Dayananda Sagar University Bengaluru

DSU *live the dream*

STUDENTS' HANDBOOK

Programme: B.Voc
(COMPUTER ENGINEERING & IT INFRASTRUCTURE)

Academic Batch: (2021-2024)

Department of Computer Science and Engineering, School of Engineering

CHAIRMAN'S MESSAGE

Welcome to the Department of Computer Science & Engineering, School of Engineering at Dayananda Sagar University!

It gives me pride and pleasure to introduce Computer Science & Engineering Department. The Department of Computer Science has designed innovative UG program in Computer Science & Engineering and PG programs in Big Data/Internet of Things and Cloud Computing.

Our aim is to provide a high-quality engineering education to our students with adequate hand-on experience. Faculty members in the department have expertise in the areas of Wireless Networks, Data Networks, Big Data, Data Analytics, Cloud Computing, Image Processing, Information Retrieval and are guiding carrying out active research.

Our department looks forward to contribute in solving technological challenges of the society with active participation from all sections of the society. Thank you for visiting us.

BEST WISHES!

Dr. Girisha G S,
Professor and Chairman
Department of CSE

DAYANANDA SAGAR UNIVERSITY, SCHOOL OF ENGINEERING

VISION AND MISSION

School of Engineering under Dayananda Sagar University provides Science & Technology based Education that is required to develop high caliber Engineers suitable for Industry and Scientific Organization.

About School of Engineering

The curriculum focuses on knowledge-based course work integrated with skill development as a part of training. It equally helps in inculcating the scientific temper necessary for the Lifelong learning process.

At the Under Graduate level, a student goes through the foundation courses in Science, Humanities and Engineering. Each department ensures that the courses cover both Core & Electives as required. Provision for open elective help the students to acquire inter-disciplinary knowledge or specialize significantly in an area outside the parent discipline. At the Post Graduate level, students are exposed to knowledge beyond their specialization and help in broadening their horizons of thought process.

The School of Engineering follows two compulsory Semesters in a year with an option of a supplementary III Semester as a makeup semester. The I Semester begins from 1st August, II Semester from 1st December, and Supplementary Semester from 1st of April.

PREFACE

We are delighted to welcome you to the new academic session of the Bachelor of Vocation (B. Voc) in Computer Engineering & It Infrastructure Programme of the School of Engineering, Dayananda Sagar University. The Student Information Handbook & Scheme of Instruction presents informationrelevant to the structure of this programme and the courses offered in this programme. It also provides detailed information about the facilities available to you and the rules and regulationsrelated to the life of an undergraduate student on the DSU campus. Please read the Handbook carefully and feel free to contact us or your subject Coordinator/ Faculty Advisor if you have any additional questions.

Our best wishes for a productive, exciting, and pleasant academic year.

Cordially,

Dr. Girisha G S,
Chairman & Professor
chairman-cse@dsu.edu.in

DEPARTMENT OVERVIEW

New initiatives
- NeoPAT Software - Placement Training tool to increase the placements and package
- Finacle Certification program - EdgeVerve subsidiary of Infosys
- Certificate courses - Altair University
- MuleSoft Training for unplaced students
- Satellite Image processing lab jointly working with NIAS-ISRO
- Joint Research on Agriculture domain with University of Agricultural Sciences (UAS) GKVK
- CDSIMER Medical research Collaboration

Empowering activities since 2015-16

For Slow Learners
- Faculty mentors
- Remedial classes
- Assignments
- Improvement tests

For Advanced Learners
- Academic competitions
- Research projects
- Conferences

For all students
- Internship in industry
- Summer research internships

Unique Pedagogy and Assessment

Teaching Pedagogy
- Experimental Learning
- Learning by Experiential Design
- Real World Examples
- Usage of Virtual Labs, Simulators
- Collaborative Learning
- Active Learning

Assessment Methods
- Open Book Test
- Problem Solving Assignment
- Reflections Notes on technical talks, seminars done by industry experts
- Research paper Reading and Seminar
- Reflection Notes on Industry Visits/Workshop/Webinar
- Computer Based QUIZ
- Seminars on real-time problems

VISION AND MISSION OF THE DEPARTMENT

VISION

To develop a pool of high caliber professionals, researchers and entrepreneurs in the areas of Computer Science & Engineering and Information Technology with exceptional technical expertise, skills and ethical values, capable of providing innovative solutions to the national and global needs.

MISSION

● To create a robust ecosystem where academicians, concept developers, product designers, business incubators, product developers, entrepreneurs, mentors and financial institutions are brought together under one platform of the department.

● To establish Project Environment in the Department with open-source tools, provide hands-on experience to students by establishing a process to channelize their effort towards acquiring relevant competencies and skills in their chosen technology areas and domains.

FACULTY – COMPUTER SCIENCE AND ENGINEERING

SL.NO	NAME OF THE FACULTY MEMBER	DESIGNATION
1	Dr. K.N.Balasubramanya Murthy	Professor of CSE and Vice-Chancellor, DSU
2	Dr. UDAYA KUMAR REDDY K.R.	Professor & Dean SoE
3	Dr. M.K Banga	Professor & Dean R&D
4	Dr. Girisha G S	Professor & Chairperson CSE
5	Dr. Basavaraj N Hiremath	Professor
6	Dr. Venkateswarlu. B	Associate Professor
7	Dr. S K Mouleeswaran	Associate Professor
8	Dr. Rajesh T.M	Associate Professor
9	Dr. Savitha Hiremath	Associate Professor
10	Dr. Revathi V	Associate Professor
11	Dr. Meenakshi Malhotra	Associate Professor
12	Dr. Pramod Naik	Associate Professor
13	Dr. Praveen Kulkarni	Associate Professor
14	Dr. Sridhar S K	Associate Professor

15	Dr. George Fernandez I	Associate Professor
16	Dr. Arunkumar Gopu	Associate Professor
17	Dr. Ravi Kumar Y B	Associate Professor
18	Dr. Jayita Saha	Assistant Professor
19	Prof. Arjun Krishnamurthy	Assistant Professor
20	Savitha Vijay	Assistant Professor
21	Hariharan V	Assistant Professor
22	Dr. Gousia Thahniyath	Assistant Professor
23	Gaurav Kumar	Assistant Professor
24	Dr. Shweta S A	Assistant Professor
25	Ranjini K	Assistant Professor
26	Veena M	Assistant Professor
27	Rashmi Mothkur	Assistant Professor
28	Sharvari J N	Assistant Professor
29	Shwetha G S	Assistant Professor
30	Nandini K	Assistant Professor
31	Pooja	Assistant Professor

32	Lavanya B Koppal	Assistant Professor
33	Amruta B	Assistant Professor
34	Bharath M B	Assistant Professor
35	Yashpal Gupta S	Assistant Professor
36	Kavya B	Assistant Professor
37	Vishwas D B	Assistant Professor
38	Pooja Shree H R	Assistant Professor
39	Dharmendra D P	Assistant Professor
40	Mr.PradeepKumar T K	Assistant Professor
41	Aiswarya R	Assistant Professor
42	Kavyashree I Pattan	Assistant Professor
43	Manojkumar N I	Assistant Professor
44	Santhosh M	Assistant Professor
45	Sharath H A	Assistant Professor
46	Mr. Mohammed Khurram J	Assistant Professor
47	Bharathy Vijayan	Assistant Professor
48	Soubhagyalakshmi P	Assistant Professor

49	Mala B A	Assistant Professor
50	Naitik S T	Assistant Professor
51	Maragatham S	Assistant Professor
52	Manjushree T L	Assistant Professor
53	Pramoda R	Assistant Professor
54	Dr. Raghavendra K	Assistant Professor
55	Navya Damodar	Assistant Professor
56	Deepa P	Assistant Professor
57	Pranami Chowdhury	Assistant Professor
58	Sasikala N	Assistant Professor
59	Priyanka Singh	Assistant Professor
60	Shilpa Sudheendran	Assistant Professor

SEATS AND ELIGIBILITY

SEATS

Title	Graduation	Programme Offered	Total Intake
COMPUTER ENGINEERING &IT INFRASTRUCTURE	B. Voc	B. Voc in COMPUTER ENGINEERING &IT INFRASTRUCTURE	60

ELIGIBILITY

Programme	Eligibility
B. Voc	- The eligibility condition for admission to B Voc programme shall be 10+2 or equivalent, such as ITI certification, job-oriented programme approved by the Government in any stream. - Admission to II year /III Semester B Voc under Lateral Entry shall be open to the students who have passed diploma - Diploma students seeking admission under Lateral Entry shall take up bridge courses as prescribed in the Scheme of Teaching - For candidates who have completed Diploma from other than State of Karnataka, their eligibility shall be based on the recognition of the Diploma awarding Boards by the University.

PROGRAMME OUTCOMES (POs)

PO1	Engineering knowledge	The capacity to use knowledge of science, engineering, and mathematics (including probability, statistics, and discrete mathematics) to solve Engineering problems and model.
PO2	Problem analysis	The capacity to plan, model, and carry out experiments, as well as to evaluate and analyze data, including that from hardware and software components.
PO3	Design / development of solutions	The capacity to create a complicated electronic system or process that satisfies requirements and criteria.
PO4	Conduct investigations of complex problems	A capacity for information identification, formulation, comprehension, analysis, and design synthesis to address complicated engineering issues and offer reliable results.
PO5	Modern tool usage	The capacity to employ current Engineering concepts, skills, and tools required for Engineering practice.
PO6	The engineer and society	Knowledge of one's obligations with regard to one's work, health, safety, law, culture, and society.
PO7	Environment and sustainability	a comprehensive education is required to comprehend the effects of engineering solutions on a global, economic, and environmental scale and to show that one has the knowledge required for sustainable development.
PO8	Ethics	Apply moral concepts, responsibility, and Engineering practice standards.
PO9	Individual and team work	A capacity for multidisciplinary teamwork.
PO10	Communication	A successful capacity to present and communicate.
PO11	Project management and finance	The capacity to work as a team member and team leader and to manage projects in multidisciplinary environments using modern engineering tools, methodologies, skills, and management principles. Effectively present and communicate
PO12	Life-long learning	An understanding of the need for, and the capacity to engage in, contemporary problem-solving and lifelong learning.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)- B. Voc

PEO1. Possess strong fundamental concepts in mathematics, science, engineering, and Technology to address technological challenges.

PEO2. Possess knowledge and skills in the field of Computer Engineering & IT Infrastructure for analyzing, designing and implementing complex engineering problems of any domain with innovative approaches.

PEO3. Commitment to ethical practices, societal contribution through communities and life-long learning.

PEO4. Possess better communication, presentation, time management and team work skills leading to responsible and will be able to address challenges in the field of IT at global level.

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PROGRAMME SPECIFIC OUTCOME (PSOS)- B. Voc

PSO1: Demonstrate understanding of the principles and working of the hardware and Software aspects of computer systems.

PSO2: Use professional engineering practices, strategies and tactics for the development, Operation and maintenance of software.

PSO3: Provide effective and efficient real time solutions using acquired knowledge in various domains.
- In addition, a skill in demand analysis is periodically conducted to identify the core topics in the CSE domain that are congruent with industry needs.
- Inputs are also gathered from alumni and other stake holders.
- As a result, the PEOs are created and reviewed for alignment with the Department's mission statement.

DAYANANDA SAGAR UNIVERSITY
Shavige Malleshwara Hills, Kumaraswamy Layout, Bengaluru - 560078, Karnataka.

SCHOOL OF ENGINEERING

REGULATIONS
FOR
BACHELOR OF VOCATION(BVoc) – 2021

(With Effect from 2021-24)

GOVERNING REGULATIONS FOR
BACHELOR OF VOCATION (B. Voc) – 2021

PREAMBLE

The School of Engineering under Dayananda Sagar University (University) provides science& technology based higher education leading to the development of high caliber engineers suitable for Industry and scientific research. The curriculum focuses on knowledge-based course work integrated with skill development as a part of training. It equally helps in inculcating the scientific temperament for the lifelong processes of learning. At the under graduate level, a student undergoes the foundation courses in science & engineering. Each department ensures that the courses cover both the core courses & electives.

ABOUT B VOC:

The University Grants Commission (UGC) has launched a scheme on skill development based higher education as part of college/university education, leading to Bachelor of Vocation (B Voc)

The B Voc program is focused on incorporating specific job skills along with broad based general education. Industry partners are integral part of the program. This would enable the students completing B Voc to make a meaningful skill oriented participation in accelerating India's economy by gaining appropriate employment, becoming entrepreneurs and creating appropriate skill/ knowledge.

OBJECTIVES:

To provide judicious mix of skills relating to a profession/vocation and appropriate content of general education.

To ensure that the students have adequate knowledge and skills, so that they are work ready after the completion of the program.

To enhance employability of the graduates and meet industry requirements. Such graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.

To provide vertical mobility to students coming out of 10+2 with vocational subjects. After

completing 10+2 years of schooling, students shall soon have the option of higher studies that go beyond the conventional arts, commerce and science courses.

To provide a multiple-exit provision - a diploma at the end of the first year and an advanced diploma after two years.

DEFINITIONS OF KEY WORDS

(i)   **Academic Year:** Two consecutive odd, even semesters and a summer term for makeup if required.

(ii)   **Course:** Usually referred to as a subject, a course may consist of any of Lecture/Tutorials/Practical /Seminar/Mini project/Project work.

(iii)   **Credit:** A unit by which the course work is measured.

(iv)   **Credit Point:** It is the product of grade point and number of credits per course.

(v)   **Cumulative Grade Point Average (CGPA):** It is the measure of overall cumulative performance over all semesters. It is expressed upto two decimal places.

(vi)   **First Attempt:** If a candidate has completed all formalities of academic requirement ina term and become eligible to attend the examinations and attend all the end semesterexaminations, such attempt shall be considered as first attempt.

(vii)   **Grade Point:** It is a numerical weight allotted to each letter grade on a 10- point scale.

(viii)   **Letter Grade:** It is an index of the performance in a said course. Grades are denoted by alphabets.

(ix)   **Programme:** An educational activity leading to award a Degree or Certificate.

(x)   **Semester Grade Point Average:** Is a measure of performance during a semester. Itshall be expressed up to two decimal places.

(xi)   **Transcript:** Based on the grades earned, a grade certificate shall be issued after every semester to the candidate registered.

(xii)   **Failure :** It is the case of appearing for Semester End examinations , but fails to obtain minimum passing marks in Semester End Examinations.

(xiii)   **Detain** : It is the case of not satisfying the eligibility criteria w.r.t Attendance /Internal Assesment in each course to appear for Semester End Examination.

(xiv)   **Audit Course** : A course to be taken by the student without benefit of a grade or acredit

RULES AND REGULATIONS

UG 1. All B. Voc programmes offered by the University shall be governed by the DSU BVoc. Rules and Regulations.

UG 2. The B. Voc rules and regulations shall be applicable to any new discipline(s) that may be introduced in future.

UG 3. A candidate shall become eligible for the award of the B. Voc Degree after fulfilling all the academic requirements as prescribed by the B. Voc. Rules and Regulations of DSU

UG 4. ELIGIBILITY FOR ADMISSION

UG 4.1. The eligibility condition for admission to B Voc program shall be 10+2 or equivalent, such as ITI certification, job-oriented program approved by the Government in any stream.

UG 4.2. Admission to II year /III Semester B Voc under Lateral Entry shall be open to the students who have passed diploma

UG 4.3. Diploma students seeking admission under Lateral Entry shall take up bridge courses as prescribed in the Scheme of Teaching

UG 4.4. For candidates who have completed Diploma from other than State of Karnataka ,their eligibility shall be based on the recognition of the Diploma awarding Boards by the University.

UG 5. ACADEMIC SESSION

UG 5.1. Each academic session is divided into two semesters of approximately eighteen weeks duration and a summer term -

Odd semester: Aug - Dec; Even

semester: Jan – May; and

Summer Term (Make-up Term): Jun- July.

UG 6. COURSE STRUCTURE

UG 6.1. Medium of instruction, examination and project reports shall be in English exceptincase
of any language audit courses.

UG 6.2. Teaching of the courses shall be reckoned in credits: Credits are assigned to the Courses
based on the following general pattern:

(a) One Credit would mean equivalent of 15 periods of 60 minutes each, for theory,
workshops/labs and tutorials.

(b) For internship/field work, the credit weightage for equivalent hours shall be
50% of that for lectures/workshops.

(c) For self-learning, based on e-content or otherwise, the credit weightage for
equivalent hours of study should be 50% or less of that for lectures/workshops

UG 6.3. In order to qualify for a BVoc degree of the University, a candidate is required to complete
the credit requirement as prescribed in the scheme/curriculum for a particular
programme.

UG 6.4.   The program of a study consists of the following components:

(i)   General Education Components

(ii)   Skill Components

(iii)   Project

(iv)   Internship

(v)   Soft Skills and Personality Development Programs

UG 6.5.   Module Delivery

Module delivery includes, but is not limited to, the following:

(i)   Face to Face Lectures /using Audio-Visuals

(ii)   Demonstrations

(iii)   Laboratory/Field work/Workshop

(iv)   Industry Visit

(v)   Group Exercises

(vi)   Project Exhibitions

UG 6.6 Every B. Voc Programme shall have a curriculum and syllabi for the courses approved by the Board of Governors. Board of Studies will discuss and recommend the syllabi of all the under graduate courses offered by the department from time to time before sending the same to the Academic Council. Academic Council will consider the proposals from the Board of Studies and make recommendations to the Board of Management and Board of Governors for consideration and approval. For all approved courses, the copyright shall be with DSU.

UG 6.7. Faculty Advisor: To help the candidates in planning their courses of study and getting general advice on the academic programme, the concerned department will assign a Faculty Advisor to each candidate.

UG 7. REGISTRATION

UG 7.1.   Every candidate is required to register for approved courses through the assigned Faculty Advisor at the end of previous semester or first week of the current semester, as notified by the Academic Calendar.

UG 7.2.   The Dean may cancel the registration of one or more courses if they are found to violate some rules or if there are restrictions imposed due to disciplinary reasons.

UG 7.3.   The student is permitted to drop a course/s from the registered courses, within 4 weeks after the start of the Semester/Year as notified in the academic calendar, with

the permission of Faculty Advisor and Chairperson / Dean / Principal of the respective School/College and no mention will be made in the grade card for dropped courses.

UG 7.4.   The student is permitted to withdraw course/s from the registered courses, within 4 weeks before the start of the Semester/Year End Examinations as notified in the academic calendar, with the permission of Faculty Advisor and

Chairperson / Dean / Principal of the respective School / College and Grade "W" will be awarded for course/s that were withdrawn.

UG 7.5.   For the courses with "W" grade, the students should re-register subsequently when offered, either in MOOCS or in-class or summer term and fulfill the passing criteria to secure a grade in that course for change from "W" grade.

UG 7.6.   Only those candidates shall be permitted to register who have:

(a) The academic eligibility to move to higher semesters (UG 8 & UG 10)

(b) Cleared all University, Hostel and Library dues and fines (if any) of the previous semesters,

(c) Paid all required advance payments of University and Hostel dues for the current semester,

(d) Not been debarred from registering on any specific ground.

(e) A minimum CGPA of 4 in the previous semesters

UG 8. EXAMINATION: ASSESSMENT CRITERIA & ELIGIBILITY

Every student is assessed for eligibility to higher semester thro Continuous Internal Assessment (CIA) and Semester End Examination (SEE) as prescribed.

UG 8.1   The Continuous Internal Assessment (CIA), to be normally conducted all through the semester; This shall include tests, assignments, problem solving, group discussions,

quiz, seminar, mini-project and other means. The subject teacher shall announce the detailed methodology for conducting the various segments of CIA together with their weightages at the beginning of the semester.

UG 8.2 The Semester End Examination (SEE), to be conducted at the end of the semester. This shall include a written examination for theory courses and practical/design/drawing examination with built-in oral part for laboratory/design/drawing courses.

UG 8.3 CIA and SEE shall have 50:50 weightage.

UG 8.4 . A student's performance in a course shall be judged by taking into account the results of CIA and SEE together. A student has to obtain and satisfy the following conditions to be declared as pass in each course:
 (i)   minimum 40% of marks in CIA
(ii) minimum 35 % of marks in SEE
(iii) minimum 40% of marks in aggregate considering both CIA & SEE

UG 8.5 . ATTENDANCE ELIGIBILITY

UG 8.5.1. Candidates are required to attend all the classes (Lectures, Tutorials, Practical, Workshop Practice,etc.) for which they have been registered.

UG 8.5.2. The candidate shall not be allowed to appear for the end semester examination if his/her attendance falls below 85% in each course and shall be awarded a "NE" grade in that course.

UG 8.5.3. A provision for condonation of 10% of the attendance by the Vice- chancellor on the specific recommendation of the chairman of the department and Dean, showing reasonable cause such as:

(a) Any medical emergencies / illness where the candidate requires rest for the specified

number of days certified by a Government Doctor only / any death in the family (near and dear ones).

(b) If the student represents the University in Sports/ Cultural activities/extra- curricular activities/Co-curricular activities.

(c) If a student presents a Paper in National/ International Conferences or attends any recognized Workshops/Seminars.

UG 8.5.4. If the period of leave is for a short duration (less than two weeks), prior applicationfor leave shall have to be submitted to the Chairman of the Department concerned stating fully the reasons for the leave requested for along with supporting document(s). Such leave will be granted by the Chairman of the Department. However, the student shall comply with 8.5.2 and 8.5.3. of regulations.

UG 8.5.5. If the period of absence is likely to exceed two weeks, a prior application for grantof leave will have to be submitted through the Chairman of the Department to the Dean with supporting documents in each case. The decision to grant leave shall be taken by the Dean on the recommendation of the Chairman of theDepartment. However the student shall comply with 8.5.2 and 8.5.3. of regulations

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UG 8.5.6. It shall be the responsibility of the candidate to intimate the concerned course instructor(s) regarding his/her absence before availing the leave.

UG 8.5.7. In exceptional circumstances, on the recommendations of the Chairman of the Department and Dean with supporting documents, the Vice Chancellor may condone/relax any of the above requirements to an extent of 10%.

UG 8.6 . CONTINUOUS INTERNAL ASSESSMENT

UG 8.6.1. Candidate shall secure minimum of 40% of marks in Continuous Internal Assessment to be eligible to appear for the end semester examination or else "NE"grade will be

awarded.

UG 8.6.2. There shall be no improvement of Continuous Internal Assessment marks if they are above 40%.

UG 8.6.3. Continuous Evaluation consists of:

UG 8.6.3.1 Internal Assessment Test : Three tests will be conducted. Average of two bestoutof three tests shall be the internal marks in theory courses.

UG 8.6.3.2 Internal Assessment for practicals shall be based on continuous evaluation anda test.

UG 8.6.4. Candidates who have missed the Internal Assessment Test on valid reasons cantake-up Internal Assessment Test with prior approval of the Chairman of the department.

UG 8.6.5. Permission to take a Internal Assessment Test will be given under exceptional circumstances such as participating in the University activity, admission to a hospital due to illness and a calamity in the family at the time of Internal Assessment Test.

UG 8.6.6 Each student shall be required to do one assignment or one seminar for each course.The seminars shall be organized by the Instructor in charge of the course andthe same shall be assessed by a panel.

UG 9. GRADING

UG 9.1. There shall be continuous assessment of a candidate's performance throughout thesemester and grades shall be awarded by the concerned course instructor and/or the appropriate committee appointed for this purpose on the following basis.

UG 9.2. The grading will normally be based on CIA and SEE

UG 9.3. Practical Courses/ Work Shop Practice: The evaluation will be based on instructor's continuous internal assessment, a test and end semester examination.

UG 9.4. The weightage assigned to different components of continuous internal assessment will be announced by the concerned instructor(s) in the beginning of the semester.

UG 9.6. The results of performance of the candidates in the Continuous Internal Assessment Test shall be announced by the instructors.

UG 9.7. Mini project /projects will be based continuous evaluation by Guide(s) and end Semester examination by an evaluation committee.

UG 9.8. The results of performance of the candidates in the end semester examination shall be announced by the Controller of Examinations.

UG 9.10. METHOD OF AWARDING LETTER GRADES

UG 9.10.1. Relationships among Grades, Grade points and % of marks are listed in Table1.

Table 1: Grade, Points, Grade Description and % of marks

GRADE	GRADE POINTS	DESCRIPTION	% MARKS
O	10	Outstanding	90 to 100
A+	9	Excellent	80 to 89
A	8	Very Good	70 to 79
B+	7	Good	60 to 69
B	6	Above Average	55 to 59
C	5	Average	50 to 54
P	4	Pass	40 to 49

F	0	Fail	< 40
AP	-	Audit Pass	-
AF	-	Audit Fail	-
IC	-	In Complete	-
NE	-	Not Eligible	-
W	-	Withdrawn	-

UG 9.11. DESCRIPTION OF GRADES

UG 9.11.1. Table 1 shows the relationships among the grades, grade points and percentage of marks.

UG 9.11.2. A candidate getting E grade in odd/even semester shall have option to improve the grade by taking re-examination conducted in the following summer term or the next corresponding semester. A student will have to compulsorily improve E grade to P , to ensure a minimum CGPA of 4 , to become eligible for the award of the degree.

UG 9.11.3. If candidates obtain E grade on second attempt he/she shall have the option to reregister for the same core-course. In case of elective course he/she shall have the option to reregister for the same or any other elective course offered.

UG 9.11.4. A candidate can take re-examination for E Grades in maximum of TWO courses in a given semester.

UG 9.11.5. A candidate shall have to repeat all core courses in which he/she obtains 'F' Grades until a passing grade is obtained.

UG 9.11.6. In case of a candidate getting F grade in an elective course he/she may take the same course or any other elective course offered in subsequent academic year.

UG 9.11.7 An IC grade denotes incomplete performance in any Theory and/or Practical Assessment. It may be awarded in case of absence on medical grounds or other special

circumstances for SEE. Requests for IC grade should be made at the earliestbut not later than the last day of SEE.

UG 9.11.8. The student can appear for the course/s with IC grade, when exams areconducted subsequently by the university for those courses.

UG 9.11.9. Grade NE is awarded when the student fails to satisfy minimum criteria w.r.t attendance, CIA and both Attendance & CIA in particular course and will beconsidered as detained in that particular course .

UG 9.12. EVALUATION OF PERFORMANCE

UG 9.12.1. The performance of a candidate shall be evaluated in terms of the Semester GradePoint Average (SGPA) which is the Grade Point Average for a semester, CumulativeGrade Pint Average (CGPA) which is the Grade Point Average for all the completed semesters.

UG 9.12.2. A candidate who completes the course and credit requirements but has CGPA of less than 5.0 which is below the minimum required for award of degree can take additional credits to make up the CGPA.

UG 9.12.3. The Earned Credits (EC) are defined as the sum of course credits for courses in which candidates have been awarded grades between O to P. (Table 1)

UG 9.12.4. Points earned in a semester = (Course credits X Grade point) for Grades O - E

UG 9.12.5. The SGPA is calculated on the basis of grades obtained in all courses, except audit courses and courses in which F grade or below, registered for in the particular semester.

$$SGPA = \frac{\text{Points secured in the semester } (O - E \text{ Grades})}{\text{Credits registered in the semester, excluding audit}}$$

UG 9.12.6. The CGPA is calculated on the basis of all pass grades, except audit courses .

$$CGPA = \frac{\text{Cumulative points secured in all the passed courses } (O - E \text{ Grades})}{\text{Cumulative registered credits, excluding audit}}$$

UG 9.13. WITHHOLDING OF GRADES

UG 9.13.1. Grades shall be withheld when the candidate has not paid his/her dues or when there is a disciplinary action pending against him/her

UG 9.14. CONVERSION OF CGPA INTO PERCENTAGE

UG 9.14.1. Conversion formula for the conversion of CGPA into percentage is

Percentage of Marks Scored = (CGPA Earned − 0.75) × 10

UG 10. PROMOTION CRITERIA AND ENROLLMENTS TO HIGHER SEMESTERS

UG 10.1. During registration for the higher semesters , the following promotional criteria/conditions should be satisfied.

UG 10.1.1 A student shall be eligible for promotion from an even semester to the next odd semester (i.e., of the next academic year) if the student has not failed in more than four courses (Credit Courses) of the immediately preceding two semesters put together. Also, the student should not have any backlog of lower semesters preceding to immediate previous two semesters. A theory or practical shall be treated as a credit course of passing. Illustrations:

(i)   A student seeking eligibility to 3rd semester should not have failed in more than 6 credit courses of first and second semesters taken together.

(ii)   A student seeking eligibility to 5th semester should have passed in all the courses of 1st and 2nd semesters and should not have failed in more than 6 credit courses of third and fourth semesters taken together.

UG 10.1.2. A student is deemed to be detained if he/she does not satisfy the minimum attendance or CIA or both in any course (Credit Course) **.**

UG 10.1.3. In an ODD semester of an academic year, a student is deemed to be detained if he/she does not satisfy attendance/CIA criteria in more than 6 courses (Credit Courses), excluding Audit courses. Such candidate will not be eligible to seek promotion to next EVEN semester, during the same academic year. Such candidates shall re-register for the same ODD semester in the next academic year.

UG 10.1.4 A student is deemed to be detained if he/she does not satisfy the attendance/CIA criteria in more than 6 courses i.e Credit Courses (odd and even semester of an academic year put together). If the student is not satisfying the attendance/CIA criteria upto 6 courses (Credit Courses - odd and even semester of an academic year put together) , shall register for those courses under the summer term program and complies with the attendance/CIA criteria in those courses (not more than 6 courses as stated at 10.7.1) .

UG 10.1.5 The students with NE (not eligible due to shortage in CIA/ & Attendance) in any Credit course/s other than Audit courses of odd and even semester put together is not eligible for promotion from an even semester to the next odd semester , but has the option to enroll in summer term and comply with the eligibility criterion(not more than 6 courses as stated at 10.7.1).

UG 10.1.6. A candidate must pass all first year courses before registering for the third year.

UG 10.1.7. Candidates obtaining grade 'F' in any core course in any semester may clear it in the subsequent summer term examination or must repeat it in the next appropriate semester when it is offered i.e odd semester courses during odd semesters examinations and even semester courses during even semester examinations.

UG 10.1.9. Those who obtain grade 'F' in an elective course may similarly clear the backlog in the summer term examination or, alternatively, register for any elective course offered in the

next semester.

UG 10.2. In case of failure in Practical/Workshop practice course the candidate in any semester may clear it in the subsequent summer term examination or semester examination.

UG 10.3. In case a candidate fails in continuous evaluation of Practical/Workshop practice he/she shall register in the summer term or subsequent semester.

UG 10.4 Candidates Candidates may add and drop course(s) with the concurrence of the Faculty Advisor, and under intimation to the concerned course instructors and the academic section provided this is done within the date mentioned in the Academic Calendar.

UG 10.5. SUMMER TERM & MAKEUP EXAMINATIONS

UG 10.5.1. A summer term program may be offered by a department and with the approval of the Dean.

UG 10.5.2. Summer term courses will be announced by the Academic Affairs Office at the end of the even semester and before the commencement of the end semester examination. A candidate will have to register for summer term courses by paying the prescribed fees within the stipulated time in the announcement.

UG 10.5.3. The total number of contact hours in any summer term program will be the same as in the regular semester course. The assessment procedure in a summer term course will also be similar to the procedure for a regular semester course.

UG 10.5.4. Candidates granted semester drop by the Board of Governors, on medical ground, shall be allowed to clear the concerned courses in summer term course and subject to conditions as stated under clauses 10.5.1, 10.5.2.and 10.5.3.

UG 10.5.5. The Candidates with "NE" grade shall register for summer term by paying the prescribed fees.

UG 10.5.6. Candidates who are awarded 'F' grades in regular semester examinations havetheoption to register for the concerned courses in summer term examinationsto the conditions as stated under clauses 10.5.1, 10.5.2.and 10.5.3above, or they can re-sit for subsequent semester/summer term examination only.

UG 10.5.7. Provision for make-up exam shall be available to the students who might have missed to attend the Semester / Annual end examinations of one or more courses for exceptional cases arising out of natural calamities / medical emergencies / death of a member in the family, with the permission of FacultyAdvisor and Chairperson / Dean / Principal of the respective School/College. All such cases have to be exclusively to be approved by the Vice-Chancellor and ratified in the Academic Council / BOM / BOG. All such courses approved for makeup examinations are awarded a transitory grade "IC" (incomplete grade)

UG 10.5.8. The makeup examinations shall be held as notified in the academic calendar or through an exclusive notification duly approved by the Vice-chancellor.

UG 11. DURATION OF THE PROGRAMME

UG 11.1. Normally a candidate should complete all the requirements for undergraduate programme in Three years. However, academically weaker candidates who do notfulfil some of the requirements in their first attempt and have to repeat them in subsequent semesters may be permitted up to Six consecutive years (from the first year of registration) to complete all the requirements of the degree.

UG 11.2. Normally a candidate under lateral entry should complete all the requirements for undergraduate programme in Two years. However, academically weaker candidates who do not fulfil some of the requirements in their first attempt and have to repeat them in subsequent semesters may be permitted up to Four consecutive years (from the second year registration) to complete all the requirements of the degree.

UG 12. TERMINATION FROM THE PROGRAMME

UG 12.1. A candidate may also be compelled to leave the Program in the University on disciplinary grounds.

UG 12.2. On having been found to have produced false documents or having made false declaration at the time of seeking admission.

. **UG 12.3.** On having been found to be pursuing regular studies and/or correspondence courses (leading to degree or diploma) in any other college, university or an educational institution simultaneously.

UG 12.4. On having been found to be concurrently employed and performing duty or carrying out business in contravention to academic schedules of the University and without seeking approval from the University.

UG 13. TEMPORARY WITHDRAWAL FROM THE UNIVERSITY

UG 13.1. Candidate who has been admitted to an undergraduate programme of the University may be permitted to withdraw temporarily from the University on the grounds of prolonged illness or grave calamity in the family for a period of one semester or more, provided:

UG 13.1.1. He/she applies to the University within at least 6 weeks of the commencement of the semester or from the date he last attended his/her classes whichever is later, stating fully the reasons for such withdrawal together with supporting documents and endorsement of his/her guardian.

UG 13.1.2. The University is satisfied that, counting the period of withdrawal, the candidate is likely to complete his/her requirements of the BVoc. Degree within the time limits specified in Clause 11.1 or 11.2 above.

UG 13.1.3. There are no outstanding dues or demands in the University/Hostel/Department/
Library.

UG 13.1.4. Normally, a candidate will be permitted only one such temporary withdrawal during
his/her tenure as a candidate of the undergraduate programme.

UG 14. ELIGIBILITY FOR THE AWARD OF BVoc DEGREE

A candidate shall be declared to be eligible for the award of BVoc degree if he/she has:

UG 14.1. Completed all the credit requirements for the degree with a CGPA 4.0 or higher at the
end of the programme.

UG 14.2. Satisfactorily completed all the mandatory audit courses.

UG 14.3. No dues to the University, Department, Hostels.

UG 14.4. No disciplinary action pending against him/her.

UG 15. AWARD OF DEGREE

The award of BVoc degree must be recommended by the Academic Council and approved
by the Board of Management and Board of Governors of the DSU.

UG 16. CONDUCT AND DISCIPLINE

UG 16.1. Candidates shall conduct themselves within and outside the precincts of the University
in a manner befitting the candidates of an institution of national importance. The
University has a separate ordinance Code and Conduct of Candidates which is applicable
to all candidates of the University.

UG 17. REPEAL AND SAVINGS

Notwithstanding anything contained in these Regulations, the provisions of any guidelines, orders, rules or regulations in force at the University shall be inapplicableto the extent of their inconsistency with these Regulations. The Academic Council , Board of Management and Board of Governors of the DSU of University may revise, amend or change the regulations from time to time.

UG 18. INTERPRETATION

Any questions as to the interpretation of these Regulations shall be decided by the University, whose decision shall be final. The University shall have the powers to issue clarifications to remove any doubt, difficulty or anomaly which may arise during the implementation of the provisions of these Regulations.

DAYANANDA SAGAR UNIVERSITY
Shavige Malleshwara Hills, Kumaraswamy Layout,Bengaluru - 560078, Karnataka.

SCHOOL OF ENGINEERING

SCHEME &
SYLLABUSFOR
BACHELOR OF VOCATION

SPECIALIZATION:

COMPUTERENGINEERING &IT

INFRASTRUCTURE

INFRASTRUCTURE. AY: 2021-2024

1th Semester

SL.	PROGRAM CODE	COURSE CODE	COURSE NAME	CREDITS	HOURS
GENERAL EDUCATION COMPONENTS :13 CREDITS,260H					
1.	P007	21VC101	MATHS-I	3	45
2.		21VC102	ENGLISH	2	30
3.		21VC103	APPLIED SCIENCE	2	30
4.		21VC104	ALGORITHM-PROBLEM SOLVING TECHNIQUES & FLOW CHARTS	3	45
5		21VC105	BASICS OF ELECTRICAL & ELECTRONICS	2	30
			TOTAL	12	180
SKILL COMPONENTS :18 CREDITS,270H					
6.	P007	21VC106	BASICS OF ELECTRICAL & ELECTRONICS LAB	4	60
7.		21VC107	BASICS OF COMPUTER LAB	4	60
8.		21VC108	PC HARDWARE LAB	3	45
9.		21VC109	HTML & CSS LAB	5	75
10.		21VC110	ELSD	2	30
			TOTAL	18	270

SCHEME AND SYLLABUS FOR

B.VOC IN COMPUTER ENGINEERING AND IT

INFRASTRUCTURE. AY: 2021-2024

2th Semester

SL.	PROGRAM CODE	COURSE CODE	COURSE NAME	CREDITS	HOURS
GENERAL EDUCATION COMPONENTS :12 CREDITS, 180H					
1.	P007	21VC201	MATHS-II	2	30
2.		21VC202	UNIX	2	30
3.		21VC203	COMPUTER NETWORKS -I	2	30
4.		21VC204	C-PROGRAMMING	2	30
5		21VC205	DATABASE MANAGEMENT SYSTEMS	2	30
		21VC206	APPLICATIONS OF ANALOG & DIGITAL CIRCUITS	2	30
TOTAL				12	180
SKILL COMPONENTS :18 CREDITS,270H					
6.	P007	21VC207	DATABASE LAB	5	75
7.		21VC208	C-PROGRAMMING LAB	4	60
8.		21VC209	UNIX LAB	4	60
9.		21VC210	COMPUTER NETWORKS LAB	5	75
				18	270
AUDIT COURSE					
		21AU0044	CUSTOMER SERVICE LAB	*	*

SCHEME AND SYLLABUS FOR

B.VOC IN COMPUTER ENGINEERING AND IT

INFRASTRUCTURE. AY: 2021-2024

3th Semester

GENERAL EDUCATION COMPONENTS :12 CREDITS,180H

SL.	PROGRAM CODE	COURSE CODE	COURSE NAME	CREDITS	HOURS
1.		21VC301	DATA STRUCTURES WITH C	2	30
2.	P007	21VC302	OOP'S WITH C++	2	30
3.		21VC303	COMPUTER NETWORKS-II	2	30
4.		21VC304	MICROPROCESSOR & MICRO CONTROLLER	2	30
5		21VC305	OPERATING SYSTEM	2	30
		21VC306	COMPUTER ORGANIZATION	2	30
			TOTAL	12	180
SKILL COMPONENTS :18 CREDITS,270H					
6.	P007	21VC307	OOP'S WITH C++ LAB	5	75
7.		21VC308	DATA STRUCTURES WITH C LAB	4	60
8.		21VC309	COMPUTER NETWORKS-II LAB	4	60
9.		21VC310	MICROPROCESSOR & MICRO CONTROLLER LAB	5	75
			TOTAL	18	270
		AUDIT COURSE			
		21AU0004	CONSTITUTION OF INDIA AND PROFESSIONAL ETHICS	*	*

SCHEME AND SYLLABUS FOR

B.VOC IN COMPUTER ENGINEERING AND IT

INFRASTRUCTURE. AY: 2021-2022

4th Semester

SL.	PROGRAM CODE	COURSE CODE	COURSE NAME	CREDITS	HOURS
GENERAL EDUCATION COMPONENTS :12 CREDITS,180H					
1.	P007	21VC401	SOFTWARE ENGINEERING	2	30
2.		21VC402	JAVA PROGRAMMING	2	30
3.		21VC403	WINDOWS SERVER ADMINISTRATION & LINUX SERVER ADMINISTRATION	2	30
4.		21VC404	IOT	2	30
5		21VC405	WEB PROGRAMMING (JAVASCRIPT, PERL, PHP, PYTHON)	2	30
		21VC406	DESIGN AND ANALYSIS OF ALGORITHMS and APPLICATION	2	30
			TOTAL	12	180
SKILL COMPONENTS :18 CREDITS,270H					
6.	P007	21VC407	WEBPROGRAMMING(JAVASCRIPT, PERL, PHP, PYTHON) LAB	5	75
7.		21VC408	WINDOWS SERVER ADMINISTRATION & LINUX SERVER ADMINISTRATION LAB	4	60
8.		21VC409	JAVA PROGRAMMING LAB	4	60
9.		21VC410	IOT LAB	5	75
			TOTAL	18	270
AUDIT COURSE					
	21AU0020	KANNADA KALI – I		*	*

SCHEME AND SYLLABUS FOR

B.VOC IN COMPUTER ENGINEERING AND IT INFRASTRUCTURE.

AY: 2021-2022

5th Semester

GENERAL EDUCATION COMPONENTS :12 CREDITS,180H					
SL.	PROGRAM CODE	COURSE CODE	COURSE NAME	CREDITS	HOURS
1.		21VCXXX	CLOUD COMPUTING	2	30
2.		21VCXXX	CYBER SECURITY	2	30
3.	P007	21VCXXX	SOFTWARE TESTING	2	30
4.		21VCXXX	ORGANIZATIONAL BEHAVIOUR AND PROJECT MANAGEMENT	2	30
5		21VCXXX	ITIL.DEVOPS(TESTING)	2	30
		21VCXXX	EMBEDDED SYSTEMS	2	30
TOTAL				12	180
SKILL COMPONENTS :18 CREDITS, 270H					
6.	P007	21VCXXX	AWS CLOUD LAB	4	60
7.		21VCXXX	CYBER SECURITY LAB	4	60
8.		21VCXXX	SOFTWARE TESTING LAB	4	60
9.		21VCXXX	DEVEOPS LAB	4	60
10.		21VCXXX	DBA LAB	2	30
				18	270

SCHEME AND SYLLABUS FOR

B.VOC IN COMPUTER ENGINEERING AND IT INFRASTRUCTURE.

AY: 2021-2022

6th Semester

SL.	PROGRAM CODE	COURSE CODE	COURSE NAME	CREDITS	HOURS
GENERAL EDUCATION COMPONENTS : 4 CREDITS,80H
1.	P007	21VCXXX	MACHINE LEARNING	4	80
			TOTAL	4	80
SKILL COMPONENTS :26 CREDITS,390H		
2.	P007	21VCXXX	Major Project	26	390
				26	390

SEMESTER	1 SEM				
YEAR	1 YEAR				
COURSE CODE	21VC101				
TITLE OF THE COURSE	**Mathematics-1**				
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	3	-	-	-	45	3

COURSE OBJECTIVES:

1. To introduce the students to mathematical tools used in various engineering branches

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to:

CO No.	Outcomes
CO1	An ability to apply knowledge of mathematics, science and engineering.
CO2	An ability to identify, formulate and solve engineering problems.
CO3	An ability to use the techniques , skills and engineering tools

COURSE CONTENT:	

MODULE 1	**10Hrs**

Linear Equations: Solutions to linear equations**,** Solutions to quadratic equations by factorization**,** Solutions to quadratic equations using formula). **Linear Algebra:** Linear spaces, Sub spaces, Linear independence, Bases and Dimensions, Orthogonality, Gram Schmidt Orthogonalization process

MODULE 2	**8Hrs**

Matrices & Determinants: Matrix Definition, Addition, Subtraction, Multiplication and Transpose of Matrix, Definition of determinant, Properties and its Evaluation, Minors, Co-factors, Determinant of transpose, Linear equation Solution (Cramer's rule)

MODULE 3	**9Hrs**

Complex Numbers : Introduction, representation of complex numbers, Representation on graph, Addition, Subtraction and multiplication, Complex conjugate, graph representation, Division of complex numbers, Polar form of complex number, Polar form of complex number, Conversion from polar to rectangular and vice-versa.

Vectors: Introduction, Unit vector, Multiply vector by a scalar, Adding vectors algebraically and graphically, Magnitude and direction, Vector dot product and length, Vector cross product,

Direction (right and rule), Area of parallelogram, Work done on moving object by a force (dot Product), Torque exerted by force (Cross Product).

MODULE 4	10Hrs

Differential Calculus: Definition and evaluation of limits, Definition of Derivative, Slope of tangent at a point on the curve, Differentiation of constant, ex,xn,ax and log x, Differentiation of trigonometric functions, Differentiation of Sum, difference, product and quotient of functions, Application of differentiation-velocity and acceleration.

Statistics: Mean, Median and mode, Moving average, Grouping of data, Class interval, Range, Standard Deviation & Variance, Histogram, Skewness, Interpretation of skewness, Normal distribution.

MODULE 5	8Hrs

Sequence and series: Sequence, Series, Recursive and explicit formulas. **Set Theory:** Definition of Sets, Venn Diagrams, Subset, Power Set, Cardinality and Cartesian products, **Set Operations:** AND,OR, NOT, Conditional statements, Univariate, Bi-variate and Multi variate data. Permutation & Combination: Multiplication and addition principle of counting, Permutation, Combination, Exercise on permutation and combination.

Text Books:
1. Erwin Kreyzig, Advanced Engineering Mathematics, Wiley, Tenth edition
2. Thomas and Finney, Calculus and Analytic Geometry, Pearson India, Ninth edition

Reference Books:
3. G.F.Simmons and S. Krantz, Differential Equations Theory, Techniques and Practice, Tata McGraw Hill.
4. W.E.Boyce and R.C.DiPrima, Elementary Differential Equations and Boundary Value Problems, Ninth Edition, Wiley Student Edition.

SEMESTER	I SEM					
YEAR	1 YEAR					
20VI101	21VC102					
TITLE OF THE COURSE	ENGLISH					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

- To Speak fluently
- To Make simple technical presentations
- To Develop Communication skills for academic and social interaction.
- To comprehend technical literature by listening.
- To write technical documents in correct English.
- To have a better interactive skill.

COURSE OUTCOMES:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	Students achieve proficiency in English
CO2	Develop their professional communication skills
CO3	Acquire skills for placement

COURSE CONTENT:	
MODULE 1: Parts of Speech	**8Hrs**
Noun- Different kind of nouns, Numbers, Articles, Pronoun- Different kind of pronouns, Adjectives- Degrees of comparison, Verbs- Verb forms (V1,V2,V3), Active and Passive voice, Adverbs, Preposition, Conjunctions, Interjection.	
MODULE 2: VERBTENSES	**5Hrs**
Main divisions, Subdivisions	
MODULE 3: LANGUAGE SKILLS DEVELOPMENTEXERCISES	**6Hrs**
Reading and Listening Exercises- Comprehension Passages, Stories, Newspaper Reading, Spoken English exercises- Self-Introduction, Story Telling, Announcements, Talk on given situations/topics	
MODULE 4: WRITING SKILL and SENTENCES	**5Hrs**
Letter writing (Leave Letter/Apology Letter), Types of Sentences, Question Tags, Direct and Indirect Speech.	
MODULE 5: LANGUAGESKILLSDEVELOPMENT	**6Hrs**
Arranging a set of information in proper order, Story development from bare outlines, Role plays Practiceon giving directions, Question & Answer sessions	

Reference Books:

2. High School English Grammar by Wren &Martin - S . Chand &Co. Ltd
3. English Communication for Polytechnics by S.Chandrashekhar & Others – Orient Black Swan
4. English Grammar at Glance by M. Gnana murali - S.Chand&Co. Ltd
5. Effective English by E. Suresh Kumar&Others – Pearson.

SEMESTER	1 SEM					
YEAR	1 YEAR					
COURSE CODE	21VC103					
TITLE OF THE COURSE	APPLIED SCIENCE					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

- To create awareness of correct usages of SI units.
- To understand the relationship between laws and specific phenomena.
- To understand the method of composition and resolution of forces Study the condition of equilibrium of a system of forces Recognize moment as one, which gives rotation effect.
- To identify the acidic, basic or neutral nature of solution.
- To understand about solar energy and its applications.
- To understand the general properties and uses of certain organic compound
- To create awareness of phenomenon Modern Physics& on wave motion.
- To get exposure on laser.

COURSE OUTCOME:

- After successful completion of the course, the trainee should be able to:

CO No.	Outcomes
CO1	Students can understand the importance of force and energy.
CO2	Moments and its applications are learn.
CO3	Students are able to understand properties of solid and fluids
CO4	Students are able to identify the acid and basic nature of solution
CO5	Students got exposure on laser

COURSE CONTENT:	
MODULE 1	**8Hrs**
PHYSICAL WORLD, FORCE & MOTION ENERGY: Physical Quantities Types of systems of units, Fundamentals of derived quantities, SI units Dimension Linear motion Displacement, velocity, acceleration. Equations of motion Problems Newton's laws of motion. Momentum (Linear) Law of conservation of momentum Force Inertia. Work power, Energy Law of conservation of energy.	
MODULE 2	**6Hrs**

Composition and resolution of forces:	
Definition, law of parallelogram of forces, triangle law of forces, polygon law of forces. **EQUILIBRIUM OF FORCES:** Introduction. System of forces Principle of equilibrium Lami's Theorem Problems Moments and its applications. Couple.	
MODULE 3	**5Hrs**
PROPERTIES OF SOLIDS AND FLUIDS: Physical properties, chemical properties, mechanical properties, electrical properties, Optical properties. **Lubrication and lubricants:** Basics of lubrication, Types of lubricants, Selection of lubricant.	
MODULE 4	**5Hrs**
HEAT: Definition of heat Thermometry. Platinum resistance thermometer, Thermos couple. Pyrometer Calorimetry Specific heat capacity Heat Transfer Optical fiber: Optical fiber, types, working principle, application.	
MODULE 5 **Laser:** Introduction and properties of laser, types and application **Renewable energy:** PV panels, specifications, Mppt, Wind turbine types, working of wind turbine, Types of batteries, PV system requirement calculations.	**6Hrs**

Reference Books:

1. Principle of physics for class XI and XII by V.K.Mehata and Rohit Mehta, as per Karnataka state PUC syllabus S.Chand and Company, New Delhi

2. Engineering chemistry for Diploma by Ranjan Kumar Mahapatra (PHI Learning Pvt. Ltd., New Delhi)

3. Basic Physics by Kongbam ChandramaniSingh (PHI Learning Pvt. Ltd., New Delhi)

4. Principle of physics by P.V.Naik (PHI Learning Pvt. Ltd. New Delhi)

SEMESTER	1 SEM					
YEAR	I YEAR					
COURSE CODE	21VC104					
TITLE OF THE COURSE	ALGORITHM-PROBLEM SOLVING TECHNIQUES & FLOW CHARTS					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

- To understand the basic computers and component of computer
- To understand about various classes of computers, speed and memory
- To gain knowledge about input and output devices
- To learn about data storage devices.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	Students are able to learn about components of computer
CO2	Students are able to identify the various data storage devices and its applications
CO3	Acquire the skills about Operating systems and GUI

COURSE CONTENT:	
MODULE 1	**8Hrs**
Introduction to Algorithm: What is an algorithm? Characteristics of an Algorithm	
MODULE 2	**10Hrs**
Method for Developing an Algorithm: Sequence structure, Selection structure, repetition structure, Flowcharts, Flowchart Constructs, and Flowchart Example.	
MODULE 3	**9Hrs**
Pseudo code (or Program Design Language): Pseudo code Language Constructs , Computation/Assignment, Input/Output, Selection, Repetition, Pseudo code Example.	
MODULE 4	**9Hrs**
Programming using C: How to develop a program using C language, Simple program examples	
MODULE 5	**9Hrs**
Problem solving: Introducing Computational Thinking, What is CT? Exploring Algorithms, Computational Thinking is a problem-solving process that includes the following characteristics. Finding	

Patterns, Developing ,Algorithms, Decomposition, Abstraction, Pattern Recognition, Designing algorithms, Computer Hardware's Computer Software, Final Project: Applying Computational Thinking.

Text Books:

i)   Computer Fundamentals – by P.K. Sinha, BPB Publications.

Reference Books:

i)   Computer Programming – by P. Kumar Wiley publication.

ii)   "Computer Fundamentals and Programming in C ", - by Reema Thareja, Oxford Press, 2014.

SEMESTER	1st SEM					
YEAR	I YEAR					
COURSE CODE	21VC105					
TITLE OF THE COURSE	BASICS OF ELECTRICAL & ELECTRONICS					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

- To effectively used digital multi-meter, function generator and oscilloscope.
- To analyses the working of a diode and its characteristics
- To understand the characteristics of different electronic devices.
- To understand the types of rectifiers and their working.

COURSE OUTCOME:

- After successful completion of the course, the trainee should be able to:

CO No.	Outcomes
CO1	Students are able to understand the Resistors, Capacitors.
CO2	Students are able to identify the types of rectifier.

COURSE CONTENT:	
MODULE 1	6Hrs
Atomic Structure and Introduction to electron current: Atom-Electron orbit& Energy levels, Concept of electric friction(resistance),current and voltage with definition(s) Unit, Ohms Law, a)Temperature effect on resistance,(b) Ideal Vg source and current source, Power, Energy, and energy in Kilo watt hour i.e., Unit with examples. **Resistors and Kirchhoff's law:** Resistance in series, Resistance in Parallel and related problems, Open circuit and short circuits, Kirchhoff's voltage law with problems, Kirchhoff's current law with problems,	
MODULE 2	6Hrs
Capacitors & Fundamentals of AC: Capacitance of a Capacitor, Principle of Capacitance, Di-electric strength, effect of dielectric material on capacitance of a capacitor and types, Capacitors in series and Parallel Combination, Different Wave forms, cycle, frequency, Time period, Instantaneous value, rms value, peak value, peak to peak value, amplitude. **Basic Semiconductor and P.N. junction Theory:** Energy bands in conductors, semiconductors and insulators, Conduction in conductors and semiconductors, P-Type &N-	

type Semiconductor, PN junction– Unbiased and biased PN junction Forward Biasing and Reverse Biasing.

MODULE 3	6Hrs

Semiconductor Diodes, Zener Diodes and LED:

Introduction to P.N.-junction diodes, Diode characteristics & Description of diode equation, Zener diodes characteristics & parameters, Light emitting diodes, its working principle characteristics& Application, Half wave rectifier, Full wave rectifier, Full wave bridge rectifier.

MODULE 4	20Hrs

Digital Basics:

Introduction to digital system, Difference between digital and analog signals, Number system–different types, Conversion of Decimal to Binary and vice versa, Conversion of Decimal to hexadecimal and vice versa, Conversion of binary to hexa decimal and vice versa, Binary coded decimal, ASCII,EBCDIC, Complement arithmetic [1's,2's], Binary addition.

MODULE 5	

Logic Gates:

Introduction of logic gates, Inverter- OR-AND-NOR– NAND symbol and truth table, XOR -XNOR gates, Construction of logic circuits using gates.

Reference Books:

1. Robert. L. Boylestad and L. Nashelsky, Electronic Devices and circuit Theory, Pearson Education,9th edition, 2005
2. David A Bell, Electronic Devices and Circuits, PHI,5th edition ,2007
3. Millman & Halkias, Electronics Devices and Circuits, McGraw Hill.

Text Books:

1. Electronic Circuits: Fundamentals and Applications   by Michael Tooley BA Elsevier Ltd., Third Edition,2006
2. Electronic Devices and Circuits, Allan Motter shed, PHI.

SEMESTER	1 SEM					
YEAR	I YEAR					
COURSE CODE	21VC106					
TITLE OF THE COURSE	BASICS OF ELECTRICAL & ELECTRONICS LAB					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	8	-	-	-	60	4

● Course objectives
- To understand Circuit operation of different types of voltage regulation circuits, including series.
- To explain the construction and characteristics of diodes, bipolar junction transistors and opticaldevices.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to:

- Ability to understand and analyse, linear and digital electronic circuits.

List of Exercises	80Hrs
1.Familiarization of toolkit	
2. Soldering Practice	
3. Familiarization of CRO	
4.Familiarization of function Generator	
5.Familiarization of Digital Multi meters	
6.Color coding of the resistor	
7.Verification of Ohm 'slaw	
8.Verification of KVL and KCL	
9. Study of diode datasheet and V.I Characteristics of diodes	
10.Study of Zener datasheet and V.I Characteristics of Zener diodes	
11.Rectifiers-Half-wave and centre -tapped full-wave rectifier	
12.Bridge rectifier with capacitor filter	
13. Familiarization of Logic Inverter(TTL)	
14. Familiarization of AND Gate(TTL)	
15. Familiarization of OR Gate(TTL)	
16.Familiarization of NOR Gates(TTL)	
17.Familiarization of EXOR Gates(TTL)	
18.Universal Property of NAND and NOR Gates	

SEMESTER	1 SEM					
YEAR	I YEAR					
COURSE CODE	21VC107					
TITLE OF THE COURSE	BASICS OF COMPUTER LAB					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	8	-	-	-	60	4

COURSE OBJECTIVES

- To learn about DOS commands
- To increase typing speed and confidence
- To create bio-data with suitable alignments
- To create the presentation& to create the email

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to:

- Student can able to learn about DOS Commands
- Students are able to increase the typing speed and confidence
- Students are able to create the bio-data, power point presentation and email on their own.

List of Exercises	60Hrs

Exercise 1: Components of Computer

    1. Input devices and output devices
    2. Functional units of computer Functional units of computer

Exercise 2: DOS Commands

1. Write the syntax and definition of following commands: cls, cd, copy, copy con, Mem, Tree, ver, exit, find, sort, time, edit, erase, date, del, dir, md, rd, type.

2. Write the syntax for appending the content of two files, copy the output of dir command to file, listing of files and directories: dir/b, dir/l, dir/on, dir/w, definition of following commands: dir/ad,dir/oe, dir/p, dir/ar.

Exercise 3: Typing Tutorial

1. Familiarize typing in standard QWERTY keyboards.

2. Touch Typing Course: In this course, Trainee will learn the positions of the letter keys and commonpunctuation by heart, after completing the course you will be able to type with all ten finger without looking at the keyboard.

3. Speed Building course: This course is designed to increase your typing speed and confidences. TheTrainee will focus on the keys for each finger, type longer texts and train with some of the most common English words

4. Numbers, Special marks and 10-key pad.4.1: Numbers Course: This two lesson course teaches how to type numbers on the number row 4.2: Special Marks Course: Extend Trainees skills to cover special marks, including Internet characters.

5. Mathematical symbols and brackets: 10-key Number pad Course: Learn to use the 10-key number pad with touch typing technique.

Exercise 4: Creating Document

1. Create the document in word pad with following information Name, qualification, city, date of birth, phone number, and increase the size of font to 24, make it bold ,put the heading as information and align it centre.

2. Create your bio data in note pad with suitable formats.

3. Demonstrate procedure for creating, naming, renaming of a folder in computer and familiarize properties like changing the icon, hiding a folder and changing attributes.

Exercise 5: Applications

1. How to open DOS, NOTEPAD, PAINT, CALCULATOR, and WORDPAD THROUGH RUN.?

2. How to create shortcuts, disappearing the desktop items, auto hide the task bar?

3. What is Status bar, Menu bar, Taskbar, Standard Toolbar, and specify their locations.

4. What is the extension of the following application: Word Pad, Notepad, and Paint?

Exercise 6: MS-Office

1. Create your CV (Bio Data) in MS-word with suitable alignments.

2. Create the paint file insert the picture in it by choosing from different place and modify it in Word Pad.

3. What is Border and Shading? Write the steps for applying Border & Shading to a Paragraph in Word Pad.

4. What is Bullets and Numbering? Write the steps for applying Bullets and Numbering, and its different types in Word Pad

5. What is spelling and grammar check. Write the steps for this and different option present in it in WordPad.

6. What is the use of Find and Replace and Go to option? Write the steps for that with example in WordPad.

7. Write the steps for inserting Symbols and special characters and inserting Date and Time, File, Object with example in WordPad.

8. Demonstrate the steps to create and enter records mail merge

9. Type the invitation for calling your friends on the occasion of your birthday using mail merge, WordArt, select the field names yourself.

10. Write the steps for creating a table. Explain merge cells and split cells options.

11. Open Ms-Excel and insert 10 sheets, apply different backgrounds to different sheets, fill different colours in different cells.

12. Open Ms-Excel insert 4 sheets hide the sheet 2 and 3 and apply different colour to sheet tabs.

13. Demonstrate mathematical function in MS-Excel.

14. How to insert Rows, Columns, Cells and Worksheet in MS-Excel?

15. Create the presentation about you daily activity

16. Create the presentation of your organization company with suitable diagrams.

17. Create the presentation to explain any technology with suitable diagrams.

18. Create the presentation for any educational organization which should consist of hyperlinks, custom animation, slide transition

19. Create the DATABASES for the Company consisting of the tables: EMPLOYEE, DEPARTMENT, DESIGNATION, ACCOUNTS. And the fields are as follows EMP: Name, City, Add, Ph no, Place, and Id. DEPARTMENT: Id, Dep Name, and Location. DESIGNATION: Id, Qualification, Experience, Skills.ACCOUNTS: Id, Basics, DA, HRA, PF. (MAKE ID AS PRIMARYKEY) and create the query to select thefields as: EMP=ID, NAME, PHNO, PALCE. DEP=DEPNAME, LOCATION. DESIG=QUALIFOCATION, EXP.ACCOU=TOTAL, BASICS, DA, PF.

Exercise 7: Internet

1. Write the steps to create the email.

2. Write the steps to search the details about historical places in internet.

3. Write the steps to create a mail and send it your friend.

4. Write the steps to create a mail which should attach some data and send it to your friend.

SEMESTER	1 SEM				
YEAR	I YEAR				
COURSE CODE	21VC108				
TITLE OF THE COURSE	PC HARDWARE LAB				
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	3	-	-	-	45	3

COURSE OUTCOME:

After completion of the course, the trainee should be able to:

1. Understand how to write the manual test cases for different scenarios.

2. Understand how to apply automation test tool to validate the software project.

List of Exercises	60Hrs
1. Basic Health & Safety Practices.	
2.Discussion about basic concepts & terminologies used in PC's	
3. Evolution of Microprocessors.	
4. Identification of various Motherboards, Add-on cards & I/O connectors.	
5. Study of Bus & Memory technologies.	
6. Dis-assembly & Assembly of an AT & ATX system.	
7. Usage of CMOS setup & familiarization of user manual	
8. Installation of HarSSSd disk drive using various utilities	
9.Installation of Operating systems such as Windows 7,8,10, Windows Server with ADS, Linux as adual boot and Virtualization in VMware), Device drivers & application software.	
10.Study of Keyboard, Mouse & Floppy disk drives	
11.Tools for System Management and Troubleshooting of PC	
12.PC Optimization utilities & Antivirus packages	
13. Study of Monitors & Display cards	
14. Study of Printers.	
15.Overview of Compact Discs & Drives, Scanner & Modem.	
16.Discussion about preventive maintenance & the tools required.	
17.Study of Networking Basics.	
18.Overview of Laptop Technologies.	

19.Discussion of Emerging trends in IT & the system configuration for best buy.

SEMESTER	1 SEM					
YEAR	I YEAR					
COURSE CODE	21VC109					
TITLE OF THE COURSE	HTML & CSS LAB					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	10	-	-	-	75	5

List of Exercises	80Hrs

1. Basic structure of an HTML document
2. Creating an HTML document
3. Mark up Tags
4. Heading-Paragraphs
5. Line Breaks
6. HTML Tags
7. Working with Text
8. Working with Lists, Tables and Frames
9. Working with Hyperlinks, Images and Multimedia
10. Working with Forms and controlsCreating Style Sheet
11. CSS Properties
12. CSS Styling (Background, Text Format, Controlling Fonts)
13. Working with block elements and objects
14. Working with Lists and Tables
15. CSS Id and Class
16. Box Model (Introduction, Border properties, Padding Properties, Margin properties)
17. CSS Advanced (Grouping, Dimension, Display,
18. Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector)
19. CSS Color
20. Creating page Layout and Site Designs Introduction to Web Publishing or Hosting
21. Creating the Web Site
22. Saving the site
23. Working on the web site
24. Creating web site structure
25. Creating Titles for web pages
26. Themes-Publishing web sites

SEMESTER	1 SEM					
YEAR	I YEAR					
COURSE CODE	21VC110					
TITLE OF THE COURSE	ELSD LAB					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OUTCOME:

After completion of the course, the trainee should be able to:

1. Explain installation and configuration of SQL Server.
2. Set up the database in SQL Server.
3. Explain how to manage security in SQL Server.
4. List different backup and recovery methods.
5. Observe the use of automation using SQL Agent.
6. Discuss database Maintenance and query tuning.

List of Exercises	30Hrs

Practice 1:

    1. WHY study Spoken English?

    2. Making Inqueries on the phone, thanking and responding to
ThanksPractice work.

Practice 2:

    1. Responding to Requests and
asking for DirectionsPractice work.

Practice 3:

    1. Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating

    2. Apologising, Advising, Suggesting, Agreeing and
Disagreeing , Practice work.

    3. The Sounds of English Practice work.

Practice 4:

    1. Letters and Sounds Practice work. Practice:
    2. The Sounds of English Practice work.

Practice 5:

1.Pronunciation
2.Stress and Intonation Practice work.

SEMESTER	II SEM				
YEAR	1 YEAR				
COURSE CODE	21VC201				
TITLE OF THE COURSE	**Mathematics-1**				
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

1. Upon successful completion of this course, the trainee will be able to analyse and apply mathematicalequations

- Solve mathematically technical problems and apply the concepts of Mathematics to engineeringproblems
- Awareness of correlation and regression.

- Know the basic concepts of statistics.
- Understand and use concepts of Integration and Differential Equations and its applications
- Know the solution of percentage, ratios and proportions

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	Solve system of Probability and Statistics
CO2	Solve problem of Analytical Geometry
CO3	Describe and Develop Correlation and Regression analysis model

COURSE CONTENT:	
MODULE 1	**2Hrs**

RATIOS, PERCENTAGE AND PROPORTIONS:
  Ratios, proportion and percentage

MODULE 2	**5Hrs**

ANALYTICAL GEOMETRY:
Rectangles and Squares, Parallelogram, Triangle, Rhombus, Trapezium, Circle, Sector and Arc, Cartesian Co-Ordinates, Equation of axis, Distance, Midpoint, Slope, Condition for Perpendicularity and parallelism, Equation of straight line Determinant of transpose,Linear equation Solution (Cramer's rule)

MODULE 3	**9Hrs**

 INTEGRALCALCULUS AND DIFFERENTIAL EQUATIONS:
Integrals of functions, Rules of Integration, Integration by parts. Definite Integrals. Area under plane curves – simple problems. Differential equations.

MODULE 4	**6Hrs**

CORRELATION AND REGRESSION:
Meaning of correlation and Regression, Correlation Analysis, Regression
Analysis, Simple Linear Regression.

MODULE 5	8Hrs

PROBABILITY AND DISTRIBUTION:
Probability, Sample and Event Space, Conditional Probability, Data Types, Uniform
Distribution, Normal Distribution, Binomial Distribution, Poisson distribution.

Reference Books:

1. Thomas, Weir and Hass(2009), Thomas's Calculus, Twelfth edition, Pearson, India
2. Goon A.M., Gupta M.K. &Dasgupta B: Fundamentals of Statistics, Vol. 1, The World
   Press Pvt.Ltd., Kolkata.
3. Thomas's Calculus, G.B.Thomas, M.Weir, J. Hass, Pearson , 12th edition

SEMESTER	II SEM					
YEAR	1 YEAR					
20VI101	21VC202					
TITLE OF THE COURSE	UNIX					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

- Written technical communication and effective use of concepts and terminology.

- Facility with UNIX command syntax and semantics.

- Ability to read and understand specifications, scripts and programs.

- Individual capability in problem solving using the tools presented within the class**.**

COURSE OUTCOMES:

After successful completion of the course, the trainee should be able to**:**

COURSE CONTENT:	
MODULE 1	**6Hrs**
Introduction to unix: Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands.	
MODULE 2	**6Hrs**
The File system: The Basics of Files-What's in a File-Directories and File Names-Permissions-I Nodes-The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.	
MODULE 3	**6Hrs**
Using The Shell: Using the Shell-Command Line Structure-Met characters-Creating New Commands-Command Arguments and Parameters-Program Output as Arguments-Shell Variables- -More on I/O Redirection-Looping in Shell Programs.	
MODULE 4	**6Hrs**
Filters: The Grep Family-Other Filters-The Stream Editor Sed-The AWK Pattern Scanning and processingLanguage-Good Files and Good Filters.	
MODULE 5	**6Hrs**

Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting- The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status- More about the Set Command-The Exit Command-Branching Control Structures-Loop Control

Structures-The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<<)-The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command.

Reference Books:

1. Unix and shell programmingby B.M. Harwani, OXFORD university press.

SEMESTER	II SEM					
YEAR	1 YEAR					
COURSE CODE	21VC203					
TITLE OF THE COURSE	Computer Networks - I					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

Upon completion of this subject, the trainee will be able to:

- Explain network technologies and explain how devices access local and remote network resources.
- Describe router hardware and Explain how switching operates in a small to medium-sized business network. Design an IP addressing scheme to provide network connectivity for a small to mediumsized business network.
- Configure initial settings on a network device and implement basic network connectivity between devices.
- Configure monitoring tools available for small to medium sized business networks.
- Determine how a router will forward traffic based on the contents of a routing table
- Use monitoring tools and network management protocols to troubleshoot data networks
- Configure Ethernet switch ports and Implement VLANs.
- Implement static routing and RIPv2 and Implement DHCP on a router.
- Implement network address translation (NAT) and Implement access control lists (ACLs) to filter traffic.

COURSE CONTENT:	
MODULE 1	**6Hrs**
Introduction to Networks: What is a network? Real world networks, The OSI seven-layer model, **Network Protocols and Standards:** Communications and network protocols and the OSI model, Protocols in real world networks, The Internet.	
MODULE 2	**6Hrs**
Wireless Networking Standards: Wireless devices, Wireless networking standards, Issues for wireless networks, Wireless networking protocols, **Network Topology and Architecture:** Network topology concepts, Common network topologies and their application, Topologies and protocols	
MODULE 3	**6Hrs**
Network Media and Connectors: Network media, Network connectors, selecting media and connectors, **Network Hardware:** Network hardware, Hardware selection, creating a network.	
MODULE 4	**6Hrs**
Wireless Network Hardware: Wireless network hardware, Wireless hardware selection creating a wireless network, Security Software, Network security threats, Security countermeasures Securitysoftware, Firewalls, Functions of a firewall, Types of firewall.	
MODULE 5	**6Hrs**
Network and Server Software: Network software requirements, Wireless network software requirements, Configuring network software Voice over IP and, Video	

| Conferencing Voice over IP (VoIP),Video conferencing, Installing and configuring voice and video networks
Virtual Private Networks: Virtual private networks (VPN), Advantages and disadvantages of VPN | |

Reference Books:

Computer Networks III and IV Edition – Andrew S. Tanenbaum, PHI

SEMESTER	II SEM					
YEAR	I YEAR					
COURSE CODE	21VC204					
TITLE OF THE COURSE	C- Programming					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:
- use data types ,operators and expressions in writing ' C ' Programmer;
- use function; external variables, multiple source files and also processors
- pointers approximately in the ' C ' Program
- employ the standard library in developing in C program

COURSE CONTENT:	
MODULE 1	**6Hrs**
Introduction to Programming, Program and Programming Languages, Types of software's, Compiler andInterpreter, Overview of C, Introduction, Importance of C, Sample C program with inbuilt Library functions, Basic structure of C program, Programming style, Execution of C program in Unix and Turbo C.	
MODULE 2	**6Hrs**
Constants, Variables and Data Types: Character set, C tokens, Keywords and identifiers, Constants, variables and data types Declaration of variables, Assigning values to variables, Declaring a variable as constant, volatile, Operators and Expressions: Arithmetic operators, Relational operators Logical operators, Assignment operators Increment and decrement operators Conditional operators Bitwise operators, Special operators, Precedence of arithmetic, relational & logical operators Arithmetic expressions Evaluation of expressions, Operators precedence and associativity Mathematical functions.	
MODULE 3	**6Hrs**
Managing Input and Output Operations : Reading a character , Writing a character, Formatted input & output , Decision Making, Branching and Looping: Decision making with IF statement, Simple IF statement, The IF…Else statement, Nesting of IF…Else statement, The Else If ladder, The Switch statement, The WHILE statement, The DO… statement, The FOR statement, Jump statements Continue, break, return and GOTO, **Arrays:** One-dimensional arrays- Declaration and initialization of one dimensional array, Two-dimensional arrays- Declaration and initialization Of two dimensional array, Multidimensional arrays, Sample programs using arrays.	
MODULE 4	**6Hrs**
Handling of Character-Strings: Declaring and initializing string variables, Reading strings from terminal, Writing strings to screen, Arithmetic operations on characters, Putting strings together, String-handling functions, User-Defined Functions: Need for user-defined	

functions, Elements of user defined function - Function declaration., Definition of functions, Return values and their types, Calling a function, Category of functions: No arguments and no return values, Arguments but no return values, Arguments with return values, No Arguments but returns a value. Nesting of functions, Recursion, Functions with arrays -Passing 1-D array to a function, Passing 2-D array to a function, Storage Class - Automatic storage class, Register storage class, Static storage class, External storage class

MODULE 5   **6Hrs**

Structures and Unions: Structure definition, Declaring structure variables, Accessing structure members. Structure initialization, Structure Operations - Copying of structure variables, Comparison of two structure variables or members, Arithmetic operations on structures, Structures and Arrays, Structures within Structures, Structure and functions, Passing individual structure members to functions, Passing a whole structure to functions, Unions, Difference between structure and unions, Pointers: Understanding pointers, The & and * operators, Declaration and initialization of pointers, Accessing a variable through its pointer, Chain of pointers, Pointer increment and scale factor.

Reference Books:

1. ANSI C By BALAGURUSWAMY
2. Let Us C By Yashwant Kanetkar
3. Computer Concepts and C Programming by P B Kotu

SEMESTER	II SEM					
YEAR	I YEAR					
COURSE CODE	21VC205					
TITLE OF THE COURSE	Data Base Management System					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

Upon successful completion of this subject, the trainee will be able to

- Understand the Database concepts
- Design the database with planning and coding
- Normalize the database
- Administration of data and data base
- Solve queries related to the database

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	Ability to Install, configure, and interact with a relational database management system
CO2	Ability to master the basics of SQL and construct queries using SQL
CO3	Ability to design and develop a large database with optimal query processing

COURSE CONTENT:	
MODULE 1	**6Hrs**
Introduction to Database System: File System versus a DBMS, Purpose of Database system, Database Applications, Basic concepts and definitions.	
MODULE 2	**6Hrs**
Data Models: **Entity-Relationship Model, Object Oriented Model, Network Model, Hierarchical Model,** Relational Model, Normalization: What is Normalization? First Normal form, Second Normal form, Third Normal form, Boyce-codd Normal Form.	
MODULE 3	**6Hrs**
SQL: Introduction to SQL, DDL Commands, DML Commands, DCL Commands, TCL Commands, User defined data type, Where Clause operators, Order By, Group By, Having Clauses, DISTINCT, TOP Keywords, Aggregate functions, Built-in functions-numeric, string and Date Functions.	

MODULE 4	6Hrs
Advance SQL:	
SQL Constraints, Sub Queries, Identity column, SQL Joins, Views, Index, Triggers	
MODULE 5	**6Hrs**
Transact-SQL	
Stored Procedure, Function, Control Structures, Conditional Processing using IF statements, While loop,Exception handling by TRY…CATCH, Error functions used within CATCH block	
DATA ADMINISTRATION:	
Database Administrator, Concurrency control, Database Recovery, Database Security.	

Reference Books:

1. SQL Server 2008 r2 - Black Book
2. SQL Server   – Patrick Paul
3. SQL Server 2008 programming – Robert vieira
4. J. Date, A. Kannan and S. Swamynathan, "An Introduction to Database Systems", 8thed, Pearson Education, 2006
5. Raghu Ramakrishnan, "Database Management Systems", Third Edition, McGraw Hill, 2003

SEMESTER	II SEM					
YEAR	I YEAR					
COURSE CODE	21VC206					
TITLE OF THE COURSE	Applications of Analog & Digital Circuits					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

The student should be made to:

- Understand analog and digital communication techniques.

- Learn data and pulse communication techniques.

- Be familiarized with source and Error control coding.

- Gain knowledge on multi-user radio communication.

COURSE OUTCOME:
 After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	Apply analog and digital communication techniques.
CO2	Use data and pulse communication techniques.
CO3	Analyze Source and Error control coding.
CO4	Utilize multi-user radio communication.

COURSE CONTENT:

MODULE 1	**6Hrs**

Introduction to Communication Systems – Modulation – Types – Need for Modulation, Theory of Amplitude Modulation – Evolution and Description of SSB Techniques – Theory of Frequency and Phase Modulation – Comparison of Analog Communication Systems (AM – FM – PM).

MODULE 2	**6Hrs**

Pulse Communication: Pulse Amplitude Modulation (PAM) – Pulse Time Modulation (PTM) – Pulse code Modulation (PCM) – Comparison of various Pulse Communication System (PAM – PTMPCM). Data Communication: History of Data Communication – Standards Organizations for Data Communication- Data Communication Circuits – Data Communication Codes – Data communication Hardware – serial and parallel interfaces.

MODULE 3	**6Hrs**

Amplitude Shift Keying (ASK) – Frequency Shift Keying (FSK)–Phase Shift Keying (PSK) – BPSK – QPSK – Quadrature Amplitude Modulation (QAM) – 8 QAM – 16 QAM –

Bandwidth Efficiency– Comparison of various Digital Communication System (ASK – FSK – PSK – QAM).	
MODULE 4	**6Hrs**
Entropy, Source encoding theorem, Shannon fano coding, Huffman coding, mutual information,channel capacity, Error Control Coding, linear block codes, cyclic codes – ARQ Techniques.	
MODULE 5	**6Hrs**
Global System for Mobile Communications (GSM) – Code division multiple access (CDMA) – Cellular Concept and Frequency Reuse – Channel Assignment and Handover Techniques –Overview of Multiple Access Schemes – Satellite Communication – Bluetooth	

Reference Books:

1. Wayne Tomasi, ―Advanced Electronic Communication Systems‖, 6th Edition, Pearson Education, 2009.

REFERENCES:

1. Simon Haykin, ―Communication Systems‖, 4th Edition, John Wiley & Sons, 2004

2. Rappaport T.S, "Wireless Communications: Principles and Practice", 2nd Edition, PearsonEducation, 2007

3. H.Taub, D L Schilling and G Saha, ―Principles of Communication‖, 3rd Edition, PearsonEducation, 2007.

4. B. P.Lathi, ―Modern Analog and Digital Communication Systems‖, 3rd Edition, OxfordUniversity Press, 2007.

5. Blake, ―Electronic Communication Systems‖, Thomson Delmar Publications, 2002.

6. Martin S.Roden, ―Analog and Digital Communication System‖, 3 rd Edition, Prentice Hall ofIndia, 2002

SEMESTER	II SEM					
YEAR	I YEAR					
COURSE CODE	21VC207					
TITLE OF THE COURSE	**Data Base Lab**					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	10	-	-	-	75	5

List of Exercises	80Hrs
1. Demo on Creating Databases	
2. Demo on Modify Databases	
3. Demo on database and files Viewing a Database	
4. Demo on Renaming a Database	
5. Demo on Deleting Database	
6. Demo on database and files	
7. Demo on database and files groups	
8. Creating tables with different Data types	
9. Demo on altering the table	
10. Creating tables with User Defined Data Types	
11. Dropping User Defined Data Types	
12. Demo on Data Manipulation Language with different types Inserting values	
13. Demo on Data Manipulation Language with different types updating values	
14. Demo on Data Manipulation Language with different types Deleting Rows	
15. Demo on Truncating a Table	
16. Demo on Deleting a Table	
17. Writing a Basic select statement	
18. Writing a Basic select statement using where clause	
19. Write a query to perform Arithmetic Operations	
20. Write a query to perform Relational operators	
21. Write a query to perform Logical operators	
22. Write a query to perform Special operators	
23. Generate query using TOP and DISTINCT keywords	
24. Generate query to perform ORDER BY clause	
25. Generate query to perform GROUP BY and HAVING clauses	

26. Generate query using String functions

27. Generate query using Date functions

28. Generate query using Mathematical Functions

29. Generate query using Aggregate functions

30. Creating tables with different types of Constraints

31. Perform demo on Correlated Sub queries

32. Perform demo on sub queries with Operators

33. Generate a query to create an identity column

34. Perform demo on Cross Join

35. Perform demo Natural Join

36. Perform demo Equi Join

37. Perform demo on inner Join

38. Perform demo on outer Join

39. Write a query to creating Views

40. Write a query to retrieve Results from Views

41. How to Altering Views

42. Write a query to Dropping Views

43. Write a query to Renaming Views

44. Write a query to Manipulating Data through Views

45. Write a query to Implementing Indexes with different types of indexes

46. Creating Triggers

47. Write programs to declare different types of variables with different data types

48. Write program to Printing Messages

49. Write program to Implementing Stored Procedures

50. Write program on Types of Stored Procedures

51. Write program on Types of Parameters

52. Demo on Altering a Stored Procedure

53. Demo on how to Viewing a Stored Procedure

54. Demo on Deleting a Stored Procedure

55. Write a program to Create a function

56. Demo on IF statement

57. Demo on WHILE loop

58. Demo on exception handling

59. Demo on Explicit Transaction

60. Demo on Implicit Transactions

Reference Books:

- SQL Server 2008 r2 - Black Book
- SQL Server – Patrick Paul
- SQL Server 2008 programming – Robert vieira

Reference Website:

- www.msdn.microsoft.com
- www.tutorialspoint.com
- www.techonthenet.com

SEMESTER	II SEM					
YEAR	I YEAR					
COURSE CODE	21VC208					
TITLE OF THE COURSE	C – Programming Lab					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	8	-	-	-	60	4

List of Exercises	80Hrs

Exercise 1: C Programming
- **INTRODUCTION AND DATA TYPES**
    1. Write a program in C language to display 'hello world'. Analyze Sub main (), compilation andexecution process of a C program.
    2. Write a program in C language to perform arithmetic operation like +, - , X, / and % anddisplay the result.
    3. By declaring int type variables.
    4. By declaring float type variables
    5. Write a program in C language to calculate the area of the circle. Formula for calculatingarea of a circle A is $A=\pi r2$ where r is the radius and π is a constant.

Exercise 2:DECISION MAKING AND LOOPING
1. Write a program in C language to find whether an input number is even or odd.
2. Write a program in C language to check whether an entered alphabet is vowel, consonant, digitor special character.
3. Write a program in C language to print counting numbers from 1 to 100 using 'for loop'
4. Write a program in C language to find the sum of digits of an input number less than 99999.
5. Write a program in C language to display a menu as given below and Execute arithmeticoperations. Use switch case.

    Men
    u
    Addi
    tion................. 1
    Subtraction 2
    Multiplication.... 3
    Division 4
    Module Termination....0
    Enter your choice …… (0/1/2/3/4)

Exercise 3: ARRAY
1. Create an array and store data into the array and print the same.
2. Write a C program to accept an array and search for an element.
3. Write a C program to create an arrays and sort in descending order and ascending order.
4. Write a C program to perform a transpose of a matrix.

Exercise 4: STRING
1. Write a C program to read text and display it

	2.	Write a C program to accept a string and find the number of vowels and displayit
	3.	Write a C program to find the length, concatenate, copy of the string using non built in function
	4.	Write a C program to check whether the string is palindrome or no

Exercise 5: FUNCTION

1. Write a function LEAP_YEAR() that receives year as a parameter and display proper message, thatthe particular year is leap year or not
2. Write a recursive function to calculate the factorial of a number.

Exercise 6:STRUCTURE

1. Write a C program to illustrate the comparison of two structure variables and print equal or nottaking individual members.
2. Write a program to add two times using structure.

Exercise 7: POINTER AND FILE

1. Write a program to create a pointer variable and display the address and value using pointervariable.
2. Create a file write some content into the file and read the content of the file and display it onmonitor.

SEMESTER	II SEM				
YEAR	I YEAR				
COURSE CODE	21VC209				
TITLE OF THE COURSE	UNIX Lab				
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	8	-	-	-	60	4

List of Exercises	60Hrs

Exercise 1:a) Study of Unix/Linux general purpose utility command list

man,who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill,

history, chmod, chown,finger, pwd, cal, logout, shutdown.

Exercise 2: Study of vi editor.

Exercise 3: Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system.

Exercise 4: Study of Unix/Linux file system (tree structure).

Exercise 5: Study of .bashrc, /etc/bashrc and Environment variables.

1. Write a C program that makes a copy of a file using standard I/O, and system calls

2. Write a C program to emulate the UNIX ls –l command.

3. Write a C program that illustrates how to execute two commands

concurrently.

4. Write a C program that illustrates two processes communicating using shared memory.

5. Write a C program to simulate producer and consumer problem using semaphores.

6. Write C program to create a thread using pthreads library and let it run its function.

    Write a C program to illustrate concurrent execution of threads using pthreads library.

SEMESTER	II SEM					
YEAR	I YEAR					
COURSE CODE	21VC210					
TITLE OF THE COURSE	Computer Networks Lab					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	8	-	-	-	60	4

List of Exercises	80Hrs

Exercise 1: Navigate the IOS:
    -Explore EXEC Modes
    -Set the Clock	

Exercise 2:Configure Initial Switch Settings:
     -Host Name -Banner MOTD
    -Save Configuration Files to NVRAM	

Exercise 3: Configure Initial Switch Settings
    -Verify the Default Switch Configuration
    -Enable Password -Enable Secret
    -Configure Line Passwords
    -Encrypt all plain text passwords
    -Save Configuration Files to NVRAM	

Exercise 4: Implement Basic Connectivity
    -Perform a Basic Configuration on Switch
    -Configure the PCs
    -Configure the Switch Management Interface	

Exercise 5:Connect a
Wired and Wireless
LANConfigure Initial
Router Settings
    -Verify the Default Router Configuration
    -Configure and Verify the Initial Router Configuration
    -Save the Running Configuration File	

Exercise 6:Connect a Router to a LAN
    -Display Router Information
    -Configure Router Interfaces
    -Verify the Configuration	

Exercise 7: Configure
Secure Passwords and
SSHVerify Directly
Connected Networks
    -Verify IPv4 Directly Connected Networks
    -Verify IPv6 Directly Connected Networks	

Exercise 8:VLAN Configuration
    -Verify the Default VLAN Configuration
    -Configure VLANs
    -Assign VLANs to Ports
     Configure Trunks
    -Configure & Verify VLANs	

-Configure Trunks
 Configure DTP
-Configure static trunking
-Configure and Verify DTP
 Configure Router-on-a-Stick Inter-VLAN
-Add VLANs to a Switch
-Configure Sub interfaces
-Test Connectivity with Inter-VLAN Routing
 Configure Layer 3 Switching and Inter-VLAN Routing
-Configure Layer 3 Switching
-Configure Inter-VLAN Routing
-Configure IPv6 Inter-VLAN Routing
 Configure Ether Channel
Configure Basic Switch Settings
Configure an Ether Channel with Cisco PAgP
 Configure Ether Channel
 Configure Basic Switch
Settings Configure an
802.3ad LACP Ether
Channel
 Configure DHCPv4
 -Configure a Router as a DHCP Server
-Configure DHCP Relay
-Configure a Router as a DHCP Client
-Verify DHCP and Connectivity
 Configure DHCPv6
-Configure and verify a Stateless DHCPv6 Server
-Configure and verify a State full DHCPv6 Server
-Configure and verify a DHCPv6 Relay
 HSRP Configuration
-Configure an HSRP active router.
 -Configure an HSRP standby router.
 -Verify HSRP operation.

SEMESTER	III SEM				
YEAR	II YEAR				
COURSE CODE	21VC301				
TITLE OF THE COURSE	DATA STRUCTURE WITH C				
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms, Describe common applications for arrays, records, linked structures, stacks, queues and trees.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to:

CO No.	Outcomes
CO1	Explain how arrays, records, linked structures, stacks, queues, trees and graphs are represented.
CO2	Describe common applications for arrays, records, linked structures, stacks, queues and trees.
CO3	Explain the concept of recursion, give examples of its use and its implementation.
CO4	Identify and deploy various search techniques in data structures.

COURSE CONTENT:	
MODULE 1	**2Hrs**
Introduction - Functions and various implementation of functions, Passing values, array, structure, pointer to a function, Structures , structure variables, pointer to structure variables, Pointers, Double pointer, NULL Pointer, void pointer, Dynamic memory allocation. **Stacks** - The Stack introduction: Definition and operations on stack, Insert/push operation, delete and pop operation and display, Representation of stacks in C using arrays implementing various operation of stack using C.	
MODULE 2	**5Hrs**
Stack application: Conversion of expressions with implementation using C, Conversion from infix to postfix, Conversion from infix to prefix, Evaluation of postfix expression, Evaluation of prefix expression. **Queues** - Introduction, operation and application of queues, Different types of queues – Sequentialrepresentation of queues, Ordinary queue, Circular Queue, Priority queue, Double Ended queue. **Linked Lists - Introduction**, Singly linked list with operations in lists, creating ordered list, mergingtwo ordered list.	

MODULE 3	9Hrs
Circular Linked List - Circular single linked list, Circular single linked list with header node, Doublylinked list and circular double linked list, **Application of linked lists:** Addition of two long integers, Evaluation of a polynomial, Addition of two polynomials, Advantage and disadvantage of different lists.	
MODULE 4	6Hrs
Trees: Introduction, Definition, storage representation of a binary tree, Terminologies associated with trees, Operations on binary tree: Insertion, Traversal, Searching, Copying a Tree, Binary search Tree: Insertion, Searching, Deletion. Application of Trees: Searching, Sorting, Conversion of Expression, Creating binary treefor postfix expression (Expression Tree).	
MODULE 5	8Hrs
Sorting - Introduction, Bubble Sort, Merge sort, Radix sort, Quick sort, Insertion Sorts, Simple insertion sortsShell sort, Heap sort, Priority Queue using heap. **Searching** - Basic search techniques, algorithmic notation, searching, searching an ordered Table, Binary searchInterpolation search, Tree searching: Binary search.	

Text Books:

1. Structures using C and C++, Tanenbaum, Tata McGraw Hill Publishers,10th edition, 2010.
2. The Definitive Guide, David Flanagan, 5th Edition, O'Reilly Media, 2020.

Reference Books:

3. Professional JavaScript for Web Developers, Nicholas C. Zakas , 2nd edition, 2016.
4. Data Structures through, Yeshwant Kanitkar,BPB publications, 2nd edition,2012.
Introduction to Data Structures using C, A. M Padma Reddy, 10th revi

SEMESTER	III SEM

YEAR	1I YEAR					
COURSE CODE	21VC302					
TITLE OF THE COURSE	OBJECT ORIENTED PROGRAMMING WITH C++					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

To introduce the Object oriented programming concepts and C++ programming language.

COURSE OUTCOMES:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	Identify the difference between C and C++ programming.
CO2	Familiarization of OOPs concepts.
CO3	Write programs in C++ using OOPs concept.
CO4	Experiment file system and understand Exception Handling Mechanism.

COURSE CONTENT:	
MODULE 1	**6Hrs**
INTRODUCTION TO OOP - How C++differs from C? Object oriented programming. Procedure oriented programming, basic concept of OOP Need of object-oriented, paradigm (Benefits of OOP) Object oriented languages. **C++ FEATURES:** The iostream class, C++comments, keywords/tokens. Variable Declaration, Different types of operators. Scope resolution operator, The Constant and volatile qualifier. The new and delete operators.	
MODULE 2	**6Hrs**
References Control statements - if else, while, do – while, Functions-Overview, prototype, Argument Passing and returning, Function Overloading. **CLASSES AND OBJECTS:** Declaration, data members, Member functions, **Access Specifiers:** Private, public and protected**,** the scope of a class object, Inline functions, Overloaded function.	
MODULE 3	**6Hrs**
Constructors - Types of constructor, Copy constructor, Constructor with default argument, Overloaded constructor Static class and manipulating, private data members. **Friends:** Friend classes, Friend function This pointer, Object as function arguments, Returning objects from functions, Classes, objects& memory. Arrays as class member data. Arrays objects. String as a class member.	
MODULE 4	**6Hrs**

CONCEPT OF OOPS - Operator Overloading Overloading unary operator. Overloading binary operator, Overloading [], =. (). ->. << And >>operators, Function Overloading, Class conversion, Inheritance Derived class and base class, Derived class, Constructor, Overloading member function, Class Hierarchies. Public and private inheritance, Levels of inheritance, multiple, Hybrid Inheritance Virtual Base Class, Container ship Inheritance and Abstract Class. Polymorphism, Pointers, Virtual Functions, Pointers to objects.Virtual functions, Pure virtual functions.

MODULE 5	6Hrs

FILE AND STREAMS - C++ Streams, C++ Streams classes. Unformatted I/O operations. Formatted I/O Operations, Managing output with manipulators. Classes for file stream operations, Opening and closing a file. Detecting end of file. More about open: file modes, File pointers and their manipulations. Sequential input and Operations.

EXCEPTION HANDLING: Exception handling. Syntax of exception handlingCode.

Reference Books:

1. OOP with C++ , E. Balaguru Swamy, Tata MC graw Hil, 8th edition, 2021

2. The Complete Reference C++, Schildt Herbert, McGraw Hill Education India, 4th Edition, 2017

SEMESTER	III SEM					
YEAR	1I YEAR					
COURSE CODE	21VC303					
TITLE OF THE COURSE	COMPUTER NETWORKS-II					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

Upon completion of this subject, the trainee will be able to:

To enable the trainees to learn Security in Switch and LAN, WLAN, IP Static and dynamic Routing, Access Control List, Network Address Translation, virtual private network, network design, Network Virtualization and Automation.

CO No.	Outcomes
CO1	Understand how to create secure LAN and Wireless LAN
CO2	Understand static and dynamic (OSPF) routing.
CO3	Create access control list to secure network.
CO4	Understand NAT concept and network automation.
CO5	Explain the use of network simulator in various networking application.

COURSE CONTENT:

MODULE 1	**6Hrs**

LAN Security Concepts - Endpoint Security, Access Control, Layer 2 Security Threats, MAC Address Table Attack, LAN Attacks, **Switch Security Configuration**: Implement Port Security, Mitigate VLAN Attacks, Mitigate DHCP Attacks, Mitigate ARP Attacks, Mitigate STP Attacks, **WLAN Concepts**: Introduction to Wireless, WLAN Components, WLAN Operation, CAPWAP Operation, Channel Management, WLAN Threats, Secure WLANs.
WLAN Configuration: Remote Site WLAN Configuration, Configure a Basic WLAN on the WLC, Configure a WPA2 Enterprise WLAN on the WLC, Troubleshoot WLAN Issues.

MODULE 2	**6Hrs**

Routing Concepts - Path Determination, Packet Forwarding, Basic Router Configuration Review, IP Routing Table, Static and Dynamic Routing. **IP Static Routing:** Static Routes, Configure IP Static Routes, Configure IPDefault Static Routes, Configure Floating Static Routes, Configure Static Host Routes, Packet Processing with Static Routes, Troubleshoot IPv4 Static and Default Route Configuration. **OSPF Concepts & Configuration:** OSPF Features and Characteristics, OSPF Packets, OSPF Operation, OSPF Router ID, Point-to-Point OSPF Networks, Multi access OSPF Networks, Modify Single-Area OSPFv2, Default Route Propagation, and Verify Single-Area OSPFv2.

MODULE 3	6Hrs
Network Security Concepts - Current State of Cyber security, Threat Actors, Threat Actor Tools, Malware, Common Network Attacks, IP Vulnerabilities and Threats, TCP and UDP Vulnerabilities IP Services, Network Security Best Practices, Cryptography. **ACL Concepts:** Purpose of ACLs, Wildcard Masks in ACLs, Guidelines for ACL Creation, Types of IPv4 ACLs. **ACLs for IPv4 Configuration**: Configure Standard IPv4 ACLs, Modify IPv4 ACLs, Secure VTY Ports with a Standard IPv4 ACL, Configure Extended IPv4 ACLs.	
MODULE 4	6Hrs
NAT for IPv4 - NAT Characteristics, Types of NAT, NAT Advantages and Disadvantages, Static NAT, DynamicNAT, PAT, NAT64. **Wan Concepts**: WANs Purpose & Operations, Traditional WAN Connectivity, Modern WAN Connectivity, Internet-Based Connectivity, **VPN and IPsec Concepts:** VPN Technology, Types of VPNs, IPsec. **QoS Concepts:** Network Transmission Quality, Traffic Characteristics, Queuing Algorithms, QoS Models & Implementation Techniques.	
MODULE 5	6Hrs
Network Management - Device Discovery with CDP, Device Discovery with LLDP, NTP, SNMP, Syslog, Router and Switch File Maintenance, OS Image Management, **Network Design**: Hierarchical Networks, Scalable Networks, Switch Hardware, Router Hardware, **Network Trouble Shooting:** Network Documentation Troubleshooting Process, Troubleshooting Tools, Symptoms and Causes of Network Problems, Troubleshooting IP Connectivity. **Network Virtualization & Automation:** Cloud Computing, Virtualization, Virtual Network Infrastructure, Software-Defined Networking, Controllers, Automation Overview, Data Formats, APIs & REST, Configuration Management Tools, IBN and CISCO DNA Centre.	

Reference Books:

Text Books:

1. OOP with C++ , E. Balaguru Swamy, Tata MC graw Hil, 8th edition, 2021

2. The Complete Reference C++, Schildt Herbert, McGraw Hill Education India, 4th Edition, 2017

SEMESTER	III SEM					
YEAR	II YEAR					
COURSE CODE	21VC304					
TITLE OF THE COURSE	MICROPROCESSOR AND MICROCONTROLLER					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

To enable the trainees to learn Architecture, comparison between 8085 microprocessor and 8051 microcontroller, pinconfigurations, assembly language programming of 8085 and 8051, Applications of 8051.

CO No.	Outcomes
CO1	Understand, describe and compare the architecture of 8085 Microprocessor and 8051 Microcontroller.
CO2	Understand the difference between opcode, mnemonics, operant and data.
CO3	Apply knowledge and programming proficiency using the various addressing modes, interrupts and data transferinstructions of the target microprocessor and microcontroller to the maximum optimization level.
CO4	Choose the suitable circuitry to connect microcontroller I/O ports to connect external devices.
CO5	Choose suitable simulator and compiler for the target microprocessor and micro controller.

COURSE CONTENT:	
MODULE 1	**6Hrs**
INTRODUCTION TO MICROPROCESSORS - Introduction to Microprocessor and Microcomputer, Evolutionof Microprocessors, Comparison of Microprocessors of Intel ,Motorola and Zilog, **MEMORY INTERFACING:** Memory Structure and its Requirement, Basic concept In Memory Interfacing, Address Decoding and Memory Addresses,	
MODULE 2	**6Hrs**
8085 MICROPROCESSOR ARCHITECTURE - Functional Block Diagram Of 8085, Pin Configuration Of 8085.**PROGRAMMING 8085**: 8085 Addressing Modes, 8085InstructionSet, Assembly Language, Flow Chart and Simple Programs with 8085. **INTERRUPTS OF 8085:** Introduction to interrupts and classification of interrupts, Interrupt Priority, Interrupt Restart Address, Interrupt Service, Subroutines.	
MODULE 3	**6Hrs**
INTRODUCTION TO MICROCONTROLLER - Introduction to Microcontroller, Comparison of Microprocessor and Microcontroller, **8051 ARCHITECTURE:** Architectureof8051 and Pin Description, I/O ports **Memory organization:** Program Memory and Data Memory.	
MODULE 4	**6Hrs**

PROGRAMMING OF 8051- 8051 Addressing Modes, Instructions Set, 8051 Assembly Language Programming, Software simulators of 8051, Introduction to Keil Compiler. **TIMERS AND INTERRUPTS OF 8051:** 8051Timers/Counters, Serial communication, Interrupts of 8051.

MODULE 5	6Hrs

8051 APPLICATION EXAMPLES USING ASSEMBLY LANGUAGE - Square Wave Generator, RectangularWave Generator, Staircase Ramp Generator, Temperature controlling system using 8051, DC Motor Control.

Reference Books:

1. Microprocessor Architecture, Programming and Applications with 8085–Ramesh S Gaonkar, VI Edition, TenramInternational Publishing Private India Ltd.,2013.

2. Fundamentals of Microprocessor and Microcomputers, Badri Ram, Dhanpatrai & Sons, III Edition, 1990

3. The 8085 microprocessors programming & interfacing , A.P.Godse ,I Edition, Technical Publication, Pune,2020

4. The 8051 Microcontroller and Embedded Systems: Using Assembly and C",-Muhammad Ali Mazidi, PearsonEducation India,II Edition, 2007.

SEMESTER	III SEM					
YEAR	II YEAR					
COURSE CODE	21VC305					
TITLE OF THE COURSE	OPERATING SYSTEM					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

Upon successful completion of this subject, the trainee will be able to:

To enable the trainees to understand structures of operating systems, including CPU scheduling, memory management, and device management, file systems, virtual memory, disk request scheduling, concurrent processes, deadlocks, security and integrity.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	Understand the services provided by the design of an operating system.
CO2	Understand the structure and organization of the file system.
CO3	Explain how processes synchronized and scheduled.
CO4	Identify different approaches to memory management.
CO5	Explain File System Management and Disk Scheduling Algorithms.

COURSE CONTENT:	
MODULE 1	**6Hrs**
Introduction Operating systems - Single user and Multi-user systems, Simple Batch systems, Time – sharingSystem and Real Time systems, Multiprogramming, multitasking, Distributed systems, SPOOLING, Functions of Operating Systems. Process concept: Process States, Process scheduling, Cooperating process, Interprocess Communication, Threads.	
MODULE 2	**6Hrs**
CPU Scheduling - Scheduling criteria, Scheduling Algorithms, Multiple Processor scheduling. **Process synchronization:** The critical section problem, Semaphores, Classical examples of Synchronization,Monitors.	
MODULE 3	**6Hrs**
Deadlocks - Deadlock Characterization, Methods for handling Deadlocks, Dead Lock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock. **Memory Management:** Logical Vs Physical Address, Swapping, Contiguous allocation, Paging, Segmentation, Segmentation with Paging.	
MODULE 4	**6Hrs**
Virtual Memory - Demand paging, Page Replacement, Page Replacement Algorithms, Thrashing. **File System Interface and Implementation:** File concept, Access methods, Directory structure and implementation, Allocation Methods, Free Space Management.	

MODULE 5	6Hrs

Secondary Storage Structure - Disk Structure, Disk scheduling, Disk management, Disk Reliability, SwapSpace management, **Real-Time Operating Systems:** Define Real-Time, Basic Requirements of an RTOS, RTOS functionality and characteristic, Difference between OS and RTOS.

Reference Books:

1. Operating system principle, Abraham silberschatz wiley student edition, 7th edition, 2006.

2. Modern operating system, Andrew tanenbaum, Pearson,education, 4th edition, 2014.

3. Real time systems, Jane.W.S.Liu, Pearson education, 4th edition, 2000

SEMESTER	III SEM					
YEAR	II YEAR					
COURSE CODE	21VC306					
TITLE OF THE COURSE	**Computer Organization**					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

Course Objectives

1. Provide in depth knowledge of designing a processor considering both the data part and control parts of a processor

2. Give students thorough knowledge of memory technology , different types of memory, I/O sub systems, and I/O operations

3. Help students understand the concept of pipeline processing, parallel architectures and multi core architectures

Course outcomes

At the end of the course student will be able

1. To design the data part and control part of a processor

2. To understand memory technology, I/O systems and I/O operation and use them i the design of a computing system

3. To understand and appreciate the pipe line processing and parallel processing

SEMESTER	III SEM					
YEAR	II YEAR					
COURSE CODE	21VC306					
TITLE OF THE COURSE	OBJECT ORIENTED PROGRAMMING WITH C++ LAB					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	10	-	-	-	75	5

Course objectives

- To understand Circuit operation of different types of voltage regulation circuits, including series.
- To explain the construction and characteristics of diodes, bipolar junction transistors and opticaldevices.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to:

CO No.	Outcomes
CO1	Apply OOPs concepts in C++ programming.
CO2	Practice Function Overloading and Operator Overloading.
CO3	Practice Inheritance and Virtual function concepts.
CO4	Implement File concepts and Exception Handling Mechanism.

List of Exercises	80Hrs

1.Write a C++ program to add two numbers using class concepts Soldering Practice.

2.Write a C++ program to swap two numbers using class concepts.

3.Write a C++ program to display student details by using class concepts.

4.Write a C++ program to perform overloading of binary operators.

5.Write a C++ program to perform overloading of binary operators.

6.Write a C++program to create a class called as complex, and implements the following by overloadingthe function ADD that returns the COMPLEX number

A) ADD(s1,s2)-wheres1isaninteger(real part)ands2isa COMPLEX number.

B)ADD (s1, s2)- where s1&s2 are complex numbers

C)Display the objects by using display function.

7) Write a C++program to create a class STRING and implement the following. Display the results byoverloading the operator << after every operation

a) STRING s1="NTTF-NEC"

b) STRING s2 = " BANGALORE"

c) STRING s3 = s1 +s2;

8.Write a C++ program to create a class called MATRIX using twodimensional array of integers. Implement the following by overloading the operator==,which checks the compatibility of two Matrices to be added and subtracted, perform the

following by overloading + and –operators. The program should read the matrix using >> operator and display the results by overloading the operator<< if(m1==m2) { m3 = m1+m2; m4 = m1-m2; } else Display appropriate error message.

9. Write a C++program to create a base class called student (name, regno, gender, and branch) and using inheritance create a derived class exam with fields (subject, marks, and semester) enter at least 4 students. Find total & average marks for each semester separately and the average of all semester.

10. Write a C++ program to create a class called DATE; accept two valid dates inform of dd/mm/yyyy. Implement the following by over loading operators – and +.Display the results by over loading the

        operator << after every operation

        d) No of days=d1-d2–whered1andd2aredateobjects; d1>=d2;and no _of _days is an integer.

        e) d1 =d1+no_of_days where d1 is a date object and no_of _days is a integer .

11. Write a C++program to create a base class called student (name, regno, gender, and branch) and using inheritance create a derived class exam with fields (subject, marks, and semester) enter at least 4 students. Find total & average marks for each semester separately and the average of all semester.

12. Create a class EMPLOYEE contains members (emp_id, emp_name, basic salary, net salary). Create a derived class INCOME contains the members (DA,HRA). Another derived class DEDUCTION consists (IT –Income Tax, LIC). Use appropriate functions to read data and calculate the net salary and print the complete data of multiple employees. (DA = 50% of the basic, HRA=25%ofBasic,IT=30%oftheGrosssalary,LIC=1800).

13. Create a base class Student (roll_no, name, sem) from which derive two derived class Test(partA, partB marks) and Sports(sports mark).Create one more derived class Result(total)which has to inherit the properties of Test, Sports. Create appropriate functions in each class to read the data, calculate the total and display complete details in derived class by using Virtual Base class concept.

14. Create a base class called Shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get data() to initialize base class data members and another member function display area() to compute and display the area of figures, Make display area() as a virtual function and redefine this function in the derived classes to suit their requirements.

15. Thereare100recordspresentinafilewitheachrecordcontaining Itemcode,20charactersItemnameandanintegerQuantity.Write A program to read these records, arrangethem in ascending order and write in a same file over writing the earlier record

16.A book shop maintains the inventory of books that are being sold at the shop the list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book the sales person inputs the title and author and the system searches the list and displays whether it is available ornot. If it is not an appropriate message is displayed. If it is, then the system displays the book details and request for the no. of copies required. If the requested copies are available the total cost of the requested copies is displayed, otherwise the message "Requested copies not available" Write a C++program read book inventory records from a file and implement the same.

17. Write a C++program to demonstrate the Exception handling for Division by zero exception and Array Index out of bounds exception.

SEMESTER	1II SEM					
YEAR	II YEAR					
COURSE CODE	21VC307					
TITLE OF THE COURSE	DATA STRUCTURES WITH C LAB					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	10	-	-	-	75	5

COURSE OBJECTIVES

To understand Circuit operation of different types of voltage regulation circuits, including series.

To explain the construction and characteristics of diodes, bipolar junction transistors

andoptical devices

COURSE OUTCOME:

After completion of the course, the trainee should be able to:
1. Explain different methods of tree traverse.
2. Implement various data structures stack, queue, linked list and trees.
3. Experiment searching and sorting in data structures.
4. Ability to analyze algorithms and its correctness.

List of Exercises	75 Hrs

Exercise 1: Write a C program to find the biggest of N numbers in an array using pointers.

Exercise 2:Write a C program to demonstrate call by value.

Exercise 3: Write a C program to demonstrate call by reference.

Exercise 4: Write a C program to find sum of n elements entered by user. To perform this program, allocatememory dynamically using malloc () function.

Exercise 5: Write a C program to demonstrate the working of a stack of size N using an array. The operationssupported are 1) Push 2) Pop 3) Display The program should check the stack overflow, underflow conditions.

Exercise 6: Write a C program to evaluate a valid suffix expression-using stack. Assume that the suffix expression is read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The arithmetic operators allowed are + (ADD), - (SUBTRACT), *(MULTIPLY), and / (DIVIDE).

Exercise 7: Write a C program to evaluate a valid prefix expression-using stack. Assume that the prefix expressionis read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The arithmetic operators allowed are +(ADD), -(SUBTRACT), *(MULTIPLY), and /(DIVIDE).

Exercise 8. Write a C program to convert and print a given valid infix arithmetic expression to Suffix or Postfix expression. The expression consisting of single character (letter or digit) as operands and +, - , *, / as operators. You may assume that only binary operators are allowed in the expression.

Exercise 9. Write a C program to demonstrate the working of a queue of size N using an array. The operations supported are 1. Q Insert 2.QDelete 3.QDisplay The program should check the queue overflow, underflow conditions.

Exercise 10. Write a C program to simulate the working of a circular Queue using an array.

Exercise 11. Write a C program to simulate the working of DoubleEnded Queue, provide the following operations
INSERT FRONT 2. INSERT REAR 3. DELETE FRONT 4. DELETE REAR 5. DISPLAY.

Exercise 12. Write a C program to design a Priority queue, which is maintained as a set of queues (Assume maximum of three queues). The elements are inserted based upon the given priority. For eg(3,34) willbe inserted on 3rd queue with elemental value 34. The deletion of elements to be done starting from1st queue if it is not empty. If it is empty then the elements from the 2nd queue will be deleted and so on.

Exercise 13. Using pointers and Dynamic memory, write a program in C to construct singly linked list consisting of following information on each node : Job_id (int), Job name (character string), Job category (character string). The operation supported are 1. LINSERT- Inserting a node based on Job_id (Ascending order) 2. LDELETE – Deleting a node based on Job_id. 3. LSEARCH – Searching a node based upon Job_id. Printing all the nodes in the list.

Exercise 14. Write a C program to simulate the working of Doubly linked list and perform forward and backward directional display.

Exercise 15. Write a C program to simulate the working of Circular singly linked list.

Exercise 16. Write a program to reverse a singly linked list without creating a new node.

Exercise 17. Write a program in C to construct a Binary Search Tree (BST). And Perform all traversals on it.

SEMESTER	III SEM				
YEAR	II YEAR				
COURSE CODE	21VC308				
TITLE OF THE COURSE	COMPUTER NETWORKS-II LAB				
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	8	-	-	-	60	4

COURSE OUTCOME:

After completion of the Course, the trainee should be able to:

1. Configure secure LAN and Wireless LAN.

2. Configure static and dynamic (OSPF) routing.

3. Implement access control list to secure the network.

4. Configure PAT interface implementation and verify NTP settings.

5. Implement NAT concept for IP address translation. 6. Configure TFTP server for backup.

List of Exercises	60Hrs
1.Implement Port Security. -Configure Port Security. -Verify Port Security.	
2.Switch Security Configuration -Create a Secure Trunk -Secure Unused Switch ports -Implement Port Security -Enable DHCP Snooping -Configure Rapid PVST Port Fast and BPDU Guard.	

3.Configure a Wireless Network
        -Connect to a wireless router
        -Configure the wireless router
        -Connect a wired device to the wireless router
        -Connect a wireless device to the wireless router
        -Add an AP to the network to extend wireless coverage
        -Update default router settings.	

4.Configure a Basic WLAN on the WLC
        -Monitor the WLC
        -Create a Wireless LAN
        -Connect a Host to the WLAN.	

5.Configure a WPA2 Enterprise WLAN on the WLC
        -Create a new WLAN.
        -Configure a DHCP Scope and SNMP.
        -Connect Hosts to the Network.	

6.Basic Router Configuration Review
        -Assign static IPv4 and IPv6 addresses to the PC interfaces.
        -Configure basic router settings.	

	-Configure the router for SSH. -Verify network connectivity.
7. Configure IPv4 Static Routes	-Configure Directly Connected Static Routes -Configure Default Static Routes.
8.Configure IPv6 Static Routes	-Configure Directly Connected Static Routes -Configure Default Static Routes.
9.Point-to-Point Single-Area OSPFv2 Configuration	-Configure Router IDs. -Configure Networks for OSPF Routing. -Configure Passive Interfaces. -Verify OSPF configuration.
10.Modify Single-Area OSPFv2	-Modify OSPF Default Settings -Verify Connectivity.
11.Propagate a Default Route in OSPFv2	-Propagate a Default Route -Verify Connectivity.
12.Configure Numbered Standard IPv4 ACLs	-Plan an ACL Implementation -Configure, Apply, and Verify a Standard ACL
13.Configure Named Standard IPv4 ACLs	-Configure and Apply a Named Standard ACL -Verify the ACL Implementation.
14.Configure Extended IPv4 ACLs	-Configure, Apply and Verify an Extended Numbered ACL -Configure, Apply and Verify an Extended Named ACL.
15.Configure Static NAT	-Configure Static NAT -Test Access with NAT.
16.Configure Dynamic NAT	-Configure Dynamic NAT -Verify NAT Implementation.
17.Configure PAT	-Configure PAT using an Interface -Verify PAT Interface Implementation.
18.Configure and Verify NTP	-Configure the NTP Clients -Verify NTP settings
19.Back Up Configuration Files	-Establish Connectivity to TFTP Server -Transfer the Configuration File from TFTP Server -Backup Configuration and IOS to TFTP Server

SEMESTER	III SEM					
YEAR	II YEAR					
COURSE CODE	**21VC309**					
TITLE OF THE COURSE	MICROPROCESSOR AND MICROCONTROLLR LAB					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	8	-	-	-	60	4

COURSE OUTCOME:

After completion of the Course, the trainee should be able to:

1. Write assembly language programs for arithmetic, logical operations using 8085 simulator.

2. Write programs using keil compiler (8051 microcontroller) for exchange, swap of data between registers, memory to register, register to memory, one timer to another timer.

3. Recall C program and write C program for applications/interfacing modules using 8051 microcontroller.

List of Exercises	60Hrs

I 8085 MICROPROCESSORS

1. Familiarization of 8085 simulator.

2. Loading of Four bytes in the Registers A, B, C, D & moving them to

consecutive location 8000Hthrough 8003H.

3. a) Add two 8-bit numbers, without carry, storing the result in location 9000H.

(Including DecimalAddition).

b) Subtract an 8-bit number from another 8-bit number and store the difference in location 9000H.

4. Add of two 16-bit numbers, with carry, storing the result in location9010H(LSB)AND 9011H(MSB).

5. Find 1's complement & 2's complement of a 8-bit number and place the

result in 9000H and9001H.

6 a) Multiplication of Two 8-BitNumbers

b) Division of 8-bit number with an 8-Bit Number.

7 Shift an 8-bit number to the left by 2 Bits and storing it in 9000H .

8051   MICROCONTROLLER LAB

8. Familiarization of keil compiler 8052.

9. Write a program to place the number 80DH in RAM locations from 30H to 40H.

10 Write a program to copy the contents of DPTR to registers R0(DPL) & R1 (DPH).

11 Write a program to exchange the contents of B register and RAM address 30H.12

12. Write a program to Swap the bytes in timer 0.Put TL0in TH0 and TH0 in TL0 .

13. Write a program to double the number in register R2and put the result in register in R3 (higher

byte) and R4 (lower byte).

14.Write a program to add the unsigned numbers found in internal RAM locations 25H, 26H and 27H

together and put the result in RAM locations31H (MSB) and 30H (LSB).

15.Write a program to move a block of data from memory X to Y.

Interfacing programs with 8051 USING C

16.LED & Switch Interfacing and display the status using LED.

17. Seven Segment Display Interfacing.

18. Alpha Numeric LCD Interfacing.

19. 4x4 Keypad Interfacing.

SEMESTER	IV SEM				
YEAR	II YEAR				
COURSE CODE	21VC401				
TITLE OF THE COURSE	SOFTWARE ENGINEERING				
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	3	-	-	-	45	3

COURSE OBJECTIVES:

1. To enable the trainees to acquire basic knowledge and understanding of the analysis and design of complex   systems.
2. To enable the trainee to apply software engineering principles and techniques.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	1. Apply the basic software engineering methods and practices based on the application.
CO2	2. Compare various software process models.
CO3	3. Build the requirements document by understanding the application.
CO4	4. Relate the software architectural styles, techniques, models to the suitable applications.
CO5	5. Analyze, design and maintain software.
CO6	6. Explain different software measurement and metrics.

COURSE CONTENT:	
MODULE 1	**6Hrs**
Software Engineering Overview: Definition, Evolution of Software, Need of Software Engineering, Importance of Software engineering, Characteristics of good Software, Evolution of Software	
MODULE 2	**6Hrs**
Software Development Life Cycle : Introduction to SDLC, Waterfall Model, Incremental Model, Spiral Model, Introduction about Agile Methodology, Agile Manifesto & Agile Characteristics, Types of Agile (Scrum, Kanban etc) mergingtwo ordered list.	
MODULE 3	**9Hrs**
Requirement Engineering Software Requirements, SRS, Characteristics of SRS, Components of SRS, Requirement Engineering Process, Feasibility Study, Requirement Elicitation & Analysis, Requirement Specification, Requirement validation & Management.	
MODULE 4	**6Hrs**
Software Design: Introduction to Software Design, Process & Principles, Design Concepts, cohesion, coupling, DFD. Coding: Introduction, Choice of programming Languages, Coding standards & Guidelines, Re-Engineering, Reverse Engineering.	
MODULE 5	**8Hrs**
Software Testing: Introduction to Software Testing, Test Plans, Levels of Testing, Methods of Testing, Black Box Testing,White Box Testing.	

Text Books:

1. SOFTWARE ENGINEERING, A Practitioner's Approach, Roger S Pressman, McGraw Hill, 6 th Edition,2005
2. SOFTWARE ENGINEERING, Sommerville, Pearson, 10th edition, 2017. Reference Books:

SEMESTER	IV SEM					
YEAR	II YEAR					
COURSE CODE	21VC402					
TITLE OF THE COURSE	OBJECT ORIENTED PROGRAMMING WITH C++					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

To enable the trainee to learn fundamentals of java-I/O concepts, Interfaces, threading and various package and to implement applets & GUI.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	1. Implement the java basics concepts and create basic programs
CO2	2. Create and deploy packages & Interfaces.
CO3	3. Implement exception handling. 4. Work with java applets and implement GUI

COURSE CONTENT:	
MODULE 1	**6Hrs**
Introduction to Java: Introduction to Java, Creation of Java, Data types & Variables Keywords, Literals, Type Casting & Conversion, Arrays, Programming in Java. Operators & Statements: Operators & Statements, Arithmetic, Relational, Bitwise, Logical Operators (Unary, Binary, Ternary), Control Statements, Conditional Statements	
MODULE 2	**6Hrs**
Working with OOP's: Working with OOP's, Introduction to OOP's Concepts, Constructors Working with Objects, Working with Application, Passing Arguments at Runtime, Inheritance in Java Polymorphism in Java (Overloading & Overriding) Abstract Classes.	
MODULE 3	**6Hrs**
Packages & Interfaces: Interfaces, Introduction to Package, Access Modifiers & their usage, working with User defined Packages & inbuilt Packages. Exceptions: Fundamentals of Exceptions, Caught & Uncaught Exceptions, Handling Exceptions in Java (try, catch, throw, throws, finally), Working with User Defined Exceptions.	
MODULE 4	**6Hrs**

Multithreading: Multithreaded Programming, Java Threaded Model, Working with Threads, Working with Threads, Creating Threads & working with them, working with multiple Threads & Thread Priorities Using Thread Methods, Thread Synchronization. Basic I/O: Working with Basic I/O in Java, Modifiers in Java (transient, volatile, static), Using 'instanceOf'.

MODULE 5	**6Hrs**

java.lang package: Wrapper Classes, Auto Boxing , String &String Buffer, String Builder, Runtime, Process, System, Clone, Math , Thread Group, Security Manager. java.util package: Collection Framework , Collection Classes & Interfaces, Exploring java.util Package (Set, Map, List, Date, Enumeration, Iterator etc.). java.io package: Working with File Class, Stream Classes (Byte Stream, Character Stream, Object Stream, Object Serialization. Applets & GUI: Difference between Applet & Application, Applet Life Cycle, Working with Applets, Passing parameters to Applet, Working with Graphics & its Methods.

Reference Books:
1. The complete reference Java, Herbert Schildt, McGraw Hill,11th edition, 2018
2. Head First Java, Kathy and Bort Base, O'Reilly Media, 2nd edition, 2005

SEMESTER	IV SEM
YEAR	II YEAR
COURSE CODE	21VC403
TITLE OF THE COURSE	WINDOWS SERVER ADMINISTRATION AND LINUX SERVER ADMINISTRATION

SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

> To enable trainees to learn Server Administration in Windows Server 2012R2 and Linux Server, Configure and manage the various server roles and features, Implement the client server infrastructure using windows and Linux environment.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	1. Identify Different Server Roles in Windows Server 2012R2.
CO2	2. Identify the Different Roles in Linux Server.
CO3	3. Explain steps involved in Server Administration and System Administration.

COURSE CONTENT:

MODULE 1	**6Hrs**

WSA: Networking Essentials & Introduction to Windows server 2012: Networking Essentials, Introduction to windows server 2008 & 2012, Features of Windows server 2008, Edition of windows server 2008, Installation of windows server 2012, Installation of windows 10, Introduction and Creation of Users accounts and group accounts, Sharing folders, Study of windows services, registry editor , study of user profiles, Print server , Network Printer, Internet printer.

MODULE 2	**6Hrs**

Active Directory – Domain Services: FSMO and FSMO Roles, IP Addressing-subnet mask, default gateway, Logical Topologies, Peer to peer & Domain Models, Introduction to Directory Services, Features of Active Directory, Installing Active Directory – Domain Controller, Member Servers, Clients, User Configuration Configuring Member Servers and Clients, Introduction to PowerShell and basic commands. User and Group Administration: Permissions/Access Control Lists, User profiles, Logical Structure of AD – DS, FSMO Roles of AD – DS, Group Policy / System Policies. Dynamic Host Configuration Protocol (DHCP) & Windows Deployment Services: Introduction and Configuration of DHCP, Windows Deployment Services.

MODULE 3	**6Hrs**

Domain Name System (DNS) &Internet information Services: Domain Name System (DNS), Internet Information Services. Disk Management , Advanced Topics - DFS & File server , Configuring Namespace, Folders, Backup media Types of Backups & Strategies, Recovery , Overview of AD- FS,

LDS, RMS, CS. HYPER V: Introduction to Virtual Machine, Installing Different OS in Hyper V, VPN . MicrosoftExchangeServer2010 (Mail Server), Linux – Introduction, Working with file system, Installing Linux.	
MODULE 4	**6Hrs**
Boot sequence, Run level & rc scripts: Understanding the boot sequence & Boot loader configuration, Understanding the kernel and init process & Run levels, Managing system V initializing scripts, Controlling services, Understanding of RPM-install, upgrade, remove. Text Processing Tools, Basic User/group administration, Basic File system administration, Basic process and GUI administration.	
MODULE 5	**6Hrs**
Basic Network administration: Network interfaces in Linux and Configuration, Speed and Duplex Settings, Dynamic and static IPv4 configuration, Device aliases, Verify IP connectivity, FTP server and client configuration, DHCP server configuration. Backup and recovery : Backup and recovery, Tools for backup-tar, GZIP and BZIP2 Compression, Preserve file permissions, Ownership and timestamps, Archiving tools-dump/restore, rsync. **Basic Troubleshooting:** Method of Fault Analysis, Fault Analysis: Gathering Data, **Things to Check:** X, Things to Check: Networking, File system Recovery, Recovery Run-levels , Order of booting process .	

Reference Books:

Text Books:

1. MCSA Windows server 2012 R2, William Panek, wiley publisher,2013.

2. RedHat Linux System Administration,Tom Adelsten, O'Reilly Media, Inc.2007.

SEMESTER	IV SEM					
YEAR	II YEAR					
COURSE CODE	21VC404					
TITLE OF THE COURSE	IOT					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	40	2

COURSE OBJECTIVES:

To enable the trainees to understand the significance of internet of things, working of Ardunio, Raspberry Pi ,ESP266, Intel-IoT Kits.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	1. Understand Arduino hardware, software features.
CO2	2. Understand the working of development board with peripherals and sensors.
CO3	3. Familiarize protocols for wired and wireless communication.
CO4	4. Explain the working of Intel Up square board with real time application in cloud environment.

COURSE CONTENT:	
MODULE 1	**6Hrs**

INTERNET OF THINGS-MARKET OPPORTUNITIES AND USE CASES: What is IoT and Latest technology trends in IoT, Brief History and evolution of IoT, M2M, Three tier IoT Architecture, ARDUINO: Arduino Introduction and Hardware overview, Download and installing the Arduino IDE, Arduino IDE and Sketch overview, Installing and Setting up the Arduino development environment, Understanding Arduino Syntax, Blink Sketch – A walk through, Arduino Sketches, Arduino Shields, Hands-on working with GPIOs, Analog I/O, Memory usage.

MODULE 2	**6Hrs**

Embedded system and Arduino: Overview of Embedded Systems and Components of Embedded Systems, Communication protocols I - UART, SPI, I2C, CAN, Interfacing IoT sensors and Actuators, Debug applications using Arduino IDE, Communication protocols II – Wired and Wireless communication, Ethernet Client Server Implementation, Build WiFi Application, Build Bluetooth Application, Debug applications using Arduino IDE. ESP8266: Introduction architecture of ESP8266, Create ESP8266 Platform in Arduino, Working with peripherals and interfacing with Sensors, Programming in Arduino Platform, Integrated with Wi-Fi module and connecting with Server.

MODULE 3	**6Hrs**

RASPBERRY PI: Working with Raspberry Pi 3 Model, Installing OS and Designing Systems using Raspberry pi, Configuring Raspberry Pi for VNC Connection, Getting introduced to Linux OS and Basic Linux command used, Getting Started with Python, Interface sensor and Actuator with Raspberry Pi.

MODULE 4	6Hrs

Embedded Development using Intel Up Squared based IoT Development kit: Three-layer IoT Architecture and its Components EDGE Gate-way Cloud, Overview of Embedded Application Development Methodology, General architecture overview of various Intel Architecture(IA) platforms for IoT and Embedded Applications, Introduction to Intel Up Squared Development Kit , UP-Square Datasheet, Grove Pi Sensors- Grove Light sensor, Grove temperature & Humidity sensor, Rotary Angle Sensor.

MODULE 5	6Hrs

Integration of Intel Up Squared with Cloud based platforms: Tier architecture of IoT applications and related protocols: Understanding TCP/IP, HTTP based IoT Application development, MQTT based IoT application development, Building IoT applications: Platforms available, Thing Speak cloud management framework for data logging and data visualization, Tweet based IoT application development, Smart city application building.

Reference Books:

1. Exploring Arduino by Jeremy Blum, Wiley publication, Second edition, 2019.

2. Programming the Raspberry Pi, Getting started with Python by Simon Monk, McGraw Hill Education, Second   edition, 2013.

SEMESTER	IV SEM					
YEAR	II YEAR					
COURSE CODE	21VC405					
TITLE OF THE COURSE	WEB PROGRAMMING (JavaScript, Perl, PHP, Python)					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

Upon successful completion of this subject, the trainee will be able to

To enable the trainees to understand the web technologies, different client side and server-side technologies

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	1. Understand and familiarize with JavaScript.
CO2	2. Use PHP and Perl to develop web applications.
CO3	3. Work with Python Django framework.

COURSE CONTENT:	
MODULE 1	**6Hrs**
Introduction to JavaScript: First Look at JavaScript, History and Use of JavaScript, Adding JavaScript to HTML Documents. Core Language Data Types and Variables: Key Concepts, JavaScript's Primitive Types, Composite Types, Type Conversion, Variables. Operators, Expressions, and Statements: Statement Basics, Operators, Core JavaScript Statements.	
MODULE 2	**6Hrs**
Functions: Function Basics, Global and Local Variables, Functions as Objects, Recursive Functions, Using Functions. Array, Date, Math, and Type-Related Objects: Array, Boolean, Date Global, Math, Number, String, Object types and primitive types. Regular Expressions: The Need and concept for Regular Expressions, Introduction to JavaScript Regular Expressions, RegExp Object, String Methods for Regular Expressions. **Fundamental Client-Side JavaScript :** JavaScript Object Models, The Initial JavaScript Object Model, The Document Object.	
MODULE 3	**6Hrs**
The Standard Document Object Model: DOM versions, Document Trees, Accessing Elements, Creating Nodes, Inserting and Appending Nodes Deleting and Replacing Nodes, Manipulating Attributes The DOM, HTML Elements and CSS. Form Handling: The Need for JavaScript Form Checking, Form validation, Introduction to PHP : Introduction,	

Creating and Running a PHP page, Adding comments to PHP code, Variables and Constants, PHP Data types.

Operators and Flow Control: PHP Operators, Making Decisions, Loops.

MODULE 4	6Hrs

Strings and Arrays: String Functions, Formatting text strings, Building some Arrays, Modifying and Deleting Data in Arrays, Handling Arrays with for and for each Loops, PHP Array functions, Converting between Strings and Arrays Using Implode and Explode. **Creating Functions:** Creating Functions in PHP, Passing Data and Arrays to Functions, Passing by Reference, Accessing Global Data, Returning Errors from Functions. **File Handling:** Opening and Closing Files, Reading a File, Writing and Appending to a File, Getting File Size, Checking if a File Exists, Copying and Deleting Files. **Reading Data in Web Pages**: Handling File Operation in web page.

MODULE 5	6Hrs

Cookies and Sessions: Setting a Cookie, Reading a Cookie, Deleting Cookies, Sessions. **Working with Databases:** Creating Database, Accessing the Database in PHP, Inserting Data Items into a Database, Updating Databases, Deleting Records. Introduction to PERL: What is PERL?, PERL program, Running a PERL program, Basic Operators, Conditional Statements and Loops, Lists , Hashes and Array Variables, Reading from and writing to files, String Manipulations and Regular expression, Introduction to Common Gateway Interface (CGI), Python Django Web framework: Django Basics, Django Environment, Create a project, Setting Up Project.

Reference Books:

1. The complete reference JavaScript , Thomas Powell and Fritz Schneide, McGraw Hill Education, Second Edition , 2004
2. Professional JavaScript for Web Developers (Wrox Programmer to Programmer) , Nicholas C. Zakas (Author), John Wiley & Sons, Fifth edition,2005.
3. A Beginner's Guide to Programming Interactive Web Applications with PHP and MySQL by Alan Forbes, Plum Island ,Fifth Edition,2012
 4. Perl Pocket Reference, Paperback Johan Vromans ,O'Reilly Media, 4th Edition ,2002 5. Django Unleashed by Andrew Paperback Pinkham, Sams Publishing, First edition,2015

SEMESTER	IV SEM					
YEAR	II YEAR					
COURSE CODE	21VC406					
TITLE OF THE COURSE	**Design and Analysis of Algorithms**					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

Course objectives
- Upon completion of this course, students will be able to do the following:
- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to:

CO No.	Outcomes
CO1	Exemplify and analyze recursive and non-recursive algorithms to obtain best, average, worst-case time and space complexity of algorithms using asymptotic notations.
CO2	Interpret the divide and conquer paradigm, employ this paradigm to synthesize divide and conquer algorithms.
CO3	Identify and interpret the greedy technique, dynamic programming paradigm algorithms and analyze them.
CO4	Illustrate various graph techniques, apply the knowledge to various domain and acquire fundamental knowledge of sum of subset.

COURSE CONTENT:	
MODULE 1	**6Hrs**
Introduction: What is an Algorithm, Algorithm Specification, Pseudocode conventions Recursive Algorithm, Performance Analysis, Space Complexity, Time Complexity, Amortized Complexity, Amortized Complexity, Asymptotic Notation, Practical Complexities, Performance measurement?	
MODULE 2	**6Hrs**
Dived and Conquer: General Method, Defective Chessboard, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Performance Measurement, Randomized Sorting Algorithms.	
MODULE 3	**9Hrs**
The Greedy Method: The General Method, Knapsack Problem, Job Sequencing with Deadlines, Minimum-cost Spanning Trees, Prim's Algorithm, Kruskal's Algorithms, An Optimal Randomized Algorithm, Optimal Merge Patterns, Single Source Shortest Paths.	
MODULE 4	**6Hrs**

Dynamic Programming: All - Pairs Shortest Paths, Single – Source Shortest paths General Weights, String Edition, 0/1 Knapsack, Reliability Design,

MODULE 5	8Hrs
Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring , Hamiltonian Cycles.	

Text Books:

1. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman

Algorithm Design, Jon Kleinberg, Pearson.

SEMESTER	IV SEM
YEAR	II YEAR
COURSE CODE	21VC407
TITLE OF THE COURSE	WEB PROGRAMMING LAB (JavaScript, Perl, PHP, Python)

SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	10	-	-	-	75	5

Course objectives

After completion of the course, the trainee should be able to:

1. Familiarize different JavaScript programs.

2. Familiarize scripting languages like PHP,PERL

3. Understand python Django web development framework.

List of Exercises	80Hrs

1. a) Write a Java Script to demonstrate document. write() and display "HELLO JAVASCRIPT" .
 b) Write a Java Script to demonstrate alert box and display "HELLO JAVASCRIPT".
 c))Write a Java Script to demonstrate the use of prompt box and read the name of user and display a message like "HELLO NAME HOW ARE YOU" Write a JavaScript to display a confirm box.

2. a) Write a JavaScript that should declare a variable, assign a value to it, display the value, change the value, and display the value again. b) Write a JavaScript to Display "Good morning" If the time on your browser is less than 10. Otherwise display "Good day". c) Write a JavaScript to generate different greetings based on what day it is. Note that Sunday=0, Monday=1, Tuesday=2, etc. (use switch). d)Write a JavaScript to generate a table of numbers using while loop a. Implement multiplication table using do-while loop in java Script. b. Write a JavaScript to generate a table of even numbers using for loop.

3. Write a function using Java Script with both argument and return value.

4. a) Create an array store some data into it and print it ,use for…in loop for printing. b) Create an array store some elements into it sort it and print the elements. c) Write a script to describe the various Boolean values. d) Write a script for manipulating dates using the methods of date object. e) Write a script to realize the usage of all the methods of math object. f) Write a script to realize the usage of all the methods of string object.

5. a) Use DOM methods and create a simple HTML creation tool b)Write a script to manipulate the common CSS properties c)Write a script to change the common properties of HTML tables.

6. Write a JavaScript which should perform form validation for the fields, such as name, age and email address while submitting the form, add a Reset button.

II PHP

1. Demonstrate on arithmetic and relational operators in PHP.
2. Demonstrate on if, if else, else if and switch Statements in PHP
3. Demonstrate on while, do while, for and for each loops in PHP
4. Write a program to demonstrate on function with parameters and return values
 5. Write a program to sort the elements in the array.
 6. Demonstrate on get and post method.
 7. Design a form with radio button and checkbox submit the value.
 8. Use cookie to create page counter and demonstrate session.
 9. Write a program to read the content from a file and write it to another file.

10. Write a program in PHP to insert, update, delete and retrieve record in the table

III PERL
1. Write a PERL program to demonstrate array functions.
2. Write a PERL program to copy content of one file to another file.
 3. Demonstrate search and sort operation in hash using PERL
4. Demonstrate string manipulation functions in PERL
5. Demonstrate usage of Regular expressions in PERL program.

 IV Python Django Web framework
1. How to setup a project?
2. How to display Hello World in browser using Django?
3. How to apply migrations & What is migrations does?
4. How to access Django admin panel?
 5. How to connect MYSQL or … (except sqllite3) in a Django application?
6. How to create a table in database & what is ORM?
7. What is Jinga? Displaying a list of items using Jinga for loop?
8. How to methods like POST & GET works?
9. How to create form using models?
10. Develop an web application to create employee registration site.

SEMESTER	IV SEM					
YEAR	II YEAR					
COURSE CODE	21VC408					
TITLE OF THE COURSE	WINDOWS SERVER ADMINSTRATION AND LINUX SERVER LAB					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	4	-	-	-	80	3

COURSE OUTCOME:

After completion of the course, the trainee should be able to:

1. Configure Different Server Roles in Windows Server 2012R2.

2. Work as a Server Administrator and System Administrator in Industry.

3. Configure the Different Roles Linux Server.

List of Exercises	80Hrs

Exercise 1: InstallationofWindows2012 r2Server.

Exercise 2 :

Terminal Login Procedure:

a) Switching between virtual consoles and the graphical environment.

b) Basic commands: explore minimum 30 commands.

c) Running Commands and Getting Help.

d) Bash Shell: Finding and changing current shell, default shell and switch to another shell – ksh, c shell.

Exercise 3: Text based installation

Exercise 4: GUI based installation

Exercise 5 :

Hardware overview.

 a) Boot loader configuration, Run levels, managing system V initializing scripts, Controlling services.

 b) Tools for Extracting – less, cat, head, tail, cut, and grep,

 c) Tools for Analyzing – Wc sort , Uniq, comm, comp, diff – patch and aspell.

d) awk command basics, Default permission – umask command

Exercise 6: Tools for Extracting – Vi Yy , Pp: Tools for Analyzing ,Tools for manipulating ,

Creating Group (CLI mode and GUI mode), Adding a member to a group, Removing a member from a

group, Understanding stuid , setgid , sticky bit.

Exercise 7: Default permission – Umask command: GUI configuration, Ifconfig,ifup, ifdown commands.

8. User/Group administration: V creating user (CLI mode and GUI mode), Changing username and password for created user, Configuring the Expire date, default shell, Understanding/etc/passwd file, Adding a member to a group, Removing a member from a group

9. Method of Fault Analysis: Things to check : Networking, Recovery Run – level, File system Recovery, PS command: Nice and renice commands, Interactive process Management Tools, GUI configuration.

10. View all network setting: Ifconfig , ifup,ifdown,commands, Assign ip address, netmask, broadcast, MTU,new Alias and change MAC address to network interface, Speed and Duplex Settings.

11. Configure a FTP server and client
11.2 Configure and test DHCP Server 10
11.3 Configure Apache Tomcat Server

12. Method of Fault Analysis : Things to check : Networking, Recovery Run – levels, File system Recovery

SEMESTER	IV SEM					
YEAR	II YEAR					
COURSE CODE	21VC408					
TITLE OF THE COURSE	JAVA PROGRAMMING LAB					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	8	-	-	-	60	4

COURSE OUTCOME:

After completion of the course, the trainee should be able to:

1. Familiarize the basics of Java (How to download and Install the JDK)

2. Implement classes and objects.

3. Understand implementation of oops concept.

4. Implement and understand the collection frame work.

5. Implement and understand multithreading.

6. Build a desktop application.

List of Exercises	60Hrs
1 Write a program to display your Information on the Console.	
2 WAP to use the Conditional Statements.	
3 WAP to use the Control Statements.	
4 WAP to pass Command Line Arguments & display the same on the console.	
5 WAP to declare a String Array of with varying Width & display the content of the Array in the same manner in which the data is stored.	
6 WAP to demonstrate the use of Operators.	
7.WAP to demonstrate Pass by Value & passing the Objects as Parameters.	
8. WAP to demonstrate Method Overloading & Method Overriding.	
9. WAP to demonstrate Constructor Overloading.	
10 WAP to use Abstract Classes.	
11 Create a Package & Import the same in the other class.	
12 Demonstrate the use of Access Modifiers with the help of Packages.	
13 WAP to demonstrate Multiple Inheritance with the help of Interfaces..	
14 WAP to handle the Exceptions.	
16 Demonstrate the use of 'try', 'catch', 'finally', 'throw' & 'throws' in Exception handling.	
17 Create your own Exception class & throw the same in the other class.	
18 WAP to demonstrate the Life Cycle of Thread.	
19 WAP to Create Multiple Threads & set the Priorities	
20 WAP to demonstrate Thread Synchronization.	
21 WAP to take the Input from the User using Basic IO & display the output	
22 WAP to demonstrate the use of static Methods & static Blocks.	
23 Demonstrate the use of transient in Serialization.	

| 24 Usage of String & String Buffer. |
| 25 WAP to create a Process & display the output given by that Process. |
| 26 WAP to set the System Properties. |
| 27 WAP to use Array List, Sort the Elements, retrieve the values & the Keys from the Map. |

SEMESTER	IV SEM					
YEAR	II YEAR					
COURSE CODE	21VC410					
TITLE OF THE COURSE	IOT LAB					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	8	-	-	-	60	4

COURSE OUTCOME:

After completion of the course, the trainee should be able to:

1. Develop a real time IoT based project using Intel up square board.

2. . Develop an application using raspberry Pi in cloud platform .

3. Build an application with Intel IoT kit.

4. Capable of creating task oriented shell scripts.

List of Exercises	60hr

1 Installation of Arduino.

2 Installation of ESP8266.

3 Installation of Rasbian OS.

4 Experiment using Sound sensor.

5 Experiment using OLED interface with Arduino- Message displayAutoscroll-moving left and right.

6 Experiment using LED-Blinking and Chasing.

7 Object tracker using Arduino.

8 Experiment on Servo motor and DC motor.

9 Experiment using MQTT Publish and Subscribe messages.

10 Smart Home lighting system Raspberry Pi - Python programming.

11 Experiment using Water senor- Moisture control.

12 Experiment using DHT temperature sensor.

13 Traffic Light project using Raspberry.

14 Colour based product sorting.

15 Software and Hardware installation in the lab Connecting Up Squared Board to internet using LAN and Wi-Fi.

16 UP Squared Grove IoT Dev Kit using Arduino Programming - GPIO Blink LED Program Grove Button Grove LCD Grove Light Sensor Grove Rotary Angle Grove Temperature and Humidity Sensor.

17 UP Squared Grove IoT Dev Kit using Python Programming – GPIO Blink Program UP2 Analog Sensor in UP2 UP2 using MQTT LED Control I2C interfacing LCD program using UP2 Temperature Humidity Plot on Firebase MQTT PWM_MRAA (Increase brightness of LED) Project on Temperature/Humidity on Twitter Account – MQTT

SEMESTER	V					
YEAR	III					
COURSE CODE	21VCXXX					
TITLE OF THE COURSE	CLOUD COMPUTING					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

1. To enable the trainees to learn the cloud computing fundamentals and various cloud web services provided by Amazon Web Services.

2. To explore the cloud computing platform using the real world cloud services.

3. To gain knowledge about IT infrastructure maintenance in cloud platform.

4. To design, deploy and various cloud resources.

COURSE OUTCOMES:

CO No.	Outcomes
CO1	Understand cloud computing fundamentals and different types of cloud and their services.
CO2	Understand the web-based business processes and cloud implications.
CO3	Understand the cloud instances and their working principles.
CO4	Understand the various types of cloud storage. cloud different type of databases and backup and recover the backup.
CO5	Understand the cloud virtual network setup and configure its features the cloud security features. and software deployment in cloud platform

COURSE CONTENT:	

MODULE 1	16Hrs

Introduction Cloud Computing Overview : What is Cloud Computing, Goal of Cloud Computing ,Essential Characteristics of Cloud Computing, Early history of Cloud Computing, Various Cloud service providers Cloud terminologies - cloud provider, cloud broker, cloud consumer, cloud carrier, cloud auditor. Why cloud computing, Advantages and disadvantages of cloud computing. Hierarchy of service/delivery model, various cloud service models - SaaS, PaaS, IaaS and XaaS. Types of cloud deployment models - Public, Private and Hybrid. Need of web-based business process, outsourcing of services, customer retention.Business process on cloud, migration of business from on-premises to cloud, running business on cloud. Cloud for small business, effective usage of cloud services, effective usage of licenses, saving CAPEX and OPEX .Heights in cloud-based business, risks in cloud-based business Popular cloud service providers – Amazon, Google, Microsoft, IBM, RackSpace, Salesforce-overview of their products.

MODULE 2	16Hrs

Cloud Computing Platform : Operating Systems and Virtualization-

Operating Systems -Operating Systems -Introduction, Process and Thread Management, Resource Management and Communication, and Distributed Systems. Amazon EC2 – AMI, instance types, regions & availability zones,VPC, Security Group.Linux Web Servers on Cloud, Basics Linux commands. Microsoft Servers on the AWS Cloud. EBS Volumes - Backing up and restoring EC2 instance EBS-backed volumes Autoscaling - launch template, launch configuration, autoscaling group, scaling policies Public IP, Private IP, Elastic IP of EC2 instance, Amazons pool of addresses Virtualization - Virtualization – virtual machine, VM import/export, containers. AWS and VMware: VMware Cloud on AWS.

MODULE 3	16Hrs

Cloud Storage Platform: AWS Storage services -Storage – object storage, file storage, block storage Object storage - Amazon S3 -- features, storage classes, buckets, objects, security and access management, bucket policy. S3 – versioning, static web hosting, lifecycle .File storage - Amazon EFS – features, file system ,storage classes, performance mode, bursting mode, mounting file system .Block storage - Amazon EBS – features, snapshots, volume types, data lifecycle manager.Backup – AWS Backup – features, backup plan, types of backup, assign AWS resources, monitor, modify, restore of backups, backup scheduling.Data transfer – AWS Storage Gateway – features, file gateway, tape gateway, volume gateway, hardware appliances Edge computing and storage – AWS Snow Family – features, Snowcone, Snowball

MODULE 4	16Hrs

Cloud Database Platform: AWS Database & Migration Services -What is cloud migration, benefits of cloud migration, cloud migration process, 7 step migration model.Databases: Data Structures – Fundamentals, data structure in the cloud, Architecting Cloud Backup and Recovery Solutions. Different database services – relational, document, in-memory, graph, ledger, time series Relational Database – Amazon RDS, features, DB engines, db instance, endpoints, backup and restore db instance. DynamoDB- features, NoSQL database, migration, DynamoDB Accelerator.Amazon Aurora – features, Aurora Serverless, MySQL & PostGre compatibility. Data Migration - AWS Database Migration Service, Cloud Data Migration Strategies, 6 Strategies for Getting Data into AWS. Schema conversion tool, heterogeneous DB migration, using AWS SCT with AWS DMS

MODULE 5	16Hrs

Cloud Networking & Security Platform : AWS Networking and Security Services
Amazon VPC, Modular and Scalable Virtual Network Architecture with Amazon VPC, Security in Your VPC, VPC and Subnet Basics, Log Analysis AWS Content delivery network & DNS services – CloudFront- features, edge locations, Route 53 – features, domain registration, resolving DNS queries.Security services – IAM (Identity and Access Management), identities – users, groups, roles Policies, permissions, data protection, logging and monitoring
Cloud Software Development Platform: Scripting & Programming
Software Development: Introduction- Software Architecture, Software Development Processes and Methodologies, Software Architecture & Design .Scripting – CLI- AWS Command Line Interface (CLI), Javascript, AWS SDK for JavaScript in Node.js .Scripting – PHP - PHP Syntax, PHP for Web Development, AWS SDK for PHP .Scripting – Powershell - AWS Tools for Windows PowerShell. Scripting – Ruby- Ruby Developer Center AWS, AWS SDK for Ruby.

Reference Books:
1. Cloud Computing: From Beginning to End ,Ray J Rafaels , Createspace Independent Publishing Platform, Second Edition,2015
2. AWS Certified Solutions Architect Official Study GuideAuthors: Joe Baron, Tim Bixler, Hisham Baz, Biff Gaut, Sean Senior, Kevin E. Kelly, John Stamper, Subex Publisher, Third Edition, Associate Exam - Originally published: 2016

SEMESTER	V					
YEAR	III					
COURSE CODE	21VCXXX					
TITLE OF THE COURSE	CYBER SECURITY					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

1. To Enable the Trainees to learn Cyber security, protecting the data and integrity of computing assets belonging to or connecting to an organization's network, defend those assets against all threat actors throughout the entire life cycle of a cyber-attack.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to:

CO No.	Outcomes
CO1	Understand different types of Cyber-attacks and protection mechanism.
CO2	Understand the different types of Classical Encryption Techniques and its application.
CO3	Understand the different types of malware and roles of firewall.
CO4	Understand Ethical Hacking, penetration testing and tools.
CO5	Identify the security challenges in cloud generation.

COURSE CONTENT:	
MODULE 1	**10Hrs**
The Need of Cyber security :Attacks, concepts and techniques,Personal data ,organized data , Attackers and cyber security professional ,Protecting the organization,Overview of cyberwarefare	
MODULE 2	**8Hrs**
Information Security Overview: Background and current scenario ,Types of attacks and analyzing a cyber-attack ,Cyber security landscape ,Types of malware	
MODULE 3	**10Hrs**
Security Threats and Vulnerabilities: Overview of security threats **,**Weak/strong passwords cracking **,**Protecting your data and privacy **,**Malicious code **,**Programming bugs **,**Cybercrime and cyber terrorism	
MODULE 4	**10Hrs**
Cryptography/Encryption: Introduction, classical encryption techniques , Data encryption standards, advanced eccryption standard, Public key infrastructure, hash functions digital signatures Behaviour approach in cyber security **,**Firewalls	
MODULE 5	**22Hrs**
Security Management: The cyber security world ,Cyber security cube ,CIA triad , states of data, Deception ,Attacks ,dos, sniffing, snoofing ,Business continuity and disaster recovery, Obscuring data	

Cyber Security Legal and Ethical Issues: Ethical hacking, Ethical hacking terminologies, Sniffing tools ,Security challenges of cloud generation ,End point security for cloud generation ,Server hardening tips and tricks.

Reference books:

1. Cyber Security Essentials-Edited by James Graham, Richard Howard, Ryan Olson, Auerbach Publication, Kindle edition, 2016.

2. CCNA: Introduction to Cyber Security from https://www.netacad.com/

3. CCNA: Cyber security Essentials from https://www.netacad.com/

SEMESTER	V				
YEAR	III				
COURSE CODE	21VCXXX				
TITLE OF THE COURSE	SOFTWARE TESTING				
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

To enable the trainees to acquire basic knowledge and understanding of the testing concept.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	Understand the different testing types and techniques.
CO2	Understand the different testing tools and its deployment.
CO3	Understand the importance of tester role to produce a quality product.

COURSE CONTENT:	
MODULE 1	**4Hrs**
Introduction and fundamentals: Software testing fundamentals,Testing policy Vs Quality Policy Test Proposal Preparation ,Testing Economics and Testing Cost ,Testers Role in Organization	
MODULE 2	**10Hrs**
Levels of Testing : Testing Levels ,Unit testing ,Integration testing ,System Testing ,Acceptance Testing **Testing Technique -**Testing Techniques ,White box testing ,Black box testing ,Incremental testing ,Thread	
MODULE 3	**10Hrs**
Types of Testing: Special test types ,Performance testing ,Usability testing ,Interoperability, Vendor validation, Recovery, Configuration, Benefits Realization. **Testing Plan-**Test Plan Preparation, Test case design, Test case Execution and Test Log preparation	
MODULE 4	**10Hrs**
Defect Life cycle: Defect tracking and Management,Test traceability matrix,Testing metrics **,**Test reports **Testing Tools** -Manual testing Vs Automated Testing,,Evaluation and selection of automated tools, Overview of Automated Tools ,Performance Test tools	
MODULE 5	**6Hrs**
Introduction of Selenium : Introduction to selenium ,Selenium features and Limitations ,Selenium Web driver architecture	

Reference Books:

1. EdKit: Software testing in the real world, ACM Press, Addison-Wesley Pub, First edition,1995

2. Effective methods for Software Testing, William Perry , John Wiley & Sons, third edition ,1999

3. Software testing techniques, Beizer B, Published by Van Nostrand Reinluold , Second Edition, 1990

4. The Art of Software Testing, MyersGJ, Published by John Wiley & Sons, Third edition,1979

SEMESTER	V
YEAR	III
COURSE CODE	21VCXXX
TITLE OF THE COURSE	**ORGANIZATIONAL BEHAVIOUR AND PROJECT MANAGEMENT**

SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

To enable the trainee to understand the human behaviour in organization and the ability to lead people to achieve more effectively towards increased organizational performance.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	Understand individual behaviour in organizations, including diversity, attitudes, job satisfaction, emotions, moods, personality, values, perception, decision making and motivational theories.
CO2	Understand group behaviour and discussions in organizations, including communication, leadership, power and politics, conflict and negotiations
CO3	Understand the organizational system, including organizational structures, culture, human resources and change.
CO4	Understand Principles of Management.

COURSE CONTENT:	
MODULE 1	**5Hrs**
Introduction to organization behaviours : Organizational Behaviour, Nature of Organization, Concepts, Features,Understanding of Human Behaviour, Management Functions, Management Roles, Management Skills ,Challenges & opportunities for OB, OB Model, Organizational Goals, Types of Organization.	
MODULE 2	**4Hrs**
Conflict : Inter-personal Conflict , Horizontal and vertical conflicts,Group Conflict , Intra and Inter group conflicts.	
MODULE 3	**5Hrs**
Leadership: Concept of Leadership, Theories of leadership, Trait theory , Behaviour theory , Situational theory,Leadership Styles, Motivational styles, Power Styles ,Orientation Styles consideration and Initiating,Styles based on authority	
MODULE 4	**9Hrs**
Stress Management &Group Discussion:stress, positive/negative stress, Causes for stress and how to manage stress ,What is G.D, Types of G.D ,Uses of group in an organization,Why a group fails. **Motivation:**Definition of Motivation Theories of Motivation Maslow's need hierarchy Herzberg's Motivation Model	

MODULE 5

Personality: Concept of Personality, Theories of Personality , Psycho-Analytical theory the ID, the Ego, Super Ego Socio-Psychological personality theory, Trait theory Self theory Self-image, Ideal self , Looking glass self, Real self , Determinates of personality ,Personality and behaviours ,self-concept and self esteem, Need patterns, Machiavellianism, Locus of control, Tolerance of Ambiguity, Type A and B , Introversion and extroversion.

Principles of Management : Concept of Management,Management functions
Planning objectives, policies, procedures, rules ,Budgets Planning,Steps in planning, Organizing, Staffing, Leading, Controlling, Establishing standards,Measurement of performance,Correction of deviations,Principles of management ,Classical management theory.

Reference Books:

1. Organizational Behaviour, K Aswathappa, Himalaya publications,Twelfth edition,2017

2. Organizational Behaviour, Stephen P Robheins, Pearson Education Publisher, Eighteenth

edition, 2018

3. Essentials of Management, Koontz and Weihrich, Tata McGraw Hill ,Tenth edition,2015

SEMESTER	V					
YEAR	III					
COURSE CODE	21VCXXX					
TITLE OF THE COURSE	ITL,DevOps(Testing)					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OBJECTIVES:

To enable the trainees to learn components of ITIL and their specific functions, architecture of ITIL,HPSM and OTRS Architecture, Service Design, Service transition, the SDLC models, Lean, ITIL, Agile,to design and deploy the various devops tools-Jenkins Architecture, Chef for configuration, Docker, Ansible and Maven.

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to**:**

CO No.	Outcomes
CO1	Understand the ITIL components and their functions.
CO2	Explain the stages of ITIL & Analyze the various functions.
CO3	Experiment the various Devops Tools-Chef, Puppet, Jenkins, Docker.
CO4	Apply Version Control System in software development.
CO5	Design and deploy software in cloud platform using - AWS OpsWorks.
CO6	Apply containerization concepts in software deployment.

COURSE CONTENT:

MODULE 1	**5Hrs**

Introduction to ITIL: ITIL History, components of ITIL and their specific functions , Service Management for IT Technology and architecture of ITIL, HPSM and OTRS, ITIL Service Strategy, service portfolio management and process objective, demand management process

MODULE 2	**5Hrs**

ITIL Service Lifecycle processes and functions:

Service life cycle, approach to IT service Management (IT SM),5 Stages of the ITIL-Service Strategy-financial management, service portfolio management, demand management, Strategy operations

Service Design- Service level management, capacity management, continuity management, information security management, service catalogue management, supplier management ,

Service transition – change management, asset management and configuration management, release and deployment, transition planning and support, service validation and testing, evaluation, knowledge management

Service Operations –incident management, problem management, access management, event management, request fulfilment , technical management, application management , IT operations management Continual Service Improvement – 7 step process improvement

MODULE 3	**10Hrs**

Introduction to Devops :Define Devops, What is Devops, SDLC models, Lean, ITIL, Agile, Why Devops?, History of Devops, Devops Stakeholders, Devops Goals, Important terminology, Devops perspective, Devops and Agile, Devops Tools ,GIT: Version Control- Introduction, What is Git, About Version Control System and Types, Difference between CVCS and DVCS, A short history of GIT, GIT Basics, GIT Command Line ,Git Essentials, repository, Cloning, check-in and committing, Fetch pull and remote, Branching

MODULE 4	**20Hrs**

DevOps Tools : Chef for configuration management -Overview of Chef, Workstation Setup, Organization Setup, Test Node Setup, Node Objects and Search, Environments, Roles, Attributes, Data bags

Git&Github

- Basic Concepts, Life Cycle
- What is Branches on Git?
- Performing following operations on Git,
- Distributed version-control system vs centralized version control system.
- Understanding SCM.

Nagios

What is Nagios? Why Continuous Monitoring on DevOps?

Install Nagios Core, Nagios Plugins And NRPE (Nagios Remote Plugin Executor)

Reference Books:

1.ITIL For Beginners: The Complete Beginner's Guide To ITIL , Clydebank Technology(Author), Create space Independent Publication, Second edition, 2015

2.ITIL For Beginners: The Complete Beginner's Guide To ITIL , Clydebank Technology (Author) , Kindle Edition, 2017

3.Effective DevOps: Building a Culture of Collaboration, Affinity, and Tooling at Scale , Jennifer Davis (Author) Ryn Daniels (Contributor) ,Orally publications, 1st Edition, 2016

4.Infrastructure as code:Managing Servers in the Cloud Kief Morris, Orally publications, 1st Edition, 2016

SEMESTER	V					
YEAR	III					
COURSE CODE	21VCXXX					
TITLE OF THE COURSE	Embedded Systems					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	3	-	-	-	30	2

Course Outcomes:

After studying this course, students will be able to:

CO No.	Outcomes
CO1	Describe the architectural features and instructions of 32 bit microcontroller ARM CortexM3.
CO2	Apply the knowledge gained for Programming ARM Cortex M3 for different applications.
CO3	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
CO4	Understand the hardware software co-design and firmware design approaches and the need of real time operating system for embedded system applications.

COURSE CONTENT:	
MODULE 1	**5Hrs**

Thumb-2 technology and applications of ARM, Architecture of ARM Cortex M3, Various Units in the architecture, Debugging support, General Purpose Registers, Special Registers, exceptions, interrupts, stack operation, reset sequence.

MODULE 2	**05Hrs**

Assembly basics, Instruction list and description, Thumb and ARM instructions, Special instructions, Useful instructions, CMSIS, Assembly and C language Programming (Text 1:Ch-4, Ch-10.1 to 10.6).

MODULE 3	**06 Hrs**

Embedded Vs General computing system, Classification of Embedded systems, Major applications and purpose of ES. Elements of an Embedded System (Block diagram and explanation), Differences between RISC and CISC, Harvard and Princeton, Big and Little Endian formats, Memory (ROM and RAM types), Sensors, Actuators, Optocoupler, Communication Interfaces (12C, SPI, IrDA, Bluetooth, Wi-Fi, Zigbee only)

(Text 2: All the Topics from Ch-1 and Ch-2 (Fig and explanation before 2.1) 2.1.1.6 to 2.1.1.8, 2.2 to 2.2.2.3, 2.3 to 2.3.2, 2.3.3.3, selected topics of2.4.1 and 2.4.2 only).

MODULE 4	**05 Hrs**

Characteristics and Quality Attributes of Embedded Systems, Operational and non- operational quality attributes, Embedded Systems-Application and Domain specific, Hardware Software Co Design and

Program Modeling (excluding UML), Embedded firmware design and development (excluding C language).

MODULE 5	09 Hrs

Operating Systembasics, Types of operating systems, Task, process and threads (Only POSIX Threads with an example program), Thread preemption, Preemptive Task scheduling techniques, Task Communication, Task synchronization issues - Racing and Deadlock, Concept of Binary and counting semaphores (Mutex example without any program), How to choose an RTOS, Integration and testing of Embedded hardware and firmware.

Text Books:

1. Joseph Yiu, "TheDefinitiveGuidetotheARMCortex-M3", 211d Edition, Newnes, (Elsevier), 2010.
2. Shibu K V, "Introduction to Embedded Systems", Tata McGraw Hill Education Private Limited, 2" Edition.

SEMESTER	V				
YEAR	III				
COURSE CODE	21VCXXX				
TITLE OF THE COURSE	AWS Cloud Lab				
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	8	-	-	-	80	4

COURSE OUTCOME:

After successful completion of the course, the trainee should be able to:

1. Deploy the EC2 instance and its configurations - load balancing, auto scaling.

2. Experiment the process of taking snapshot and recover the instance.

3. Demonstrate the different storage services like S3, EBS, EFS, create, store data and retrieve the same from cloud.

4. Configure the different cloud databases RDS, DynamoDB, create and configure the database, access the database from EC2 instance.

5. Implement the function as a service using Lambda, create and execute the function.

6. Demonstrate the networking concepts, create configure the different types of VPC deployment.

7. Make use of the public IP, private IP, elastic IP configurations in AWS.

8. Apply the security configurations and enhancement of resource using Identity and Access Management

9. Deploy the various AWS Software Development Kits for different software development platform.

List of Exercises	80Hrs
1. Create Your First Amazon EC2 Instance (Windows) Create a Windows EC2 instance Retrieve the Administrator password using the Keypair , Connect to a Windows instance using a Remote Desktop connection Get the EC2 instance metadata (Windows) and Terminate the EC2 instance	
2. Create Your First Amazon EC2 Instance (Linux) Creating an EC2 Instance Converting a PEM Key to a PPK Key Connecting to an Instance using SSH Getting the EC2 Instance Metadata and Terminating the EC2 Instance	
3. Create an EBS-Backed Linux AMI as public Create a basic Linux web server instance Create a snapshot of the instance Create an AMI starting from an EBS-backed instance	

Make an AMI public and launch the new instance

4.Getting Started with Amazon EC2 Auto Scaling
Create a Launch Template
Create an Auto Scaling Group
Configure Your Auto Scaling Group to Send Notifications and Test the Notification Configuration
Delete Your Scaling Infrastructure

5.Work with Elastic IP addresses
Allocate an Elastic IP address from Amazon's Pool of address
Associate the Elastic IP address to the instance
Access the instance using Elastic IP address
Disassociate and release Elastic IP address

6.Getting Started with Network Load Balancers
Choose a Load Balancer Type
Configure Your Load Balancer and Listener
Configure Your Target Group & Register Targets with Your Target Group
Create and Test Your Load Balancer & Delete Your Load Balancer

7.Create your first Cloud Storage bucket using Amazon Simple Storage Service (Amazon S3)
Creating an S3 Bucket
Uploading a File to S3
Granting Public Access to an S3 Object
Accessing the S3 object using unique url

8.Introductions to the Elastic File System
Create an EFS file system
Mount the file system in EC2 instance
Test the file system
Clean up the instance and file system

9. Hosting static website using S3 bucket
Create S3 bucket and upload the web content
Enable static web hosting for the bucket
Configure the index document for the website
Access the website using the endpoint

10.Working with AWS Backup
Open the AWS Backup console & Create an On-Demand Backup
Choose the resource for backing up – eg EC2
Choose name or ID of the resource
Initiate the backup process and verify the backup

11.Restoring the AWS Backup
Open the AWS Backup console & choose Protected resources
Select the resource ID in the resource details page
Select the Network & Role as default
Restore the backup and verify

12. Create an RDS instance in AWS
Create a database cluster using RDS with MySQL DB Engine
Setup security group rules for connecting to the RDS instance
Create an EC2 instance with a key pair & connect to a remote shell using an SSH connection
Connect to RDS using the endpoint and verify

13. Migrating a SQL server database to Amazon Aurora
Install the SQL Drivers and AWS Schema Conversion Tool on Your Local Computer

Configure Your Microsoft SQL Server Source Database and Aurora Target Database
Use AWS SCT to Convert the SQL Server Schema to Aurora MySQL and Create AWS DMS Source and Target Endpoints
Create and Run Your AWS DMS Migration Task

14 Setting up Amazon VPC with IPv4
Create the VPC & Create a Security Group
Adding inbound & outbound rules in the security group
Launch an Instance into Your VPC
Assign an Elastic IP Address to Your Instance and access the instance

15. Creating AWS IAM account and managing
Creating Your First IAM Admin User and Group and Creating Your First IAM Delegated User and Group
How Users Sign in to Your Account
Delegate Access Across AWS Accounts Using IAM Roles and Create and Attach Your First Customer Managed Policy
Enable Your Users to Configure Their Own Credentials and MFA Settings

16.Access s3 bucket from an amazon ec2 without access credentials
Create VPC & Create Key Pair
Create S3 Bucket and objects inside buckets
Create IAM Policy and Role
Connect to the instance and access the S3 bucket

17.Monitor the EC2 instance with Cloud Watch
Enable and Disable detailed monitoring
List the available CloudWatch metrics for your instances
Add stop actions to Amazon CloudWatch alarms
Add terminate actions to Amazon CloudWatch alarms

18.Managing Amazon EC2 Instances Using the AWS SDK for PHP Version 3
Describe Amazon EC2 instances using Describe Instances.
Enable detailed monitoring for a running instance using Monitor Instances and Disable monitoring for a running instance using Unmonitor Instances
Start an Amazon EBS-backed AMI that you've previously stopped, using Start Instances and Stop an Amazon EBS-backed instance using Stop Instances
Request a reboot of one or more instances using Reboot Instances.

19.Deploy a Node.js Stack Web App
Launch an Elastic Beanstalk Environment
Add Permissions to Your Environment's Instances
Deploy the Sample Application (Eg: Node.js) and access the application using the endpoint *url*
Upload the new Node.js code to the application and verify

20.AWS Tools for PowerShell
Install and configure AWS Tools for PowerShell
Create a keypair through PowerShell cmdlets
Create a Security Group through PowerShell cmdlets
Find an AMI and launch the instance through PowerShell cmdlets

SEMESTER	V					
YEAR	III					
COURSE CODE	21VCXXX					
TITLE OF THE COURSE	Cyber Security Lab					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	8	-	-	-	80	4

 COURSE OUTCOME:

After successful completion of the course, the trainee should be able to:

    1. Understand different types of attacks and how to ensure the security settings.

    2. Understand and perform Port scanning, OS scan and other types of scan to gather information of any

Demo Network.

    3. Identify different types of malware, Roles of firewall and Perform Inbound/Outbound rules.

    4. Examine Ethical hacking tool and do penetration testing.

List of Exercises	80Hrs
1. Steps to ensure Security of any one web browser (Mozilla Firefox/Google Chrome)	
2. Study of different types of vulnerabilities for hacking a websites / Web Applications.	
3Study of the features of firewall in providing network security and to set Firewall Security in windows.	
4 Perform Demo Port Scanning Using Nmap /Zen map Tool and perform Reconnaissance.	
5.Study the steps to Protect Microsoft word document of different version with different operating system and Steps to Remove passwords from Microsoft word	
6. Study "How to make strong passwords" and "passwords cracking techniques". Study the steps to hack a strong password.	
7. Hiding confidential information within image or in Audio using Steganography tools.	
8 .Practice the best ways to protect Phishing attacks.	
9. Using Burp Suite Professional evaluate the security of web-based applications.	
10Perform Google Hacking commands, to display specific results and to display Public CC Camera.	

SEMESTER	V
YEAR	III
COURSE CODE	21VCXXX
TITLE OF THE COURSE	Software Testing Lab

SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	8	-	-	-	80	4

COURSE OUTCOME:

After completion of the course, the trainee should be able to:

1. Understand how to write the manual test cases for different scenarios.

2. Understand how to apply automation test tool to validate the software project.

List of Exercises	60Hrs

Manual Testing
1. Write the Test cases for Login Page of Gmail, Facebook.

2.Write all the test cases using the appropriate testing techniques wherever applicable for the below requirement.

REQUIREMENT 1:
Here is a KSRTC application. This application is used to search KSRTC Buses for travelling different locations. The below screen will help the user to search KSRTC Buses based on Trip, Date, Time, Number of Passengers, Ladies, Service Class.
Fields:
Trip - Radio button (One Way or Round Trip)
From: Text Box is alphanumeric, This field can accept 256 characters.
The values that is available in the current database is "Bangalore, Chennai, Mumbai, Pune"
To: Text Box, This field can accept 256 characters. Text box is alpha numeric.
The values that is available in the current database is "Bangalore, Chennai, Mumbai, Pune"

REQUIREMENT 2:
Here is a KSRTC application. This application is used to search KSRTC Buses for travelling different locations. The below screen will help the user to search KSRTC Buses based on Trip, Date, Time, Number of Passengers, Ladies, Service Class.
1. Onward Date: Text is view only;
On clicking calendar Icon, Calendar will be displayed and user can select the date of travel.
Date is displayed in DD/MM/YYYY format.
Time: Dropdown.
Current values displayed in database is (9 a.m, 10a.m, 11a.m, 12p.m, 1p.m, 2p.m)
Return Date: Text is view only;
On clicking calendar Icon, Calendar will be displayed and user can select the date of travel.
Date is displayed in DD/MM/YYYY format.

REQUIREMENT 3:
Here is a KSRTC application. This application is used to search KSRTC Buses for travelling different locations. The below screen will help the user to search KSRTC Buses based on Trip, Date, Time, Number of Passengers, Ladies, Service Class.
> Time: Dropdown.

Current values displayed in database is (9 a.m, 10a.m, 11a.m, 12p.m, 1p.m, 2p.m)
> Number of Passengers: Drop down.
Current values in database is (1, 2, 3, 4)
> All Ladies Checkbox
> Service Class: Drop down.
Current values in database is (Premium, Luxury, Deluxe, Express)
> On submitting the forum by clicking "Search available services", "Search results of all the KSRTC buses based on the criteria should be displayed in "KSRTC Search Results " page along with query provided by the user.

UI screenshot
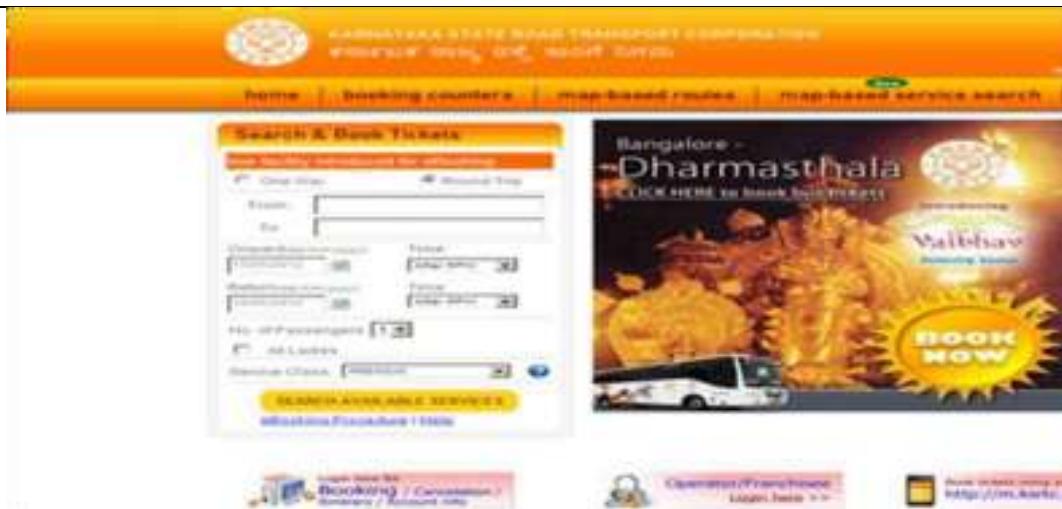
Selenium

1. Introduction to Selenium & its components.

2.Write a selenium web driver script for opening a login page of demo.actitime.com

3.Demonstrate Title check point Text Checkpoint

4.Demonstrate URL check point

5.Demonstrate element checkpoint

6.Demonstrate working with single select dropdown

7. Demonstrate working with multi select dropdown.

8.Demonstrate selecting and deselecting option from multi select dropdown

9.Demonstrate to get all the option which are there in the dropdown and print it in the console.

10.Demonstrate Synchronization

Reference:

1. Testing in 30+ Open Source Tools, Rahul Shende, Shroff Publishers & Distributor Pvt. Ltd, ISBN 13: 9789350231005 (page numbers from 15 to 117)

2. http://seleniumhq.org/

3. http://sourceforge.net/projects/sahi/

4. The art of software Testing: MyersGJ, Published by John Wiley & Sons, Inc.,Third edition,1979

SEMESTER	V					
YEAR	III					
COURSE CODE	21VCXXX					
TITLE OF THE COURSE	DevOps Lab					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	2	-	-	-	30	2

COURSE OUTCOME:

After completion of the course, the trainee should be able to:

1 .Deploy Jenkins on Windows, downloading and installing proper version.

2. Configure GitHub & Git, working on GitHub with sample experiment.

3. Demonstrate working with Software provisioning and configuration management with Ansible

4. Deploy Wordpress using Cloud Formation.

5. Build first OpsWorks stack.

6. Develop and Deploy an application with AWS CodeStar.

List of Exercises	80Hrs

1. **Hands on with GitHub & Git**

Creating new free GitHub account online.
Creating new repository and commit the codes to newly created repository
Importing the codebase from different Github account to your Github account
Understanding different operations on Github

2. **Using Chef Solo on Linux for AWS**

Configure a Chef node in AWS using Chef Solo
Write Chef cookbooks and recipes
Use Chef attributes and templates to generalize your cookbooks
Create Chef roles to define Chef node functions

3.Build your first OpsWorks stack

Build the infrastructure and automate code deployment for a PHP application with OpsWorks
Registering the Instance (Linux) in OpsWorks
Deploying Apps- Deploy test PHP application
Execute other commands – Undeploy, Rollback, Start Web Server, Stop Web Server, Restart Web Server

4.**Getting Started with Jenkins on Windows (Hyper or Oracle VM box)**

Build the server on Hyper or Oracle VM box on on premise machine
Install and configure a Jenkins server
Add plugins and create Jenkins jobs
Run Jenkins jobs and examine outputs and results

5.Software provisioning and configuration management with Ansible

Introduction to Ansible hands-on
YAML and Hands-on Exercises
Build Ansible Inventory Files and modules
Automate provisioning and web server deployment

6 **Linux Command Line Byte Session** Understand what the Linux command line Directory Manipulations commands Use common commands for working with files and directories Installing Software in Linux CLI Sending E-mails
7.Create AWS Resources with Terraform Install Terraform on Linux Configure Terraform providers Create AWS resources with Terraform
8.Deploy Word press using Cloud Formation Create your first cloud infrastructure using Amazon Cloud Formation Use CloudFormation to launch an EC2 (Linux) instance Create the Stack and choose template for launching instance Perform Wordpress full installation in the instance
9 Develop and Deploy an Application with AWS CodeStar Create AWS CodeStar projects Monitor project activity Develop and deploy code using AWS CodeStar Manage teams inside of AWS CodeStar projects
10.Use AWS Fargate for Serverless Deployment of Container Applications Use application source files to create Docker container images and place them in Amazon ECR Create an Amazon ECS cluster Use the Amazon ECR images to create ECS task definitions and services Implement the services in ECS by using AWS Fargate enjoying the advantages of serverless Register ECS tasks with an Application Load Balancer (ALB) target group

SEMESTER	V					
YEAR	III					
COURSE CODE	21VCXXX					
TITLE OF THE COURSE	DBA Lab					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	3	-	-	-	60	2

COURSE OUTCOME:

After completion of the course, the trainee should be able to:

     1. Explain installation and configuration of SQL Server.

     2. Set up the database in SQL Server.

     3. Explain how to manage security in SQL Server.

     4. List different backup and recovery methods.

     5. Observe the use of automation using SQL Agent.

     6. Discuss database Maintenance and query tuning.

List of Exercises	80Hrs

1. .Introduction

2. Installation of SQL Server 2012

  2.1 Lab Exercise : Step by Step Installation guide for SQL Server 2012

3.SQL Server Management Studio (SSMS)

  3.1 Lab Exercise - Exploring the SSMS

  3.2 Lab Exercise - SSMS Configurations, Tips and Issues

4. Architecture

  4.1 SQL Server QUERY TREE Viewer (optional demo)

  4.2 Lab Exercise: Viewing a QUERY PLAN

5.Setting up DB

  5.1 Lab Exercises to CREATE, ALTER AND DELETE User Databases

6.Security Management

  6.1 Demo : Security Components

  6.2 Lab Exercise : Create Login, User, assign Permission

  6.3 SQL Server Data Encryption

  6.4 Lab Exercise : Row Level Security (RLS)

7.Backup and Recovery

  7.1 Lab Exercise: Types of recovery models

  7.2 Understanding SQL Server Backup Types

  7.3 Backup Commands T-SQL Recap

  7.4 Create backup using SQL Server Management Studio SSMS

  7.5 SQL Server Restore Options and Commands Tutorial

8.SQL Server Agent

  8.1 Demo of Jobs and Schedules

  8.2 Analyzing Problems with SQL Server Agents

9.Project 1 : Security

10.DB Maintenance

  10.1 Lab Exercise : Maintenance Plan Wizard - Backup Schedule

  10.2 Lab Exercise: Page Level Restore for a Corrupted database using DBCC

11.Performance Tuning

SEMESTER	VI					
YEAR	III					
COURSE CODE	21VCXXX					
TITLE OF THE COURSE	MACHINE LEARNING					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	4	-	-	-	80	4

COURSE OBJECTIVES:

1.　　To enable the trainees to learn the cloud computing fundamentals and various cloud web services provided by Amazon Web Services

2.　　To explore the cloud computing platform using the real world cloud services

3.　　To gain knowledge about IT infrastructure maintenance in cloud platform

4.　　To design, deploy and various cloud resources.

COURSE OUTCOMES:

CO No.	Outcomes	
CO1	Describe the basic concepts and different types of Machine Learning.	L2
CO2	Explore and analyse the mathematics behind Machine Learning algorithms.	L2
CO3	Apply the design principles and concepts of Machine Learning Algorithms.	L3
CO4	Apply effectively Unsupervised Machine Learning algorithms and various learning techniques for appropriate applications.	L3
CO5	Explore, analyse and validate the different Machine Learning algorithms.	L3

COURSE CONTENT:

MODULE 1	4 Hrs

Well posed learning problems, Designing a Learning system. Introduction to AI, Machine learning and Deep learning with applications. Types of learning: supervised, unsupervised and reinforcement learning. Perspective and Issues in Machine Learning. Classical paradigm of solving learning problems, The learning problems--classes and types of learning, fundamental of statistical learning and its framework. Introduction to feature representation and extraction.

MODULE 2	10 Hrs

Introduction to Statics Probability (joint probability, conditional probability, Bayes theorem, different distributions, univariate and multivariate Gaussian distribution, PDF, MLE, Motivation, estimating hypothesis accuracy, Basics of sampling theorem, General approach for deriving confidence intervals, Difference in error of two hypothesis, Comparing learning algorithms.

MODULE 3	10 Hrs

Introduction to Supervised Learning, Introduction to Perceptron model and its adaptive learning algorithms (gradient Decent and Stochastic Gradient Decent), Introduction to classification,

Naive Bayes classification Binary and multi class Classification, decision trees and random forest, Regression (methods of function estimation) --Linear regression and Non-linear regression, logistic regression, Introduction To Kernel Based Methods of machine learning: K-Nearest neighbourhood , kernel functions, SVM, Introduction to ensemble based learning methods.	
MODULE 4	**10Hrs**
Introduction to Unsupervised Learning, Clustering (hard and soft clustering) Hierarchal clustering: K-means, Fuzzy C-Means (FCM) algorithm, Gaussian mixture models (GMM), Expectation Maximization algorithm, feature Engineering in Machine Learning, Dimensionality reduction, Linear Discriminant Analysis and Principle Component Analysis.	
MODULE 5	**6Hrs**
Machine Learning model validation - Confusion Matrix, Accuracy, Precision, F score, Cost function, Machine Learning Optimization algorithms: Gradient descent, stochastic GD. Regularization: Normalization and Standardization overfitting, underfitting, optimal fit, bias, variance, cross-validation.	

TEXT BOOKS:

1. Thomas M. Mitchell, Machine Learning, McGraw- Hill, Inc. New York, ISBN: 0070428077 9780070428072.

2. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville. "Deep learning." An MIT Press book in preparation. (2015).

SEMESTER	VI					
YEAR	III					
COURSE CODE	21VCXXX					
TITLE OF THE COURSE	PROJECT WORK					
SCHEME OF INSTRUCTION	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Project Hours (J)	Total Hours	Credits
	13	-	-	-	560	26

DAYANANDA SAGAR UNIVERSITY

Shavige Malleshwara Hills, Kumaraswamy Layout,
Bengaluru - 560078, Karnataka.

SCHOOL OF ENGINEERING

CODE OF CONDUCT

Code of Conduct
in
Dayananda Sagar University

Short title, extent and commencement	**1**			i	These Guidelines shall be called "Guidelines for Maintaining Discipline in DSU - 2020"
				ii	They shall come into force from the above date of their approval by the Executive Council;
				iii	These Guidelines shall be read in conjunction with the Act, Statutes, Regulations Governing Academic and Research Programmes and other notifications of the University;
				iv	These Guidelines shall be applicable to the students admitted to DSU from the academic year 2020-21 onwards.
Definitions	**2**				In these Guidelines, unless the context otherwise requires:
				i	"Act" means The Dayananda Sagar University Act, 2012 (Karnataka Act No. 20 of 2013);
				ii	"Board of Governors", "Executive Council", "Academic Council", and "Finance Council", means respectively the Board of Governors, Executive Council, Academic Council, and Finance Council, of the University;
				iii	"Campus" means a campus established and maintained by the University;
				iv	"CGPA", "SGPA" means respectively Cumulative Grade Point Average and Semester Grade Point Average;
				v	"Chancellor", "Pro Chancellor", "Vice-Chancellor", "Registrar", "Controller of Examinations", "Dean", and "Departmental Chairperson" mean respectively the Chancellor, Pro Chancellor, Vice-Chancellor, Registrar, Controller of Examinations, Dean, and Departmental Chairperson of the University;
				vi	"ISA" and "ESA" mean respectively the In-Semester Assessment, and End-Semester Assessment of the University;
				vii	"Committees" means the committees formed by the various authorities and officers of the University;
				viii	"Convocation" means the convocation of the University, where Degrees, Honorary Degrees, Diplomas, Academic Distinctions, and Certificates are awarded as per requirements of the University;
				ix	"Course" means a plan of study on a particular subject in a programme.
				x	"Credit" means credit earned by a student after a successful completion of a credited course;

			xi	"Degree" means a degree awarded by the University with or without Specialization and/or Minor;
			xii	"Examination Hall" means both the hall where theory examinations are conducted or the laboratory or workshop where practical examinations are conducted;
			xiii	"Government" means the Government of Karnataka;
			xiv	"Notification" means the notification of the University;
			xv	"Prescribed" means prescribed by the rules made by the University under the Act, Statutes, Regulations, and Notifications;
			xvi	"Programme" or "Programme of study" means a higher education programme pursued for a degree awarded by the University as specified under Section-22(3) of the UGC Act;
			xvii	"Regulations" means the Regulations of the University, notified by the Executive Council;
			xviii	"Statutes" means the Statutes of DSU University, notified by the Board of Governors;
			xix	"Student" means a person admitted to and pursuing a specified Programme of study in the University;
			xx	"Teacher", "Course Instructor" means respectively a faculty appointed for imparting instruction and research guidance to students in the University and the Teacher instructing a course;
			xxi	"University" means the DSU, Bangalore, established and incorporated under the Dayananda Sagar University Act, 2012.
Student Discipline Committee	3	3.1		A Student Discipline Committee shall be constituted by the Vice-Chancellor with the following framework:
			i	Registrar – Chairperson;
			ii	Dean of one of the Faculties by rotation – Member;
			iii	ONE Departmental Chairperson by rotation – Member-Secretary;
			iv	TWO senior Teachers nominated by the Vice-Chancellor, of whom at least one shall be a woman – Members;
			v	TWO students nominated by the Vice-Chancellor, of whom at least one shall be a woman – Invited Members.
		3.1.1		The Vice-Chancellor may invite additional members to the Committee as deemed fit.
		3.2		The Student Discipline Committee shall:
			i	Consider matters concerning discipline among the students;

		ii	Inquire into acts of indiscipline or misconduct by students whenever such cases are referred to the Committee, and submit its recommendations to the Vice-Chancellor;
		iii	Take preventive and precautionary steps such as conducting awareness and sensitization campaigns, and issue of notices, warnings, and instructions, for the purpose of abating occurrences of individual or collective indiscipline;
		iv	Liaison with law and order authorities, concerned departments of the Government, and neighbouring institutions regarding maintenance of law and order in the University; and
		v	Perform any other related functions assigned by Vice-Chancellor.
Anti-Ragging Committee	**4**	4.1		The Vice-Chancellor shall constitute an Anti-Ragging Committee comprising of:
			i	Nominee of Vice-Chancellor – Member-Secretary;
			ii	All Deans of Faculty –Members;
			iii	Concerned Departmental Chairperson – Invitee;
			iv	Registrar – Chairperson;
			v	TWO Teachers nominated by the Vice-Chancellor of whom at least one shall be a woman.
		4.1.1		The Vice-Chancellor may invite additional members to the Committee as deemed fit.
		4.2		The Anti-Ragging Committee shall inquire and report their findings and recommendations, if any, to the Vice-Chancellor. The decision of the Vice-Chancellor in such matters shall be final and binding.
Anti-Sexual Harassment Committee	**5**	5.1		The Vice-Chancellor shall constitute an Anti-Sexual Harassment Committee comprising of:
			i	Nominee of Vice-Chancellor – Member-Secretary;
			ii	All Deans of Faculty – Members;
			iii	Concerned Departmental Chairperson – Invitee;
			iv	Registrar – Chairperson;
			v	TWO Teachers nominated by the Vice-Chancellor of whom at least one shall be a woman.
		5.2		The Vice-Chancellor may invite additional members to the Committee as prescribed by legal stipulations and as deemed fit.

				The Anti-Sexual Harassment Committee shall inquire and report their findings and recommendations, if any, to the Vice-Chancellor. The decision of the Vice-Chancellor in such matters shall be finaland binding.
Grievance Redressal Cell	**6**	**6.1**		The Vice-Chancellor shall constitute a Grievance Redressal Cell comprising of:
			i	Nominee of Vice-Chancellor – Member-Secretary;
			ii	ONE Dean of Faculty nominated by the Vice-Chancellor – Member;
			iii	Concerned Departmental Chairperson – Invitee;
			iv	Registrar – Chairperson; and
			v	TWO Teachers nominated by the Vice-Chancellor of whom at least one shall be a woman.
		6.2		The Grievance Redressal Cell shall inquire, resolve wherever possible and report their findings and recommendations, if any, to the Vice-Chancellor. The decision of the Vice-Chancellor in such matters shall be final and binding.
Discipline	**7**	**7.1**		Every student shall maintain discipline and decorous behavior both inside and outside the Campus and not indulge in any activity that may bring down the reputation of the University.
		7.2		Every student shall respect and extend courtesy to the staff and other students of the University.
		7.3		Any violation of the code of conduct or breach of any rule or regulation of the University by the student shall constitute an act of indiscipline and is liable for disciplinary action.
		7.4		The following shall constitute acts of gross indiscipline and students indulging in any of them shall be liable to disciplinary action:
			i	Disobeying the staff and displaying misdemeanor within the University premises;
			ii	Indulging in Vandalism / violence and damaging University and / or Public property or property of fellow students;
			iii	Quarrelling, fighting and passing derogatory remarks in the University premises against its staff and others on the University campus.
			iv	Possession and use of fire-arms, weapons and potentially dangerous instruments
			v	Consumption and sale of drugs/alcohol/intoxicants
			vi	Indulging in ragging, which is strictly prohibited as per Supreme Court ruling;
			vii	Any other act which the Disciplinary Committee may determine to be undesirable;

Punctuality	8			Students shall compulsorily attend classes from day one. Those who cannot attend the class on the first day for any valid reason shall take prior permission with a letter signed by the parent supporting the reason. No fax/phone calls are accepted regarding the same. Late comers will be penalized as per the prevailing norms. Students shall be allowed to attend the classes only if they submit the Declaration Form duly signed by the parent during the first hour of class on the opening day. However, permitted late-comers may submit the declaration form to respective Departmental Chairperson upon return. Every student shall enter their classes in time and maintain punctuality for class sessions, laboratories and workshops. The class teachers have the right to deny admission to latecomers.
Mobile Phones	9			The University has banned the use or possession of mobile phones inside the campus. In case of violations, the mobile phones will be confiscated and sent to the University Office. Students are also not permitted to carry music players, cameras or any other electronic gadgets except laptop computers, non-programmable calculators and permitted digital tablets.
Wearing and Display of ID Cards	10			It is mandatory for all students to preserve the ID card issued and to wear/display them throughout their presence inside the campus. Students without ID card will not be allowed to attend the classes.
Dress Code and Appearance	11			Both for boys and girls: Student should wear attire which is befitting a student of professional course. Any other dress that may be considered less than decent is not allowed.
Decorum	12			Students everywhere in the campus - including the classrooms, hostels, library, laboratories, workshops and canteen, and also outside the campus during industrial visits and educational tours shall maintain decorum befitting the University's reputation.
University Transport	13			Students may contact Accounts Section of the University office for availing the University bus facility. Follow queue system while boarding and alighting the bus. Respect the driver and conductor and wish as well as thank them. Start occupying the seats from the last row and last seat. Avoid reserving seats for others. Allow the next student getting in to sit next to you. Avoid rushing and pushing others. Students must use only the designated bus and bus stop assigned to them. Bus drivers are authorized to maintain control of students in the bus and report misbehavior, if any, to the authorities.

Parking and Speeding	14			Only 2-wheeler parking is available in the Campus for students. Secure a parking slot for your vehicle at the earliest as spaces are allotted on first-come-first-served basis. Speed limit is 15 kmph within the campus. Penalty on violators includes deflation of vehicle tyres. For repeat offenders, vehicle seizure and monetary penalty may be imposed. Students are encouraged to utilize University or public transport facility.
Social Networking	15			Abusing of computer-based social networking options is prohibited. Students should exercise responsibility in the usage of computer based social networking activities.
Disciplinary Action	16	16.1		Any incidence of indiscipline or misconduct related to an examination shall be referred to the Examinations Malpractice Review Committee by the Controller of Examinations. The Examinations Malpractice Review Committee shall hold an inquiry and recommend the disciplinary action, if any, to the Vice-Chancellor as per the prevailing guidelines. All other incidences of academic indiscipline shall be referred to the Student Discipline Committee by the Registrar. The Student Discipline Committee shall inquire into the incident and recommend suitable disciplinary action, if any, to the Vice-Chancellor as per the prevailing guidelines. The parents of the concerned students shall also be informed.
		16.2		Faculty / staff concerned who have witnessed the act of indiscipline / misconduct/ breach of code of conduct shall independently issue an Infraction Slip to erring students and mark on the infraction slip the action taken / recommended. A blank copy of the infraction slip with the list of charges is shown in Annexure 1. This infraction slip issued by the faculty will be different from the one that are issued by the hostel authorities. The actions can be taken separately or combined, left to the discretion of the University authorities. The disciplinary rules, code of conduct of the University / hostel may be updated on a need basis and the prevailing set of guidelines shall apply at the time of an incident. The actions beyond verbal warning, written warning and reprimand as recorded by the faculty in the infraction slip shall be finally decided and imposed by the Disciplinary Committee.
				Commensurate with the gravity of the offence, the action will be taken or punishment will be given by the University authorities. In all matters of disciplinary action, the decision taken by the Vice-Chancellor shall be final. A "Conduct Register" maintained by each department, shall have all the details of Infraction Slips recorded in the folio of the particular student.
		16.3		Some of the actions that the Disciplinary Committee can take include:

				"Disciplined for Bad Conduct", if any, will be stamped / printed on the back of his Final Semester Grade Card, Degree
			ii	The Disciplinary Committee reserves the right to withhold the issue of Grade Cards, certificates till the resolution of any infraction incidence.
			iii	As per the order of Honorable Supreme Court of India, ragging inany form is considered as a criminal and culpable offence and is banned in all forms, inside & out of the campus. Any form of raggingwill be severely dealt with through an inquiry committee and the action may include:
				a) University authorities exercising the right to emboss the final marks card, Degree Certificate that he/ she indulged in ragging.
				b) Summary expulsion from the University
Undertaking to be signed by a student	17			At the time of admission, every student jointly with one of his/her parents or an authorized local guardian, shall sign in person an undertaking, in the prescribed format, to maintain conduct and discipline as well as not to indulge in or abet ragging or sexual harassment.
Acts of Indiscipline and Misconduct	18			Acts of indiscipline or misconduct include:
			i	Academic indiscipline;
			ii	Ragging;
			iii	Sexual harassment; and
			iv	Other acts of indiscipline or misconduct.
Academic Indiscipline	19	19.1		Students shall maintain academic integrity at all times. The broad categories of academic indiscipline are:
			i	Plagiarism;
			ii	Cheating; and
			iii	Conflict of interest.
		19.2		*Plagiarism*: Use of material, ideas, figures, code or data without appropriate acknowledgement or permission of the original source shall be treated as cases of plagiarism. Submission of material, verbatim or paraphrased, that is authored by another person or published earlier by oneself shall also be considered as cases of plagiarism. Examples of plagiarism include:
			i	Reproducing, in whole or part, text/sentences from a report, book, thesis, publication or the internet;

				ii	Reproducing one's own previously published data, illustrations, figures, images, or someone else's data, etc.;
				iii	Taking material from class-notes or downloading material from internet sites, and incorporating it in one's class reports, presentations, manuscripts or thesis without citing the original source;
				iv	Self-plagiarism which constitutes copying verbatim from one's own earlier published work in a journal or conference proceedings without appropriate citations.
			19.3		*Cheating*: Any of the following acts shall be considered as cheating:
				i	Copying during tests, quizzes, examinations, and copying of homework assignments, term papers or manuscripts;
				ii	Allowing or facilitating copying, or writing a report or examination for someone else;
				iii	Using unauthorized material, copying, collaborating when not authorized, and purchasing or borrowing papers or material from various sources; and
				iv	Fabricating (making up) or falsifying (manipulating) data and reporting them in reports and publications.
			19.4		*Conflict of Interest*: A conflict of interest may arise from any clash of personal or private interests with academic and professionalactivities such as learning, research, publication, work on projects and internships. A student shall disclose in writing any potential conflicts of interests to the concerned Dean immediately after coming to know of the conflict. The Dean may constitute a committee to inquire on a case to case basis and give its recommendation to the Vice-Chancellor.
Ragging	**20**		20.1		All forms of ragging are prohibited. Any individual or collective act or practice of ragging shall constitute an act of gross indiscipline and shall be dealt with under the provisions of national regulatory bodies and judiciary.
			20.2		Ragging, for the purposes of these regulations, shall ordinarily mean any act, conduct or practice by which the dominant power or status of senior students is brought to bear upon the students who are in any way considered junior or inferior by the former and includes individual or collective acts or practices which:
				i	Involve physical assault or threat to use physical force;
				i	Violate the status, dignity and honour of students, in particular female students;
				iii	Expose students to ridicule or contempt or commit an act which may lower their self-esteem; and

				iv	Entail verbal abuse, mental torture, aggression, harassment, trauma, indecent gesture and obscene behavior.
		20.3			Handling of Incidences of Ragging:
				i	The Vice-Chancellor shall make arrangements for a sensitization programme among students, staff, parents, and other stakeholders on the ill effects of ragging to serve as a preventive mechanism.
				ii	The Vice-Chancellor shall constitute an Anti-Ragging Squad to serve as a deterrent to acts of ragging.
				iii	Any incidence, either inside or outside the Campus, of ragging, as defined in legal parlance, may be reported by anyone to the Anti-Ragging Committee.
				iv	Depending on the nature and gravity of the guilt established by the Anti-Ragging Committee, the Vice-Chancellor may impose, to those found guilty, punishments such as:
					a. Cancellation of admission;
					b. Rustication from the University;
					c. Withholding/withdrawing scholarship/ fellowship and other benefits;
					d. Debarring from appearing in any test/examination or other evaluation process;
					e. Imposing a fine; and
					f. When the persons or a group of students committing or abetting the crime of ragging are not identifiable, the University shall resort to collective punishment as a deterrent to potential offenders.
				v	The Registrar / Dean of Faculty, as the case may be, shall take immediate action on the receipt of any information that ragging has taken place or is likely to take place.
				vi	The Vice Chancellor / Registrar / Dean of Faculty, as the case may be, may take help of local police or other law enforcing authorities for immediate action.
				vii	The Chairperson of Anti-Ragging Committee or any other Officer of the University may *suo motu* inquire into any incident of ragging or likelihood of such incident and make a report in writing to the Vice-Chancellor clearly pinpointing, among other details, the identity of the student or the students who were involved in the incident and the nature of the incident.
				viii	The Chairperson of Anti-Ragging Committee or any other Officer of the University, as the case may be, may also submit an interimreport to the Vice-Chancellor establishing the identity of the perpetrators of ragging and the nature of the incident.

Sexual Harassment	**21**	**21.1**		Students shall conduct themselves in a manner that provides a safe working environment for women. Sexual harassment of any kind is unacceptable and shall attract disciplinary action.
		21.2		Acts of sexual harassment shall be as defined in legal parlance.
		21.3		Handling of Incidents of Sexual Harassment:
			a	The Vice-Chancellor shall make arrangements for a sensitization programme among students, staff, parents, and other stakeholders on the ill effects of Sexual Harassment to serve as a preventive mechanism.
			b	Any incidence, either inside or outside the Campus, of Sexual Harassment, as defined in legal parlance, may be reported by anyone to the Anti-Sexual Harassment Committee.
			C	Depending on the nature and gravity of the guilt established by the Anti-Sexual Harassment Committee, the Vice-Chancellor may impose, to those found guilty, punishments such as:
			i	Cancellation of admission;
			ii	Rustication from the University;
			iii	Withholding/withdrawing scholarship/ fellowship and other benefits;
			iv	Debarring from appearing in any test/examination or other evaluation process;
			v	Imposing a fine; and
			vi	When the persons or a group of students committing or abetting the crime of Sexual Harassment are not identifiable, the University shall resort to collective punishment as a deterrent to potential offenders.
Other Acts of Indiscipline or Misconduct	**22**	**22.1**		Without prejudice to the generality of the power to maintain and enforce discipline, the following actions shall amount to acts of indiscipline or misconduct on the part of a student of the University:
			i	physical assault or threat to use physical force against any teaching or non-teaching staff or student of the University or any individual of the society;
			ii	carrying of, use of or threat to use, any weapon;
			iii	indulging in or instigating any kind of gambling / betting activities;
			iv	misbehaving or cruelty towards any teaching or non-teaching staff or student of the University or any individual of the society;
			v	use of banned drugs, intoxicants, alcohol, and tobacco products;
			vi	any violation of the provisions of the Civil Rights Protection Act, 1976;
			vii	indulging in or encouraging violence or any conduct which involves

					moral turpitude;
				viii	violation of the status, dignity and honour of a student belonging to scheduled caste or scheduled tribe;
				ix	creating / circulating bad information / rumors / gossip on social media, websites, blogs, internet, sms and other e-communications, against any teaching or non-teaching staff or student of the University or any individual of the Society;
				x	discrimination against any teaching or non-teaching staff or student of the University or any individual of the society on grounds ofcaste, creed, language, place of origin, social and cultural background;
				xi	practicing casteism and untouchability in any form or inciting any other person to do so;
				xii	any act, whether verbal or otherwise, derogatory to women;
				xiii	any form of bribing or corruption;
				xiv	willful destruction of the property of the University or public property;
				xv	behaving in a rowdy, intemperate or disorderly manner in the premises of the University or outside the campus or encouraging or inciting any other person to do so;
				xvi	creating discord, ill-will or intolerance among the students on sectarian or communal grounds or inciting any other student to do so;
				xvii	causing any kind of disruption of the academic functioning of the University;
				xviii	giving information / misrepresentation of the University to any external agency including press or media without the consent of the University;
			22.2		The University may amend or add to the list of acts of indiscipline and misconduct on the part of a student of the University.
					Handling of Other acts of indiscipline or misconduct:
				i	Any Other act of indiscipline by one or more students shall be dealt with by the concerned Dean of Faculty.
			22.3	ii	A serious act of indiscipline by one or more students shall be referred by the concerned Dean of Faculty to the Student Discipline Committee for necessary action. The Committee shall inquire into the charges and give the concerned student an opportunity to explain himself/herself. After the hearing, the Committee shall recommend to the Vice-Chancellor suitable action if the charges are substantiated.

Penalties for Breach of Discipline and Conduct	**23**	**23.1**			Without prejudice to the generality of the powers relating to the maintenance of discipline and taking such action in the interest of maintaining discipline as deemed appropriate, the Vice-Chancellor / Registrar / Deans of Faculties may in the exercise of the vested powers aforesaid, order or direct that any student:
			i		be expelled from the University, in which case the student shall not be re-admitted to the University;
			ii		be, for a stated period, suspended in which case the student shall not be admitted to the University till the expiry of the period of suspension;
			iii		be imposed with fine of a specified amount of money;
			iv		be debarred from appearing in a University examination or examinations for one or more terms / years; and
			v		be reported to the local state law and order authority.
		23.2			The Vice-Chancellor, in exercise of powers aforesaid or on the recommendations of the Registrar / Deans of Faculties, may also order or direct that the result of the student concerned of the examination or examinations at which he has appeared, be cancelled.
		23.3			Mass absence shall be deemed as an act of indiscipline. The concerned Teachers are not obligated to cover the lessons planned for the missed classes.
		23.4			A student shall be required to withdraw from the programme and leave the University on the following additional grounds:
Conditions for Termination from the Programme	**24**	**24.1**	**i**		Absence from classes for more than SIX weeks at a time in a semester without leave of absence being granted by the concerned Dean of Faculty; and
			ii		Failure to meet the standards of discipline as prescribed by the University from time to time.
Grievance Redressal Cell	**25**				A student may approach the Grievance Redressal Cell to seek redressal for any grievance including any penalty imposed on the student. The Grievance Redressal Cell shall:
			i		Create awareness among students about the existence of Grievance Redressal Cell (GRC);
			ii		Encourage the students to express their grievances freely and frankly, without any fear of being victimized;
			iii		Inquire into the grievance issue and initiate the process of redressal; and

		iv	Forward recommendation(s) to the concerned authority on the basis of its findings.
Cancellation of Studentship of University Employees	26			Employees of the University may be eligible to enroll as part-time students of the University. The studentship of such an employee shall be cancelled if he/she ceases to be an employee of the University as a consequence of disciplinary action.
Rules of Residence in Campus and Off-Campus Housing	27	27.1		The University shall provide housing facilities for students to the extent possible. Such housing may be both on and off campus and shall be separate for male and female students. The following rules encompass eligibility, allotment, boarding, lodging and allied facilities, maintenance and discipline. The University shall strive to provide safe, economical and holistic living environment in its housing facility that is conducive to academic pursuits.
Eligibility	28	28.1		The hostel accommodation shall be available only for a regular student for the minimum duration of programme of study.
		28.2		Preference shall be given to students having good academic standing.
		28.3		Preference shall be given to students hailing from rural and far off places.
Allotment	29	29.1		Each student desirous of seeking admission to the hostel shall submit an application in the prescribed form to the Warden after admission in the University along with proof of admission. The student shall appear before the hostel committee in person along with the parents / local guardian and the original documents.
		29.2		The admission to the hostel shall be granted on a first-come-first-served basis.
		29.3		On admission to the hostel, the parents shall fill the prescribed forms, pay prescribed fees, nominate the local guardian and authorized visitors to be allowed to the hostel.
		29.4		The student shall occupy the allotted room and shall not change the room or shift the furniture in / out of the room without the written permission of the Warden.
		29.5		Renewal of stay in the hostel for the subsequent years is not automatic and is based on the students' discipline, behaviour and attendance. Students staying in hostel are expected to have 100% attendance in all classes. However if a student's attendance falls below the academic mandatory requirement of 85%, he /she will become ineligible for hostel accommodation for the remaining period of study.

		29.6		The hostel fees and mess charges shall be specified from time to time. In case of non-payment of the same within the scheduled time, the student is liable to be asked to vacate the hostel.
		29.7		All students leaving / rejoining the hostel shall enter their names in the dining out / dining in register.
Hostel Maintenance	**30**	**30.1**		The residents of the hostel shall be responsible for the safe-keeping of their personal belongings.
		30.2		The students shall be responsible for the care and maintenance of the furniture, furnishing, and fixtures and any damage to hostel property shall be made good by the concerned student(s).
		30.3		General upkeep of the hostel and mess buildings, facilities and equipment shall be the collective responsibility of all resident students and they shall be required to make good any damage, if the students who caused the damage could not be identified.
Hostel Discipline	**31**	**31.1**		Every student staying in the hostel, at all times, shall maintain highest standard of discipline and conduct befitting the status of a student of higher learning.
		31.2		Students shall be duty bound to report to the Warden in case they notice any unwanted incidents or undesirable activity in the hostel or on the campus.
		31.3		No student shall cause disturbance to fellow students in their studies.
		31.4		Students shall not arrange any function, celebration or meeting within the hostel or outside or within the Campus without specific permission of the Warden / concerned Authorities.
		31.5		Students shall not arrange any picnic outside without specific permission of the Warden / Authorities concerned.
		31.6		Students shall be collectively responsible for the hostel environment including allotted room in which they live in by keeping it clean, healthy and presentable.
		31.7		The residents shall not use any electrical appliances other than those provided or specifically permitted by the Warden in writing.
		31.8		The use of electronic equipment which may cause inconvenience to other occupants shall not be allowed.
		31.9		The permission to use computer / lap top / tablets / smart phones shall be only for legitimate purposes. If any misuse / abuse of the same is observed, the permission to use such equipment shall be withdrawn.
		31.1		When the students go out of their room they shall switch off all the

				electrical / electronic appliances, and keep the room locked at all times. Violation shall attract suitable penalty and punishment as decided by the Authorities.
		31.1		The students shall not screen pirated / unauthorized / unlicensed movies in their computers / laptops and common rooms. Any violation shall be dealt severely. Punishment for the same shall be decided by the concerned Authorities.
		31.1		The students shall not put up any posters / pictures on the walls, doors, windows and shelves or otherwise disfigure them.
		31.1		The students are prohibited to possess firearms, weapons or potentially dangerous instruments. Defaulters shall be dealt with seriously including rustication.
		31.1		Consumption of narcotic drugs / alcohol / intoxicants and smoking are strictly prohibited in the hostel premises. Defaulters shall be referred to the Student Disciplinary Committee and be severely dealt with including expulsion.
		31.2		The students indulging in vandalism/ violence within the hostel premises shall be severely dealt with including expulsion.
		31.2		Students shall not participate in any political, anti-national, anti-social or undesirable activity in or outside the campus.
		31.2		All students are required to give daily attendance at the time fixed and declared by the Warden from time to time. The students missing the attendance are liable for disciplinary action. Students shall produce the identity card as and when demanded by any authorized staff.
		31.2		Hostel students shall obtain written permission in advance for proceeding on outstation leave.
		31.2		No visitors shall be allowed to be entertained inside the rooms. The visitors / guests may, however, be entertained in the visitors' area only.
		31.2		The visit of a person of other gender is restricted to common areas such as dining hall, common room and lounge.
		31.2		No student is allowed to have guests staying in the room allotted to the student without the written permission of the Warden.
		31.2		No student is allowed to cook meals in his / her hostel room. Meals shall not be served in the room except in case of sickness.
		31.2		The consumption of food delivered to the hostel by outside agencies shall not be entertained.

		31.2		Students shall not carry mess cookery / cutlery / glassware to their rooms. Defaulters will be severely dealt with.
Miscellaneous	**32**	**32.1**		On all matters, which are not explicitly mentioned above, the decision of the Vice-Chancellor shall be final and binding on all concerned.
		32.2		Notwithstanding the foregoing, the Vice-Chancellor shall have the powers to make additional guidelines and regulations for the residents from time to time and to get the hostel vacated without assigning any reasons.
Protection of Action Taken in Good Faith	**33**			No suit or other legal proceedings shall lie against any Officer or other employee of the University for anything, which is done in good faith or intended to be done in pursuance of the provisions of the Act, the Statutes, or these Regulations.
Interpretation	**34**			Any question as to the interpretation of these Guidelines shall be decided by the Chancellor, whose decision shall be final and binding. The Executive Council shall have the power to issue clarifications to remove any doubt, difficulty or anomaly which may arise during implementation of the provisions of these Guidelines.
Removal of Difficulties	**35**			If any difficulty arises in giving effect to the provisions of these Guidelines, the Executive Council may, by a notification or by order, make such provisions, which are not inconsistent with the provisions of the Act, Statutes, as appear to it to be necessary or expedient, for removing the difficulty.
Power to Amend these Guidelines	**36**			The Executive Council may make new or additional Guidelines or amend or repeal these Guidelines as prescribed under Section-38 of the Act.

DSU COLLEGE CODES:

K-CET Code (B.Tech)	E240	Comed-K Code (B.Tech.)	E182
PGCET Code (M.Tech.)	T970	PGCET Code (MBA)	B365MB
PGCET Code (MCA)	C520MC		

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