A Student admitted into III semester shall be declared eligible for the award of the B.Tech. degree, if she pursues a course of study in not less than three and not more than six academic years (plus maximum of 1 year of GAP year).
RB 2.2	Each discipline of the B.Tech. programme is designed to have a total of 160 credits and the student shall have to complete the courses and earn all credits as per the requirements for award of the degree. Students joining the B.Tech. programme in the third semester directly through Lateral Entry Scheme (LES) shall have to complete the courses, excluding first year courses and earn 121 credits as per the requirements for award of the degree.

RB 2.3	The B.Tech. Degree shall be conferred on a candidate who has satisfied the following requirements. A Regular student (four-year programme) should register herself for 160 credits. To become eligible for the award of B.Tech. Degree, the student must obtain all 160 credits. A Lateral Entry student should register herself for 121 credits and should obtain all the credits. However, it is mandatory for the students to complete the noncredit courses
RB 2.4	A student shall be eligible for the award of B.Tech degree with Honors or Minor if she earns 20 credits in addition to the 160 credits. A student shall be permitted to register either for Honors or for Minor and not for both simultaneously.
RB 3.0	MINIMUM INSTRUCTION DAYS
RB 3.1	The minimum instruction days for each semester shall be 90 working days.
RB 4.0	COURSES OF STUDY
RB 4.1	Branch Code - Branch Name 01 - Civil Engineering 02 - Electrical & Electronics Engineering 03 - Mechanical Engineering 04 - Electronics & Communication Engineering 05 - Computer Science & Engineering 12 - Information Technology 42 - CSE(Artificial Intelligence & Machine Learning) 45 - CSE(Artificial Intelligence & Data Science) 46 - CSE(Cyber Security)
RB 4.2	Groups of Courses: The courses in the B.Tech. Programme are grouped as Basic Science, Humanities and Social Science, Engineering Science, Professional Core, Professional Elective or Job Oriented Elective, Open Elective, Skill Oriented Course and Mandatory Audit Course. Basic Science, Humanities and Social Science, Engineering Science and Professional Core Courses: These are courses which are to be compulsorily studied by a student and it is the core requirement to complete the programme in a said branch. Professional Elective or Job Oriented Elective Course: A student can choose a course (subject) from a pool of courses of branch concerned, which add proficiency to the students. Open Elective Course: These are the courses offered by other branches. These courses are designed to lead to knowledge enhancement in multi-disciplinary domains. Skill Oriented Course: These courses will be designed by keeping the interest of the students and requirement of specific industry. Mandatory Audit Course: These courses allow a student to attend classes without the benefit of a grade for a course. An undergraduate student who audits a course does so, for the purpose of self-enrichment and academic exploration.
RB 5.0	DISTRIBUTION AND WEIGHTAGE OF MARKS
RB 5.1	The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 50 marks for practical subject. The main project work shall be evaluated for 200 marks, Summer Internship/Skill oriented courses/Seminar shall be evaluated for 50 marks.
RB 5.2	For theory subjects, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End Examinations.
RB 5.3	Internal evaluation 30 marks shall be awarded as follows: 25 marks for MID Exam (15 marks for Descriptive and 10 marks for Quiz) and 5 marks for Course Activity like Technical quiz, Capstone project, Case studies, Short talk, etc. The Descriptive examination is for 90 minutes duration conducted for 30 marks. Each descriptive examination question paper consists of 3 questions (either – or type) from two and half

	units. Three questions are to be answered, one from each unit. The descriptive examination conducted for 30 Marks is to be brought down to total marks of 15. The quiz examination is for 20 minutes duration (conducted with 20 multiple choice questions with a weightage of ½ Mark each). After every two and half Units, one Course activity shall be conducted. Course Activity shall be evaluated by the Departmental Committee consisting of Head of the Department and Course Coordinator. For theory subjects, during the semester there shall be 2 MID Examinations. As the syllabus is framed for 5 units, the First MID examination (both descriptive and quiz) is conducted from first two and half units and Second MID examination(both descriptive and quiz) is conducted from last two and half units of each subject. Internal marks can be calculated with 80% weightage for better of the two mids and 20% Weightage for other mid exam. Example: Mid-1 marks = Marks secured in(Descriptive examination-1 + Quiz examination-1 + Course Activity-1) Mid-2 marks = Marks secured in(Descriptive examination-2 + Quiz examination-2 + Course Activity-2) Final Internal Marks =Best of (Mid-1/Mid-2) marks x 0.8 + Least of (Mid-1/Mid-2) marks x 0.2 If a student is absent for any one MID examination, she can appear for a Grand Test after MID-2. The Grand Test will be conducted with questions covering the entire syllabus. The marks in the grand test is reduced to 25 marks and to be considered for respective MID.
RB 5.4	The end semester examination is conducted for 70 marks by covering the topics of all units. Part-A contains mandatory short answer questions, 5 questions for total 10 marks covering all the units. Part-B contains 10 questions (two from each unit with either – or choice) of 12 marks each. 1 question has to be answered from each unit (5 x 12 = 60 marks).
RB 5.5	For practical subjects, there shall be continuous evaluation during the semester for 15 internal marks. Out of the 15 marks for internal, day-to-day work 5 marks, Record 5 marks and 5 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted for 35 marks by the internal examiner and external examiner.
RB 5.6	For the subject having design and/or drawing (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 30 marks for internal evaluation (15 marks for day-to-day work, and 15 marks for MID tests) and 70 marks for end examination. Mid marks can be calculated with 80% weightage for better of the two mids and 20% Weightage for other mid exam.
RB 5.7	For the seminar, the student shall collect the information on a specialized topic and prepare a technical report showing her understanding over the topic, and submit to the department, which shall be evaluated by the Departmental Committee consisting of Head of the Department, seminar supervisor and senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.
RB 5.8	Out of a total of 200 marks for the main project work, 60 marks shall be for Internal Evaluation and 140 marks for the End Semester Examination. The End Semester Examination (Viva – Voce) shall be conducted by the Committee. The Committee consists of an external examiner, Head of the Department and Supervisor of the Project. The evaluation of project work shall be conducted at the end of the Eighth semester. The Internal Evaluation marks shall be on the basis of Two seminars given by each student on the topic of her project and evaluated by an Internal Committee, consisting of Head of the department, supervisor of the project and a senior faculty member.
RB 5.9	For Internship(2 Months Mandatory during summer vacation), 50 marks shall be for Internal Evaluation. A supervisor/mentor/advisor has to be allotted to guide the students for taking

	up the summer internship. The supervisor shall monitor the attendance of the students while taking up the internship. The student shall submit the report to the department after completion of her Internship. A certificate from industry/skill development center shall be included in the report. Viva-Voce shall be conducted by the Departmental Committee consisting of Head of the Department, supervisor of the internship and a senior faculty member of the department. The Viva-Voce may be conducted along with respective semester lab external examinations. The report and the Viva-Voce shall carry 40% and 60% weightages respectively. There shall be no external examination for Internships.	
RB 5.10	Laboratory marks and the internal marks awarded by the department are not final. The marks are subjected to be scrutinized and scaled by the Institute wherever it felt desirable. The internal and laboratory marks awarded by the department shall be referred to a Committee if required. The Committee shall arrive at a scaling factor and the marks shall be scaled as per the scaling factor. The recommendations of the Committee are final and binding. The laboratory records and internal test papers shall be preserved for two years after the final examinations of that semester in the respective departments as per the norms of the Institute and shall be produced to the Committees as and when they ask for.	
RB 6.0	PROGRAMME STRUCTURE	
	Basic Science Courses	18 to 21 credits
	Engineering Science Courses	20 to 24 credits
	Humanities and Social Science including Management Courses	10 to 11 credits
	Professional Core Courses	50 to 54 credits
	Professional Elective Courses	13 to 16 credits
	Project/ Internships / Certification Courses/ Seminar	15 to 18 credits
	Open Elective or Job Oriented Elective Courses	10 to 14 credits
	Skill Oriented Courses	10 Credits
	Mandatory Audit Courses – courses without credits	-
RB 7.0	SCHEME OF INSTRUCTION FOR I, II, III AND IV YEARS	
RB 7.1	The Schemes of Instruction and syllabi of all B.Tech. programmes are given separately, which are approved by the BOS concerned and the Academic Council.	
RB 8.0	CONTACT HOURS AND CREDITS	
RB 8.1	One hour of Lecture/Tutorial is equivalent to 1 credit and one hour of practical work/field work is equivalent to 0.5 credit.	
RB 8.2	THEORY / TUTORIAL CLASSES Each course is prescribed with fixed number of lecture periods per week. During lecture periods, the course instructor shall deal with the concepts of the course. For certain courses, tutorial periods are prescribed to give exercises to the students and to closely monitor their learning abilities and achievements.	
RB 8.3	LABORATORY / DRAWING COURSES A minimum prescribed number of experiments/drawings/jobs/programmes have to be performed by students, who shall complete these in all aspects and get each experiment evaluated by teacher concerned and certified by the Head of the Department concerned at the end of the semester.	
RB 9.0	MEDIUM OF INSTRUCTION	
RB 9.1	The Medium of Instruction and examination is in English.	
RB 10	ATTENDANCE REQUIREMENTS	
RB 10.1	In each semester the candidate has to put in a minimum attendance of 75% with a provision of condonation of 10% of the attendance by the Principal on the specific recommendation of the HOD, showing some reasonable cause such as medical grounds, participation in	

	University level sports, cultural activities, seminars, workshops, paper presentation etc. A student is eligible to write the University examinations if she acquires a minimum of 40% in each subject and 75% of attendance in aggregate of all the subjects.
RB 10.2	Shortage of attendance below 65% in aggregate shall not be condoned.
RB 10.3	A stipulated fee of Rs. 500/- in the concerned semester shall be payable towards condonation of shortage of attendance. Students availing condonation on medical ground shall produce a medical certificate issued by the competitive authority.
RB 10.4	Students whose shortage of attendance is not condoned will be detained and the student has to re-register for that semester when it is offered by the department.
RB 10.5	Rules for calculation of attendance for the re-admitted candidates who were detained for want of attendance or who had break – in study for various reasons: a) No. of classes conducted shall be counted from the day one of the semester concerned, irrespective of the date of payment of tuition fee. b) They should submit a written request to the Principal, along with a challan paid towards tuition and other fee, for re-admission before the commencement of class-work. c) Student should come to know about the date of commencement of class-work of the semester into which she wishes to get re-admission. The information regarding date of commencement of class-work for each semester is available in the college notice boards/ website.
RB 11.0	CONDITIONS FOR PASS AND AWARD OF CREDITS FOR A COURSE
RB 11.1	A candidate shall be declared to have passed in individual theory/drawing course if she secures a minimum of 40% aggregate marks (40 marks out of 100, Internal and semester end examination marks put together), subject to a minimum of 35% marks (24 marks out of 70) in semester end examination. For successful completion of mandatory audit course the student must get a satisfactory(pass) grade from the department offering the course. If fails, she has to reappear whenever the course is offered.
RB 11.2	A candidate shall be declared to have passed in individual lab/project/seminar/ Internship/ Skill oriented course if she secures a minimum of 40% aggregate marks (Internal and semester end examination marks put together), subject to minimum of 35% marks in semester end examination.
RB 11.3	The student must pass the failed course by appearing the supplementary examination as per the requirement for the award of degree.
RB 11.4	On passing a course of a programme, the student shall earn assigned credits in that course.
RB 12.0	TRANSITORY REGULATIONS
RB 12.1	a) Discontinued or detained candidates are eligible for re-admission as and when next offered. b) The re-admitted candidate will be governed by the rules & regulations under which the candidate has been admitted. c) In case of transferred students from other Universities/Institutions, credits shall be transferred to SVECW as per the academic regulations and course structure of SVECW. d) The students seeking transfer to SVECW from various other Universities / Institutions have to obtain the credits of any equivalent subjects as prescribed by SVECW. In addition, the transferred candidates have to pass the failed subjects at the earlier Institute with already obtained internal/sessional marks to be conducted by SVECW.
RB 12.2	A student shall be eligible for promotion to next semester of B.Tech. programme, if she satisfies the conditions as stipulated in Regulation RB10.
RB 12.3	Further, a student shall be eligible for promotion to V / VII Semesters of B.Tech. programme, if she acquires the minimum number of credits as given below: A student shall be promoted from Semester - IV to Semester - V or from Semester - VI to

	Semester - VII only if she fulfills the academic requirements of 40% of the credits from the exams for which results are declared. For Lateral Entry Student: A student shall be promoted from Semester - VI to Semester - VII only if she fulfills the academic requirements of 40% credits from the exams for which results are declared.
RB 13.0	COURSE CODE AND COURSE NUMBERING SCHEME: The subject codes shall be given by the Department teaching the subject. Each subject code contains 10 characters. The 10 Characters for each subject shall be coded as per the following guidelines.
RB 13.1	The diagram illustrates the structure of a 10-character subject code. It is divided into six segments, each with a specific meaning and possible values: UG: UG for B.Tech. Subjects, PG for M.Tech/MBA Subjects IT: Code of the Dept teaching the subject - IT – IT - CS – CSE, CSE(CS) - EC – ECE - EE – EEE - ME – Mech - CE – Civil - MB – MBA - BS – Basic Science - AI – CSE(AI&DS), CSE(AI&ML) 1: Semester Number 1/2/3/.../8 0 for Open Elective/Honors/Minor T: Type of subject - T – Theory(Core/Elective) - P – Practical - S – Seminar - J – Project - A – Mandatory Audit course - O – MOOC - I – Internship/certification course/Yoga/Foreign languages/EPICS - C – Creative Arts - K – Skill Oriented Course - H – Honors - M – Minor 01: Serial Number of the course taught by the department in the semester 01/02/03/... 22: Regulation Year
RB 13.2	While giving the subject codes the Departments can follow the below steps. - Collect the requirements from various Departments.(subjects which they have to teach for other Departments) - Prepare a list of all the subjects the Departments have to teach in that semester (for their Department as well as other Departments based on the requirements, they have collected in point i.) - Give subject codes to all these subjects following the guidelines given. - Communicate these subject codes(identified in point i) to various Departments. - Use the subject codes identified in point iii to the subjects in their course structure.
RB 14.0	CONSOLIDATED GRADE CARD
RB 14.1	A consolidated grade card containing credits and grades obtained by the candidate shall be issued after completion of the four years B.Tech. Programme.
RB 15.0	METHOD OF AWARDING LETTER GRADES AND GRADE POINTS FOR A COURSE

RB 15.1	A letter grade and grade point shall be awarded to the student in each course based on her performance as per the grading system given below.			
	Percentage of Marks Range	Level	Letter Grade	Grade Point
	≥ 90	Outstanding	A+	10
	80-89	Excellent	A	9
	70-79	Very Good	B	8
	60-69	Good	C	7
	50-59	Fair	D	6
	40-49	Satisfactory	E	5
	< 40	Fail	F	0
	-	Absent	AB	0
Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters A+, A, B, C, D, E and F. Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.				
RB 15.2	Calculation of Semester Grade Points Average(SGPA) for semester: The Performance of each student at the end of each semester is indicated in terms of SGPA. The SGPA is calculated as below: The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e. $SGPA = \frac{\sum (C_i \times G_i)}{\sum C_i}$ where, C_i is the number of credits of the i^{th} subject and G_i is the grade point scored by the student in the i^{th} course			
RB 15.3	Calculation of Cumulative Grade Points Average (CGPA) : The CGPA is calculated as below: The Cumulative Grade Point Average (CGPA) will be computed in the same manner considering all the courses undergone by a student over all the semesters of a program, i.e. $CGPA = \frac{\sum (C_i \times S_i)}{\sum C_i}$ where ' S_i ' is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester. Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts. While computing the SGPA/CGPA, the subjects in which the student is awarded Zero grade points will also be included.			
RB 15.4	As per AICTE regulations, conversion of CGPA into equivalent percentage is as follows: Equivalent Percentage = (CGPA – 0.75) x 10			
RB 16.0	REVALUATION As per the notification issued by the Controller of Examination, the student can submit the application for revaluation, along with the fee receipt for revaluation of her answer script(s) of theory course(s), if she is not satisfied with the Grade obtained. The Controller of Examination shall arrange for revaluation of those answer script(s).			
RB 16.1	For Revaluation a new external examiner, other than the first examiner, shall re-evaluate the answer script(s). If there is any change in marks (below 15% of the maximum External marks) the highest of the two marks will be considered and if there is any change in marks (Equal or above 15% of the maximum External marks), the script will be evaluated by the third valuator. The marks of all the three valutors are compared and the average of two nearer marks will be awarded to the student.			
RB 17.0	SUPPLEMENTARY EXAMINATIONS Supplementary examinations shall be conducted twice in an academic year, along with regular semester end examinations.			

RB 18.0	READMISSION CRITERIA A candidate, who is detained in a semester due to lack of attendance/ credits, has to obtain written permission from the Principal for readmission in the same semester after duly fulfilling all the required norms stipulated by the college in addition to paying an administrative fee of Rs.1,000/-	
RB 19.0	BREAK IN STUDY Student, who discontinues her studies for whatsoever may be the reason, can get readmission into appropriate semester of B.Tech. programme after break-in study only with the prior permission of the Principal of the College provided, such candidate shall follow the transitory regulations applicable to such batch in which she joins. An administrative fee of Rs.1000/- per year of break in study in addition to the prescribed tuition fee and special fee has to be paid by the candidate to condone her break in study if this break in study is not covered under GAP year facility.	
RB 20.0	AWARD OF DIVISION	
RB 20.1	After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. degree, she shall be placed in one of the following:	
	CGPA secured from 160 credits (121 credits for Lateral Entry Students)	Class Awarded
	≥ 7.75	First Class with Distinction
	≥ 6.75 to < 7.75	First Class
	≥ 5.75 to < 6.75	Second Class
	≥ 5.0 to < 5.75	Pass Class
RB 21.0	BETTERMENT / IMPROVEMENT OF CUMULATIVE GRADE POINT AVERAGE	
RB 21.1	A candidate, after becoming eligible for the award of the Degree, may reappear for the external Examination in any of the theory courses as and when conducted, for the purpose of improving the CGPA. But this reappearance shall be within a period of two academic years after becoming eligible for the award of the Degree, subject to fulfillment of Regulation RB 2.0.	
RB 21.2	However, this facility shall not be availed by a candidate to reappear either for Internal Examination or for Semester End Examinations in Practical courses (including Project Viva-Voce) and also for Semester End Examinations evaluated internally for the purpose of improvement.	
RB 21.3	Modified Grade Card and New Consolidated Grade Card shall be issued after incorporating new Grades and Credits.	
RB 22.0	ADVANCED SUPPLEMENTARY EXAMINATIONS Candidate(s), who fails in Theory or Lab courses of 4th year second semester, can appear for advanced supplementary examinations conducted within one month after declaration of the revaluation results. However, those candidates who fail in this advanced supplementary examination of IV year second semester shall appear for subsequent examination along with regular candidates conducted at the end of the respective academic year.	
RB 23.0	MALPRACTICES The Principal/chief superintendent shall refer the cases of malpractices in internal assessment tests and Semester End Examinations to a Malpractice Enquiry Committee, constituted by him/her for the purpose. The Principal shall take necessary action, against the erring students based on the recommendations of the Committee as per JNTUK Malpractice regulations.	
RB 24.0	The physically challenged candidates who have availed additional examination time and a scribe during their Intermediate/EAMCET examinations shall be given similar concessions on production of relevant proof/documents.	

RB 25.0	The students who are suffering from contagious diseases are not allowed to appear either internal or Semester end examinations with other students. A separate room will be allotted for such type of students.
RB 26.0	The students who participate in coaching/tournaments held at State/National/International levels through University / Indian Olympic Association during Semester end external examination period shall be promoted to subsequent semesters till the entire course is completed as per the guidelines of University Grants Commission Letter No. F. 1-5/88 (SPE/PES), dated 18-08-1994.
RB 27.0	The Principal shall deal with any academic problem, which is not covered under these rules and regulations, in consultation with the Heads of the Departments in an appropriate manner, and subsequently such actions shall be placed before the Academic Council for ratification. Any emergency modification of Regulation, approved in the Heads of the Departments meetings, shall be reported to the Academic Council for ratification.
RB 28.0	The Academic Council, from time to time, may revise or amend or change the Regulations, schemes of examination and/or syllabi.
RB 29.0	GAP YEAR: Gap Year – concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship can take a break of one year at any time after I year/II year/III year to pursue entrepreneurship full time. This period shall be counted for the maximum time for graduation. An evaluation committee at College level shall be constituted to evaluate the proposal submitted by the student and the committee shall decide on permitting the student for availing the Gap Year.
RB 30.0	As per the demand of the industry, a specific elective can be offered in the department with the permission of the Principal and that can be ratified in the college academic committee. Minimum 20% of intake of students is compulsory for offering regular electives.
RB 31.0	All undergraduate students shall register for NCC/NSS activities and Community Service Project as per the Government and University norms. A student shall be required to participate in an activity for two hours in a week during second and third semesters. Grade shall be awarded as Satisfactory or Unsatisfactory in the mark sheet on the basis of participation, attendance, performance and behavior. If a student gets an unsatisfactory Grade, she shall repeat the above activity in the subsequent years, in order to complete the degree requirements.
RB 32.0	Environmental Science, Indian Constitution, etc are offered as mandatory courses for all branches. A student has to secure 40% of the marks allotted in the internal evaluation(conducted for 50 marks) for passing the course. No marks or letter grade shall be printed in the transcripts for all mandatory non-credit courses, but only Completed (Y)/Not-completed (N) will be specified. The students shall maintain the attendance similar to credit courses.
RB 33.0	All Open Electives are offered to students of all branches in general. However, a student shall choose an Open Elective from the list in such a manner that she has not studied the same course in any form during the Programme.
RB 34.0	A student shall be permitted to pursue upto a maximum of two elective courses under MOOCs during the Programme. Each of the courses must be of minimum 12 weeks in duration. Attendance will not be monitored for MOOC courses. Student has to pursue and acquire a certificate for a MOOC course only from the organizations/agencies(like SWAYAM/NPTEL) approved by the BOS in order to earn the 3 credits. The Head of the department shall notify the list of such courses at the beginning of the semester. The Head of the Department shall appoint one mentor for each of the MOOC subjects offered. The student needs to register the course in the SWAYAM/NPTEL/etc portal. During

	the course, the mentor monitors the student's assignment submissions given by SWAYAM/NPTEL/etc. The student needs to submit all the assignments given and needs to take final exam at the proctor center. The student needs to earn a certificate by passing the exam. The student shall be awarded the credits given in curriculum only by submission of the certificate. In case, if student does not pass subjects registered through SWAYAM/NPTEL/etc, the same or alternative equivalent subject may be registered again through SWAYAM/NPTEL/etc in the next semester with the recommendation of HOD.
RB 35.0	Students shall undergo mandatory summer internships for a minimum of six weeks duration at the end of second and third year of the Programme. In the final semester, the student should mandatorily register and undergo internship and in parallel she should work on a project with well-defined objectives. Internship shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Hydel and thermal power projects and also in software MNCs in the area of concerned specialization of the UG programme. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship.
RB 36.0	There shall be 05 skill-oriented courses offered during III to VII semesters. Among the five skill courses, four courses shall focus on the basic and advanced skills related to the domain courses and the remaining one shall be a soft skills course. Skill oriented courses may be registered at the college or at any accredited external agency. A student shall submit a record/report on the skills learned. If the student completes skill oriented course at an external agency, a certificate from the agency shall be included in the report. The course will be evaluated at the end of the semester for 50 marks (Record/Report: 15 marks and Viva-Voce: 35 marks) along with laboratory end examinations. Viva-Voce shall be conducted by the Departmental Committee consisting of Head of the Department and senior faculty member. There shall be no external examination for Skill oriented courses.
RB 37.0	Undergraduate Degree with Honors/Minor shall be issued by the University to the students who fulfill all the academic eligibility requirements for the B.Tech program and Honors/Minor program. The objective is to provide additional learning opportunities to academically motivated students.
RB 38.0	Curricular Framework for Skill Oriented Courses
RB 38.1	For skill oriented/skill advanced course, one theory and 2 practical hours or two theory hours may be allotted as per the decision of concerned BOS.
RB 38.2	Out of the five skill courses two shall be skill-oriented courses from the same domain and shall be completed in second year. Of the remaining 3 skill courses, one shall be necessarily be a soft skill course and the remaining 2 shall be skill-advanced courses either from the same domain or Job oriented skill courses, which can be of inter disciplinary nature.
RB 38.3	A pool of interdisciplinary job-oriented skill courses shall be designed by a common Board of studies by the participating departments/disciplines and the syllabus along with the pre requisites shall be prepared for each of the laboratory infrastructure requirements. The list of such courses shall be included in the curriculum structure of each branch of Engineering, so as to enable the student to choose from the list.
RB 38.4	The student shall be given an option to choose either the skill courses being offered by the college or to choose a certificate course being offered by industries/Professional bodies/APSSDC or any other accredited bodies as approved by the concerned BoS.
RB 38.5	The Board of studies of the concerned discipline of Engineering shall review the skill advanced courses being offered by eligible external agencies and prepare a fresh list every year incorporating latest courses based on industrial demand.
RB 38.6	If a student chooses to take a Certificate Course offered by industries/Professional

	bodies/APSSDC or any other accredited bodies, in lieu of the skill advanced course offered by the Department, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency/professional bodies as approved by the Board of studies.
RB 38.7	If a student prefers to take a certificate course offered by external agency, the department shall mark attendance of the student for the remaining courses in that semester excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate as approved by the concerned Board of Studies, the student is deemed to have fulfilled the attendance requirement of the course and acquire the credits assigned to the course.
RB 38.8	A committee shall be formed at the level of the college to evaluate the grades/marks given for a course by external agencies and convert to the equivalent marks/grades. The recommended conversions and appropriate grades/marks are to be approved by the College/Academic Council.
RB 39.0	Curricular Framework for Honors Programme
RB 39.1	Students of a Department/Discipline are eligible to opt for Honors Programme offered by the same Department/Discipline. The department offering Honors shall have at least one M. Tech in concerned stream. Institutions having at least two NBA accredited B.Tech/M.Tech programs can offer B.Tech(Honors). The Program should have valid NBA accreditation at the time of registration of the student for B.Tech (Honors).
RB 39.2	The students registered for Minor degree shall not be permitted to register for B. Tech (Honors). A student shall be permitted to register for Honors program at the beginning of 4th semester provided that the student must have acquired a minimum of 8.0 CGPA upto the end of 2nd semester without any backlogs. In case of the declaration of the 3rd semester results after the commencement of the 4th semester and if a student fails to score the required minimum of 8 CGPA, her registration for Honors Programme stands cancelled and she shall continue with the regular Programme. An SGPA or CGPA in excess of 8.0 has to be maintained in the subsequent semesters in major as well as Honors degree without any backlogs in order to keep the Honors degree registration active. Should both the SGPA and CGPA fall below 8.0 at any point after registering for the Honors; the Honors degree registration will cease to be active.
RB 39.3	Students can select the additional and advanced courses from their respective branch in which they are pursuing the degree and get an honors degree in the same. e.g. If a Mechanical Engineering student completes the selected advanced courses from same branch under this scheme, she will be awarded B.Tech. (Honors) in Mechanical Engineering. The department concerned will determine required courses for award of Honor degree. The subjects in the Honor degree would be a combination of core (theory and lab) and some electives.
RB 39.4	In addition to fulfilling all the requisites of a Regular B.Tech Programme, a student shall earn 20 additional credits to be eligible for the award of B. Tech (Honors) degree. This is in addition to the credits essential for obtaining the Regular B.Tech Degree (i.e. 160 credits).
RB 39.5	Of the 20 additional credits to be acquired, 16 credits shall be earned by undergoing four courses from specified courses list in the department, each carrying 4 credits. The remaining 4 credits must be acquired through two MOOCs(NPTEL/SWAYAM), which shall be domain specific, each with 2 credits and with a minimum duration of 8/12 weeks as recommended by the Board of studies. If a student fails to complete a course offered in online/offline, she will not be permitted to continue the Honors degree. Transfer of credits from a particular Honors to regular B. Tech and vice-versa shall not be permitted.

RB 39.6	It is the responsibility of the student to acquire/complete prerequisite before taking the respective course. The courses offered in each pool/track shall be domain specific courses and advanced courses. Students can complete Honors degree courses either in the college or online from platforms like NPTEL/SWAYAM etc. The online NPTEL/SWAYAM subjects selected by a student shall be approved by concerned BOS. The duration of courses shall be a minimum of 14 weeks.
RB 39.7	The concerned BOS shall decide on the minimum enrolments for offering Honors program by the department. If minimum enrolments criterion is not met then the students shall be permitted to register for the equivalent MOOC courses as approved by the concerned Head of the department in consultation with BOS. Total number of seats offered for Honors degree shall be a maximum of 35% of sanctioned intake of major degree programme.
RB 39.8	Each pool/track can have theory as well as laboratory courses. If a course comes with a lab component, that component has to be cleared separately. The concerned BOS shall explore the possibility of introducing virtual labs for such courses with lab component.
RB 39.9	MOOC courses must be of minimum 8 weeks in duration. Attendance will not be monitored for MOOC courses. Students have to acquire a certificate from the agencies approved by the BOS with grading or marks or pass/fail in order to earn 4 credits. If the MOOC course is a pass/fail course without any grades, the grade to be assigned will be as decided by the College Academic Council. . The online NPTEL/SWAYAM subjects selected by a student shall be approved by concerned BOS.
RB 39.10	The concerned BOS shall also consider courses listed under professional electives of the respective B. Tech programs for the requirements of B. Tech (Honors). However, a student shall be permitted to choose only those courses that she has not studied in any form during the Programme.
RB 39.11	If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into core or other electives; they will remain extra. These additional courses shall be mentioned in the transcript (but not in the degree certificate). In such cases, the student may choose between the actual grade or a “pass (P)” grade and also choose to omit the mention of the course as per the following: All the courses done under the dropped Honors will be shown in the transcript. None of the courses done under the dropped Honors will be shown in the transcript.
RB 39.12	Separate SGPA/CGPA shall be shown on semester and final transcripts of regular B. Tech and Honors. If a student failed in any registered course of the Honors, she shall not be eligible to continue the B.Tech Honors. However, the additional credits and grades thus far earned by the student shall be included in the grade card but shall not be considered to calculate the CGPA.
RB 39.13	Honors must be completed simultaneously with the regular degree program. A student cannot earn Honors after she has already earned bachelor’s degree. Honors degree shall not be awarded at any circumstances without completing the regular major B. Tech programme in which a student got admitted.
RB 39.14	Registration Procedure: The department offering the Honors will announce courses required before the start of the session. The interested students shall apply for the Honors degree to the HOD of the concerned department. In the event of any tie during the seat allotment for Honors, the concerned major degree department offering Honors shall conduct a test/interview on the prerequisite subjects of Honors and final decision shall be taken. The concerned department shall submit the final list of selected students to the Principal. Only selected students shall be permitted to register the courses for Honors degree. The selected students shall submit a joining letter to the Principal through the concerned HOD.

	The whole process of Honors should be completed within one week before the start of every session. The department offering Honors shall maintain the record of student pursuing the Honors degree. An advisor/mentor from parent department shall be assigned to a group of students to monitor the progress. Students shall not be permitted to register for Honors degree after completion of VI semester.
RB 39.15	Attendance Requirements: The overall attendance in each semester of regular B.Tech courses and Honors courses shall be computed separately. A student shall maintain an overall attendance of 75% in all registered courses of Honors to be eligible for attending semester end examinations. However, condonation for shortage of attendance between 65-75% may be given as per University norms. A student detained due to lack of attendance in regular B. Tech programme shall not be permitted to continue Honors programme.
RB 39.16	A student shall report the concerned Principal of the college, if he/she is not interested to pursue/continue the Honors degree programme. If the student wishes to withdraw/change the registration of subject/course, she shall inform the same to advisor/mentor, subject teacher, HOD of parent department and Principal within two weeks after registration of the course. Students shall be permitted to select a maximum of two subjects per semester from the list of subjects specified for Honors. If the Honors subjects are the same as regular or elective subjects studied as part of curriculum then students are not allowed to choose such Honors subjects. There is no fee for registration of subjects for Honors degree programme offered in offline.
RB 39.17	Examinations: (a) The examination for the Honors degree courses offered in offline shall be conducted along with regular B. Tech programme. (b) The examinations (internal and external) and evaluation procedure of Honors degree courses offered in offline is similar to regular B. Tech courses. (c) A separate transcript shall be issued for the Honors subjects passed in each semester. (d) There is no supplementary examination for the failed subjects in an Honors degree programme. (e) Students shall pay the examination fee for the Honors degree courses.
RB 40.0	Curricular Framework for Minor Programme:
RB 40.1	a) Students who are desirous of pursuing their special interest areas other than the chosen discipline of Engineering may opt for additional courses in Minor specialization groups offered by a department other than their parent department. For example, If Mechanical Engineering student selects subjects from Civil Engineering under this scheme, she will get Major degree in Mechanical Engineering with Minor degree in Civil Engineering. b) Student can also opt for Industry relevant tracks of any branch to obtain the Minor Degree, for example, a B.Tech Mechanical student can opt for the industry relevant tracks like Data Science track, IOT track, Machine Learning track etc.
RB 40.2	The BOS concerned shall identify as many tracks as possible in the areas of emerging technologies and industrial relevance / demand. For example, the Minor tracks can be the fundamental courses in CSE, ECE, EEE, CE, ME etc or industry tracks such as Artificial Intelligence (AI), Machine Learning (ML), Data Science (DS), Robotics, Electric vehicles, VLSI etc.
RB 40.3	The list of disciplines/branches eligible to opt for a particular industry relevant Minor specialization shall be clearly mentioned by the respective BOS.
RB 40.4	There shall be no limit on the number of programs offered under Minor. The

	University/Institution can offer Minor programs in emerging technologies based on expertise in the respective departments or can explore the possibility of collaborating with the relevant industries/agencies in offering the program. The department concerned will determine the required courses for award of Minor. The subjects in Minor program would be a combination of mostly core and some electives.
RB 40.5	The concerned BOS shall decide on the minimum enrolments for offering Minor program by the department. If a minimum enrolments criterion is not met, then the students may be permitted to register for the equivalent MOOC courses as approved by the concerned Head of the department in consultation with BOS. Total number of seats offered for a Minor programme shall be a maximum of 35% of sanctioned intake of major degree programme.
RB 40.6	The students registered for B. Tech (Honors) shall not be permitted to register for Minor. A student shall be permitted to register for Minor program at the beginning of 4th semester subject to a maximum of two additional courses per semester, provided that the student must have acquired CGPA of 7.75 or above upto the end of 2nd semester without any history of backlogs. It is expected that the 3rd semester results may be announced after the commencement of the 4th semester. If a student fails to acquire CGPA of 7.75 upto 3rd semester or failed in any of the courses, her registration for Minor program shall stand cancelled. An SGPA or CGPA in excess of 7.75 has to be maintained in the subsequent semesters in major as well as Minor without any backlogs in order to keep the Minor registration active. Should both the SGPA and CGPA fall below 7.75 at any point after registering for the Minor; the Minor registration will cease to be active. A student registered for Minor in a discipline must register and pass in all subjects with a minimum GPA of 7.75 that constitute requirement for award of Minor.
RB 40.7	A student shall earn additional 20 credits in the specified area to be eligible for the award of B. Tech degree with Minor. This is in addition to the credits essential for obtaining the Under Graduate Degree in Major Discipline (i.e. 160 credits). If a student fails to complete a course offered in online/offline, she will not be permitted to continue the Minor degree. Transfer of credits from a particular Minor to regular B. Tech and vice-versa shall not be permitted.
RB 40.8	Out of the 20 Credits, 16 credits(with four courses, each carrying 4 credits) shall be earned by undergoing specified courses listed by the concerned BOS along with prerequisites. It is the responsibility of the student to acquire/complete prerequisite before taking the respective course. If a course comes with a lab component, that component has to be cleared separately. A student shall be permitted to choose only those courses that she has not studied in any form during the Programme. Students can complete Minor courses either in the college or in online from platforms like NPTEL/SWAYAM etc. The online NPTEL/SWAYAM subjects selected by a student shall be approved by concerned BOS. The duration of courses shall be a minimum of 14 weeks.
RB 40.9	In addition to the 16 credits, students must pursue at least 2 courses which shall be domain specific each with 2 credits through MOOCs(NPTEL/SWAYAM) to earn the remaining 4 credits. The courses shall be a minimum of 8/12 weeks in duration. Attendance will not be monitored for MOOC courses. Student has to acquire a certificate from the agencies approved by the BOS with grading or marks or pass/fail in order to earn 4 credits. If the MOOC course is a pass/fail course without any grades, the grade will be assigned as decided by the university/academic council.
RB 40.10	Student can opt for the Industry relevant Minor specialization as approved by the concerned departmental BOS. Student can opt the courses from Skill Development Corporation (APSSDC) or can opt the courses from an external agency recommended and approved by concerned BOS and should produce course completion certificate. The Board of studies of

	the concerned discipline of Engineering shall review such courses being offered by eligible external agencies and prepare a fresh list every year incorporating latest skills based on industrial demand.
RB 40.11	A committee should be formed at the level of College/ department to evaluate the grades/marks given by external agencies to a student which are approved by concerned BOS. Upon completion of courses the departmental committee should convert the obtained grades/marks to the maximum marks assigned to that course. The controller of examinations can take a decision on such conversions and may give appropriate grades.
RB 40.12	If a student drops (is terminated) from the Minor program, the additional credits so far earned cannot be converted into core or other electives; they will remain extra. These additional courses shall be mentioned in the transcript (but not in the degree certificate). In such cases, the student may choose between the actual grade or a “pass (P)” grade and also choose to omit the mention of the course as per the following: All the courses done under the dropped Minor will be shown in the transcript. None of the courses done under the dropped Minor will be shown in the transcript.
RB 40.13	Separate SGPA/CGPA shall be shown on semester and final transcripts of regular B. Tech and Minor. If a student failed in any registered course of the Minor, she shall not be eligible to continue the B.Tech Minor. However, the additional credits and grades thus far earned by the student shall be included in the grade card but shall not be considered to calculate the CGPA.
RB 40.14	Minor must be completed simultaneously with the regular degree program. A student cannot earn the Minor after she has already earned bachelor’s degree. Minor shall not be awarded at any circumstances without completing the regular major B. Tech programme in which a student got admitted.
RB 40.15	Registration Procedure: The department offering the Minor will announce specialization and courses before the start of the session. The interested students shall apply through the HOD of her parent department. In the event of any tie during the seat allotment for Minor, the concerned major degree department offering Minor shall conduct a test/interview on the prerequisite subjects of Minor and final decision shall be taken. The concerned department will submit the final list of selected students to the Principal. Only selected students shall be permitted to register the courses for Minor. The selected students shall submit a joining letter to the Principal through the concerned HOD offering the Minor. The student shall inform same to the HOD of her parent department. The whole process of Minor should be completed within one week before the start of every session. Both parent department and department offering Minor shall maintain the record of student pursuing the Minor. An advisor/mentor from parent department shall be assigned to a group of students to monitor the progress. Students shall not be permitted to register for Minor degree after completion of VI semester. The students are permitted to opt for only a single Minor course in her entire tenure of B.Tech.
RB 40.16	Attendance Requirements: The overall attendance in each semester of regular B.Tech courses and Minor courses shall be computed separately. A student shall maintain an overall attendance of 75% in all registered courses of Minor to be eligible for attending semester end examinations. However, condonation for shortage of attendance between 65-75% may be given as per University norms. A student detained due to lack of attendance in regular B. Tech programme shall not be permitted to continue Minor programme.
RB 40.17	A student shall report the concerned Principal of the college, if he/she is not interested to

	pursue/continue the Minor degree programme. If the student wishes to withdraw/change the registration of subject/course, she shall inform the same to advisor/mentor, subject teacher, HODs of Minor department and parent department and Principal within two weeks after registration of the course. Students shall be permitted to select a maximum of two subjects per semester from the list of subjects specified for Minor. If some of the Minor subjects are offered as regular subjects as part of students' parent department curriculum then students are not allowed to choose such Minor degree. They have to choose some other department Minor degree. There is no fee for registration of subjects for Minor degree programme offered in offline.
RB 40.18	Examinations: (a) The examination for the Minor courses offered in offline shall be conducted along with regular B. Tech programme. (b) The examinations (internal and external) and evaluation procedure of Minor courses offered in offline is similar to regular B. Tech courses. (c) A separate transcript shall be issued for the Minor subjects passed in each semester. (d) There is no supplementary examination for the failed subjects in a Minor programme. (e) Students shall pay the examination fee for the Minor degree courses.
RB 41.0	Withholding of Results If the student is involved in indiscipline/malpractices/court cases, the result of the student will be withheld.

Guidelines for Community Service Project

Introduction

1. Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development.
2. Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.
3. Community Service Project is meant to link the community with the college for mutual benefit. The community will be benefited with the focused contribution of the college students for the village/ local development. The college finds an opportunity to develop social sensibility and responsibility among students and also emerge as a socially responsible institution.

Objectives

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

1. To sensitize the students to the living conditions of the people who are around them.
2. To help students to realize the stark realities of the society.
3. To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability.
4. To make students aware of their inner strength and help them to find new /out of box solutions to the social problems.
5. To make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.
6. To help students to initiate developmental activities in the community in coordination with public and government authorities.

7. To develop a holistic life perspective among the students by making them study culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Implementation of Community Service Project

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

Procedure

1. A group of students or even a single student could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, so as to enable them to commute from their residence and return back by evening or so.
2. The Community Service Project is a twofold one –
 - a. First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the Village or Ward volunteers, rather, it could be another primary source of data.
 - b. Secondly, the student/s could take up a social activity, concerning their domain or subject area. The different areas, could be like –
 - Agriculture
 - Health
 - Marketing and Cooperation
 - Animal Husbandry
 - Horticulture
 - Fisheries
 - Sericulture
 - Revenue and Survey
 - Natural Disaster Management
 - Irrigation
 - Law & Order
 - Excise and Prohibition
 - Mines and Geology
 - Energy

- Internet
- Free Electricity
- Drinking Water

EXPECTED OUTCOMES

BENEFITS OF COMMUNITY SERVICE PROJECT TO STUDENTS

Learning Outcomes

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

Personal Outcomes

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

Social Outcomes

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

Career Development

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

Relationship with the Institution

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

BENEFITS OF COMMUNITY SERVICE PROJECT TO FACULTY MEMBERS

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

BENEFITS OF COMMUNITY SERVICE PROJECT TO COLLEGES AND UNIVERSITIES

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

BENEFITS OF COMMUNITY SERVICE PROJECT TO COMMUNITY

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

SUGGESTIVE LIST OF PROGRAMMES UNDER COMMUNITY SERVICE PROJECT

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

responsibility of motivating, facilitating, and guiding the students. They have to interact with local leadership and people and appraise the objectives and benefits of this kind of projects. The project reports shall be placed in the college website for reference. Systematic, Factual, methodical and honest reporting shall be ensured.

For Engineering Students

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

Complementing the community service project, the students may be involved to take up some awareness campaigns on social issues/special groups. The suggested list of programmes is;
Programmes for School Children

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

Programmes for Women Empowerment

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

General Camps

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

Programmes for Youth Empowerment

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

Common Programmes

1. Awareness on RTI
2. Health intervention programmes
3. Yoga
4. Tree plantation
5. Programmes in consonance with the Govt. Departments like –
 - i. Agriculture
 - ii. Health
 - iii. Marketing and Cooperation
 - iv. Animal Husbandry
 - v. Horticulture
 - vi. Fisheries
 - vii. Sericulture
 - viii. Revenue and Survey
 - ix. Natural Disaster Management
 - x. Irrigation
 - xi. Law & Order
 - xii. Excise and Prohibition

xiii. Mines and Geology

xiv. Energy

Role of Students:

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

Timeline for the Community Service Project Activity

Duration: 8 weeks

1. Preliminary Survey (One Week)

- a. A preliminary survey including the socio-economic conditions of the allotted habitation to be conducted.
- b. A survey form based on the type of habitation to be prepared before visiting the habitation with the help of social sciences faculty. (However, a template could be designed for different habitations, rural/urban.)
- c. The Governmental agencies, like revenue administration, corporation and municipal authorities and village secretariats could be aligned for the survey.

2. Community Awareness Campaigns (Two Weeks)

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

3. Community Immersion Programme (Four Weeks)

Along with the Community Awareness Programmes, the student batch can also work with any one of the below listed governmental agencies and work in tandem with them. This community involvement programme will involve the students in exposing themselves to the experiential learning about the community and its dynamics. Programmes could be in consonance with the Govt. Departments.

4. Community Exit Report (One Week)

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

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

MALPRACTICES GUIDELINES

Disciplinary Action for Improper Conduct in Examinations

	Nature of Malpractices/Improper conduct	Punishment
	If the candidate:	
1.(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which she is appearing but has not made use of. (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the examination hall in respect of any matter.	Expulsion of all the candidates involved from the examination hall and cancellation of the performance in that subject only. In case of an outsider, he will be handed over to the police and a case will be registered against him
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate will be seized and cancelled.
3.	Impersonates any other candidate in connection with the examination.	The candidate/Person who has impersonated shall be expelled from examination hall. The candidate will also be debarred and forfeits the course. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all semester end examinations. The continuation of the course of such candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all semester end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent / Asst. Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which results in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester / year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the examination hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate will also be debarred for two consecutive semesters from class work and all semester end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate will also forfeit his/her course.
9.	If the student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the college shall be expelled from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate will also forfeit the course. Person(s) who do not belong to the College will be

		handed over to police and a police case will be registered against them.
10.	Comes in a drunken/intoxicated condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Principal for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

Punishments to the candidates as per the above guidelines.

* * * * *

Ragging

Prohibition of ragging in educational institutions Act 26 of 1997

Salient Features

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

	Imprisonment upto		Fine Upto
Teasing, Embarrassing and Humiliation	 6 Months	+	Rs. 1,000/-
Assaulting or Using Criminal force or Criminal intimidation	 1 Year	+	Rs. 2,000/-
Wrongfully restraining or confining or causing	 2 Years	+	Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	 5 Years	+	Rs. 10,000/-
Causing death or abetting suicide	 10 Years	+	Rs. 50,000/-

**SHRI VISHNU ENGINEERING COLLEGE FOR WOMEN :: BHIMAVARAM
(Autonomous)**

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Program Educational Objectives(PEOs):

PEO 1	Graduates will have the expertise in analyzing real time problems and providing appropriate solutions related to Computer Science & Engineering.
PEO 2	Graduates will have the knowledge of fundamental principles and innovative technologies to succeed in higher studies, and research.
PEO 3	Graduates will continue to learn and to adapt technology developments combined with deep awareness of ethical responsibilities in profession.

**SHRI VISHNU ENGINEERING COLLEGE FOR WOMEN :: BHIMAVARAM
(Autonomous)**

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Program Outcomes(POs):

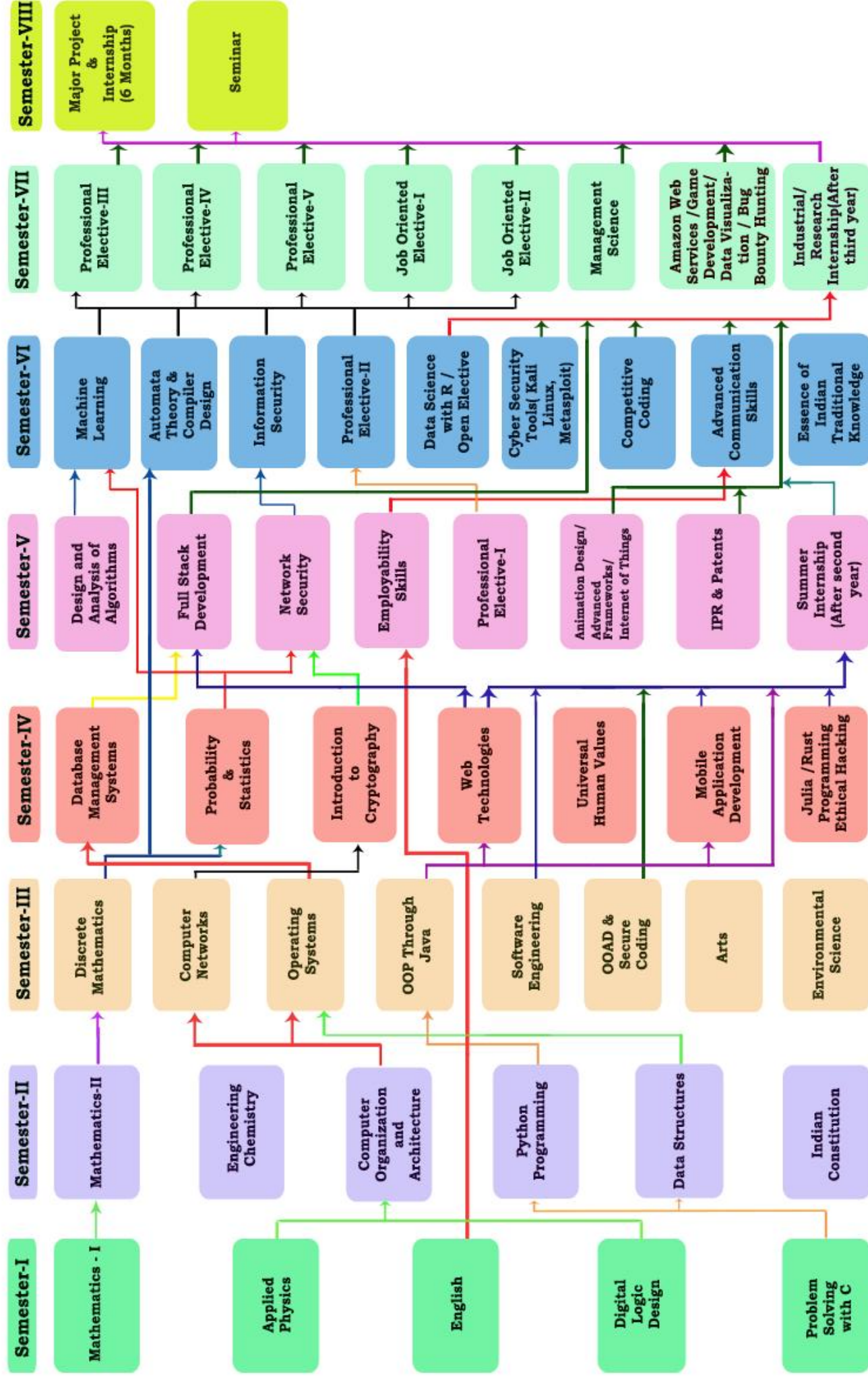
- PO 1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO 2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO 3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO 4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO 5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO 6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO 7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO 8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO 9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO 10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large,

such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

- PO 11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO 12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes(PSOs):

PSO 1	Apply various programming skills to deliver innovative quality software products for the changing business needs.
PSO 2	Utilize the skills of Data Analytics, Cloud Computing and Machine Learning to address technological challenges in multidisciplinary areas of engineering.



CSE(Cyber Security) Course Structure – R22
(With effect from 2022-2023)

I Year - I Semester

S.No	Category	Course Code	Course Title	L	T	P	C	IM	EM	TM
1	BS	UGBS1T0122	Mathematics – I	3	-	-	3	30	70	100
2	BS	UGBS1T0222	Applied Physics	3	-	-	3	30	70	100
3	HSS	UGBS1T0522	English	3	-	-	3	30	70	100
4	ES	UGCS1T0122	Digital Logic Design	3	-	-	3	30	70	100
5	ES	UGCS1T0222	Problem Solving with C	3	-	-	3	30	70	100
6	HSS LAB	UGBS1P0622	English Communication Skills Lab	-	-	3	1.5	15	35	50
7	BS LAB	UGBS1P0722	Applied Physics Lab	-	-	3	1.5	15	35	50
8	ES LAB	UGCS1P0322	Problem Solving with 'C' Lab	-	-	3	1.5	15	35	50
			Total	15	0	9	19.5	195	455	650

I Year - II Semester

S.No	Category	Course Code	Course Title	L	T	P	C	IM	EM	TM
1	BS	UGBS2T0122	Mathematics-II	3	-	-	3	30	70	100
2	BS	UGBS2T0422	Engineering Chemistry	3	-	-	3	30	70	100
3	ES	UGCS2T0122	Computer Organization and Architecture	3	-	-	3	30	70	100
4	ES	UGCS2T0222	Python Programming	3	-	-	3	30	70	100
5	ES	UGCS2T0322	Data Structures	3	-	-	3	30	70	100
6	ES LAB	UGCS2P0422	Python Programming Lab	-	-	3	1.5	15	35	50
7	BS LAB	UGBS2P0822	Engineering Chemistry Lab	-	-	3	1.5	15	35	50
8	ES LAB	UGCS2P0522	Data Structures Lab	-	-	3	1.5	15	35	50
9	MC	UGBS2A1022	Indian Constitution	2	-	-	-	-	-	-
			Total	17	0	9	19.5	195	455	650

II Year - I Semester

S.No	Category	Course Code	Course Title	L	T	P	C	IM	EM	TM
1	BS	UGBS3T0822	Discrete Mathematics	3	-	-	3	30	70	100
2	PC	UGCS3T0822	Computer Networks	3	-	-	3	30	70	100
3	PC	UGCS3T0222	Operating Systems	3	-	-	3	30	70	100
4	PC	UGCS3T0322	Object Oriented Programming through Java	3	-	-	3	30	70	100
5	PC	UGCS3T0422	Software Engineering	3	-	-	3	30	70	100
6	PC LAB	UGCS3P0922	Object Oriented Analysis & Design and Secure Coding Lab	-	-	3	1.5	15	35	50
7	PC LAB	UGCS3P0622	Linux Programming Lab	-	-	3	1.5	15	35	50
8	PC LAB	UGCS3P0722	Object Oriented Programming through Java Lab	-	-	3	1.5	15	35	50
9	SOC	UGBS3C0122	Arts	1	-	2	2	50	-	50
10	MC	UGBS3A0322	Environmental Science	2	-	-	-	-	-	-
			Total	18	0	11	21.5	245	455	700

II Year - II Semester

S.No	Category	Course Code	Course Title	L	T	P	C	IM	EM	TM
1	ES	UGCS4T0122	Database Management Systems	3	-	-	3	30	70	100
2	BS/PC	UGBS4T0422	Probability & Statistics	3	-	-	3	30	70	100
3	PC	UGCS4T0922	Introduction to Cryptography	3	-	-	3	30	70	100
4	PC	UGCS4T0322	Web Technologies	3	-	-	3	30	70	100
5	HSS	UGBS4T0122	Universal Human Values	3	-	-	3	30	70	100
6	ES/PC LAB	UGCS4P0422	Database Management Systems Lab	-	-	3	1.5	15	35	50
7	PC LAB	UGCS4P0522	Mobile Application Development Lab	-	-	3	1.5	15	35	50
8	PC LAB	UGCS4P0622	Web Technologies Lab	-	-	3	1.5	15	35	50
9	SOC	UGCS4K0722 UGCS4K0822 UGCS4K1022	Julia Programming Rust Programming Ethical Hacking	1	-	2	2	50	-	50
			Total	16	0	11	21.5	245	455	700
Internship 2 Months (Mandatory) during Summer Vacation										
Honors/Minor Course (4 Credits)										

III Year - I Semester

S.No	Category	Course Code	Course Title	L	T	P	C	IM	EM	TM
1	PC	UGCS5T1422	Design and Analysis of Algorithms	3	-	-	3	30	70	100
2	PC	UGCS5T0322	Full Stack Development	3	-	-	3	30	70	100
3	PC	UGCS5T1522	Network Security	3	-	-	3	30	70	100
4	OE/JOE	UGBS5T0122	Employability Skills	2	-	2	3	30	70	100
5	PE	UGCS5T1622 UGCS5T0522 UGCS5T1722 UGCS5T1822	Professional Elective-I 1. Advanced Computer Networks 2. Advanced Data Structures 3. Intrusion Detection Systems 4. Secure Coding Techniques	3	-	-	3	30	70	100
6	PC LAB	UGCS5P0922	Full Stack Development Lab	-	-	3	1.5	15	35	50
7	PC LAB	UGCS5P1922	Network Security Lab	-	-	3	1.5	15	35	50
8	SOC	UGCS5K1022 UGCS5K1122 UGCS5K2022	Animation Design Advanced Frameworks Internet of Things	1	-	2	2	50	-	50
9	MC	UGMB5A0122	IPR & Patents	2	-	-	-	-	-	-
10	Internship	UGCS5I1322	Summer Internship(After second year)	-	-	-	1.5	50	-	50
			Total	17	0	10	21.5	280	420	700
Honors/Minor Course (4 Credits)										

III Year - II Semester

S.No	Category	Course Code	Course Title	L	T	P	C	IM	EM	TM
1	PC	UGCS6T0322	Machine Learning	3	-	-	3	30	70	100
2	PC	UGCS6T1222	Automata Theory & Compiler Design	3	-	-	3	30	70	100
3	PC	UGCS6T1322	Information Security	3	-	-	3	30	70	100
4	PE	UGCS6T1422 UGCS6T1522 UGCS6T1622 UGCS6T1722	Professional Elective-II 1. Applied Cryptography 2. Biometrics 3. Cloud Computing 4. Distributed Systems	3	-	-	3	30	70	100
5	OE/JOE	UGCS6T0822	Data Science with R / Open Elective	2	-	2	3	30	70	100
6	PC LAB	UGCS6P1022	Machine Learning using Python Lab	-	-	3	1.5	15	35	50
7	PC LAB	UGCS6P1822	Cyber Security Tools(Kali Linux, Metasploit)	-	-	3	1.5	15	35	50
8	PC LAB	UGCS6P1122	Competitive Coding Lab	-	-	3	1.5	15	35	50
9	SOC	UGBS6K0122	Advanced Communication Skills	1	-	2	2	50	-	50
10	MC	UGBS6A0222	Essence of Indian Traditional Knowledge	2	-	-	-	-	-	-
			Total	17	0	13	21.5	245	455	700
Internship 2 Months (Mandatory) during Summer Vacation										
Honors/Minor Course (4 Credits)										

IV Year - I Semester

S.No	Category	Course Code	Course Title	L	T	P	C	IM	EM	TM
1	PE	UGCS7T2422 UGCS7T2522 UGCS7T2622 UGCS7T2722 UGCS7T2822	Professional Elective-III 1. Information Security Analysis & Audit 2. Penetration Testing & Vulnerability Analysis 3. IOT Security 4. Database Security 5. Computer Forensics	3	-	-	3	30	70	100
2	PE	UGCS7T2922 UGCS7T3022 UGCS7T3122 UGCS7T3222 UGCS7T3322	Professional Elective-IV 1. Information Security Management 2. Malware Analysis 3. Cloud Security 4. Mobile & Wireless Security 5. Darknet and Deep Web	3	-	-	3	30	70	100
3	PE	UGCS7T3422 UGCS7T3522 UGCS7T3622 UGCS7T3722	Professional Elective-V 1. Information Security Incident Response 2. Cyber Laws & Ethics 3. Cyber Crime Investigation 4. Web Application Security	3	-	-	3	30	70	100
4	OE/JOE	UGCS7T1322 UGCS7T1422 UGCS7T0222 UGCS7T0422	Job Oriented Elective-I 1. Augmented Reality and Virtual Reality 2. Big Data Analytics 3. Dart Programming 4. DevOps	2	-	2	3	30	70	100
5	OE/JOE	UGCS7T1722 UGCS7T0822 UGCS7T1922 UGCS7T2022	Job Oriented Elective-II 1. Blockchain Technologies 2. Artificial Intelligence 3. Go Programming 4. Robotic Process Automation	2	-	2	3	30	70	100
6	HSSE	UGMB7T0122	Management Science	3	-	-	3	30	70	100
7	SOC	UGCS7K2122 UGCS7K2222 UGCS7K3822 UGCS7K3922	Amazon Web Services Game Development Data Visualization Bug Bounty Hunting	1	-	2	2	50	-	50
8	Internship	UGCS7I2322	Industrial/Research Internship(After third year)	-	-	-	3	50	-	50
			Total	17	0	6	23	280	420	700
Honors/Minor Course (4 Credits)										

IV Year - II Semester

S.No	Category	Course Code	Course Title	L	T	P	C	IM	EM	TM
1	Major Project	UGCS8J0122	Major Project & Internship (6 Months)	-	-	20	10	60	140	200
2	Seminar	UGCS8S0222	Seminar	-	2	-	2	50	-	50
			Total	0	2	20	12	110	140	250

L – Lectures, T – Tutorials, P – Practicals, C – Credits, IM – Internal Marks, EM – External Marks, TM – Total Marks

BS - Basic Science, HSS - Humanities & Social Science, ES - Engineering Science, MC - Mandatory Course, PC - Professional Core, SOC - Skill Oriented Course, OE/JOE - Open Elective/Job Oriented Elective, PE - Professional Elective, HSSE - Humanities & Social Science Elective



SHRI VISHNU ENGINEERING COLLEGE FOR WOMEN (AUTONOMOUS)
BHIMAVARAM – 534202
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CSE(Cyber Security) Course Structure - R22
(With effect from 2022-2023)

Open Electives

The following courses are offered to the students of other departments.

S.No.	Course Code	Course Title
1	UGCS0T2122	Biometrics
2	UGCS0T2222	Cryptography & Network Security
3	UGCS0T2322	Cyber Laws & Ethics
4	UGCS0T2422	Cyber Security Essentials
5	UGCS0T2522	Digital Forensics
6	UGCS0T2622	Ethical Hacking
7	UGCS0T2722	Intrusion Detection Systems
8	UGCS0T2822	Malware Analysis
9	UGCS0T2922	Mobile & Wireless Security
10	UGCS0T3022	Secure Coding Techniques

Note: Each department will notify the list of Open Electives to be offered at the time of course registration.



SHRI VISHNU ENGINEERING COLLEGE FOR WOMEN (AUTONOMOUS)
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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CSE(Cyber Security) Course Structure – R22
(With effect from 2022-2023)

Minor (For other depts)

S.No	Course Code	Course Title	L	T	P	C
1	UGCS0M3122	Cyber Security Essentials	3	1	-	4
2	UGCS0M3222	Introduction to Cryptography	3	1	-	4
3	UGCS0M3322	Network Security	3	1	-	4
4	UGCS0M3422	Information Security	3	1	-	4
5	UGCS0M3522	Ethical Hacking	3	1	-	4
6	UGCS0M3622	Cyber Laws & Ethics	3	1	-	4
7	UGCS0M3722	MOOC1	2	-	-	2
8	UGCS0M3822	MOOC2	2	-	-	2

Note: Non CSE(Cyber Security) Students can choose any 4 courses in the above list in addition to the 2 MOOC courses to get the Minor degree in Cyber Security.

**I YEAR
I SEMESTER**

MATHEMATICS-I
(Common to All Branches)

Subject Code : UGBS1T0122

I Year / I Semester

L	T	P	C
3	0	0	3

Prerequisites: Basics of Matrices, Differentiation and Integration

Course Objectives:

- Prepare students to learn the concepts of rank of a matrix, Eigen values, Eigen vectors.
- Familiarize students with analytical methods to solve ordinary differential equations.
- Assist the students to learn the concepts of partial differentiation.
- Gain knowledge of infinite series expansions of various real valued functions.

Syllabus:

Unit-I:

Linear Systems of Equations

10 Hrs

Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations - solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method.

Application: Finding the current in an Electrical Circuit by Gauss elimination method

Unit-II:

Eigen Values and Eigen Vectors

10 Hrs

Linear Transformation and Orthogonal Transformations, Eigen values and Eigen vectors and their properties.

Diagonalization of matrices by Similarity and Orthogonal transformations, Cayley-Hamilton Theorem (without proof).

Application : Finding inverse and powers of a matrix by Cayley-Hamilton Theorem

Unit-III:

Ordinary Differential Equations of First Order and First Degree

10Hrs

Exact, Reducible to exact equations, Linear and Bernoulli's equations.

Applications: Orthogonal Trajectories, Newton's Law of Cooling, Law of Natural Growth and Decay.

Unit-IV:

Ordinary Differential Equations of Higher Order

10 Hrs

Second and Higher order linear differential equations with constant coefficients, Non-Homogeneous terms of the type $\sin ax, \cos ax, e^{ax}$, polynomials in $x, e^{ax}V(x)$ and $xV(x)$. Linear Differential equations with variable coefficients: Cauchy-Euler and Legendre's Equations.

Unit-V:

Partial Differentiation & Mean Value Theorems

12Hrs

Partial Differentiation, Total derivative; Jacobian, Functional dependence, Maxima, minima of functions of two and three variables, Lagrange method of undetermined multiplier.

Taylor's and Maclaurin's theorems with remainders (Without Proof), Taylor's and Maclaurin's series.

Course Outcomes:

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

CO1: Determine the rank, inverse, powers of a matrix and apply matrix techniques to model and solve system of linear equations (L4)

CO2: Illustrate Eigen values, Eigen vectors, properties and diagonalization of a given matrix (L2)

CO3: Apply appropriate analytical technique to model and solve a given differential equation (L3)

CO4: Apply the concepts of Partial differentiation to Jacobians, Extrema of several variable functions and to construct the Taylor's, Maclaurin's series from generalized mean value theorem (L3)

Mapping of COs to POs:

POs/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	2	-	-	-	-	-	-	-	3
CO2	3	3	3	2	-	-	-	-	-	-	-	3
CO3	3	3	3	2	-	-	-	-	-	-	-	3
CO4	3	3	3	2	-	-	-	-	-	-	-	3

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2015.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

REFERENCE BOOKS:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, 2008.

2. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
3. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
5. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, 2002.
6. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2013.

APPLIED PHYSICS
(Common to CSE, CSE(AI&DS), CSE(AI&ML), CSE(CS))

Subject Code: UGBS1T0222
I Year / I Semester

L	T	P	C
3	0	0	3

Prerequisites: Ray optics, Basics of Mechanics, Properties of Matter.

Course Objectives:

1. Impart the knowledge of optical phenomena like interference and diffraction required to design optical instruments with higher resolution.
2. Understand the physics of semiconductors and their working mechanisms to use in electronic circuits and devices.
3. Impart knowledge of materials with characteristics utility in appliances.

Syllabus:

UNIT-I: (10 Hours)

INTERFERENCE & DIFFRACTION:

Interference: Superposition principle, Young's double slit experiment and intensity curve, Conditions for good Interference - Interference in thin films (reflected geometry) – Newton's rings(reflected geometry) – Determination of Wavelength, Refractive index by Newton's rings.

Diffraction: Kinds of Diffraction – Fraunhofer Diffraction at Single slit - Diffraction Grating – Intensity curves - Grating spectrum – Rayleigh's criterion and resolving power.

UNIT-II: (10 Hours)

LASER & FIBRE OPTICS:

Laser: Characteristics – Spontaneous and Stimulated emission - Relation between Einstein's coefficients – Population inversion - Pumping Methods – Optical Resonator - Ruby laser - Helium-Neon laser – Applications of laser.

Fibre Optics: Construction and working of optical fibre - Acceptance angle & Numerical aperture – Types of fibres – Optical fibre communication system - Applications.

UNIT-III: (10 Hours)

QUANTUM MECHANICS & FREE ELECTRON THEORY:

Quantum Mechanics: Introduction - Matter waves – Properties of Matter waves – Physical significance of wave function – Schrödinger Time Independent and Time Dependent wave equations – Particle in one dimensional infinite potential well.

Free electron & Band theory of Solids: Merits and Demerits of Classical free electron theory- Electrical conductivity based on Quantum Free electron theory –

Fermi - Dirac distribution function and Temperature dependence - Kronig-Penney model (qualitative) and results – Classification of crystalline solid.

UNIT-IV:

(10 Hours)

SEMICONDUCTOR PHYSICS:

Semiconductor: Introduction – Bond and Band structures of Intrinsic and Extrinsic semiconductors - Density of charge carriers in Intrinsic and Extrinsic - Fermi level (Temperature dependence)– Hall effect - Hall voltage – Hall Coefficient - Applications - Drift and Diffusion currents – p-n junction diode –Zener diode.

UNIT-V:

(10 Hours)

MAGNETIC & DIELECTRIC PROPERTIES:

Magnetism: Magnetic dipole moment– Permeability, Magnetization, Susceptibility -
– Origin of permanent magnetic moment – Classification and Properties of Dia, Para
& Ferro – Hysteresis – Soft and Hard magnetic materials and their applications.

Dielectrics: Dielectric constant, polarization, Polarizability, Susceptibility - Types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossotti relation - Applications of dielectrics.

Course Outcomes:

At the end of this course, students will be able to:

C01: Understand the phenomena of interference and diffraction with applications.

C02: Interpret the knowledge of Laser and Optical fibre for engineering applications

C03: Apply Schrodinger wave equation to estimate the behavior of particle.

C04: Illustrate various free electron theories to classify solids.

C05: Analyze the properties of semiconductors to construct basic electronic devices.

C06: Summarize various magnetic and dielectric properties to know the scientific and engineering applications.

Mapping of COs to POs:

[illegible]

TEXT BOOKS:

1. "A Text book of Engineering Physics" by M.N. Avadhanulu, P.G. Kshirsagar - S. Chand Publications (2017)
2. "Engineering Physics" by D. Bhattacharya and PoonamTandon, Oxford press (2015)
3. "Engineering Physics" by R.K Gaur and S.L Gupta., - DhanpatRai publishers (2012)

REFERENCE BOOKS:

1. "Engineering Physics" by M. R. Srinivasan, New Age international publishers (2009)
2. "Optics" by AjoyGhatak, 6th Edition McGraw Hill Education (2017)
3. "Solid State Physics" by A. J. Dekker, McMillan Publishers (2011)
4. "Physics Volume –II", 5th edition, ResnickHalliday, Krane, by Wiley India
5. "Engineering Physics" by Dr. Armugam, Anuradha agencies

ENGLISH
(Common to CSE, CSE(AI&DS), CSE(AI&ML), CSE(CS))

Subject Code: UGBS1T0522

I Year / I Semester

L	T	P	C
3	0	0	3

Prerequisites: Basic competency in grammar and composition

Course Objectives:

- To develop English language skills in listening, speaking, reading and writing by having learners engaged in a range of communicative tasks.
- To expand the learner's use of grammatically correct and situationally and culturally appropriate language in speaking and writing for effective communication in a variety of interpersonal and academic situations.

Syllabus:

UNIT-I: (9 Hours)

STAY HUNGRY – STAY FOOLISH – STEVE JOBS

Grammar : Verb -Tense

Speaking : Describing oneself and others, objects, places, processes and narrating events and stories.

Writing : Read different genres of novels and stories and produce them briefly.

UNIT-II: (9 Hours)

GIVE US A ROLE MODEL – A P J ABDUL KALAM

Grammar : Subject – Verb Agreement

Speaking : Framing appropriate questions and giving answers

Exercises Reading : Don't Ask your children to strive by William Martin

UNIT-III: (9 Hours)

TSUNAMI RELIGION –ANJALI PRASHAR

Vocabulary : Articles & Selected Prefixes, Suffixes and root words

Speaking : Extemporaneous speech

UNIT-IV: (9 Hours)

THE SECRET OF WORK - SWAMY VIVEKANANDA

Grammar : Active and Passive Voice

UNIT-V: (9 Hours)

A REVIEW ON THE MOVIE 'THE MAN FROM THE EARTH' (2007 release)

Composition : Paragraph writing on general topics

Listening : Listening Comprehension

Course Outcomes:

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

- CO1:** Infer the life lessons or stories of great people/characters and apply wherever possible in life as well as use tenses correctly. (L2)
- CO2:** Examine the concept of 'knowledge society' as well as learn to apply verb forms correctly for better communication. (L3)
- CO3:** Practice the philosophy that 'all are equal' and apply it in every walk of life as well as use articles correctly in communication. (L3)
- CO4:** Illustrate the philosophy of work as well as use active and passive voice appropriately. (L4)
- CO5:** Evaluate the essence of any movie through writing/online quiz as well as write paragraphs coherently. (L2)

Mapping of COs to POs:

POs	1	2	3	4	5	6	7	8	9	10	11	12
CO1	-	-	-	-	-	-	-	-	3	3	-	3
CO2	-	-	-	-	-	-	-	-	3	3	-	3
CO3	-	-	-	-	-	-	-	-	3	3	-	3
CO4	-	-	-	-	-	-	-	-	3	3	-	3
CO5	-	-	-	-	-	-	-	-	-	3	-	3

TEXT BOOKS:

1. Infotech English - JNTUK prescribed text book – Maruthi Publications
2. Ignited Minds – A P J Abdul Kalam
3. English for Enjoyment and Efficiency – Maruthi Publications
4. Life, Language and Culture – Explorations –1 & 2 Cengage publishers

REFERENCE BOOKS:

1. The Oxford Guide to Writing & Speaking – John Seely
2. The students' Companion – Wilfred D Best (New Edition) – Harper, Collins Publishers, 2012
3. Col-Locate Your World, a store house of words & word-relations, their similarities & dissimilarities – Ajay Singh, Arihant Publications (I) Pvt. Ltd., Meerut
4. Situational Grammar – M I Dubrovin (Visalandra Publishers)
5. Wren & Martin English Grammar and Composition – N.D.V. Prasada Rao

INTERNET SOURCES:

1. <https://news.stanford.edu/2005/06/14/jobs-061505/> (Steve Jobs' Speech)
2. <https://www.imdb.com/title/tt0756683/> (The Man from the Earth)

DIGITAL LOGIC DESIGN

Subject Code: UGCS1T0122

I Year / I Semester

L	T	P	C
3	0	0	3

Prerequisites: Basic knowledge in Boolean Algebra.

Course Objectives:

This course helps students to acquire basic knowledge on number systems, logic gates, gate level minimization, combinational and sequential logic circuits, registers and counters

Syllabus:

UNIT I: (8 Hours)

Number Systems: Digital Systems, Binary, Decimal, Octal and Hexadecimal Numbers, Conversion of Numbers from one Radix to another Radix, r 's Complement and $(r-1)$'s Complements of Numbers, Signed Binary Numbers, Binary Codes.

UNIT II: (8 Hours)

Logic Gates and Boolean Algebra: Basic Gates NOT, AND, OR, Boolean Theorems, Complement and Dual of Logical Expressions, Universal Gates, XOR and XNOR Gates, SOP, POS, Minimizations of Logic Functions using Boolean Theorems, Two level Realization of Logic Functions Using Universal Gates.

UNIT III: (12 Hours)

Gate-Level Minimization: Karnaugh Map Method (K-Map), Minimization of Boolean Functions maximum upto Four Variables, POS and SOP, Simplifications with Don't Care Conditions using K-Map.

Combinational Logic Circuits: Design of Half Adder, Full Adder, Half Subtractor, Full Subtractor, BCD Adder, Magnitude Comparator, Decoders, Encoders, Priority Encoder, Multiplexers, De-multiplexers, Code Converters.

UNIT IV: (10 Hours)

Sequential Logic Circuits: Classification of Sequential Circuits, Latch and Flip-Flop, SR Latch Using NAND and NOR Gates, Truth Tables, SR, JK, T and D Flip Flops, Truth and Excitation Tables, Conversion of Flip Flops, Flip Flops with Asynchronous Inputs (Preset and Clear).

UNIT V: (10 Hours)

Registers and Counters: Design of Registers, Buffer Register, Control Buffer Register, Shift Registers, Universal Shift Register, Ripple Counters, Synchronous Counters and Variable Modulus Counters, Ring Counter, Johnson Counter.

Course Outcomes:

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

CO1: Summarize various number systems for computer arithmetic. [L2]

CO2: Apply Boolean Algebra principles to simplify the Boolean expressions.[L3]

CO3: Interpret and design the combinational and sequential circuits.[L3]

CO4: Distinguish various types of registers and counters and their operations.[L4]

Mapping of COs to POs:

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

TEXT BOOKS:

1. M. Morris Mano, Michael D Ciletti, "Digital Design" , 5/e, Pearson, 2017.
2. C.H. Roth, L.L. Kinney, "Fundamentals of Logic Design", 7/e, Cengage, 2013.

REFERENCE BOOKS:

1. Kohavi, Jha, "Switching and Finite Automata Theory", 3/e, Cambridge, 2010.
2. Leach, Malvino, Saha, "Digital Logic Design", TMH, 2009.
3. R.P.Jain, "Modern Digital Electronics", TMH, 2019.
- 4.. M. Morris Mano, "Computer System Architecture" , Pearson, 2014.
5. M. Rafiquzzaman, "Fundamentals of Digital Logic & Micro Computer Design", 5th Edition, John Wiley, 2005.

PROBLEM SOLVING WITH C **(Common to All Branches)**

Subject Code: UGCS1T0222

I Year / I Semester

L	T	P	C
3	0	0	3

Prerequisites: Basic knowledge on Mathematics and problem solving skills.

Course Objectives: The students will learn the basic knowledge of Computer components and program development steps. Students will be able to develop logic which will help them to create applications in C. Also by learning the basic programming constructs, they can easily switch over to any other language in future.

Syllabus:

UNIT I: (10 hrs)

Introduction: Computer Systems, Programming Languages: Machine, Symbolic and High-level languages. Algorithm, Pseudo code, Flowchart.

Basics of C: History of C, Structure of a C program, Program development steps, C tokens, Keywords and Identifiers, Constants, Variables, Data Types, Managing Input and Output operations, Operators and expressions, Operator precedence and associativity, Type conversion.

UNIT II: (8 hrs)

Selection and Decision making: Decision making with If, simple if, If-else, Nesting of if else, else-if ladder, switch-statement, ternary Operator.

Iteration: Decision making and looping, while, do-while, for, jumps in loops.

UNIT III: (8 hrs)

Arrays: One-Dimensional Arrays, declaration of One-Dimensional Arrays, Initialization of One-Dimensional Arrays, Two-Dimensional Arrays, Initialization of Two-Dimensional Arrays, Multidimensional Arrays, Searching - Linear Search and Sorting - Bubble sort.

Strings: Declaring and Initializing String variables, Reading and writing Strings, String handling Functions, Table of Strings.

UNIT IV: (10 hrs)

Pointers: Understanding Pointers, accessing address of a variable, Declaring and Initialization of Pointer Variables, Pointer expressions, Pointer and Arrays, Dynamic Memory Allocation.

Functions: Need for user defined functions, Elements of User Defined Functions, Definition of Functions, Function Declaration and calling, Category of functions,

parameter-passing mechanism, passing an Array to a Function, scope, visibility and life time of variables, Pre-processor commands.

Recursion: Types of recursion, Recursive solutions for factorial, Fibonacci series, GCD.

UNIT V: (10 hrs)

Structures: Defining a Structure, Declaring and initialization of Structure variables, Accessing Structure members, Arrays of Structures, Pointers to Structures, Unions, Type Definition (typedef).

Files: Types of Files, Defining and opening a file, Input/output operations on files, Command-line Arguments.

Course Outcomes:

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

CO1: Apply knowledge of C constructs for developing programs/applications.[L3]

CO2: Analyse the given C program to identify bugs and to write correct code.[L4]

CO3: Apply the concepts of Pointers, Dynamic memory allocation to write memory efficient programs.[L3]

CO4: Design C programs/applications for a given requirement.[L4]

Mapping of COs to POs:

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-

TEXT BOOKS:

1. E. Balagurusamy, C Programming, McGrawHill Publications.
2. Yashawant Kanitkar, Let us C, BPB publications

REFERENCE BOOKS:

1. Dennis Ritchie and Brian Kernighan, The C programming Language, Prentice Hall.
2. Herbert Schildt, C: The Complete Reference, 4th Edition, Osborne Mc Graw Hill.
3. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach using C, 3rd Edition, Thomson Publications.
4. Reema Thareja, Programming in C, OXFORD.

ENGLISH COMMUNICATION SKILLS LAB
(Common to CSE, CSE(AI&DS), CSE(AI&ML), CSE(CS))

Subject Code: UGBS1P0622

I Year / I Semester

L	T	P	C
0	0	3	1.5

Prerequisites: Basic knowledge in using language for oral communication.

Course Objectives:

- To enable learners to use the correct pronunciation of English sounds.
- To prepare students to use different functions of English Language.

Syllabus:

Week1: Greeting, Introducing and Taking leave

Week2: Pure Vowels

Week3: Giving information and Asking for information

Week4: Diphthongs

Week5: Inviting, Accepting and Declining Invitations

Week6: Consonants

Week7: Commands, Instructions and Requests

Week8: Syllables

Week9: Suggestions and Opinions

Week10: Accent

Topics beyond syllabus:

- A. JAM
- B. BBC Flatmates

Course Outcomes:

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

- CO1:** Articulate correct pronunciation of Pure Vowel' sounds for oral communication as well as enable them to greet and take leave of others appropriately. (L3)
- CO2:** Practice correct pronunciation of Diphthongs' for oral communication as well as give and ask information in real life situations. (L3)
- CO3:** Identify the correct use of consonants as well as how to invite, accept and decline Invitations in daily conversations. (L1)

CO4: Practice correct syllable division as well as make commands, instructions and requests in daily life. (L3)

CO5: Analyze correct accent as well as use correct expressions for suggestions and opinions while speaking. (L1)

Mapping of COs to POs:

POs	1	2	3	4	5	6	7	8	9	10	11	12
CO1	-	-	-	-	-	-	-	-	-	3	-	3
CO2	-	-	-	-	-	-	-	-	-	3	-	3
CO3	-	-	-	-	-	-	-	-	-	3	-	3
CO4	-	-	-	-	-	-	-	-	-	3	-	3
CO5	-	-	-	-	-	-	-	-	-	3	-	3

TEXT BOOKS:

1. Strengthen Your Steps – Maruthi Publications (the latest edition)
2. Interact – English Lab Manual for Undergraduate Students – Orient BlackSwan

REFERENCE BOOKS:

1. English Conversation Practice – Grant Taylor, Tata Mc Graw-Hill Publishing Company Limited, New Delhi, 2007.
2. A series of 'ROBIN READERS' published by Orient Black Swan

INTERNET SOURCES:

1. www.flatmates.com
2. <https://learnenglish.britishcouncil.org/> (Learn English – British Council)

APPLIED PHYSICS LAB
(Common to CSE, CSE(AI&DS), CSE(AI&ML), CSE(CS))

Subject Code: UGBS1P0722

I Year / I Semester

L	T	P	C
0	0	3	1.5

Prerequisites: Knowledge on measuring instruments, electricity and magnetism.

Course Objectives:

1. Gain knowledge in various areas of physics to apply real time applications
2. Use fundamental techniques and skills of physics in modern engineering
3. Enhance analytical thinking and to improve problem solving techniques

Syllabus:

(Any 8 of the following listed 15 experiments can be done)

Experiment 1:

Determination of thickness of a spacer using wedge film and parallel interference fringes

Experiment 2:

Newton's rings – Radius of Curvature of Plano - Convex Lens

Experiment 3:

Determination of wavelength of a source-Diffraction Grating-Normal incidence

Experiment 4:

Determination of width of a slit using Laser diffraction

Experiment 5:

Determination of numerical aperture of a given optical fibre

Experiment 6:

Determination of Planck's constant using photo cell

Experiment 7:

Study the V-I characteristics of p-n junction diode

Experiment 8:

Study the V-I characteristics of Zener diode

Experiment 9:

Study the current characteristics of PIN diode

Experiment 10:

Energy Band gap of a Semiconductor p-n junction

Experiment 11:

Characteristics of Thermistor – Temperature Coefficients

Experiment 12:

Determination of Hall voltage and Hall coefficients of a given semiconductor using Hall effect

Experiment 13:

Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus

Experiment 14:

Study the variation of Magnetic induction (B) versus Magnetic field strength (H) by magnetizing the magnetic material (B-H curve)

Experiment 15:

Determination of dielectric constant by charging and discharging method.

Course Outcomes:

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

CO1: Apply the scientific knowledge to understand optical concepts.

CO2: Experiment with basic electronic circuits to understand their function.

CO3: Study the magnetic behaviour of materials.

Mapping of COs to POs:

POs	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	3	-	2	-	-	-	-	-	-	-	-
CO2	3	3	-	2	-	-	-	-	-	-	-	-
CO3	3	3	-	2	-	-	-	-	-	-	-	-

TEXT BOOKS:

1. "A Text book of Engineering Physics" by M.N. Avadhanulu, P.G. Kshirsagar - S. Chand Publications (2017)
2. "Engineering Physics" by R.K Gaur and S.L Gupta., - DhanpatRai publishers (2012)

PROBLEM SOLVING WITH 'C' LAB
(Common to All Branches)

Subject Code: UGCS1P0322

I Year / I Semester

L	T	P	C
0	0	3	1.5

Prerequisites: Basic knowledge on Mathematics and problem solving skills.

Course Objectives:

1. The students will learn to develop the programs for solving the basic problems using operators, control statements and loops.
2. The Students will be able to write programs using concepts like Arrays, Strings, Pointers and Functions.

List of Experiments:

EXP 1:

- a. Write a C program that will output your name and address using a separate printf() statement for each line of output.
- b. Modify your solution for the previous program so that it produces all the output using only one printf() statement.
- c. Write a C program to output the following text exactly as it appears here:
"C Programming....." she said.
- d. Write a C program that prompts the user to enter a distance in inches and then outputs that distance in yards and feet.
- e. Write a C program to convert the temperature from degree centigrade to Fahrenheit and vice versa.

EXP 2:

- a. Write a C program to find the largest of three numbers using nested if-else.
- b. Write a C Program to swap two numbers without using a temporary variable.
- c. Write a simple program based on operators (pre, post increment, bitwise and, or, etc.).
- d. Write a simple program based on type conversions (from int to float & float to int)

EXP 3:

- a. Write a C program that displays all the numbers from X to Y, that are divisible by a and b. (X, Y, a and b should be read from the keyboard)
- b. Write a C program that reads an unspecified number of integers, determines how many positive and negative values have been read, and computes the total and average of the input values, not counting zeros. Your program ends with the input 0. Display the average as a floating-point number. (For example, if you entered 1, 2, and 0, the average should be 1.5.)
- c. Write a C program for finding student Grade by reading marks as input.

EXP 4:

- The total distance travelled by vehicle in 't' seconds is given by distance $s = ut + \frac{1}{2}at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec²). Write a C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
- Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)
- Write a C Program to enter a decimal number, and calculate and display the binary equivalent of that number.

EXP 5:

- Write a C program to find the sum of individual digits of a positive integer and find the reverse of the given number.
- A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1, Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first 'n' terms of the sequence.
- Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

EXP 6:

- Write a C Program to check whether the given number is Armstrong number or not.
- Write C programs for the following series:

$$1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n}$$

$$\frac{1}{3} + \frac{3}{5} + \frac{5}{7} + \frac{7}{9} + \frac{9}{11} + \frac{11}{13} + \dots + \frac{95}{97} + \frac{97}{99}$$

- Write a C program to find the roots of a Quadratic equation.
- Write a C program to construct the following pyramid of numbers.

1	*	1	A
1 2	* *	2 3	B B
1 2 3	* * *	4 5 6	C C C
			D D D D
			E E E E E

EXP 7:

- Write a C program to find the minimum and maximum integer of an Array.
- Write a C program that uses functions to perform the following:
 - Addition of Two Matrices
 - Multiplication of Two Matrices

EXP 8:

- Write a C program to implement Linear Search.
- Write a C program to implement sorting of an array using bubble sort.

EXP 9:

- Write a C program to find length of the given string without using strlen().
- Write a C program that uses functions to perform the following operations:
 - To insert a sub-string into a given main string from a given position.
 - To delete n Characters from a given position in a given string.
- Write a C program to determine if the given string is a palindrome or not

EXP 10:

- Write a C program to swap two numbers using call by reference method.
- Write a C program that uses a pointer to read and display Array elements.
- Write a C program to create an array with `calloc()`, store the values into it and find their sum.

EXP 11:

- a. Write C programs that use both recursive and non-recursive functions
 - i. To find the factorial of a given integer.
 - ii. To find the GCD (greatest common divisor) of two given integers.
- b. Write C programs for implementing Storage classes: (Auto, register, static, extern)

EXP 12:

Examples that explore the use of structures and union.

EXP 13:

Handling file operations.

Course Outcomes:

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

- CO 1** Apply various skills in problem solving. **[L3]**
- CO 2** Analyze a given problem and develop an algorithm to solve it. **[L4]**
- CO 3** Implement different operations on arrays, functions, pointers, structures, unions and files. **[L4]**

Mapping of COs to POs :

[illegible]

TEXT BOOKS:

1. Byron Gottfried, Jitender Chhabra, Programming with C (Schaum's Outlines Series), McGraw Hill Publishers.
2. Yashawanth Kanethkar, Let us C, 8th Edition, Jones & Bartlett Publishers, India.

REFERENCE BOOKS:

1. Herbert Schildt, C: The Complete Reference, 4th Edition, Mc Graw Hill.
2. B. A. Fouruzan and R. F. Gilberg, Computer Science: A Structured Programming Approach using C, 3rd Edition, Thomson Publications, New Delhi.
3. Dennis Ritchie and Brian Kernighan, The C programming Language, Prentice Hall.

I YEAR
II SEMESTER

MATHEMATICS-II
(Common to All Branches)

Subject Code: UGBS2T0122
I Year / II Semester

L	T	P	C
3	0	0	3

Prerequisites: Basics of Differentiation and Integration.

Course Objectives:

- To assist the students in learning Fourier series expansions of various periodic functions and the corresponding Fourier Transform
- To train the students to deal with multiple integrals and improper integrals
- To prepare the students to learn the concepts of Vector calculus

Syllabus:

UNIT-I:

FOURIER SERIES

10 Hrs

Introduction, Determination of Fourier coefficients, Even and Odd functions, Change of Interval, Half range Sine and Cosine series.

UNIT-II:

FOURIER TRANSFORMS

10 Hrs

Fourier Integral Theorem (Without proof) Fourier Sine and Cosine Integrals, Sine and Cosine Transforms, Properties, Inverse Transforms.

UNIT-III:

MULTIPLE INTEGRALS

12 Hrs

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form). Change of variables (Cartesian to polar) for double integrals.

Evaluation of Triple Integrals: Change of variables for triple integrals, (spherical polar coordinates, cylindrical coordinates)

UNIT-IV:

VECTOR DIFFERENTIATION

10 Hrs

Vector point functions and scalar point functions. Gradient, Divergence and Curl, Directional derivative, Solenoidal and Irrotational Vectors. Vector identities (without proof).

Application: Scalar potential function

UNIT-V:**VECTOR INTEGRATION****10 Hrs**

Line, Surface and Volume Integrals. Green's, Gauss and Stoke's Theorems (without proofs) and their applications involving cubes, sphere and rectangular parallelepipeds.

Application: Work done by force as a line integral

Course Outcomes:

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

CO1: Find Fourier series expansion of various periodic functions(L2)

CO2: Represent a continuous function in Fourier integral form and hence find its Fourier Transform (L3)

CO3: Evaluate double and triple integrals in Cartesian and Polar coordinates over given regions (L3).

CO4: Determine the Gradient, Divergence and Curl of a vector field using vector differentiation(L4)

CO5: Evaluate vector integrals (Line, surface, volume) and justify the relation between them by integral theorems (L3)

Mapping of COs to POs:

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	-	-	-	-	-	-	-	3
CO2	3	3	3	2	-	-	-	-	-	-	-	3
CO3	3	3	3	2	-	-	-	-	-	-	-	3
CO4	3	3	3	2	-	-	-	-	-	-	-	3
CO5	3	3	3	2	-	-	-	-	-	-	-	3

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

REFERENCE BOOKS:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, 2008.
2. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
3. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
5. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, 2002.
6. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2013.

ENGINEERING CHEMISTRY
(Common to CSE, CSE(AI&DS), CSE(AI&ML), CSE(CS))

Subject Code: UGBS2T0422

I Year / II Semester

L	T	P	C
3	0	0	3

Prerequisites: Basic knowledge on Chemistry.

Course objectives:

- To provide basic building blocks of Engineering by coverage of advanced chemistry topics.
- To make the students learn about importance of nano and material chemistry.
- To introduce the basic principles of batteries, fuel cell construction and the importance of advanced polymers.

Syllabus:

UNIT-1: COMPUTATIONAL CHEMISTRY& CHEMINFORMATICS (15 Hours)

Computational chemistry: Introduction, Molecular Machines- Molecular switches, Molecular motors, characteristics of molecular machines, Artificial molecular machines-preparation of Rotaxanes and Catenanes and applications, linear motions in rotaxanes, molecular Elevators, Acid-Base catalysed molecular machines, Prototypes (Materialisation).

Cheminformatics: Docking- Kinds, approaches and Types, factors effecting docking, Key stages and applications, drug and receptor interaction, polarity of the molecule.

UNIT-2: CHEMIELECTRONICS (10 Hours)

Battery Chemistry – Introduction, Primary batteries-Zn/NH₄Cl, Alkaline battery and Hg/HgO Battery. Secondary batteries- Mercury cell, NiMH, Li-ion batteries. Fuel cells- H₂- O₂ fuel cells, Methanol – Oxygen fuel cell working and applications.

PCB'S-Electro plating, Electroless plating-Ni, Cu. Applications-Manufacturing of printed circuit boards by Electroless plating, Types of PCB'S- single sided, double sided, multilayered.

Liquid crystals- Introduction, types-Thermotropic and lyotropic, structure, and Applications- Working of Liquid crystal display (LCD).

UNIT-3: PHOTO AND LIGHT RESPONSIVE COMPOUNDS (10 Hours)

Sensors- Introduction, Characteristics of sensors. Types-Internal, external, active and passive. Electrochemical sensors (to detect the Carbon monoxide in the atmosphere), Biosensors - Characteristics and working of Glucose biosensor (Glucose monitoring in blood).

Storage devices- Introduction, primary and secondary storage devices, working of floppy, CD, Hard disk, Pen drive and applications.

UNIT-4: NON-CONVENTIONAL ENERGY RESOURCES (7 Hours)

Solar Energy – Introduction, Types of Solar cells – Concentrating and Non-concentrating solar cells. Harnessing of solar energy by solar Fresnel's, and PV cells. Construction, Working and Types of PV cells.

Hydropower - Working of hydro electrical power plant, Geothermal energy, Tidal power and, ocean thermal energy conversion (OTEC).

UNIT-5: MATERIAL CHEMISTRY (8 Hours)

Composite materials- Constituents of composites, classification based on Primary phase and secondary phase, Types - CFRP, GFRP & its applications.

Nano materials- Classification, Preparation, Properties and applications of Carbon Nano materials.

Advanced polymers- Preparation of poly lactic acid, PHBV, Polyvinyl alcohol, Properties and applications of Biodegradable polymers, conducting polymers- Classification and application.

Super conductors- Introduction, Type-I&II Super conductors, preparation of the 1-2-3-super conducting pellet ($\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$) and its applications.

Course Outcomes (COs):

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

CO1: Evaluate applicability of computational chemistry in Engineering. (L5)

CO2: Make use of the concepts in quantum chemistry and molecular mechanics for drug modelling. (L3)

CO3: Apply the working principles of batteries, fuel cells in Engineering. (L3)

CO4: Distinguish types of sensors based on the working principle. (L4)

CO5: Analyze various types of conventional and non- conventional energy resources. (L4)

CO6: Identify properties and applications of industrially important advanced materials. (L3)

Mapping of COs to POs:

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	3	3	-	-	-	-	3
CO4	-	-	-	-	-	3	3	-	-	-	-	3
CO5	-	-	-	-	-	3	3	-	-	-	-	3
CO6	-	-	-	-	-	3	3	-	-	-	-	3

TEXT BOOKS:

1. Text book of Engineering Chemistry by Jain & Jain. Dhanpat Rai Publishing Company, 16th edition, 2015.
2. A Text book of Engineering Chemistry by Shashi Chawla. Dhanpat Rai Publications, 3rd edition, 2013.
3. A text book of Organic Chemistry by Morrison and Boyd, 7th edition, Pearson publications.
4. Computational Chemistry by Dr. Parashuram mishra, Jagadamba publications.

REFERENCE BOOKS:

1. A Text book of Engineering Chemistry by S.S.Dara, S.Chand & Company Ltd., 12th edition. 2010.
2. A Text book of Engineering Chemistry Shika Agarwal, Cambridge, 2015.
3. A text book of Engineering Chemistry by Rath, Rama Devi, Reddy, Cengage Learning Indian pvt. Ltd., 2016.
4. A Text book of Chemistry, principles and applications by M.J.sienko and R.A.Plane.
5. Fundamentals of molecular spectroscopy by C.N.Banwell.
6. A Text book of Physical chemistry by P.W. Atkins.
7. A Text book of Organic Chemistry: structure and function by K.P.C.Volhardt and N.E. Schore, 5th edition.
8. A text book of Inorganic Chemistry by Dr.Wahid, U.Malik, S.Chand publication, Revised edition.
9. Computational Chemistry by Errol G. Lewis 2nd edition, Springer publications.
10. Essentials of Computational Chemistry Christopher J Cramer 2nd edition, Wiley.

COMPUTER ORGANIZATION AND ARCHITECTURE

Subject Code: UGCS2T0122

I Year / II Semester

L	T	P	C
3	0	0	3

Prerequisites: Familiarity with Digital Logic Design.

Course Objectives: Main objective of the course is to familiarize students about hardware design including logic design, basic structure and behavior of the various functional modules of the modern computer and how they interact to provide the processing needs of the user. It will cover machine level representation of data, instruction sets, computer arithmetic, CPU structure and functions, memory system organization and architecture, system input/output, multiprocessors, and digital logic.

Syllabus:

UNIT I: (8 Lectures)

Basic Structure of Computers: Computer types, functional unit, basic operational concepts, bus structures. Performance - Processor clock, basic performance equation, Pipe line and super scalar operation, clock rate.

Register Transfer Language and Micro Operations: Register Transfer Language, Register Transfer Bus and memory transfers, Arithmetic Micro operations, logical micro operations, shift micro operations, Arithmetic logic shift unit.

UNIT II: (10 Lectures)

Basic Computer Organization and Design: Instruction codes, Computer Register, Computer Instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions, Input-Output and Interrupt.

Central Processing Unit: General Register Organization, STACK Organization, Instruction formats, Addressing modes, Data transfer and manipulation, Program control

UNIT III: (12 Lectures)

Micro Programmed Control: Control memory, Address sequencing, Reduced Instruction Set Computer.

Computer Arithmetic: Addition and subtraction with Signed Magnitude Data - Hardware implementation, Hardware Algorithm, Multiplication Algorithms - Hardware Implementation for Signed-Magnitude Data, Hardware Algorithm, Booth Multiplication Algorithm, Division algorithms - Hardware implementation for Signed-Magnitude data.

UNIT IV: (8 Lectures)

The Memory System: Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory.

UNIT V:**(8 Lectures)**

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of transfer, Priority interrupt - Daisy Chaining Priority, Parallel Priority Interrupt, Direct memory access.

Course Outcomes:

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

CO1: Demonstrate the basic structure, organization and design of a computer.

CO2: Analyze the elements in the RTL and micro operations, CPU organization and micro-programmed controlled unit.

CO3: Experiment with numerous algorithms to perform computer arithmetic and logical operations and propose suitable hardware for them.

CO4: Classify different types of memory structures and organizations.

CO5: Utilize the design characteristics of I/O organization in the modern computer.

Mapping of COs to POs:

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

TEXT BOOKS:

1. M. Moris Mano, Computer System Architecture, 3rd ed, Pearson/PHI.
2. William Stallings, Computer Organization and Architecture, 6th ed, Pearson/PHI.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, Structured Computer Organization, 4th ed. PHI/ Pearson.
2. Sivaraama Dandamudi, Fundamentals of Computer Organization and Design, Springer Int. Edition. John L.Hennessy and David A.Patterson, Computer Organization a quantitative approach, 4th ed, Elsevier.
3. B. Ram, Computer Fundamentals Architecture and Organization, 5th ed., New Age International Publications.
4. Carl Hamacher, Zvonks Vranesic, SafeaZaky, Computer Organization, 5th ed, McGraw Hill.

PYTHON PROGRAMMING

Subject Code: UGCS2T0222

I Year / II Semester

L	T	P	C
3	0	0	3

Prerequisites: Basic knowledge on C programming.

Course Objectives:

- To learn about Python programming language syntax, semantics, and the runtime environment.
- To be familiarized with universal computer programming concepts like data types, containers.
- To be familiarized with general computer programming concepts like conditional execution, loops & functions.
- To be familiarized with general coding techniques and object-oriented programming.

Syllabus:

UNIT I: (8 Hrs)

Basics of Python Programming: Features of Python, Comparison with C, Python Virtual Machine, comments, indentation, literals, variables and identifiers, data types, operators, Input and Output Statements, type conversion, command Line Arguments.

Decision Control Statements: selection/conditional branching statements, basic loop structures, nested loops, break, continue and pass statements, else statement used with loops.

UNIT II: (10 Hrs)

Functions: Declaration and definition, calling a function, returning values from function, pass by object reference, Formal and actual arguments, Local and Global variables, recursive functions, lambda functions, Higher Order Function.

Data Structures: Strings and its operations, Lists: accessing and updating values in list, basic list operations and list methods, nested and cloning lists, list comprehensions, looping in lists, Tuples, Sets, Dictionaries and their operations.

UNIT III: (12 Hrs)

Classes and Objects: Introduction to Object Oriented Programming, classes and objects, Class method and self argument, __init__() method, class variables and object variables, __del__() method, other special method, public and private data members, built-in class functions and attributes, garbage collection, class and static methods.

Inheritance: Introduction, inheriting classes, types of inheritance, overriding methods, abstract classes and interfaces.

UNIT IV: (10 Hrs)

Modules: What are Modules, Modules and Files, Namespaces, Importing Modules, Module Built-in Functions, Packages.

Error and Exception Handling: Types of Errors, Exceptions, Handling Exceptions, types of exceptions, except block.

UNIT V: (10 Hrs)

Files: Introduction, Types of files, Opening and Closing files, Reading and Writing Files, Deleting files and Directory Methods.

Regular Expression Operations: Meta character in regular expression and Regular Expression Methods, Application of Regular Expression.

Course Outcomes:

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

- CO 1** Understand the Python syntax, semantics, basic programming constructs to be used to write the programs.[L2]
- CO 2** Utilize the methods of various data structures to manipulate the data. [L3]
- CO 3** Apply the appropriate Object-Oriented Programming principle for a given scenario.[L3]
- CO 4** Develop bug free applications by handling different types of exceptions. [L4]

Mapping of COs to POs:

POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-

TEXT BOOKS:

1. Reema thareja, Python Programming using problem solving approach, Oxford University Press.

REFERENCE BOOKS:

1. Dietel and Dietel, Python How to Program.
2. Kenneth A. Lambert, B.L. Juneja, Fundamentals of Python, Cengage Learning
3. Dr. R. Nageswara Rao, Core Python Programming , Dreamtech Press

DATA STRUCTURES

Subject Code: UGCS2T0322

I Year / II Semester

L	T	P	C
3	0	0	3

Prerequisites: Basic knowledge on C programming.

Course Objectives:

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

Syllabus:

UNIT I: (12 Lectures)

Introduction: Definition, Classification of Data Structures, Operations on Data Structures, Abstract Data Type (ADT), Preliminaries of algorithms, Time and Space complexity.

Searching: Linear search, Binary search.

Sorting: Insertion sort, Selection sort, Exchange (Bubble sort, quick sort), Merge sort algorithms

UNIT II: (8 Lectures)

Stacks: Introduction to Stacks, Array Representation of Stacks, Operations on Stacks, Applications - Infix to Postfix Conversion, Evaluating Postfix Expressions.

Queues: Introduction to Queues, Representation of Queues using Arrays, Implementation of Queues using Arrays, Circular Queues.

UNIT III: (12 Lectures)

Linked List: Introduction, Single linked list, Representation of Linked list in memory, Operations on Single Linked list - Insertion, Deletion, Search and Traversal, Reversing Single Linked list.

Polynomial Expression Representation, Stack and Queue using Single Linked List, Advantages and Applications on Single Linked list, Disadvantages of Single Linked list, Double Linked list-Insertion, Deletion, Circular Linked list-Insertion, Deletion.

UNIT IV: (10 Lectures)

Trees: Basic Terminology in Trees, Binary Trees: Properties, Representation of Binary Trees using arrays and linked lists, Binary Search Trees - Basic Concepts, Binary Search tree Operations: Insertion, Deletion, Tree Traversals(Recursive), Applications - Heap Sort.

UNIT V: (8 Lectures)

Graphs: Basic Concepts, Representations of Graphs - Adjacency Matrix and using Linked list, Graph Traversals (BFS & DFS), Applications - Minimum Spanning Tree Using Prims & Kruskal's Algorithm.

Course Outcomes:

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

- CO 1.** Choose the appropriate data structure and algorithm design method for a specified application [L2].
- CO 2.** Implement the operations like searching, insertion, deletion, traversing mechanism on various data structures. [L3]
- CO 3.** Solve problems using data structures such as linear lists, stacks, queues, binary trees and graphs and writing programs for these solutions. [L4]
- CO 4.** Evaluate algorithms and data structures in terms of time and space complexity of basic operations. [L5]

Mapping of COs to POs:

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

TEXT BOOKS:

1. Yeshavant Kanetkar, Data Structures through C, 2nd Edition, BPB Learning Pvt. Ltd.
2. Richard F, Gilberg, Forouzan, Data Structures, 2nd edition, Cengage.
3. Reema Thareja, Data Structures using C, 2nd edition, Oxford.

REFERENCE BOOKS:

1. Horowitz and Sahani, Fundamentals of Data Structures, Galgotia Publication
2. Jean-Paul Tremblay Paul G. Sorenson, An Introduction to Data Structures with Applications, 2nd edition, Mc Graw Hill Higher Education.
3. Seymour Lipschutz, Data Structure with C, TMH.
4. Mark Allen Weiss, Data structures and Algorithm Analysis in C, 2nd edition, Pearson Education. Ltd.
5. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein, Data Structures Using C and C++, PHI Publications.
6. Narasimha Karumanchi, Data Structures and Algorithmic Thinking, Career Monk publication.

PYTHON PROGRAMMING LAB

Subject Code: UGCS2P0422

I Year / II Semester

L	T	P	C
0	0	3	1.5

Prerequisites: Basic understanding of Computer Programming terminologies.

Course Objectives:

- To acquire programming skills in core Python.
- To acquire Object Oriented Skills in Python.

Experiments:

1. Write a program to demonstrate different representations of numbers in Python.
2. Write a program to perform different complex Arithmetic Operations on numbers in Python.
3. Develop programs to demonstrate decision making and looping structures in python.
4. Write a program to demonstrate working with lists in python.
5. Write a program to demonstrate working with tuples in python.
6. Write a program to demonstrate working with dictionaries in python.
7. Write a program to create a module by adding a method and import the module in the application.
8. Write a program to create user defined exception and handle the exception in the application.
9. Write a program to demonstrate how to create classes and objects in the application.
10. Write the programs to demonstrate the files operations in python.
11. Demonstrate the regular expression for different scenarios.

Case Studies:

1. Case study on Loops:

A perfect number is a number for which the sum of its proper divisors is exactly equal to the number. For example, the sum of the proper divisors of 28 would be $1 + 2 + 4 + 7 + 14 = 28$, which means that 28 is a perfect number. A number n is called deficient if the sum of its proper divisors is less than n and it is called abundant if this sum exceeds n . Write a program for the given large n , find the sum of all perfect numbers, sum of all deficient numbers and sum of abundant numbers separately. Print all perfect numbers along with its sum, deficient numbers along with its sum and abundant numbers along with its sum.

2. Case studies on Functions:

a) Write a function "remove_duplicates" which takes a string argument and returns a string which is the same as the argument except only the first occurrence of each letter is present. Make your function case sensitive.

b) Write a function `mult_lists(a, b)` that takes two lists of numbers of the same length, and returns the sum of the products of the corresponding elements of each.

c) Write a function called `flatten_list` that takes as input a list which may be nested, and returns a non-nested list with all the elements of the input list.

3. Case study on modules:

Create a module "Prime" to include the following functions.

a) `isPrime(number)` : returns Boolean whether the given number is prime number or not.

b) `isPalindromePrime(number)` : returns Boolean whether the given number is prime with palindromic. Example 131 is a palindromic prime.

c) `isEmirp(number)` : returns Boolean whether the given number and its reversal number are also prime numbers. Example 17 and 71 are both Emirps.

d) `mersennePrime(p)`: returns $2^p - 1$ value for given integer p if it is prime number.

e) `printTwinPrimes(range)` : prints all twin prime numbers below given range.

Write a test program to import the Prime module and perform the following operations using the functions of Prime module.

- Prints first 100 prime numbers.
- Prints first 100 Palindrome prime numbers.
- Prints first 100 Emirp numbers.
- Prints all Mersenne prime numbers for the p value below 32.
- Prints all twin prime numbers below 1000.

4. Case study on Lists:

Counting the occurrence of each letter.

The program counts the occurrence of each letter among 100 letters.

Procedure

- Generates 100 lowercase letters randomly and assigns them to a list of characters, named **chars**. You can obtain a random letter by using the **getRandomLowerCaseLetter()** function in the **RandomCharacter** module. (Import RandomCharacter module into your program)

- Counts the occurrences of each letter in the list. To do so, it creates a list named **counts** that has 26 **int** values, each of which counts the occurrences of a letter. That is, **counts[0]** counts the number of times **a** appears in the list, **counts[1]** counts the number of time **b** appears, and so on.

<code>chars[0]</code>		<code>counts[0]</code>	
<code>chars[1]</code>		<code>counts[1]</code>	
...	...	...	...
...	...	...	...
<code>chars[98]</code>		<code>counts[24]</code>	
<code>chars[99]</code>		<code>counts[25]</code>	

5. Case study on Classes:

Design a class named QuadraticEquation for a quadratic equation $ax^2+bx+c=0$. The class contains:

- The private data fields a, b, c that represents three coefficients.
- A constructor for the arguments for a, b and c
- Three get methods for a, b and c
- A method named getDiscriminant() that returns the discriminant, which is b^2-4ac .
- The methods named getRoot1() and getRoot2() for returning the two roots of the equation using the formulas:
 $R1 = -b + (\sqrt{b^2-4ac})/2a$ and $R2 = -b - (\sqrt{b^2-4ac})/2a$.
- These methods are useful only if the discriminant is non negative. Let these methods return 0 if the discriminant is negative.
- Write a test program that prompts the user to enter values for a, b, c and displays the result based on discriminant.

Course Outcomes:

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

- CO 1.** Understand python programming structure for solving basic programming problems. [L2]
- CO 2.** Use primitive data types, selection statements, loops, function, and classes to write programs. [L3]
- CO 3.** Develop programs for a given scenario. [L3]
- CO 4.** Analyze different data structures and choose suitable one for a given problem. [L4]

Mapping of COs to POs:

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-

TEXT BOOKS:

1. Reema thareja, Python Programming using problem solving approach, Oxford University Press, 1st Edition.
2. Kenneth a. lambert, B.L. Juneja, Fundamentals of Python, Cengage Learning, 1st Edition.
3. Chun, J Wesley, Core Python Programming, 2nd Edition, Pearson.

REFERENCE BOOKS:

1. Dietel and Dietel, Python How to Program, 1st Edition.
2. Barry, Paul, Head First Python, 2nd Edition, O Rielly.
3. Lutz, Mark, Learning Python, 4th Edition, O Rielly.

ENGINEERING CHEMISTRY LAB
(Common to CSE, CSE(AI&DS), CSE(AI&ML), CSE(CS))

Subject Code: UGBS2P0822

I Year / II Semester

L	T	P	C
0	0	3	1.5

Prerequisites: Basic knowledge on Chemistry.

Course Objectives:

- To provide the students with a solid foundation in Chemistry laboratory required to solve engineering problems.
- To understand the principles of engineering chemistry associated with basics of Engineering.

List of Experiments:

1. Determination of suitable binding pose of drug and receptor by mcule online free software (Molecular Modeling-1).
2. Determination of suitable binding pose of drug and receptor by mcule online free software (Molecular Modeling-2).
3. Construction of Electrochemical cell.
4. Identification of unknown amino acids using thin layer chromatography.
5. Preparation of Bio-degradable polymer.
6. Determination of concentration of an unknown solution using conductance.
7. Potentiometric determination of strong acid vs strong base.
8. Determination of Ferrous ion by colorimetric method.
9. Determination of pH content in soft drinks and write a program based on the result and student should compare with standard values.
10. Estimation of vitamin-C in the given solution.

Course Outcomes:

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

CO1: Illustrate the computational chemistry to design a drug/molecule. (L2)

CO2: Illustrate the basic knowledge on volumetric and electrochemical analysis. (L3)

CO3: Interpret cell constant and reduction potentials of electrolytes. (L3)

CO4: Evaluate the Physical and chemical properties of solutions used in Engineering. (L5)

Mapping of COs to POs:

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C01	3	3	-		-	-	-	-	-	-	-	-
C02	3	3	-	3	-	-	3	-	-	-	-	3
C03	3	-	-	3	-	-	3	-	-	-	-	-
C04	-	-	3	-	-	3	-	-	-	-	-	-

TEXT BOOK:

Computational Chemistry: A Practical Guide for Applying Techniques to Real World Problems by David Young (Author), Wiley publications.

DATA STRUCTURES LAB

Subject Code: UGCS2P0522

I Year / II Semester

L	T	P	C
0	0	3	1.5

Prerequisites: Knowledge on C language to implement the data structures.

Course Objectives:

Demonstrate the different data structures implementation.

List of Experiments:

Exercise 1:

- a) Write a C program that implements Bubble sort, to sort a given list of integers in ascending order.
- b) Write a C program that implements Selection sort, to sort a given list of integers in ascending order.
- c) Write a C program that implements Insertion sort, to sort a given list of integers in ascending order.

Exercise 2:

- a) Write a C program that implements Quick sort, to sort a given list of integers in ascending order.
- b) Write a C program that implements Merge sort, to sort a given list of integers in ascending order.

Exercise 3:

- a) Write a C program that implements Stack (its operations) using arrays.
- b) Write a C program that uses Stack operations to convert infix expression into postfix expression.

Exercise 4:

- a) Write a C program that implements Queue (its operations) using arrays.
- b) Write a C program that implements Circular Queue (its operations) using arrays.

Exercise 5:

- a) Write a C program that uses functions to create a singly linked list and its operations(insert, delete, search and reverse).

Exercise 6:

- a) Write a C program that implements Stack (its operations) using Linked list.
- b) Write a C program that implements Queue (its operations) using Linked list.

Exercise 7:

- a) Write a C program to create a Circular Linked list and its operations(insert, delete and search).
- b) Write a C program to create a Doubly Linked list and its operations(insert, delete and search).

Exercise 8:

- a) Write a C program to create a Binary Search Tree and traverse the tree in pre-order, in-order and post-order.

Exercise 9:

- a) Write a C program to perform BFS and DFS traversal on given graph.

Course Outcomes:

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

- CO 1.** Apply recursive and iterative methodologies to solve complex engineering problems.
- CO 2.** Implement various searching and sorting techniques on the given set of data elements.
- CO 3.** Develop solutions to implement operations of linear and nonlinear data structures.
- CO 4.** Apply suitable data structure for a given real time scenario.

Mapping of COs to POs:

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

TEXT BOOKS:

1. Debasis Samanta, Classic Data Structures, 2nd Edition, PHI Learning Pvt. Ltd.
2. Richard F, Gilberg, Forouzan, Data Structures, 2nd edition, Cengage.
3. Reema Thareja, Data Structures using C, 2nd edition, Oxford.

REFERENCE BOOKS:

1. Jean-Paul Tremblay Paul G. Sorenson, An Introduction to Data Structures with Applications, 2nd edition, McGraw Hill Higher Education
2. Seymour Lipschutz, Data Structure with C, TMH
3. Mark Allen Weiss, Data structures and Algorithm Analysis in C, 2nd edition, Pearson Education. Ltd.
4. Narasimha Karumanchi, Data Structures and Algorithmic Thinking, Career Monk publication.

INDIAN CONSTITUTION
(Common to CSE, CSE(Cyber Security), ECE & EEE)

Subject Code: UGBS2A1022

I Year / II Semester

L	T	P	C
2	0	0	0

Prerequisites: Basic knowledge about fundamental rights and role of state and central governments.

Course Objectives:

- To understand fundamental rights and its implications.
- To enable an understanding of the nature and basic foundations of Indian constitution.
- To impart knowledge about the state and central policies, electoral process, amendments and provisions.

Syllabus:

UNIT-I: 5 hours

Introduction to Indian Constitution

Meaning of the term Indian Constitution – Preamble - Constituent Assembly - Salient Features of Indian Constitution.

UNIT-II: 5 hours

Fundamental Rights

Fundamental Rights - Fundamental Duties - The Directive Principles of State Policy.

UNIT-III: 6 hours

Union Government

Union Legislature (Parliament) - Lok Sabha and Rajya Sabha (with Powers and Functions) - Union Executive - President of India (with Powers and Functions) - Prime Minister of India (with Powers and Functions) - Union Judiciary (Supreme Court) -Jurisdiction of the Supreme Court.

UNIT-IV: 6 hours

State Government

State Legislature (Legislative Assembly / Vidhan Sabha, Legislative Council / Vidhan Parishad) - Powers and Functions of the State Legislature - State Executive - Governor of the State (with Powers and Functions) - The Chief Minister of the State (with Powers and Functions) - State Judiciary (High Courts).

UNIT-V: 6 hours

Local Self Governance

Powers and functions of Municipalities, Panchayats, ZPs and Co-operative Societies.

Sovereign Bodies

Election Commission of India (with Powers and Functions) - The Union Public Service Commission (with Powers and Functions).

Course Outcomes:

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

CO1: Simplify the emergence and evolution of Indian Constitution. (L4)

CO2: Summarize the structure and composition of Indian Constitution. (L2)

CO3: Illustrate and analyze the three organs of the state in the contemporary scenario.(L2)

CO4: Examine the fundamental rights and duties of Indian citizens with a study of the significance and status of directive principles. (L4)

CO5: Explain the concept of sovereignty and understand the electoral process and its provisions.(L2)

CO6: Infer and assess the important institutions of the Indian union.(L2)

CO7: Analyze the successful functioning of Democracy in India (L4)

Mapping of COs to POs:

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	-	-	-	-	-	3	3	-	-	-	-	-
CO2	-	-	-	-	-	3	3	-	-	-	-	3
CO3	-	-	-	-	-	3	3	3	-	-	-	3
CO4	-	-	-	-	-	3	3	-	-	-	-	-
CO5	-	-	-	-	-	3	-	3	-	-	-	3
CO6	-	-	-	-	-	-	-	3	-	-	-	3
CO7	-	-	-	-	-	-	-	3	-	-	-	3

TEXT BOOKS:

1. Introduction to Constitution of India, Durga Das Basu, Lexis Nexis Publications
2. Constitution of India by Professional Book Publications
3. The Constitution of India by Arun K Tiru Vengadam, Blooms Bury Publishers
4. The Constitution of India by PM Bakshi, Universal Law Publishing Co.
5. The Constitution of India by S R Bhansali, Universal Law Publishing Co.

II Year

I Semester

DISCRETE MATHEMATICS

Subject Code: UGBS3T0822

II Year / I Semester

L	T	P	C
3	0	0	3

Prerequisites: Basic knowledge in Mathematics.

Course Objectives: This course will introduce number theory and operations on sets and relations. It acquires the relevance of statements, inference and predicates in computer science. It gives overview of algebraic structures and exposure to graph theory.

Syllabus:

UNIT I: (12 Lectures)

Mathematical Logic:

Propositional Calculus: Statements and Notations, Connectives, Truth Tables, Tautologies, Equivalence of Formulas, Duality law, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises, Indirect Method of Proof.

Predicate calculus: Predicative Logic, Statement Functions, Variables and Quantifiers, Free & Bound Variables, Inference theory for predicate calculus.

UNIT II: (8 Lectures)

Set Theory : Introduction, Operations on Sets, Relations: Properties of Binary Relations, Relation Matrix and Graph of relation, Operations on Relations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering Relations, Lattice as Partial Ordered set, Hasse Diagrams.

UNIT III: (12 Lectures)

Combinatorics: Basics of Counting, Permutations, Permutations with Repetitions, Circular Permutations, Restricted Permutations, Combinations, Restricted Combinations. Binomial and Multinomial Theorems, Binomial and Multinomial Coefficients, Principle of Inclusion–Exclusion.

UNIT IV: (8 Lectures)

Algebraic Structures : Binary Operation, Algebraic Structure, Properties, Algebraic Systems with one Binary Operation, Semi group, Monoid and group with examples.

UNIT V: (12 Lectures)

Graph Theory: Basic Concepts of Graphs, Graph theory and it's applications, Sub graphs, Bipartite and Planar graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and

Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula (Theorems without proofs)

Course Outcomes:

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

CO1: Demonstrate inference theory of mathematical logic (L3)

CO2: Illustrate the fundamentals of set theory, relations, functions and graphs(L3)

CO3: Identify and examining the basic counting techniques(L2)

CO4: Classify algebraic structures based on the properties(L2)

CO5: Compare various graph theory concepts to suit real time applications(L3)

Mapping of COs to POs:

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

TEXT BOOKS:

1. Tremblay, Manohar, Discrete Mathematical Structures with Applications to Computer Science, TMH.
2. Mott, Kandel, Baker, Discrete Mathematics for Computer Scientists & Mathematicians, 2/e, PHI.

REFERENCE BOOKS:

1. Kenneth H. Rosen, Discrete mathematics and its applications, TMH
2. JK Sharma, Discrete Mathematics, 2/e, Macmillan.
3. Swapan Kumar Chakraborty, Bikash Kanti Sarkar, Discrete Mathematics, Oxford.
4. Biswal, Discrete Mathematics and Graph theory, 3rd ed, PHI.
5. CRC Press, Discrete Mathematics, Proofs, Structures and applications, 3rd ed.
6. S.Santha, Discrete Mathematics, Cengage.

COMPUTER NETWORKS

Subject Code: UGCS3T0822

II Year / I Semester

L	T	P	C
3	0	0	3

Prerequisites: Familiarity with Computer Organization and Architecture.

Course Objectives: Students will be able to master in the computer network terminology and concepts of the OSI model and the TCP/IP model, summarize with wired and wireless networking concepts and routing protocols, and solve current issues in networking technologies.

Syllabus:

UNIT I: (9 Lectures)

Introduction: Data Communication - Components, Representation of data and its flow; Uses of Computer Networks, Networks – Network Criteria, Physical Structures; Categories of Networks - LAN, WAN, MAN; Protocols and Standards; Network Models - OSI model, TCP/IP Model.

Physical Layer: Transmission media – Guided media, Unguided media; Multiplexing - Frequency division, Time division.

UNIT II: (9 Lectures)

Data Link Layer: Data link layer design issues – Services provided to the network layer, Framing, Error control, Flow control; Error Detection and Error Correction – Error correcting codes, Error detecting codes; Data link layer protocols - Stop and wait, Sliding window protocols (Go back – N, Selective Repeat); Wired LANs, Wireless LANs, Bridge, Switch.

UNIT III: (8 Lectures)

Medium Access Sub Layer: Channel allocation problem, dynamic channel allocation in LANs and MANs; Multiple access protocols - Pure ALOHA, Slotted ALOHA, CSMA/CD; Collision free protocols – A bit map protocol, Binary countdown. LAN Standards - 802.3, 802.5; Bridges – Transparent bridges, Source routing bridges; Wireless LANs – 802.11, Architecture; MAC sub layer, frame format.

UNIT IV: (10 Lectures)

Network Layer: Network layer design issues – services provided to the transport layer, virtual circuit and datagram subnets; Routing algorithms – The optimality principle, shortest path routing, Flooding, Distance vector routing, Link state routing, Hierarchical routing, Broadcast routing, Multicast routing.

Internetworking – Tunneling, fragmentation, firewall, IP Addressing, IPV4 Addressing, IPV6 Addressing, subnets, ICMP; Address mapping – ARP, RARP, BOOTP and DHCP.

UNIT V:**(12 Lectures)**

Transport Layer: Services provided to upper layer, Quality of Service, Elements of transport protocols – Establishing connection, Releasing connection; User Datagram Protocol (UDP) and its frame format, Transmission Control Protocol (TCP) and its frame format; TCP congestion control - Leaky Bucket and Token Bucket algorithm.

Application Layer: Domain Name System (DNS), TELNET(Remote Login), EMAIL(SMTP,POP3), File Transfer Protocol (FTP), HTTP.

Course Outcomes:

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

CO 1. Interpret the principles of networking protocols and standards, and identify different concepts of layered architectures in networking.

CO 2. Understand the design issues and classify the different framing methods and various multiple access protocols.

CO 3. Analyze various routing algorithms to find optimum routing path, classify various routing protocols and analyze how to assign IP addresses for the devices in the network.

CO 4. Analyze the functionality of transport layer and to demonstrate how to control the congestion.

CO 5. Demonstrate working functionalities of various application layer protocols and design various applications using these protocols.

Mapping of COs to POs:

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	3	-	-	-	-	-	-	-	-	-	-

TEXT BOOKS:

1. Andrew S. Tanenbaum, Computer Networks, 5th Edition, Pearson New International Edition.
2. Behrouz A. Forouzan, Data Communication and Networking, 5th Edition, McGraw-Hill.

REFERENCE BOOKS:

1. William Stallings, Data and Computer Communication, 8th Edition, Pearson Prentice Hall India.
2. Douglas Comer, Internetworking with TCP/IP, Volume 1, 6th Edition, Prentice Hall of India.
3. W. Richard Stevens, TCP/IP Illustrated, Volume 1, Addison-Wesley, United States of America.

OPERATING SYSTEMS

Subject Code: UGCS3T0222

II Year / I Semester

L	T	P	C
3	0	0	3

Prerequisites: Familiarity with Data Structures and Computer Organization & Architecture.

Course Objectives:

The course teaches the basic operating system abstractions, mechanisms, and their implementations. The core of the course contains concurrent programming and inter process communication. Also, gives insight to the concepts including file systems, virtual memory and disk management.

Syllabus:

UNIT I: (8 lectures)

Introduction: What is Operating System, Main Frame Systems, Multiprocessor systems, Distributed system, Clustered system, Real time systems, Hand held systems, Computer System Operations, Storage Structure, IO structure, OS Services, System Calls, System Structure, Virtual Machines, Case study: Microsoft Windows Overview, Traditional and modern Unix Systems.

UNIT II: (8 lectures)

Process Management: Process concept, Process scheduling, Operations, Inter process communication, Multi Thread programming models. Process scheduling criteria and algorithms (FCFS, SJF, Priority, RR, Multilevel queue Scheduling), and their evaluation.

UNIT III: (10 lectures)

Process Synchronization: The Critical-Section problem, Peterson's Solution, Synchronization Hardware, Semaphores, Monitors, Classical problems of synchronization.

Deadlocks: System Model, Deadlock Characterization, Deadlock Prevention, Deadlock Avoidance, Banker's algorithm, Deadlock Detection and Recovery from deadlock.

UNIT IV: (8 lectures)

Memory Management: Contiguous memory allocation, Paging, Swapping, Segmentation, Virtual memory: Demand paging, Page replacement algorithms, Allocation of Frames, Thrashing.

UNIT V: (8 lectures)

File Management: File concepts, Access methods, Directory structure, File system

structure, File system operations, Directory implementation, Allocation methods, Free-space management, Efficiency and performance.

Disk Management: Disk structure, Disk scheduling, Disk Management, RAID structure.

Course Outcomes:

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

CO1. Demonstrate the basic concepts of Operating Systems.

CO2. Analyze various process management concepts and memory management strategies.

CO3. Apply various process scheduling algorithms, page replacement algorithms and deadlock detection and avoidance techniques.

CO4. Analyze file management and disk management aspects of operating systems.

Mapping of COs to POs:

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

TEXT BOOKS:

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Operating System Concepts, 10th edition, John Wiley.
2. Stallings, Operating Systems-Internal and Design Principles, Pearson education.

REFERENCE BOOKS:

1. D.M. Dhamdhere, Operating systems- A Concept based Approach, TMH.
2. Crowley, Operating System A Design Approach, TMH.
3. Andrew S Tanenbaum, Modern Operating Systems, PHI.
4. Gary J. Nutt, Operating Systems: A Modern Perspective, Addison-Wesley.
5. http://nptel.iitm.ac.in/courses/Webcourse-contents/IISc-BANG/Operating%20Systems /New_index1.html

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Subject Code: UGCS3T0322

II Year / I Semester

L	T	P	C
3	0	0	3

Prerequisites: Knowledge in C programming language.

Course Objectives: To teach the basic concepts and techniques which form the object oriented programming paradigm. Student completing the course should know the model of object oriented programming, Fundamental features of Java such as class, object, interface, exception, multithreading and libraries of object collections and build applications using Applet and swing components.

Syllabus:

UNIT I: (8 Lectures)

Introduction to OOP: Need of object oriented programming, principles of object oriented programming, OOP languages and Applications, history of JAVA, Java Virtual Machine, Java features.

Programming Constructs: Primitive data types, Identifiers - Naming Conventions, Keywords, Literals, Operators - Binary, Unary and Ternary, Expressions, Primitive Type conversion and casting, Control statements, Arrays.

UNIT II: (8 Lectures)

Classes and Objects: Classes, Objects, Creating objects, methods, method overloading, class variable and methods, static keyword, this keyword, Constructors: constructor overloading, cleaning up unused objects - Garbage collector, Command line arguments, String and StringTokenizer, Wrapper Classes.

UNIT III: (8 Lectures)

Inheritance: Types of Inheritance, deriving classes using extends keyword, super keyword, method overriding, abstract class, final keyword.

Interfaces: Creating Interface and implementing Interface, Extending Interface, Interface Vs Abstract class.

Packages: Creating Packages, using Packages, Access protection.

UNIT IV: (8 Lectures)

Exceptions: Exception handling techniques - try...catch, throw, throws, finally block, user defined Exceptions.

Multithreading: Java.lang.Thread, the main Thread, creation of new Threads, multiple Threads, Thread priority, Synchronization.

The Collections Framework: Collections Overview, The Collection Interfaces - Collection, List, Set and SortedSet, The Collection Classes - ArrayList, HashSet and TreeSet, HashMap, Accessing a Collection via an Iterator.

UNIT V: (8 Lectures)

Event Handling: Delegation Event Model, Events, Event Sources, Event Listeners, Adapter classes, Inner classes.

Swing Components: Swing Components hierarchy, Layout Managers, JFrame, JButton, JTextField, JPasswordField, JTextArea, JList, JComboBox, JCheckBox, JRadioButton.

Course Outcomes:

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

CO 1. Summarize the object oriented programming principles and various Java programming constructs such as data types, operators and control structures.[L2]

CO 2. Apply the concepts of classes, objects and their relationship in solving the computational problems. [L3]

CO 3. Analyze the usage of interfaces, packages, exception handling, and multithreading. [L4]

CO 4. Develop the GUI applications for the end users using applets and swings with event handling.[L5]

Mapping of COs to POs:

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

TEXT BOOKS:

1. Herbert Schildt, Java The Complete Reference, McGraw Hill.

REFERENCE BOOKS:

1. P.J.Dietel, Java for Programming, Pearson Education.
2. P.Radha Krishna, Object Oriented Programming through Java, Universities Press.
3. Bruce Eckel, Thinking in Java, Pearson Education.
4. S.Malhotra and S.Choudhary, Programming in Java, Oxford University Press.
5. Kathy Sierra and Bert Bates, "Head first java", O'Reilly.

SOFTWARE ENGINEERING

Subject Code: UGCS3T0422

II Year / I Semester

L	T	P	C
3	0	0	3

Prerequisites: Familiarity with at least one computer programming language.

Course Objectives:

In this course,

1. The student learns and gain practical experience with software engineering principles and techniques.
2. The practical experience centers on team project in which a software development project is carried through the various stages of the software lifecycle.

Syllabus:

UNIT I: (6 Lectures)

Introduction to Software Engineering: The Evolving Role of Software, Changing Nature of Software, Software Myths.

The Software Problem: Cost, Schedule and Quality, Scale and Change.

UNIT II: (8 Lectures)

Software Process: Process and Project, Component Software Process, Software Development Process Models : Waterfall Model, Prototyping, Iterative Development, Relational Unified Process, Time Boxing Model, Extreme Programming and Agile Process, Using process models in a Project, Project Management Process.

UNIT III: (7 Lectures)

Software Requirement Analysis and Specification: Value of Good SRS, Requirement Process, Requirement Specification.

Functional Specifications with use-cases, Other approaches for analysis, Validation.

UNIT IV: (7 Lectures)

Planning a Software Project: Effort Estimation, Project Schedule and Staffing, Quality Planning, Risk Management Planning, Project Monitoring Plan, Detailed Scheduling.

Software Architecture and Design: Role of Software Architecture, Components and Connector View, Characteristics of Good Design, Design Principles, Modular Design, Design Methodologies, Detailed design.

UNIT V: (7 Lectures)

Software Implementation and Testing: Coding Techniques, Structural and Object Oriented, Software Quality, CMM Levels, Testing Concepts, Black-Box and White-Box Testing, Art of Debugging.

Course Outcomes:

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

- CO 1.** Make use of the software development life cycle principles and process models.[L3]
- CO 2.** Construct the software requirements specifications with relevant use-cases.[L3]
- CO 3.** Analyze the project management strategies and various components to build the architecture using suitable design strategies.[L4]
- CO 4.** Estimate the best coding standards and testing strategies to develop high quality software products.[L5]

Mapping of COs to POs:

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

TEXT BOOKS:

1. Pankaj Jalote, A Concise Introduction to Software Engineering (Undergraduate Topics in Computer Science), Springer International Edition.
2. Roger S Pressman, "Software Engineering – A Practitioner's Approach", 7th Edition, McGrawHill.
3. Ugrasen Suman, Software Engineering Concepts and Practices, Cengage Learning Publications.

REFERENCE BOOKS:

1. K.K.Agarwal & Yogesh Singh. Software Engineering, New Age International Publishers.
2. Rajesh Naik and Swapna Kishore: Software Requirements and Estimation, 1st edition, Tata Mc Graw Hill.
3. Waman S Jawadekar , Software Engineering Principles and Practice, Tata Mc Graw Hill.
4. Ian Sommerville, "Software Engineering", 9th Edition, Pearson Education.

OBJECT ORIENTED ANALYSIS & DESIGN AND SECURE CODING LAB

Subject Code: UGCS3P0922

II Year / I Semester

L	T	P	C
0	0	3	1.5

Prerequisites: Basic understanding of Software Engineering and Object Oriented Programming paradigms.

Course Objectives: The focus of the course is to give basic knowledge on the concepts of Object Oriented Analysis & Design and Secure coding. It will facilitate the students to learn Unified Modeling Language that enables to create UML Diagrams to visualize, specify, construct, and document the artifacts of a real world software intensive system in Multiple Views. It also gives an outline of the techniques for developing a secure application.

Part-A : Object Oriented Analysis & Design

List of Case Studies:

- 1) Online Reservation System
- 2) Student Marks Analysis System
- 3) Library Management System

List of Experiments:

- 1) Draw Use case diagrams for above case studies.
- 2) Draw Class diagrams for above case studies.
- 3) Draw Object diagrams for above case studies.
- 4) Draw Sequence diagrams for above case studies.
- 5) Draw Collaboration diagrams for above case studies.
- 6) Draw Activity diagrams for above case studies.
- 7) Draw State chart diagrams for above case studies.
- 8) Draw Component diagrams for above case studies.
- 9) Draw Deployment diagrams for above case studies.

Part-B : Secure Coding

List of Experiments:

1. Identifying Security Vulnerabilities in C Programming.
2. Exploiting and Securing Vulnerabilities in Java Applications.
3. Monitor Internet connections and scan all networks devices with Zabbix.
4. Implementation of Automate Phishing Emails with GoPhish
5. Use a Python hacking tool (Sherlock) to find social media accounts.
6. Implementing Access Controls for Remote Employees in an Organization.

Course Outcomes:

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

CO1: Interpret software requirements of various real-time applications.

CO2: Construct structural elements of the application in terms of object-oriented-design.

CO3: Classify the modelling of interaction diagrams of the application to represent functionalities of a software system.

CO4: Develop secure software applications.

CO5: Apply code analysis tools to discover coding flaws and vulnerabilities.

Mapping of COs to POs:

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

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobso, The Unified Modeling Language User Guide, Pearson Education.
2. Mark G. Graff, Kenneth R. Van Wyk, Secure Coding: Principles and Practices, O'Reilly Media, Inc.

REFERENCE BOOKS:

1. Meilir Page-Jones, Fundamentals of Object-oriented Design in UML, Pearson Education.
2. Martina Seidl, Marion Scholz, Christian Huemer, Gerti Kappel, UML@Classroom - An introduction to Object-Oriented Modeling, Springer.
3. Robert C. Seacord, Secure Coding in C and C++, Addison-Wesley Professional

LINUX PROGRAMMING LAB

Subject Code: UGCS3P0622

II Year / I Semester

L	T	P	C
-	-	3	1.5

Prerequisites: Familiarity with operating systems and C programming.

Course Objectives: This course explains the fundamental ideas behind the open source operating system approach to programming. Knowledge of Linux helps to understand OS level programming. This course involves basics commands, shell scripting, file processing, sockets, and IPCs. Along, with this the students, will gain practical experience with designing and implementing concepts of operating systems such as system calls, CPU scheduling, process management, memory management, file systems and deadlock handling etc.

List of Experiments:

1. Study of Linux general purpose utility command list and vi editor.
2. Study of Linux user & session management commands, file system navigation commands.
3. Study of Linux, text processing tools, communication commands, Shell Script, Bash shell, Bourne shell and C shell in Linux operating system.
4. A) Write a shell script that accepts a file name, starting and ending numbers as arguments and displays all the lines between the given line numbers.
B) Write a shell script that deletes all lines containing the specified word in one or more files supplied as arguments to it.
5. A) Write a shell script that displays a list of all files in the current directory to which the user has read, write and execute permissions.
B) Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
6. A) Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
B) Write a shell script to list all of the directory files in a directory.
7. Write a shell script to find factorial of a given number.
8. Write a C Program that makes a copy of a file using standard I/O and system calls.
9. A) Write a C program to list files in a directory.
B) Write a C program that illustrates two processes communicating using shared memory.
10. Write a program to implement the FCFS and Round Robin CPU Scheduling Algorithms.
11. Write a program to implement the SJF and Priority Scheduling CPU Scheduling Algorithms.
12. Write a program to simulate the Page Replacement Algorithms like FIFO/LRU/Optimal replacement algorithms.

Course Outcomes:

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

CO1: Demonstrating the basic knowledge of Linux commands and system calls.

CO2: Planning and modeling towards application programs in shell environment.

CO3: Constructing and get familiarized to process and memory management algorithms.

Mapping of COs to POs:

POs/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-

TEXT BOOKS:

1. Beginning Linux Programming, 4th Edition, N. Matthew, R.Stones, Wrox, Wiley India Edition
2. Sumitabha Das, "Unix concepts and applications" ,TMH Publications.
3. Yashwanth Kanetkar , "Shell programming".
4. Abraham Silberchatz, Peter B.Galcin, Greg Gagne, Operating System Concepts, 8th Edition, John Wiley.

REFERENCE BOOKS:

1. Linux System Programming, Robert Love, O'Reily, SPD
2. Unix and Shell Programming, B.A.Forouzan & R.F.Gilberg, Cengage Learning.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Subject Code: UGCS3P0722

II Year / I Semester

L	T	P	C
0	0	3	1.5

Prerequisites: Students must be familiar with C programming Language.

Course Objectives: The students will learn the following:

1. Java programming language: its syntax, idioms, patterns and styles.
2. Object oriented concepts in Java.
3. How exception handling and multithreading makes Java robust.
4. Building applications using swing.

List of Experiments:

1. Write Java programs to demonstrate the following
 - a) Reading data from keyboard and display the data on console.
 - b) Creating and casting of variables.
 - c) Use of command line arguments.
2. Write a Java program that uses arithmetic operators, unary operators and conditional operator.
3. Write Java programs that illustrate Selection statements, looping statements and labelled break and continue statements.
4. Write a program to demonstrate 1-D array.
5. Write a program to perform operations on Matrix using 2-D Arrays..
6. Write a program to implement a class with data members and methods.
7. Write a program to demonstrate 'this' keyword usage in the class.
8. Write a program that illustrates String and StringBuffer classes.
9. Write a program to demonstrate the Constructors with and without parameters.
10. Write a program to demonstrate the static members in the class.
11. Write a program to implement method overloading concept.
12. Write a program to implement Single and Multi level Inheritance.
13. Write a program to implement method overriding.
14. Write a program to illustrate the final keyword.
15. Write a program to implement multiple inheritance using interfaces.
16. Write a program to create package, include classes and access the package.
17. Write java programs to demonstrate Exception handling using try, catch, throws and finally statements.
18. Write a Java Program to calculate sum of 3 subject marks in Result class. Create a User Defined Exception class MarksOutOfBoundsException, If entered marks of any subject is greater than 100 or less than 0, and then program should catch Exception of type MarksOutOfBoundsException and must have a provision to handle it.
19. Write a program to illustrate multi-threading concept.

20. Write a Java program to demonstrate the following collections.
a) ArrayList b) HashSet c) HashMap
21. Write a Swing application that displays line, rectangle, rounded rectangle, filled rectangle, filled rounded rectangle, circle, ellipse, arc, filled arc and polygon, all in different colors.
22. Write a Swing application that changes the background color when the mouse is entered, clicked, pressed, released or exited.
23. Design a GUI application using Swing API for user registration.

Course Outcomes:

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

- CO1.** Demonstrate the classes, objects, members of a class and relationships among them needed for a specific problem. [L2]
- CO2.** Apply OOP principles and Java programming constructs in Java application programs. [L3]
- CO3.** Illustrate the concepts of exception handling and multi-threading in Java applications. [L3].
- CO4.** Design GUI based applications by using Swings and even handling mechanisms.[L4]

Mapping of COs to POs:

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

TEXT BOOKS:

1. Herbert Schildt, Java The Complete Reference, McGraw Hill.
2. P.J.Dietel and H.M.Dietel, Java: How to Program , PHI.

REFERENCE BOOKS:

1. P.J. Dietel, Java for Programming, Pearson Education, 2nd Edition
2. P.Radha Krishna, Object Oriented Programming through java, Universities Press.
3. Bruce Eckel, Thinking in Java, Pearson Education.
4. S.Malhotra and S.Choudhary, Programming in Java, Oxford University Press.

II Year

II Semester

DATABASE MANAGEMENT SYSTEMS

Subject Code: UGCS4T0122

II Year / II Semester

L	T	P	C
3	0	0	3

Prerequisites: Familiarity with data structures.

Course Objectives:

This course introduces relational data model, entity-relationship modeling, SQL, normalization and database design. This course would examine transaction management, concurrency control, recovery, file organizations and indexing.

Syllabus:

UNIT I: (10 Lectures)

Introduction: Database System Applications, File System Vs Database System, View of Data - Data Abstraction, Instances and Schemas; Data Models, Database Languages - DDL, DML; Database System Architecture - Storage Manager & Query Processor, Database Users and Administrator, History of database systems.

Database Design with E-R Model: Database design and ER Diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model.

UNIT II: (8 Lectures)

Relational Model: Introduction, Integrity Constraints over relations, Enforcing Integrity constraints, Querying relational data, Logical database Design, Views.

Relational Algebra: Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra queries.

Basic SQL: Data types and DDL, Specifying Constraints, Insert, Delete and Update Statements, Basic Queries in SQL.

UNIT III: (12 Lectures)

Advanced SQL: Joins, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers.

Schema Refinement: Problems caused by redundancy, Decompositions, Problems related to decomposition, Functional dependencies, Reasoning about FDS, Normal forms - FIRST, SECOND, THIRD Normal forms and BCNF, Properties of Decomposition-Lossless Join Decomposition, Dependency Preserving Decomposition, Multivalued dependencies, Fourth normal form.

UNIT IV: (9 Lectures)

Transaction Management: Properties of transactions, Transactions and Schedules, Concurrent Execution of Transactions.

Concurrency Control: Lock Based Concurrency Control, Serializability and Recoverability, Introduction to Lock Management, Dealing with Deadlocks, Concurrency Control without Locking.

Crash Recovery: Introduction to ARIES, Log, Recovery-Related Structures, Checkpointing.

UNIT V: (8 Lectures)

Overview of Indexing: File organizations and Indexing, Primary and Secondary Indexes, Index specification in SQL.

Tree Structured Indexing: Intuitions for tree Indexes, B+ Trees: Format of a Node, Search, Insert and Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable vs. Linear hashing.

Course Outcomes:

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

CO1: Understand the database system design and its functionality.

CO2: Apply the knowledge of SQL to construct the queries for efficient data access and manipulation.

CO3: Inspect database problems and utilize the normalization theory to refine the database schema.

CO4: Analyse and solve the transaction processing issues through concurrency control and recovery mechanisms.

CO5: Examine different Indexing mechanisms for efficient data access.

Mapping of COs to POs:

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

TEXT BOOKS:

1. Silberschatz, Korth, Database System Concepts, TATA McGraw hill.
2. Raghurama Krishnan, Johannes Gehrke, Database Management Systems, 3rd Edition, TATA McGraw hill.

REFERENCE BOOKS:

1. C.J.Date, Introduction to Database Systems, 8th Edition, Pearson Education.
2. Peter ROB and Carlos Coronel, Database System Concepts, Cengage Learning.
3. Ramez Elmasri , Shamkant B. Navathe , Fundamentals of Database Systems, 5th Edition, Pearson Education

INTRODUCTION TO CRYPTOGRAPHY

Subject Code: UGCS4T0922

II Year / II Semester

L	T	P	C
3	0	0	3

Prerequisites: Familiarity with Computer Networks.

Course Objectives:

This course provides introduction to various cryptographic algorithms. It also focuses on the practical applications that have been implemented and are in use to provide email and web security.

Syllabus:

UNIT I: (8 Lectures)

Introduction: Security Attacks, Security Services, Security Mechanisms, and a Model for Network Security. Non-Cryptographic Protocol Vulnerabilities-DoS, DDoS, Session Hijacking and Spoofing, Software Vulnerabilities- Phishing, Buffer Overflow, Format String Attacks, SQL Injection.

UNIT II: (8 Lectures)

Basics of Cryptography: Steganography, Symmetric Cipher Model, Substitution Techniques, Transportation Techniques, Other Cipher Properties- Confusion, Diffusion, Block and Stream Ciphers.

Secret Key Cryptography: S-DES, Data Encryption Standard (DES), Strength of DES, Block Cipher Design Principles and Modes of Operations, Triple DES, AES.

UNIT III: (10 Lectures)

Number Theory: Divisibility and the Division Algorithm, Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorems, the Chinese Remainder Theorem, Discrete Logarithms.

Public Key Cryptography: Principles of Public Key Cryptosystems, RSA Algorithm, Diffie-Hellman Key Exchange, Introduction to Elliptic Curve Cryptography.

UNIT IV: (8 Lectures)

Cryptographic Hash Functions: Applications of Cryptographic Hash Functions, Secure Hash Algorithm, Message Authentication Codes – Message Authentication Requirements and Functions, HMAC, Digital signatures, Digital Signature Standards.

UNIT V: (8 Lectures)

Authentication Applications: Kerberos, Key Management and Distribution, X.509 Directory Authentication service, Public Key Infrastructure, Electronic Mail Security: Pretty Good Privacy.

Course Outcomes:

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

CO1: Acquire knowledge about various types of attacks, services, mechanisms, transposition and substitution techniques to provide security to data, system and network.

CO2: Analyze different types of private key encryption algorithms convert original message into unintelligible form.

CO3: Apply Public Key Cryptosystems and analyze their security by applying different algorithms.

CO4: Develop Hash and MAC authentication applications to generate codes for a secure message.

Mapping of COs to POs:

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

TEXT BOOKS:

1. Cryptography and Network Security: Principles and Practice, 5th edition, William Stallings, Pearson Education, 2011.
2. Network Security and Cryptography, Bernard Menezes, Cengage Learning, 2011.
3. Cryptography and Network, 2nd edition, Behrouz A. Fourouzan and Debdeep Mukhopadhyay, McGraw-Hill, 2010.

REFERENCE BOOKS:

1. Fundamentals of Network Security by Eric Maiwald, Dreamtech press.
2. Principles of Information Security, Whitman, Thomson.
3. Introduction to Cryptography, Buchmann, Springer.
4. Applied Cryptography. 2nd Edition, Bruce Schneier, John Wiley & Sons.

WEB TECHNOLOGIES

Subject Code: UGCS4T0322

II Year / II Semester

L	T	P	C
3	0	0	3

Prerequisites: Familiarity with OOPs concepts, core Java concepts and Internet.

Course Objectives: The student will be familiar with client-server architecture and able to develop a web application using HTML, JavaScript, Servlets, JSP and JDBC. Students will acquire the necessary skills and techniques needed for developing Web based Projects.

Syllabus:

UNIT I: (8 Lectures)

HTML Introduction: Elements, Attributes, Headings, Paragraphs, Styles, Text Formatting, Frames, Quotation and Citation Elements, Comments, Colors, Links, Images, tables, lists, classes and id.

HTML Forms: Form Attributes, Form Elements, Input Types, Input Attributes, Input form Attributes.

CSS: Inline, Internal and External Cascading Style Sheets.

UNIT II: (12 Lectures)

Bootstrap: Grid basics, Bootstrap Text/Typography, Tables, Images, Jumbotron, Wells, Alerts, Button groups, Glyphicons, Progress Bars, List Groups, Panels, Dropdowns, Tabs and Pills, Navigation Bar, Forms, input sizing, Media Objects, Carousel Plugin, Popover Plugin, Scrollspy Plugin.

JavaScript: Variables, Operators, Functions, Control structures, Events, Objects, Form validations, Dynamic HTML with JavaScript.

UNIT III: (12 Lectures)

Working with XML: Document type Definition, XML schemas, Document object model, XSLT, DOM and SAX.

Web Servers and Servlets: Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, and Reading Initialization parameters, The javax.servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues.

UNIT IV: (9 Lectures)

Introduction to JSP: The Problem with Servlet, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC. **JSP Application Development:** Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data between JSP pages, Requests, and Users Passing Control and Data between Pages, Sharing Session and Application Data.

UNIT V:**(8 Lectures)**

JDBC Introduction: JDBC Driver, DB connectivity steps, Connectivity with Oracle and MySQL, Access without DSN, Driver Manager, Connection, Statement, ResultSet, storing and retrieving images and files, Studying Javax.sql.* package, Accessing a Database from a Servlets and JSP Page.

Course Outcomes:

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

CO 1. Develop interactive Web pages with improved GUI.

CO 2. Interpret scripting language techniques.

CO 3. Acquire knowledge on server side scripting language.

CO 4. Apply JDBC techniques to access different databases.

Mapping of COs to POs:

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

TEXT BOOKS:

1. Kogent Learning solutions, Web Technologies – Black Book, Dreamtech press.
2. Jacob Lett, Bootstrap 4 Quick Start: Responsive Web Design and Development Basics for Beginners, Bootstrap Creative.
3. Jeffrey C. Jackson, Web Technologies: A Computer Science Perspective, Pearson.

REFERENCE BOOKS:

1. Uttam K Roy , Web Technologies, Oxford.
2. Wang, Katila, An Introduction to Web Design and Programming, CENGAGE.
3. Dietel and Nieto, Internet and World Wide Web – How to program, PHI/Pearson Education Asia.
4. Wang-Thomson, An Introduction to web Design and Programming.
5. Robert W Sebesta, Programming the World Wide Web – Pearson publications, Fourth edition.
6. Godbole, Atul Kahate , Web Technologies, TCP/IP Architecture and Java programming- 2nd ed, TMH.
7. N P Gopalan, Akhilandeswari, Web Technologies, A developer's Perspective, PHI.

DATABASE MANAGEMENT SYSTEMS LAB

Subject Code: UGCS4P0422

II Year / II Semester

L	T	P	C
0	0	3	1.5

Prerequisites: Basic knowledge in programming.

Course Objectives:

The objective of the DBMS lab is to understand the practical applicability of database management system concepts. The students also learn how to design the database and apply various operations on it.

List of Experiments:

Experiment 1: Working with ER Diagrams

Example: ER Diagram for Sailors Database

Entities:

1. Sailors(Sid,Sname,Rating,Age)
2. Boats(Bid,Bname,Color)

Relationship: Reserves(Day)

Primary Key Attributes:

1. Sid (Sailors Entity)
2. Bid (Boats Entity)

Experiment 2: Working with DDL, DML, DCL and Key Constraints

Creating, Altering and Dropping of Tables and Inserting Rows into a Table (Use Constraints while Creating Tables), Examples using Select command.

Experiment 3: Working with Queries and Nested Queries

Queries (along with sub Queries) using UNION, INTERSECT and MINUS, ANY, ALL, IN, EXISTS, NOT EXISTS

Experiment 4: Working with Queries using Aggregate Operators & Views

Queries using Aggregate Operators (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING, Creation and Dropping of Views.

Experiment 5: Working with different types of Functions

Queries using Conversion Functions (to_char, to_number and to_date), String Functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), Date Functions (Sysdate, next_day, add_months, last_day, months_between), Numerical Functions(least, greatest, trunc, round).

Experiment 6: Working with Loops using PL/SQL

Develop programs using LOOP, WHILE and FOR loops and Nested loops.

Experiment 7: Working with Triggers using PL/SQL

Develop programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.

Experiment 8: Working with Procedures using PL/SQL

Develop programs using Procedures, passing Parameters IN and OUT of Procedures.

Experiment 9: Working with Functions using PL/SQL

Develop programs using Functions and invoke Functions in SQL statements.

Experiment 10: Working with Exception Handling using PL/SQL

Develop programs using Error handling, Built-in Exceptions, User defined Exceptions and RAISE_APPLICATION_ERROR.

Experiment 11: Working with Cursors using PL/SQL

Develop programs using Cursors, parameters in a Cursor, FOR UPDATE Cursor, WHERE CURRENT OF clause and Cursor variables.

Course Outcomes:

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

- CO 1.** Demonstrate the database design using ER Diagrams.
- CO 2.** Develop SQL Queries to manipulate the data in the database.
- CO 3.** Apply Procedural Language constructs to execute a block of SQL statements.
- CO 4.** Inspect and handle errors using exception handling mechanism.

Mapping of COs to POs:

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

TEXT BOOKS:

1. Benjamin Rosenzweig, Elena Silvestrova Rakhimov, Oracle PL/SQL by Example, 3rd Edition, Pearson Education.
2. Scott Urman, Ron Hardman, Michael McLaughlin, Oracle Database 10G PL/SQL Programming, Tata Mc-Graw Hill.
3. Dr .P.S. Deshpande, SQL and PL/SQL for Oracle 11g, Black Book.

MOBILE APPLICATION DEVELOPMENT LAB

Subject Code: UGCS4P0522

II Year / II Semester

L	T	P	C
0	0	3	1.5

Prerequisites: Basic knowledge in Operating Systems and programming.

Course Objectives:

This course covers the fundamentals of Android programming using Android SDK.

Softwares Required: Android Studio.

List of Experiments:

1. Write an Android application program that displays Hello World.
2. Write an Android application program that accepts a name from the user and displays the hello name to the user in response as output.
3. Write an Android application program that demonstrates the following:
(i) Linear Layout (ii)Relative Layout (iii)Table Layout (iv) Grid View layout
4. Write an Android application program that converts the temperature in Celsius to Fahrenheit.
5. Develop a native calculator application.
6. Write an Android application program that demonstrates intent in mobile application development.
7. Write an Android application Scheduling Task Using Alarm Manager
8. Write an android application with customized list view with Image ,Text
9. Write an android application with Menu and Alert Dialog
10. Develop an android application that uses GPS location information.
11. Create new database & database tables using SQLite API and perform CRUD "Create, Read, Update and Delete" operations?
12. Create new database in MySQL and perform CRUD "Create, Read, Update and Delete" operations?

Course Outcomes:

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

CO1: Develop mobile application by using android IDE.

C02: Design and develop user Interfaces for mobile applications using GUI components.

C03: Implement various database operations for android applications.

Mapping of COs to POs:

[illegible]

TEXT BOOKS:

1. John Horton, "Android Programming for Beginners", Packt Publishing, 1st edition.
2. Ed Burnette, "Hello, Android: Introducing Google's Mobile Development Platform", Fourth Edition, The pragmatic programmers

REFERENCE BOOKS:

1. Reto Meier, Professional Android 2 Application Development, Wiley India Pvt Ltd.
2. Mark L Murphy, Beginning Android, Wiley India Pvt Ltd
3. Mike McGrath, Building Android Apps in easy steps, McGraw-Hill Education.
4. Android Developer Fundamental Course: Practical Workbook, developed by Google Developer Training Team.
5. <https://developer.android.com/guide/platform/index.html>.

WEB TECHNOLOGIES LAB

Subject Code: UGCS4P0622

II Year / II Semester

L	T	P	C
0	0	3	1.5

Prerequisites: Familiarity with OOPs concepts, core Java concepts and Internet.

Course Objectives: The students will learn to develop web applications using the technologies HTML, Bootstrap, JavaScript, XML, Servlets, JSP and JDBC.

List Of Experiments:

Week-1:

Design the following static web pages required for an online book store website.

1) HOME PAGE:

The static home page must contain three **frames**.

Top frame : Logo and the website name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left frame: At least four links for navigation, which will display the catalogue of respective links.

For e.g.: When you click the link "**CSE**" the catalogue for **CSE** Books should be displayed in the Right frame.

Right frame: The pages to the links in the left frame must be loaded here. Initially this page contains description of the website.

Logo	Website Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description of the Website			

2) LOGIN PAGE:

This page looks like below:

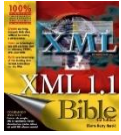
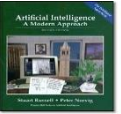
Logo	Website Name			
Home	Login	Registration	Catalogue	Cart

CSE ECE EEE Civil	Login :
	Password:
	Submit Reset

3) CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the Website in a table. The details should contain the following:

1. Snapshot of Cover Page
2. Book Name
3. Author Name
4. Publisher
5. Price
6. Add to cart button

Logo	Website Name			
Home	Login	Registration	Catalogue	Cart
CSE		Book : XML Bible Author : Winston Publication : Wiely	\$ 40.5	
ECE		Book : AI Author : S.Russell Publication : Princeton hall	\$ 63	
EEE				
CIVIL		Book : Java 2 Author : Watson Publication: BPB Publications	\$ 35.5	
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	\$ 50	

Note: Week 2 contains the remaining pages and their description.

Week-2:

4) CART PAGE:

The cart page contains the details about the books which are added to the cart.
The cart page should look like this:

Logo	Website Name			
Home	Login	Registration	Catalogue	Cart
CSE	Book name	Price	Quantity	Amout
ECE	Java 2	\$35.0	2	\$70
EEE	XML bible	\$40.5	1	\$40.5
CIVIL	Total Amount			- \$110.5

5) REGISTRATION PAGE:

Create registration" form "with the following fields

- 1)Name (Text field)
- 2>Password (password field)
- 3)E-mail id (text field)
- 4)Phone number (text field)
- 5)Sex (radio button)
- 6)Date of birth (3 select boxes)
- 7)Languages known (check boxes – English, Telugu, Hindi, Tamil)
- 8)Address (text area)

Week-3:

Design a web page using **CSS (Cascading Style Sheets)** which includes the following:

- 1) Use different font, styles:

In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

For example:

```
<HTML>
<HEAD>
<style type="text/css">
B.headline {color:red. font-size:22px. font-family:arial. text-
decoration:underline}
</style>
</HEAD>
<BODY>
<b>This is normal bold</b><br>
Selector {cursor:value}
For example:
<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
```

```
.hlink{cursor:help}
</style>
</head>
<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a> <br>
<a href="mypage.htm" class="hlink">HELP LINK</a> </b>
</body>
</html>
<b class="headline">This is headline style bold</b> </BODY>
</HTML>
```

2) Set a background image for both the page and single elements on the page. You can define the background image for the page like this:

```
BODY {background-image:url(myimage.gif).}
```

3) Control the repetition of the image with the background-repeat property. As background-repeat tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4) Define styles for links as

```
A:link
A:visited
A:active
A:hover
```

Example:

```
<style type="text/css">
A:link {text-decoration: none}
A:visited {text-decoration: none}
A:active {text-decoration: none}
A:hover {text-decoration: underline. color: red.} </style>
```

5) Work with layers:

For example:

LAYER 1 ON TOP:

```
<div style="position: relative. font-size:50px. z-index:2.">LAYER 1</div> <div
style="position: relative. top:-50. left:5. color: red. font-size:80px.z-index:1">LAYER
2</div>
```

LAYER 2 ON TOP:

```
<div style="position: relative. font-size:50px. z-index:3.">LAYER 1</div> <div
style="position: relative. top:-50. left:5. color: red. font-size:80px.z-index:4">LAYER
2</div>
```

6) Add a customized cursor:

```
Selector {cursor:value}
```

For example:

```
<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a> <br>
<a href="mypage.htm" class="hlink">HELP LINK</a> </b>
</body>
</html>
```

WEEK 4:

VALIDATION:

Write JavaScript to validate the following fields of the above registration page.

1. Name (Name should contains alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Phone number (Phone number should contain 10 digits only).

Note : You can also validate the login page with these parameters.

Week-5:

Write an XML file which will display the Book information which includes the following:

- 1)Title of the book
- 2)Author Name
- 3)ISBN number
- 4)Publisher name
- 5)Edition
- 6)Price

Write a Document Type Definition (DTD) to validate the above XML file.

Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and

should be capitalized and in bold. Use your own colors for remaining columns.
Use XML schemas XSL and CSS for the above purpose.
Note: Give at least for 4 books. It should be valid syntactically.
Hint: You can use some xml editors like XML-spy.

Week-6:

Design a static web page and make the screen responsive using bootstrap.

Week-7:

1. Install TOMCAT web server and APACHE.

While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

2. Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root. Access the pages by using the urls : <http://localhost:4040/rama/books.html> (for tomcat)

Week-8:

User Authentication:

Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following.

1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user (i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticate

Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.

Week-9:

Install a database (Mysql or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form).

Practice 'JDBC' connectivity.

Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

Week-10:

Write a JSP which does the following job:

Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

Week-11:

Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount) of each category. Modify your catalogue page (week 2) in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

Course Outcomes:

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

CO 1. Analyze and apply the scripting languages for developing web applications.

CO 2. Create dynamic web applications using server side scripting programs.

CO 3. Design database connectivity for different data sources.

Mapping of COs to POs:

POs/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	-	3	3	-	3	-	-	3	3	3	3	-	3	-
CO2	-	3	3	-	3	-	-	3	3	3	3	-	3	-
CO3	-	3	3	-	3	-	-	3	3	3	3	-	3	-

TEXT BOOKS:

1. Achyut S Godbole and Atul Kahate, "Web Technologies", Second Edition, Tata McGraw Hill.
2. HTML 5, Black Book, Dreamtech Press.
3. Jacob Lett, Bootstrap 4 Quick Start: Responsive Web Design and Development Basics for Beginners, Bootstrap Creative.
4. Herbert Schildt , The Complete Reference Java, 7th edition, Tata McGraw Hill.
5. Hans Bergsten, Java Server Pages, SPD O'Reilly.

REFERENCE BOOKS:

1. David Flanagan, "JavaScript: The Definitive Guide, Sixth Edition", O'Reilly Media.
2. Chris Bates , Web Programming , building internet applications, 2nd edition, Wiley Dreamtech.
3. Beginning PHP and MySQL: From Novice to Professional, Fourth Edition, Dreamtech Press.

JULIA PROGRAMMING

Subject Code: UGCS4K0722

II Year / II Semester

L	T	P	C
1	0	2	2

Prerequisites: Familiarity with programming language constructs of C and Python.

Course Objectives:

This course teaches the best features of mathematics, engineering, and natural science by Using Julia Programming. While it is a general-purpose language and can be used to write any application, many of its features are well suited for numerical analysis and computational science.

Syllabus:

Introduction to Julia: The Way of the Program, what is a Program, Running Julia, The First Program, Arithmetic Operators, Values and Types.

Variables, Expressions and Statements: Assignment Statements, Variables Names, Expressions and Statements.

Functions: Basic Function Definitions and Uses, Flow of Execution, Parameters and Arguments.

Interface Design: Turtles, Simple repetition, Exercises, Encapsulation, Generalization, Interface Design, Conditionals and Recursion

Strings, Arrays, Map, Filter and Reduce.

Dictionaries, Tuples: Arrays and Tuples, Dictionaries and Tuples.

Experiments:

1. Program to print a string on the screen.
2. Program to demonstrate Assignment Statements.
3. Program to use Variable names, Expressions and Script Mode.
4. Program to demonstrate Math Functions.
5. Program to use a Simple Function.
6. Program to add User Defined Functions.
7. Program to use Fruitful Functions and Void Functions.
8. Programs on repetition.
9. Program to demonstrate Encapsulation.
10. Program to use Generalization.
11. Program to design an Interface

12. Programs to demonstrate Floor Division, Modulus Division and Boolean Expressions.
13. Programs on Logical Operators.
14. Programs on Conditional Expressions.
15. Program to demonstrate Recursion.
16. Programs to demonstrate Input and Output.
17. Program to demonstrate While, break and Continue.
18. Programs on String Basics.
19. Programs on String Converting and Formatting.
20. Programs on String Manipulations.
21. Programs to demonstrate Arrays and its manipulations.
22. Programs to demonstrate Dictionaries.
23. Programs to demonstrate Tuples.

Course Outcomes:

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

CO 1. Implement the basic programming constructs using Julia.

CO 2. Apply the concepts multiple dispatch and Dynamic programming.

CO 3. Develop applications by using concepts of arrays, strings and Dictionaries.

Mapping of COs to POs:

POs/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	-	-	-	-	3	3	-	-	3	3	-
CO2	3	3	3	-	-	-	-	3	3	-	-	3	3	-
CO3	3	3	3	-	-	-	-	3	3	-	-	3	3	-

TEXT BOOKS:

1. Ben Lauwens, Allen Downey, "Think Julia: How to Think Like a Computer Scientist", 1st Edition, O'reilly
2. Malcolm Sherrington, "Mastering Julia 1.0", 1st Edition, Packt.

REFERENCE BOOKS:

1. Sandeep Nagar, "Beginning Julia Programming" : For Engineers and Scientists, 1st Edition, Apress.

RUST PROGRAMMING

Subject Code: UGCS4K0822

II Year / II Semester

L	T	P	C
1	0	2	2

Prerequisites: Knowledge in any procedural oriented programming.

Course Objectives:

Rust is intended to be a language for highly concurrent and highly safe systems, and programming in the large, that is, creating and maintaining boundaries that preserve large-system integrity. This course teaches you how to install Rust and then familiarize yourself with basic concepts like variables, data types, method syntax, enums, and more and discover how the unique Ownership Principles of Rust impact the language. Data Handling, Pattern Matching, and Error Handling.

Syllabus:

UNIT I: (6 hrs)

Introduction to RUST: Introduction, Language, Environment Setup, Constant, HelloWorld, Functions, Memory management.

Programming Constructs: Data Types, Variables, Constant, String, Operators, Decision Making.

UNIT II: (6 hrs)

Loops and Arrays: Loop, Comments, Cargo, Functions, Switch, Machine Types, Tuples, Pointer Types, String Types, Destructing, Array, Vectors, Ownership, Borrowing, Slices, Structure.

UNIT III: (6 hrs)

Enums and Pattern Matching : Enums, Enum Values, The Match Control Flow Operator, Modules, Collections, List of Values with Vectors, UTF-8 Encoded text with Strings, Storing Keys with Associated Values in Hash Maps.

UNIT IV: (6 hrs)

Error Handling and Generic Types: Panic Macro and Unrecoverable Errors, Result Enum and Recoverable Errors, unwrap() and expect(), Generic Types, Generic Data Types, Traits, Validating References with Lifetimes.

UNIT V: (6 hrs)

File Input/Output : Input Output, File Input/Output, Package Manager, Iterator and Closure, Smart Pointers, Concurrency.

Writing Automated Tests and I/O Project : How to Write Tests, Controlling How Tests are Run, Unit and Integration Tests, Building a Command Line Program,

Reading a File, Refactoring, Test-Driven Development, Environment Variables and Error Messages.

Course Outcomes:

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

CO 1. Implement the basic programming constructs using Rust.

CO 2. Apply the concepts Pattern Matching and Error Handling.

CO 3. Develop applications using Rust programming.

Mapping of COs to POs:

POs/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	-	-	-	-	3	3	-	-	3	3	-
CO2	3	3	3	-	-	-	-	3	3	-	-	3	3	-
CO3	3	3	3	-	-	-	-	3	3	-	-	3	3	-

TEXT BOOKS:

1. The RUST Programming Language, Steve Klabnik and Carol Nichols, with contributions from the rust community.
2. Programming Rust fast, safe systems development, Jim Blandy & Jason rendorff.

ETHICAL HACKING

Subject Code: UGCS4K1022

II Year / II Semester

L	T	P	C
1	0	2	2

Prerequisites: Familiarity with Computer Networks.

Course Objectives:

1. The aim of the course is to introduce the methodologies framework tools of ethical hacking to get awareness in enhancing the security
2. To get knowledge on various attacks and their detection.

List of Experiments:

1. Setup a honey pot and monitor the honey pot on network.
2. Write a script or code to demonstrate SQL injection attacks.
3. Create a social networking website login page using phishing techniques.
4. Write a code to demonstrate DoS attacks.
5. Install rootkits and study variety of options.
6. Study of Techniques uses for Web Based Password Capturing.
7. Install jcrypt tool (or any other equivalent) and demonstrate Asymmetric, Symmetric Crypto algorithm.
8. Implement Passive scanning, active scanning, session hijacking, cookies extraction using Burp suit tool.

Course Outcomes:

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

CO1: Gain knowledge on the use and availability of tools to support ethical hacking.

CO2: Gain knowledge of interpreting the results of a controlled attack.

Mapping of COs to POs:

POs/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	-	-	3	-	-	3	3	-	-	-	-	-
CO2	3	3	-	-	3	-	-	3	3	-	-	-	-	-

TEXT BOOKS:

1. Michael T. Simpson, Kent Backman, James E Corley, Hand-On Ethical Hacking and Network Defense, Second Edition, CENGAGE Learning.

REFERENCE BOOKS:

1. Manthandesai, Basics of Ethical hacking, Hacking for beginners, Hacking Tech.
2. Patrick Engebretson, The Basics of Hacking and Penetration Testing Ethical Hacking and Penetration Testing Made Easy, Syngress –Elsevier.