V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Reaccredited with 'A++' Grade (4th Cycle) by NAAC
VIRUDHUNAGAR

Quality Education with Wisdom and Values

OUTCOME BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM REGULATIONS AND SYLLABUS
(with effect from Academic Year 2024 – 2025)

V.V.Vanniaperumal College for Women, Virudhunagar, established in 1962, offers 13 UG Programmes (Aided), 15 UG Programmes (SF), 15 PG Programmes and 6 Ph.D. Programmes. The curricula for all these Programmes, except Ph.D. Programmes, have been framed as per the guidelines given by the and University Grants Commission (UGC)& Tamil Nadu State Council for Higher Education (TANSCHE) under Choice Based Credit System (CBCS) and the guidelines for Outcome Based Education (OBE).

The Departments of Commerce, English, History, Mathematics, Biochemistry and Tamil upgraded as Research Centres offer Ph.D. Programmes as per the norms and regulations of Madurai Kamaraj University, Madurai and do not come under the purview of CBCS.

A. CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS provides an opportunity for the students to choose courses from the prescribed Courses. The CBCS is followed as per the guidelines formulated by the UGC. The performance of students is evaluated based on the uniform grading system. Computation of the Cumulative Grade Point Average (CGPA) is made to ensure uniformity in evaluation system.

List of Programmes in which CBCS/Elective Course System is implemented

UG PROGRAMMES

Arts & Humanities	:	History (E.M. & T.M.), English, Tamil
Physical & Life Sciences	:	Mathematics, Zoology, Chemistry, Physics, Biochemistry, Home Science - Nutrition and Dietetics, Costume Design and Fashion, Microbiology, Biotechnology, Computer Science, Information Technology, Data Science, Computer Applications and Computer Applications - Graphic Design
Commerce & Management	:	Commerce, Commerce (Computer Applications), Commerce (Professional Accounting), Business Administration

PG PROGRAMMES

Arts & Humanities	:	History, English, Tamil
Physical & Life Sciences	:	Mathematics, Physics, Chemistry, Zoology, Biochemistry, Home Science - Nutrition and Dietetics, Biotechnology, Computer Science, Computer Science (Data Science) and Computer Applications (MCA) *
Commerce & Management	:	Commerce, Business Administration (MBA) *

* AICTE approved Programmes

OUTLINE OF CHOICE BASED CREDIT SYSTEM- PG
1. Core Courses
2. Elective Courses
   - Discipline Specific Elective Courses (DSEC)
   - Generic Elective Courses
   - Non-Major Elective Course (NMEC)
3. Skill Enhancement Courses
4. Self Study Course (Online)
5. Extension Activity
6. Extra Credit Courses (Optional)

List of Non Major Elective Courses (NME)
(2024-2025 onwards)

PG PROGRAMMES

Name of the Course	Course Code	Department
Introduction to Epigraphy	24PHIN21	History
Functional English	24PENN21	English
தமிழ் இலக்கிய வரலாறு	24PTAN21	Tamil
Taxation Concepts and Assessment	24PCON21	Commerce
Entrepreneurship Development	24PBAN21	Business Administration
Mathematics for Life Sciences	24PMTN21	Mathematics
Solid Waste Management	24PPHN21	Physics
Chemistry in Everyday Life	24PCHN21	Chemistry
Food Preservation	24PHSN21	Home Science - Nutrition and Dietetics
Nutritional Biochemistry	24PBCN21	Biochemistry
Tissue engineering	24PBON21	Biotechnology
Web Programming	24PCSN21	Computer Science
Fundamentals of Web Design	24PCAN21	Computer Applications

B. OUTCOME BASED EDUCATION (OBE) FRAMEWORK

The core philosophy of Outcome Based Education rests in employing a student - centric learning approach to measure the performance of students based on a set of pre-determined outcomes. The significant advantage of OBE is that it enables a revamp of the curriculum based on the learning outcomes, upgrade of academic resources, quality enhancement in research and integration of technology in the teaching-learning process. It also helps in bringing clarity among students as to what is expected of them after completion of the Programme in general and the Course in particular. The OBE directs the teachers to channelise their teaching methodologies and evaluation strategies to attain the Programme Educational Objectives (PEOs) and fulfill the Vision and Mission of the Institution.

Vision of the Institution

The founding vision of the Institution is to impart Quality Education to the rural womenfolk and to empower them with knowledge and leadership quality.

Mission of the Institution

The mission of the Institution is to impart liberal education committed to quality and excellence. Its quest is to mould learners into globally competent individuals instilling in them life-oriented skills, personal integrity, leadership qualities and service mindedness

B.1 Programme Educational Objectives, Programme Outcomes and Programme Specific Outcomes

It is imperative for the Institution to set the Programme Educational Objectives (PEOs), Programme Outcomes (POs) and Course Outcomes (COs), consistent with its Vision and Mission statements. The PEOs and the POs should be driven by the Mission of the Institution and should provide distinctive paths to achieve the stated goals. The PEOs for each Programme have to fulfill the Vision and Mission of the Department offering the Programme.

Vision of the Department of Computer Science (SF)

To promote academic excellence by inculcating the quest for continuous learning, intensive research thereby making students' professionally competent graduates and responsible citizens to outreach wider community.

Mission of the Department of Computer Science (SF)

➢ To offer an in depth knowledge of the subject.

➢ To groom the graduates with good attitude, team work and personality skills

➢ To promote original inquiry and innovations.

➢ To co-ordinate knowledge, skills and attitude towards successful career.

➢ To impart moral, ethical and social responsibilities to students

B.1.1 Programme Educational Objectives (PEOs)

PEOs are broad statements that describe the career and professional achievements that the Programme is preparing the graduates to achieve within the first few years after graduation. PEOs are framed for each Programme and should be consistent with the Mission of the Institution.

Programme Educational Objectives (PEOs) of M.Sc. COMPUTER SCIENCE Programme The Students will be able to

PEO1 - utilize the gained knowledge and adapt current emerging technologies throughindependent thinking in the rapid changing world.

PEO2 - enhance the technocrats as successful computer professionals, researchers orentrepreneurs with global competence.

PEO3 - acquire professional integrity, moral ethics and become responsible forsustainable development of society and industrial needs through research outcomes.

Key Components of Mission Statement	Programme Educational Objectives		
	PEO1	**PEO2**	**PEO3**
in-depth Knowledge	√	√	-
good attitude, team work and personality skills	-	√	√
promote inquiry and innovation	-	√	√
knowledge, skills and attitude	√	√	√
moral ethical and social responsibility	-	-	√

B.1.2 Programme Outcomes (POs)

POs shall be based on Graduate Attributes (GAs) of the Programme. The GAs are the attributes expected of a graduate from a Programme in terms of knowledge, skills, attitude and values. The Graduate Attributes include Disciplinary Knowledge,

Communication Skills, Critical Thinking, Problem Solving, Analytical Reasoning, Research Related Skills, Co-operation/Team Work, Scientific Reasoning, Reflective Thinking, Information/Digital Literacy, Multicultural Competence, Moral and Ethical Awareness/Reasoning, Leadership Qualities and Lifelong Learning.

On successful completion of the Programme, the students will be able to

1 apply their in-depth domain knowledge and practical skills in interdisciplinary fields for research-based endeavours, employment and entrepreneurship development. (*Disciplinary Knowledge)*

2 communicate proficiently and confidently with the ability to present complex ideas both in spoken and written forms in a concise manner to assorted groups. (*Communication Skills*)

3 identify, formulate and solve problems in a consistent and systematic way with updated skills using modern tools and techniques. (*Scientific Reasoning and Problem Solving*)

4 analyze the data, synthesis the findings and provide valid conclusion by critical evaluation of theories, policies and practices for the fulfillment of the local, national, regional and global developmental needs. (*Critical Thinking and Analytical Reasoning*)

5 explore and evaluate globally competent research methodologies to apply appropriately in interdisciplinary research; Develop and sustain the research capabilities to meet the emerging needs for the welfare of the society. (*Research Related Skills*)

6 use ICT to mould themselves for lifelong learning activities to face career challenges in the changing environment. (*Digital Literacy, Self - directed and Lifelong Learning*)

7 self-manage and function efficiently as a member or a leader in diverse teams in a multicultural society for nation building. (*Co-operation/Team Work and Multicultural Competence*)

8 uphold the imbibed ethical and moral values in personal, professional and social life for sustainable environment. (*Moral and Ethical Awareness*)

B.1.3 Programme Specific Outcomes (PSOs)

Based on the Programme Outcomes, Programme Specific Outcomes are framed for each PG Programme**.** Programme Specific Outcomes denote what the students would be able to do at the time of graduation. They are Programme-specific and it is mandatory that each PO should be mapped to the respective PSO.

On Successful completion of M.Sc. Computer Science Programme, the students will be able to

PO 1: *Disciplinary Knowledge*

PSO 1.a: explore in depth knowledge in diverse areas of Computer Science and advanced programming skills to carry research.

PSO 1.b: adapt to new computing technologies with broad range of programming languages and open source platforms for attaining professional excellence and entrepreneurial skill.

PO2: *Communication Skills*

PSO 2: effectively communicate the concepts and ideas of new emerging technologies in computer science through effective reports, documentation and clear presentations.

PO3: *Scientific Reasoning and Problem Solving*

PSO 3: apply the attained knowledge in computer science for problem solving and in developing new application software.

PO4: *Critical thinking and Analytical Reasoning*

PSO 4: integrate the acquired knowledge with social concern and responsibility to become an efficient entrepreneur and member of the workforce to improve the standard of living in society.

PO5: *Research Related Skills*

PSO 5: enhance technical skills to promote interdisciplinary research in various domains of computer science to fulfill the needs of the society.

PO6: *Digital Literacy, Self - directed and Lifelong learning*

PSO 6a: use online collaboration tools like google classroom, youtube channel, slide share and MOOC platform to negotiate content to enhance their learning behaviour through green environment.

PSO 6b: adapt to new technologies and constantly upgrade their technical skills with an attitude towards independent and lifelong learning to become successful in computer industry.

PO7: *Cooperation/Team Work and Multicultural Competence*

      PSO 7: implement and evaluate the software projects as a member in a team by utilizing modern software tools.

PO8: *Moral and Ethical awareness*

      PSO 8: promote ethical values and make them professionally responsible with the ability to relate computer applications to broader social context for the growth of the nation.

PO-PEO Mapping Matrix

      Attainment of PEOs can be measured by a PO-PEO matrix. PEOs should evolve through constant feedback from alumnae, students, industry, management, *etc*. It is mandatory that each PEO should be mapped to at least one of the Pos.

PEOs POs/PSOs	PEO1	PEO2	PEO3
PO1/PSO1	✓	✓	✓
PO2/PSO2	✓	✓	✓
PO3/PSO3	✓	✓	✓
PO4/PSO4	✓	✓	-
PO5/PSO5	-	✓	✓
PO6/PSO6	✓	✓	✓
PO7/PSO7	✓	✓	✓
PO8/PSO8	✓	✓	-

B.1.4 Course Outcomes (COs)

      Course Outcomes are narrow statements restricted to the course contents given in five units. Course Outcomes describe what students would be capable of, after learning the contents of the Course. They reflect the level of knowledge gained, skills acquired and attributes developed by the students after learning of Course contents. COs are measurable, attainable and manageable in number. COs contribute to attain POs in such a way that each CO addresses at least one of the POs and also each PO is reasonably addressed by adequate number of COs.
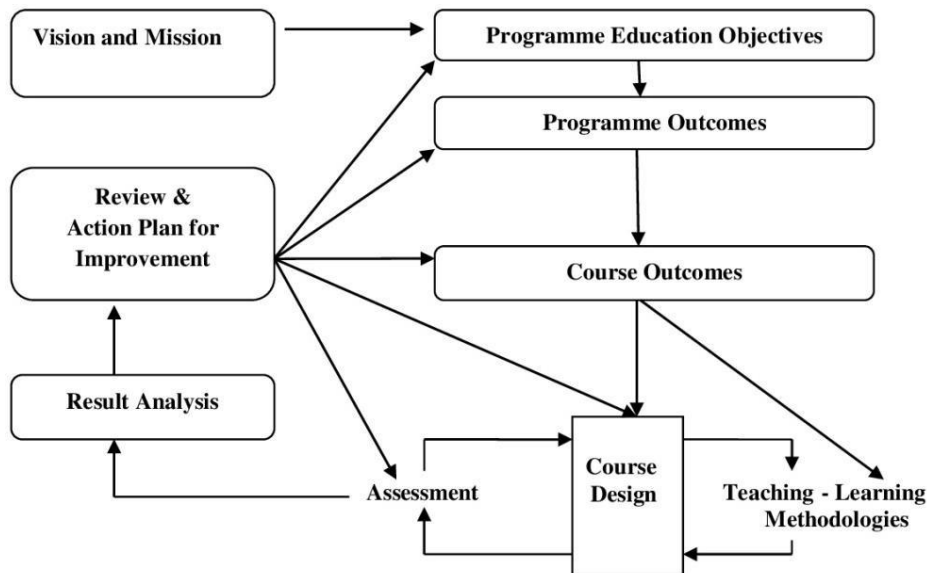
It is important to determine the methods of assessment. A comprehensive assessment strategy may be outlined using the revised Bloom's Taxonomy levels.

BLOOM'S TAXONOMY
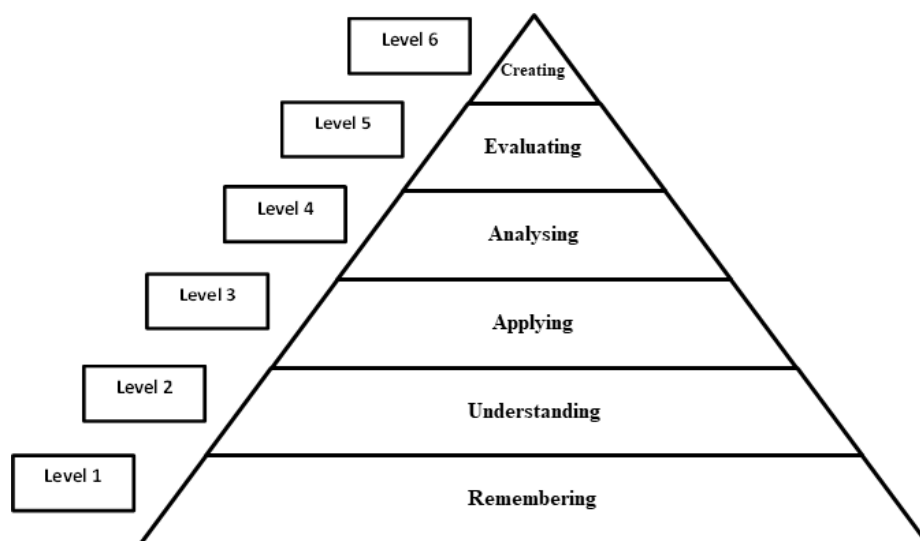
CO - PO Mapping of Courses

After framing the CO statements, the COs framed for each course is mapped with POs based on the relationship that exists between them. The COs which are not related to any of the POs is indicated with (-), signifying Nil. Measurement Mapping is based on Four Points Scale [High (H), Medium (M), Low (L) and Nil (-)]. For calculating weighted percentage of contribution of each Course in the attainment of the respective POs, the weights assigned for H, M and L are 3, 2 and 1 respectively.

CO-PO/PSO Mapping Table (Course Articulation Matrix)

PO/PSOs COs	PO1/ PSO 1	PO2/ PSO 2	PO3/ PSO 3	PO4/ PSO 4	PO5/ PSO 5	PO6/ PSO 6	PO7/ PSO 7	PO8/ PSO 8
CO1								
CO2								
CO3								
CO4								
CO5								

ELIGIBILITY FOR ADMISSION

Candidate for admission to the M.Sc. (Computer Science) Course (Full Time) should posses a Bachelors Degree of this University or as an Examination accepted as equivalent there to, with a minimum aggregate of 45% marks in Part III subjects other than languages and mathematics subject as ancillary.

DURATION OF THE PROGRAMME

The candidates shall undergo the prescribed Programme of study for a period of two academic years (four semesters).

MEDIUM OF INSTRUCTION

English

B.2 EVALUATION SCHEME

Components	Internal Assessment Marks	External Examination Marks	Total Marks
Theory	25	75	**100**

B.2.1   Core Courses, Elective Courses (Discipline Specific Elective Courses, Generic Elective Courses & Non Major Elective Courses

---

INTERNAL ASSESSMENT
Distribution of Marks
Theory

Mode of Evaluation		Marks
Periodic Test	:	20
Assignment	:	5
Total	**:**	**25**

Three Periodic Tests - Average of the best two will be considered

Two Assignments   - Better of the two will be considered

Practical

Mode of Evaluation		Marks
Periodic Test	:	30
Record Performance	:	10
Total	**:**	**40**

Periodic Test   - Average of the best two will be considered

Performance   - Attendance and Record

Question Pattern for Periodic Test   **Duration: 2 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 5	Multiple Choice Questions	5	5	1	5
B	6-9	Internal Choice – Either… or Type	4	4	5	20
C	10 - 11	Internal Choice – Either…. or Type	2	2	10	20
					Total	**45***

*The total marks obtained in the Periodic Test will be calculated for 20 marks

Summative Examination

External Assessment

Distribution of Marks

Mode of Evaluation		Marks
Summative Examination	**:**	60
Seminar Presentation	**:**	15
Total	**:**	**75**

Summative Examination

Question Pattern   **Duration: 3 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 5	Multiple Choice Questions	5	5	1	5
B	6 - 10	Internal Choice - Either ….or Type	5	5	5	25
C	11 - 13	Internal Choice - Either …or Type	3	3	10	30
					Total	**60**

B.2.2 Project

Individual Project is compulsory for II PG Students in IV Semester.

Distribution of Marks

Mode of Evaluation		Marks
Internal Assessment	:	40
External Examination	:	60
Total	**:**	**100**

Internal Assessment: Pre-submission Presentation   - 10 Marks

Review Report   - 20 Marks

One Open Online Course related to the Project   - 10 Marks

External Examination: Project Report   - 40 Marks

Viva Voce   - 20 Marks

B. 2.3 SKILL ENHANCEMENT COURSES
INTERNAL ASSESSMENT
Distribution of Marks

Theory

Mode of Evaluation		Marks
Periodic Test	:	20
Assignment	:	5
Total	**:**	**25**

Three Periodic Tests - Average of the best two will be considered

Two Assignments   - Better of the two will be considered

Practical

Mode of Evaluation		Marks
Periodic Test	:	30
Record Performance	:	10
Total	**:**	**40**

Periodic Test   - Average of the best two will be considered

Performance   - Attendance and Record

Question Pattern for Periodic Test   **Duration: 2 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 4	Internal Choice – Either… or Type	4	4	5	20
B	5	Internal Choice – Either… or Type	1	1	10	10
					Total	**30***

*The total marks obtained in the Periodic Test will be calculated for 20 marks

Summative Examination

External Assessment

Distribution of Marks

Mode of Evaluation		Marks
Seminar Paper		10
Seminar Presentation	:	15
Summative Examination	:	50
Total	**:**	**75**

Summative Examination

Question Pattern   **Duration: 3 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 5	Multiple Choice Questions	5	5	1	5
B	6 - 10	Internal Choice - Either ….or Type	5	5	5	25
C	11 - 12	Internal Choice - Either …or Type	2	2	10	20
					Total	**50**

B.2.3.1. Skill Enhancement Course - Professional Competency Skill
Types of Question – Multiple Choice Questions – Only

71   *19th Academic Council Meeting 14.08.2024*

INTERNAL ASSESSMENT
Distribution of Marks
Theory

Mode of Evaluation		Marks
Periodic Test	:	20
Assignment	:	5
Total	**:**	**25**

Three Periodic Tests - Average of the best two will be considered
Two Assignments   - Better of the two will be considered

Question Pattern for Periodic Test   **Duration: 2 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 5	Multiple Choice Questions	5	5	1	5
B	6-9	Internal Choice – Either… or Type	4	4	5	20
C	10 - 11	Internal Choice – Either…. or Type	2	2	10	20
			Total			**45***

*The total marks obtained in the Periodic Test will be calculated for 20 marks

Summative Examination
External Assessment
Distribution of Marks

Mode of Evaluation		Marks
Summative Examination	:	60
Seminar Presentation	:	15
Total	**:**	**75**

Summative Examination
Question Pattern   **Duration: 3 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 5	Fill in & Sentence Form	5	5	1	5
B	6 - 10	Internal Choice - Either ….or Type	5	5	5	25
C	11 - 13	Internal Choice - Either …or Type	3	3	10	30
					Total	**60**

B.2.4. Self Study - Online Course
Practice for SET/NET-General Paper -Online

Internal Examination only

- Two Periodic Tests (Online) with Multiple Choice Questions will be conducted in III Semester.

- Model Examination will be conducted after two periodic tests.

Distribution of Marks

Mode of Evaluation		Marks
Periodic Test	:	25
Model Examination	:	75
Total	**:**	**100**

Two Periodic Tests   - Better of the two will be considered

B.2.5. Extension Activities
Assessment by Internal Examiner only

Distribution of Marks

Mode of Evaluation		Marks
Attendance	:	5
Performance	:	10
Report	:	10
Total	**:**	**25***

*The marks obtained will be calculated for 100 marks

B.2.6. EXTRA CREDIT COURSES (OPTIONAL)

2.6.1 Extra Credit Course offered by the Department.
Assessment by Internal Examiner Only (To be conducted along with the III Periodic Test)

Distribution of Marks

Mode of Evaluation		Marks
Quiz (Multiple Choice Questions)	:	25
Model Examination	:	75
Total	**:**	**100**

Question Pattern for Model Examination

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q.No.(1-5)	Internal Choice-Either or Type	5	5	7	35
B Q.No.(6-9)	Internal Choice-Either or Type	4	4	10	40
				Total	**75**

2.6.2 Extra credit Course offered by MOOC (Massive Open Online Course)

➢ The Courses shall be completed within the first III Semesters of the Programme.

➢ The allotment of credits is as follows **(Maximum of 15 credits)**

4 weeks Course	- 1 credit
8 weeks Course	- 2 credits
12 weeks Course	- 3 credits

ELIGIBILITY FOR THE DEGREE

- The candidate will not be eligible for the Degree without completing the prescribed Courses of study and a minimum of 50% Pass marks in all the Courses.

    ➢ No Pass minimum for Internal Assessment for other Courses.

    ➢ Pass minimum for External Examination is 27 marks out of 60 marks for Core Courses, Discipline Specific Elective Courses and Non-Major Elective Course.

    ➢ Pass minimum for Practice for SET/NET - General Paper is 50 Marks.

  - Attendance

    ➢ The students who have attended the classes for 76 days (85%) and above are permitted to appear for the Summative Examinations without any condition.

    ➢ The students who have only 60-75days (66% -84%) of attendance are permitted to appear for the Summative Examinations after paying the required fine amountand fulfilling other conditions according to the respective cases.

    ➢ The students who have attended the classes for 59 days and less – upto 45 days (50% - 65%) can appear for the Summative Examinations only after getting special permission from the Principal.

    ➢ The students who have attended the classes for 44 days or less (<50%) cannot appear for the Summative Examinations and have to repeat the whole semester.

    ➢ These rules are applicable to UG, PG and M.Phil. Programmes and come into effect from 2020-2021 onwards.

    ➢ For Certificate, Diploma, Advanced Diploma and Post Graduate Diploma Programmes, the students require 75% of attendance to appear for the Theory/Practical Examinations.

B.3 ASSESSMENT MANAGEMENT PLAN

An Assessment Management Plan that details the assessment strategy both at the Programme and the Course levels is prepared. The continuous assessment is implemented using an assessment rubric to interpret and grade students.

B.3.1 Assessment Process for CO Attainment

Assessment is one or more processes carried out by the institution that identify, collect and prepare data to evaluate the achievement of Course Outcomes and Programme Outcomes. Course Outcome is evaluated based on the performance of

students in the Continuous Internal Assessments and in End Semester Examination of a course. Target levels of attainment shall be fixed by the Course teacher and Heads of the respective departments.

Direct Assessment (Rubric based) - Conventional assessment tools such as Term Test, Assignment, Quiz and End Semester Summative Examination are used.

Indirect Assessment - Done through Course Exit Survey.

CO Assessment Rubrics

For the evaluation and assessment of COs and POs, rubrics are used. Internal assessment contributes 40% and End Semester assessment contributes 60% to the total attainment of a CO for the theory courses. For the practical courses, internal assessment contributes 50% and Semester assessment contributes 50% to the total attainment of a CO. Once the Course Outcome is measured, the PO can be measured using a CO-PO matrix.

CO Attainment

Direct CO Attainment

Course Outcomes of all courses are assessed and the CO - wise marks obtained by all the students are recorded for all the assessment tools. The respective CO attainment level is evaluated based on set attainment rubrics.

Target Setting for Assessment Method

For setting up the target of internal assessment tools, 55% of the maximum mark is fixed as target. For setting up the target of End Semester Examination, the average mark of the class shall be set as target.

Formula for Attainment for each CO

Attainment = Percentage of students who have scored more than the target marks

$$\text{Percentage of Attainment} = \frac{\text{Number of Students who Scored more than the Target}}{\text{Total Number of Students}} \times 100$$

Attainment Levels of COs

Assessment Methods	Attainment Levels	
Internal Assessment	Level 1	50% of students scoring more than set target marks in Internal Assessment tools
	Level 2	55% of students scoring more than set target marks in Internal Assessment tools
	Level 3	60% of students scoring more than set target marks in internal Assessment tools
End Semester Summative Examination	Level 1	50% of students scoring more than average marks in End Semester Summative Examination
	Level 2	55% of students scoring more than average marks in End Semester Summative Examination
	Level 3	60% of students scoring more than average marks in End Semester Summative Examination

Indirect CO Attainment

At the end of each Course, an exit survey is conducted to collect the opinion of the students on attainment of Course Outcomes. A questionnaire is designed to reflect the views of the students about the Course Outcomes.

Overall CO Attainment=75% of Direct CO Attainment + 25 % of Indirect CO Attainment

In each Course, the level of attainment of each CO is compared with the predefined targets. If the target is not reached, the Course teacher takes necessary steps for the improvement to reach the target.

For continuous improvement, if the target is reached, the Course teacher can set the target as a value greater than the CO attainment of the previous year.

B.3.2 Assessment Process for Overall PO Attainment

With the help of CO - PO mapping, the PO attainment is calculated. PO assessment is done by giving 75% weightage to direct assessment and 25% weightage to indirect assessment. Direct assessment is based on CO attainment, where 75% weightage is given to attainment through End Semester Examination and 25 % weightage is given to attainment through Internal assessments. Indirect assessment is done through Graduate Exit Survey and participation of students in Co-curricular/Extra-curricular activities.

PO Assessment Tools

Mode of Assessment	Assessment Tool	Description
Direct Attainment (Weightage -75%)	CO Assessment	This is computed from the calculated CO Attainment value for each Course.
Indirect Attainment (Weightage - 25%)	Graduate Exit Survey 10%	At the end of the Programme, Graduate Exit Survey is collected from the graduates and it gives the opinion of the graduates on attainment of Programme Outcomes.
	Co-curricular / Extra-curricular activities 15%	For participation in Co-curricular/Extra-curricular activities during the period of their study.

Programme Articulation Matrix (PAM)

Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
Average Direct PO Attainment									
Direct PO Attainment in percentage									

Indirect Attainment of POs for all Courses

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
Graduate Exit Survey								
Indirect PO Attainment								

Attainments of POs for all Courses

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
Direct Attainment(Weightage - 75%)								
Indirect Attainment(Weightage - 25%)								
Overall PO Attainment								

Overall PO Attainment= 75% of Direct PO Attainment +
25% of Indirect PO Attainment (Graduate Exit Survey
& Participation in Co- curricular and
Extra-curricular Activities)

Expected Level of Attainment for each of the Programme Outcomes

POs	Level of Attainment
Attainment Value ≥70%	Excellent
60% ≤ Attainment Value < 70%	Very Good
50% ≤ Attainment Value < 60%	Good
40% ≤ Attainment Value < 50%	Satisfactory
Attainment Value <40%	Not Satisfactory

Level of PO Attainment

Graduation Batch	Overall PO Attainment (in percentage)	Whether Expected Level of PO is Achieved? (Yes/No)

B.3.3 Assessment Process for PEOs

The curriculum is designed so that all the courses contribute to the achievement of PEOs. The attainment of PEOs is measured after 3 years of completion of the Programme only through Indirect methods.

Target for PEO Attainment

Assessment Criteria	Target (UG)	Target (PG)
Record of Employment	15% of the class strength	30 % of the class strength
Progression to Higher Education	50% of the class strength	5 % of the class strength
Record of Entrepreneurship	2 % of the class strength	5 % of the class strength

Attainment of PEOs

Assessment Criteria & Tool	Weightage
Record of Employment	10
Progression to Higher Education	20
Record of Entrepreneurship	10
Feedback from Alumnae	30
Feedback from Parents	10
Feedback from Employers	20
Total Attainment	**100**

$$\text{Percentage of PEO Attainment from Employment} = \frac{\text{Number of Students who have got Employment}}{\text{Target}} \times 100$$

$$\text{Percentage of PEO Attainment from Higher Education} = \frac{\text{Number of Students who pursue Higher Education}}{\text{Target}} \times 100$$

$$\text{Percentage of PEO Attainment from Entrepreneurship} = \frac{\text{Number of Students who have become Entrepreneurs}}{\text{Target}} \times 100$$

Expected Level of Attainment for each of the Programme Educational Objectives

POs	Level of Attainment
Attainment Value ≥70%	Excellent
60% ≤ Attainment Value < 70%	Very Good
50% ≤ Attainment Value < 60%	Good
40% ≤ Attainment Value < 50%	Satisfactory
Attainment Value <40%	Not Satisfactory

Level of PEO Attainment

Graduation Batch	Overall PEO Attainment (in percentage)	Whether Expected Level of PEO is Achieved? (Yes/No)

C. PROCESS OF REDEFINING THE PROGRMME EDUCATIONAL OBJECTIVES

The college has always been involving the key stakeholders in collecting information and suggestions with regard to curriculum development and curriculum revision. Based on the information collected, the objectives of the Programme are defined, refined and are inscribed in the form of PEOs. The level of attainment of PEOs defined earlier will be analysed and will identify the need for redefining PEOs. Based on identified changes in terms of curriculum, regulations and PEOs, the administrative system like Board of Studies, Academic Council and Governing Body may recommend appropriate actions. As per the Outcome Based Education Framework implemented from the Academic Year 2020 - 2021, the following are the Programme Structure, the Programme Contents and the Course Contents of M.Sc. Computer Science Programme.

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Re-accredited with 'A++' Grade (4th Cycle) by NAAC

VIRUDHUNAGAR

Quality Education with Wisdom and Values

MASTER OF COMPUTER SCIENCE (7016)
Outcome Based Education with Choice Base Credit System
Programme Structure - Allotment of Hours and Credits
For those who join in the Academic Year 2024-2025

Components	Semester				Total Number of Hours (Credits)
	I	**II**	**III**	**IV**	
Core Course	6 (5)	6 (5)	6 (5)	6 (5)	24 (20)
Core Course	6 (5)	6 (5)	6 (5)	6 (5)	24 (20)
Core Course	-	-	6 (5)	-	6 (5)
Core Course Practical	6 (4)	6 (4)	6 (4)	-	18 (12)
Project	-	-	-	6 (5)	6(5)
Elective Course (DSEC)	6 (3)	4 (3)	3 (3)	-	13 (9)
Elective Course (Generic)	6 (3)	4 (3)	-	-	10 (6)
Elective Course(NME)	-	4 (2)	3 (2)	-	7 (4)
Elective Course- (Industry / Entrepreneurship) 20% Theory 80 % Practical	-	-		6 (3)	6 (3)
Skill Enhancement Course/ Professional Competency Skill	-	-	-	6 (3)	6 (3)
Self Study Course	-	-	0 (1)	-	0 (1)
Internship/Industrial Activity	-	-	0 (2)	-	0 (2)
Extension Activity	-	-	-	0 (1)	0 (1)
Total	**30 (20)**	**30 (22)**	**30 (27)**	**30 (22)**	**120 (91)**
Extra Credit Course(Optional) - Offered by the Department	**-**	**-**	0(2)	-	0(2)
Extra Credit Course(Optional) - MOOC	-	-	-	-	Limited to a maximum of 15 credits

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A++' Grade (4th Cycle) by NAAC

VIRUDHUNAGAR

Quality Education with Wisdom and Values

M.Sc. COMPUTER SCIENCE -7016

PROGRAMME CONTENT

For those who join in the Academic Year 2024- 2025

SEMESTER I

S.No.	Components	Title of the Course	Course Code	Hours per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1	Core Course 1	Analysis & Design of Algorithms	24PCSC11	6	5	3	25	75	100
2	Core Course 2	Object oriented analysis and Design & C++	24PCSC12	6	5	3	25	75	100
3	Core Course -3 Practical 1	Algorithm and OOPS Practical	24PCSC11P	6	4	3	40	60	100
4	Elective Course -1 (DSEC)	Python Programming Practical	24PCSE11P	6	4	3	40	60	100
5	Elective Course -2 (Generic)	Mathematical Foundations	24PCSE12	6	4	3	25	75	100
			Total	**30**	**22**				**500**

SEMESTER II

S.No.	Components	Title of the Course	Course Code	Hours per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1	Core Course -4	Data Mining and Warehousing	24PCSC21	6	5	3	25	75	100
2	Core Course -5	Advanced Operating Systems	24PCSC22	6	5	3	25	75	100
3	Core Course -6 Practical 2	Data Mining Practical using R	24PCSC21P	6	4	3	40	60	100
4	Elective Course -3 (DSEC)	Multimedia Practical	24PCSE21P	4	3	3	40	60	100
5	Elective Course -4 (Generic)	Optimization Techniques	24PCSE22	4	3	3	25	75	100
6	Elective Course-5 (NME)	Web Programming	24PCSN21	4	2	3	25	75	100
			Total	30	22				600

DSEC **-** Discipline Specific Elective Course

SEMESTER III

S.No.	Components	Title of the Course	Course Code	Hours per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1	Core Course -7	Advanced Java Programming	24PCSC31	6	5	3	25	75	100
2	Core Course- 8	Artificial Intelligent & Machine Learning	24PCSC32	6	5	3	25	75	100
3	Core Course- 9	Cloud Computing	24PCSC33	6	5	3	25	75	100
4	Core Course -10 Practical 5	Advanced Java Programming Practical	24PCSC31P	6	4	3	40	60	100
5	Elective Course -6 (DSEC)	Web Services/ Robotic Process Automation for Business	24PCSE31/ 24PCSE32	3	3	3	25	75	100
6	Elective Course -7 (NME)	Python Programming	24PCSN31	3	2	3	25	75	100
7.	Self study Course	Practice for SET/ NET – General Paper- Online	24PGOL31	-	1	2	100	-	100
8		Internship	24PCSI31	-	2	-	100	-	100
			Total	**30**	**27**				**800**

S.No.	Components	Title of the Course	Course Code	Hours per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
9	Extra Credit Course	Embedded Systems	24PCSO31	-	2	3	100	-	100

SEMESTER IV

S.No.	Components	Title of the Course	Course Code	Hours per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1	Core Course -11 Practical 6	Web Application Development & Hosting Practical	24PCSC41P	6	4	3	40	60	100
2	Core Course -12 Practical 7	Data Science & Analytics Practical	24PCSC42P	6	4	3	40	60	100
3	Project	Project Work and Viva-Voce	24PCSC41PR	6	5	-	40	60	100
4	Elective Course -8 (Industry)	Machine Learning	24PCSE41	6	3	3	25	75	100
5	SEC/Professional Competency Skill	Computer Science for Competitive Exam	24PCSS41	6	3	3	25	75	100
6	Extension Activity			-	1	-	100	-	100
			Total	**30**	**20**				**600**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A++' Grade (4th Cycle) by NAAC

VIRUDHUNAGAR

Quality Education with Wisdom and Values

M.Sc. COMPUTER SCIENCE
(gor those who join in 2024 -2025)

Semester I		Hours/Week: 6	
Core Course -1	**ANALYSIS & DESIGN OF ALGORITHMS**	Credits: 5	
Course Code		Internal	External
24PCSC11		25	75

COURSE OUTCOMES

On completion of the course, the learners will be able to

CO1: describe elementary data structures, algorithms and its complexity. [K2]

CO2: apply appropriate data structures considering its complexity, greedy methods, branch & bound and backtracking. [K3]

CO3: demonstrate traversal techniques, searching & sorting algorithms using divide & conquer and dynamic programming. [K3]

CO4: analyze asymptotic performance of elementary data structures, greedy, backtracking and branch & bound algorithms. [K4]

CO5: examine methods of binary trees, graph traversal, searching techniques, divide & conquer and dynamic programming. [K4]

UNIT I

Introduction: What is an Algorithm? – Algorithm Specification – Space Complexity – Time Complexity- Asymptotic Notations. **Elementary Data Structures:** Stacks and Queues – Binary Tree - Binary Search Tree - Heaps – Heap sort- Graph.   (18 Hours)

UNIT II

Basic Traversal and Search Techniques: Techniques for Binary Trees – Techniques for Graphs. **Divide and Conquer:** General Method – Binary Search – Merge Sort – Quick Sort.   (18 Hours)

UNIT III

The Greedy Method: The General Method – Knapsack Problem – Minimum Cost Spanning Tree – Single Source Shortest Path. (18 Hours)

UNIT IV

Dynamic Programming: The General Method – Multistage Graphs – All Pair Shortest Path – Optimal Binary Search Trees – 0/1 Knapsack – The Traveling Salesman Problem – Flow Shop Scheduling. (18 Hours)

UNIT V

Backtracking: The General Method – 8-Queens Problem – Sum of Subsets – Graph Coloring– Hamiltonian Cycles. **Branch And Bound:** The Method – Traveling Salesperson.

(18 Hours)

SELF STUDY
UNIT I: Elementary Data Structure: Stacks

TEXT BOOK

Ellis Horowitz.(2001). *Computer Algorithms*, Galgotia Publications, 2nd Edition.

UNIT	CHAPTER	SECTIONS
I	1	1.1 – 1.2, 1.3.1 - 1.3.3
	2	2.1, 2.2.2, 2.3.1, 2.4, 2.6
II	6	6.1 - 6.2
	3	3.1 - 3.2, 3.4 - 3.5
III	4	4.1 - 4.2, 4.5, 4.8
IV	5	5.1 - 5.3, 5.5, 5.7, 5.9, 5.10
V	7	7.1 - 7.5
	8	8.1, 8.3

REFERENCE BOOKS

1. Goodrich. (2003). *Data Structures & Algorithms in Java*, Wiley, 3rd Edition.

2. Skiena. (2008). *The Algorithm Design Manual*, Springer, 2nd Edition.

3. Anany Levith. (2003). *Introduction to the Design and Analysis of Algorithm*, Pearson Education Asia, 2nd Edition.

4. Robert Sedgewick, Phillipe Flajolet. (2003). *An Introduction to the Analysis of Algorithms*, Addison-Wesley Publishing Company, 2nd Edition.

WEB RESOURCES

1. https://nptel.ac.in/courses/106/106/106106131/
2. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
3. https://www.javatpoint.com/daa-tutorial

Course Code 24PCSC11	PO1		PO2	PO3	PO4	PO5	PO6		PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6.a	PSO 6.b	PSO 7	PSO 8
CO1	2	2	1	1	1	1	1	1	-	2
CO2	3	2	2	1	2	1	2	1	-	1
CO3	3	2	2	1	2	1	2	2	-	1
CO4	3	2	2	1	2	1	2	2	-	1
CO5	3	2	2	1	2	2	2	2	-	1

Strong (3)   Medium (2)   Low (1)

Mrs. P.Aruna Devi   Mrs. S.Veni
Head of the Department   **Course Designer**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Re-accredited with 'A++' Grade (4th Cycle) by NAAC

VIRUDHUNAGAR

Quality Education with Wisdom and Values

M.Sc. COMPUTER SCIENCE
(for those who join in 2024 -2025)

Semester I		Hours/Week: 6	
Core Course -2	**OBJECT ORIENTED ANALYSIS AND DESIGN & C++**	Credits: 5	
Course Code		Internal	External
24PCSC12		25	75

COURSE OUTCOMES

On completion of the course, the learners will be able to

CO1: describe object model and object oriented concepts in C++. [K2]

CO2: illustrate usage of object model and concepts of object oriented paradigm. [K3]

CO3: explore type conversions, pointers, array, memory management operators, files, string and exceptions handling. [K3]

CO4: outline object oriented programming approaches, templates, pointers and arrays. [K4]

CO5: examine inheritance, constructors, operator overloading and exception handling techniques of C++. [K4]

UNIT I

The Object Model: The Evolution of the Object Model – Elements of the Object Model – Applying the Object Model. **Classes and Objects:** The Nature of an Object – Relationship among Objects.   (17 Hours)

UNIT II

Classes and Objects: Nature of Class – Relationship Among classes – The Interplay of classes and Objects. **Classification:** The importance of Proper Classification– Identifying classes and objects – Key Abstractions and Mechanism.   (17 Hours)

UNIT III

Classes and Objects: Classes in C++ – Declaring object – The public keyword – The private keyword – The protected keyword – Defining member function – static member

variables – static member functions – static object – Array of objects – friend functions – Local classes – Nested Classes. **Constructors and Destructors:** Characteristics of constructors and destructors – Applications with constructors –Constructors with arguments – Overloading constructors – Copy constructors – Destructors. **Operators overloading and Type conversion:** The keyword operator– Overloading unary operator – Overloading binary operator – Overloading with friend functions – Overloading assignment operator – Type conversion. **Inheritance:** Types of inheritance – Singe inheritance – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance – Multipath inheritance. (18 Hours)

UNIT IV

Arrays: Introduction – One-dimensional array declaration and initialization – Two-dimensional array – Three- or Multi-dimensional array. **Pointers:** Pointer declaration – Pointer to pointer – void pointers – wild pointers – Pointer to class – Pointer to object – The this pointer. **C++ and Memory Models:** Memory models – Dynamic memory allocation – The new and delete operator. **Polymorphism and Virtual functions:** Introduction – Binding in C++ – Virtual functions – Pure virtual function – Working of virtual functions.

(19 Hours)

UNIT V

Applications with Files: Introduction – File stream classes – Steps of file operations – File opening modes – File pointers and manipulators. **Templates:** Need for templates – Definition of class templates – Normal function templates – Working of function templates. **Working with String:** Declaring and initializing string objects – Handling string objects – String attributes – Accessing elements of string – Comparing and exchanging. **Exception Handling:** Principles of exception handling – The keywords try, throw and catch – Multiple catch statements – Catching multiple exceptions – Re-throwing exceptions. (19 Hours)

SELF STUDY

UNIT I: Input and output statements in C++
TEXT BOOKS

1. Grady Booch ." *Object Oriented Analysis and Design with Applications*", Pearson Education, 2nd Edition.
2. Ashok N. Kamthane. (2003). "*Object-Oriented Programming with ANSI & Turbo C++*", Pearson Education.

.UNIT	TEXT BOOK	CHAPTERS	SECTIONS
I	T1	2	2.1, 2 . 3 , 2 . 4
		3	3.1, 3.2
II	T1	3	3.3 – 3.5
		4	4.1 – 4.3
III	T2	8	8.4 – 8.8, 8.10, 8.16 – 8.19, 8.21, 8.25, 8.33
		9	9.3 – 9.6, 9.9, 9.11
		10	10.2, 10.3. 10.6 – 10.9
		11	11.5 – 11.11
IV	T2	12	12.1, 12.2, 12.9 – 12.11
		13	13.3, 13.5 – 13.10
		14	14.2 – 14.4
		15	15.1, 15.2, 15.4, 15.7, 15.9
V	T2	16	16.1 – 16.3, 16.6, 16.7
		17	17.2 – 17.5
		18	18.3, 18.5 – 18.8
		19	19.2, 19.3, 19.5 – 19.7

REFERENCE BOOK

Balagurusamy. (2003). Object Oriented Programming with C++,TMH, 2nd Edition.

WEB RESOURCES

1.https://onlinecourses.nptel.ac.in/noc19_cs48/preview

2.https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs19/

3.https://www.tutorialspoint.com/object_oriented_analysis_design/ooad_object_oriented_

analysis.html

Course Code 24PCSC12	PO1		PO2	PO3	PO4	PO5	PO6		PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6.a	PSO 6.b	PSO 7	PSO 8
CO1	1	2	1	2	2	1	1	2	-	2
CO2	1	1	1	2	2	1	2	2	-	2
CO3	2	3	1	3	3	2	1	3	-	1
CO4	2	3	1	3	3	2	1	3	-	1
CO5	2	2	1	3	2	2	2	1	-	1

Strong (3)   Medium (2)   Low (1)

Mrs. P.Aruna Devi   Mrs.V.Subhasini
Head of the Department   **Course Designer**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Re-accredited with 'A++' Grade (4th Cycle) by NAAC

VIRUDHUNAGAR

Quality Education with Wisdom and Values

M.Sc. COMPUTER SCIENCE
(for those who join in 2024 -2025)

Semester I		Hours/Week: 6	
Core Course -3 Practical 1	**ALGORITHM AND OOPS PRACTICAL**	Credits: 4	
Course Code **24PCSC11P**		Internal 40	External 60

COURSE OUTCOMES

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

CO1: write programs to illustrate elementary data structures and algorithms. [K2]

CO2: write C++ programs using OOPs concepts. [K2]

CO3: execute elementary data structure operations through OOPs concepts for the specified problem. [K3]

CO4: use various algorithms applying object oriented programming concepts. [K3]

CO5: examine the performance of data structures and complexity of algorithms. [K4]

Write C++ programs for the following

1. Solve the tower of Hanoi using recursion.

2. Traverse through binary search tree using traversals.

3. Perform various operations on stack using linked list.

4. Perform various operations in circular queue.

5. Sort an array of an elements using quick sort.

6. Solve number of elements in ascending order using heap sort.

7. Solve the knapsack problem using greedy method.

8. Search for an element in a tree using divide& conquer strategy.

9. Place the 8 queens on an 8X8 matrix so that no two queens Attack.

10. Virtual Function.

11. Parameterized constructor.

12. Friend Function.

13. Function Overloading.

14. Single Inheritance.

15. Employee Details using files.

Course Code 24PCSC11P	PO1		PO2	PO3	PO4	PO5	PO6		PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6.a	PSO 6.b	PSO 7	PSO 8
CO1	2	2	2	3	3	1	1	2	1	1
CO2	2	2	2	3	3	1	1	2	1	1
CO3	3	3	2	3	3	1	2	2	-	-
CO4	2	2	3	3	3	1	2	2	-	-
CO5	3	3	2	3	3	2	2	2	1	1

Strong (3)   Medium (2)   Low (1)

Mrs. P. Aruna Devi   Mrs.T.Chitra
Head of the Department   **Course Designer**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Re-accredited with 'A++' Grade (4ᵗʰ Cycle) by NAAC
VIRUDHUNAGAR
Quality Education with Wisdom and Values

M.Sc. COMPUTER SCIENCE
(for those who join in 2024 -2025)

Semester I		Hours/Week: 6	
Elective Course -1 (DSEC)	**PYTHON PROGRAMMING PRACTICAL**	Credits: 4	
Course Code **24PCSE11P**		Internal	External
		40	60

COURSE OUTCOMES

On completion of the course, the learners will be able to

CO1: write python programs using various data structures with conditional branches and loop statements. [K2]

CO2: write python programs with functions and modules. [K2]

CO3: demonstrate data representation using different data structures. [K3]

CO4: examine various methods of files and exception handling in python. [K3]

CO5: develop dynamic and interactive web pages using forms in python. [K4]

Write Python Programs for the following

1. Programs using elementary data items, lists, dictionaries and tuples.

2. Programs using conditional branches.

3. Programs using loops.

4. Programs using functions.

5. Programs using exception handling.

6. Programs using inheritance.

7. Programs using polymorphism.

8. Programs to implement file operations.

9. Programs using modules.

10. Programs for creating dynamic and interactive web pages using forms.

11. Programs using CSV file.

12. Programs using Numpy, Pandas and Matplot Library.

13. Programs using Turtle Graphics.

14. Programs using Database.

15. Updating the student database from SQLite Query.

16. Developing a game

Course Code 24PCSE11P	PO1		PO2	PO3	PO4	PO5	PO6		PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6.a	PSO 6.b	PSO 7	PSO 8
CO1	2	3	1	1	1	2	1	1	1	-
CO2	2	3	1	1	1	2	1	1	1	-
CO3	3	3	3	2	1	2	2	2	1	-
CO4	3	3	2	2	1	2	2	2	1	-
CO5	3	3	3	3	3	2	2	3	2	3

Strong (3)   Medium (2)   Low (1)

Mrs. P. Aruna Devi
Head of the Department

Ms. M. Porkalai Selvi
Course Designer

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A++' Grade (4ᵗʰ Cycle) by NAAC

VIRUDHUNAGAR

Quality Education with Wisdom and Values

M.Sc. COMPUTER SCIENCE
(2024-2025 onwards)

Semester I		Hours/Week: 6	
Elective Course – 2 (Generic)	**MATHEMATICAL FOUNDATIONS**	Credits: 3	
Course Code 24PCSE12		Internal 25	External 75

Course Outcomes

On completion of the course the students will be able to

CO1: understand the basic concepts of relations, functions, Mathematical logic, Matrices and Graphs. [K2]

CO2: apply the knowledge gained in functions to other fields.[K3]

CO3:solve problems in matrices, mathematical logic and graphs. [K3]

CO4: analyze the concepts of relations & functions in set theory. [K4]

CO5: analyze the concepts of mathematical logic, matrices and graphs in interdisciplinary level. [K4]

UNIT I

Mathematical Logic - Connectives: Negation – Conjunction – Disjunction -Statement Formulas and Truth Tables - Conditional and Biconditional - Well-formed formulas – Tautologies - Equivalence of formulas - Tautological implications - **Normal Forms:** Disjunctive Normal Forms - Conjunctive Normal Forms - Principal Disjunctive Normal Forms - Principal Conjunctive Normal Forms - **Theory of Inference for Statement Calculus:** Validity using Truth Tables - Rules of Inference - Consistency of Premises and Indirect method of Proof. (18 Hours)

UNIT II

Relations and Ordering: Relations - Properties of Binary Relations in a Set – Relation Matrix and the Graph of a Relation - Equivalence Relations.

Functions: Definition and Examples - Composition of Functions - Inverse Functions. (18 Hours)

UNIT III

Recurrence Relations- Recurrence an Introduction – Polynomials and their Evaluations – Recurrence relation – Solution of finite order homogeneous relations - Solution of non-homogeneous relations – Generating Functions-Some common recurrence relations.   (18 Hours)

UNIT IV

Matrix Algebra : Introduction – Matrix Operations –The Inverse of a square matrix- Determinant - Cramer's rule for solving linear equations-Elementary operations and Rank of a matrix-Simultaneous linear equations-Inverse by Partitioning – Eigen values and eigen vectors - Cayley-Hamilton Theorem-problems   (18 Hours)

UNIT V

Graph Theory: Basic concepts (definitions only) – Matrix Representation of Graphs (Theorems statements and Problems only) – Trees – Spanning Trees – Shortest Path Problem.   (18 Hours)

TEXT BOOK

1. Tremblay. J.P and Manohar . R, *Discrete Mathematical Structures with applications to Computer Science* , McGraw Hill,1997.
2. M.K.Venkataraman, N.Sridharan and N.Chandrasekaran, *Discrete Mathematics*, The National Publishing Company, 2009.

Unit	Text Book	Chapter	Section
I	1	1	1-2, 1-2.1 to 1-2.4, 1-2.6 to 1-2.9, 1-2.11 1-3, 1-3.1 to 1-3.4 1-4, 1-4.1 to 1-4.3
II	1	2	2-3, 2-3.1 to 2-3.3, 2-3.5 2-4, 2-4.1 to 2.4.3
III	2	V	1-7
IV	2	VI	1-7
V	2	XI	1-5

REFERENCE BOOKS

1. Seymour Lipschutz and Maarc Lipson, *Discrete Mathematics (Second Edition)*, Tata McGraw Hill.

2. S.Arumugam and A. Thangapandi Isaac, *Modern Algebra*, Scitech publications 2005.

3. S.Arumugam and S.Ramachandran, *Invitation to Graph Theory*, Scitech Publications,2005, Chennai.

Web Resources

Web resources from NDL Library, E-content from open-source libraries

Course Code 24PCSE12	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	3	3	1	2
CO2	3	3	3	3	3	1	2
CO3	3	3	3	3	3	1	2
CO4	3	2	3	3	3	3	2
CO5	3	2	3	2	3	3	2

Strong (3)   Medium (2)   Low (1)

Dr.M.C. Maheswari   Mrs.K.Anitha
Head of the Department   Course Designer

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Re-accredited with 'A++' Grade (4th Cycle) by NAAC
VIRUDHUNAGAR
Quality Education with Wisdom and Values

M.Sc. COMPUTER SCIENCE
(for those who join in 2024 -2025)

Semester II		Hours/Week: 6	
Core Course -4	**DATA MINING AND WAREHOUSING**	Credits: 5	
Course Code		Internal	External
24PCSC21		25	75

COURSE OUTCOMES

On completion of the course, the learners will be able to

CO1: infer data mining basics, data pre-processing, data warehousing and online analytical processing. [K2]

CO2: apply associations, correlations and mining frequent patterns [K3]

CO3: illustrate the usage of data pre-processing, classification, clustering and data warehouse operations [K3]

CO4: analyse pre-processing methods, OLAP operations and various frequent item set mining methods. [K4]

CO5: explore data mining algorithms to perform classification, clustering on particular data set. [K4]

UNIT I

Introduction: Data mining – Kinds of data mined – Kinds of Patterns mined – Technologies used. **Getting to Know your Data:** Data Objects and Attribute Types **Data Preprocessing:** Data Preprocessing: An Overview – Data Cleaning – Data Integration – Data Transformation and Data Discretization.　　　　　　　　　　(18 Hours)

UNIT II

Data Warehouse and Online Analytical Processing: Data Warehouse: Basic Concepts – Data Warehouse Modeling: Data Cube and OLAP – Data Warehouse Design and Usage – Data Warehouse implementation – Data Generalization by Attribute-Oriented Induction.　　　　　　　　　　(18 Hours)

UNIT III

Mining frequent patterns, Associations and Correlations: Basic Concepts and Methods Basic Concepts – Frequent Itemset Mining Method. **Classification: Basic Concepts:** Basic Concepts – Decision Tree Induction. (18 Hours)

UNIT IV

Classification: Advanced Methods: Classification by Back Propagation. **Cluster Analysis:** Cluster Analysis – Partitioning Methods – Hierarchical Methods – Density Based Methods. (18 Hours)

UNIT V

Outlier Detection: Outliers and Outlier Analysis – Outlier Detection Methods. **Data Mining Trends and Research Frontiers:** Data Mining Applications. (18 Hours)

SELF STUDY

UNIT V: Oulier Detection Methods.

TEXT BOOK

Jiawei Han and Micheline Kamber, Jian Pei. (2016). *Data Mining Concepts and Techniques*, New Delhi: Morgan Kaufmann Publishers, An imprint of Elsevier, Third Edition, Reprinted 2016.

UNIT	CHAPTERS	SECTIONS
I	1	1.2 - 1.6
	2	2.1
	3	3.1 - 3.3, 3.5
II	4	4.1 - 4.5
III	6	6.1 – 6.3
	8	8.1, 8.2
IV	9	9.2, 9.5
	10	10.1 - 10.4
V	12	12.1, 12.2
	13	13.2, 13.3

REFERENCE BOOKS

1. Mehmed Kantardzic. (2011). *Data mining Concepts, Models, Methods, and Algorithms,* New Delhi: Wiley Inter science, Second Edition.

2. Alex Berson,& Stephen J. Smith. (2016). *Data Warehousing, Data Mining and OLAP*, Mumbai: Tata McGraw Hill Edition, 35th Reprint 2007.

3. Soman, K.P., Shyam Diwakar and Ajay, V. (2014). Insight *into Data Mining Theory and Practice*, New Delhi: PHI Learning Private Limited, Eastern Economy Edition, Seventh Printing.

4. Ian H.Witten, Eibe Frank, Mark A. Hall and Christopher J. Pal (2017). *Data Mining: Practical Machine Learning Tools and Techniques*, New Delhi: Elsevier – Morgan Kaufmann an imprint of Elsevier, Fourth Edition.

5. G. K. Gupta (2006). *Introduction to Data Mining with Case Studies*, New Delhi: Prentice Hall of India, Easter Economy Edition.

6. Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani (2014). *An Introduction to Statistical Learning: with Applications in R*, United States: Springer.

Course Code 24PCSC21	PO1		PO2	PO3	PO4	PO5	PO6		PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6.a	PSO 6.b	PSO 7	PSO 8
CO1	2	-	2	-	-	-	1	1	-	-
CO2	2	1	2	-	-	-	1	1	-	-
CO3	3	3	3	1	2	2	2	2	-	-
CO4	3	3	3	3	2	3	3	3	-	1
CO5	3	3	3	3	3	3	2	3	-	1

Strong (3)   Medium (2)   Low (1)

Mrs. P.Aruna Devi   Mrs. R.Sabitha
Head of the Department   **Course Designer**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A++' Grade (4th Cycle) by NAAC

VIRUDHUNAGAR

Quality Education with Wisdom and Values

M.Sc. COMPUTER SCIENCE
(for those who join in 2024 -2025)

Semester II		Hours/Week: 6	
Core Course -5	**ADVANCED OPERATING SYSTEMS**	Credits: 5	
Course Code		Internal	External
24PCSC22		25	75

COURSE OUTCOMES

On completion of the course, the learners will be able to

CO1: describe the concepts of virtualization, distributed operating system, synchronization, deadlocks, failure and recovery systems. [K2]

CO2: illustrate the concepts of distributed file system, virtualization and distributed resource management system. [K3]

CO3: determine the agreement problem, deadlocks, memory and I/O management in virtual environment, failure recovery algorithms and fault tolerance protocols. [K3]

CO4: analyze the centralized deadlock detection algorithms, issues, errors and recovery in distributed system, different scheduling algorithms, mutual exclusion, critical section problems in distributed operating systems. [K4]

CO5: assess the features of deadlock detection algorithms, recovery algorithms, kernel modules and hypervisor virtualization platforms. [K4]

UNIT I

Process Synchronization: Overview: Introduction– Functions of an Operating System – Design Approaches – Types of Advanced Operating System. **Synchronization Mechanisms:** Concept of a Process, Concurrent Processes – The Critical Section Problem, Other Synchronization Problems. **Process Deadlocks:** Preliminaries – Models of Deadlocks – Models of Resources – A Graph-Theoretic Model of a System State – Necessary and Sufficient conditions for a Deadlock – Systems with Single-Unit Requests – System with only Consumable Resources – System with only Reusable Resources. (18 Hours)

UNIT II

Distributed Operating Systems: Architectures of Distributed Systems: Introduction – Issues in Distributed Operating System – Communication Primitives. **Distributed Mutual Exclusion:** Non-Token Based Algorithms – Lamport's Algorithm – Token-Based Algorithms – Suzuki-Kasami's Broadcast Algorithm. **Distributed Deadlock Detection:** Issues in Deadlock Detection and Resolution – Centralized Deadlock-Detection Algorithms - Distributed Deadlock Detection Algorithms: A Path-Pushing Algorithm – An Edge-Chasing Algorithm – A Diffusion Computation Based algorithm. (19 Hours)

UNIT III

Distributed Resource Management: Distributed File systems: Architecture – Mechanisms for building Distributed File System - Design Issues. **Distributed Shared Memory:** Architecture and Motivation – Algorithm for Implementing DSM - Coherence Protocols – Design Issues. **Distributed Scheduling**: Issues in Load Distributing – Components of Load Distributing algorithm– Load Distributing Algorithms. (17 Hours)

UNIT IV

Agreement Protocols: A Classification of Agreement Problems –Solutions to the Byzantine Agreement Problem – Applications of Agreement Algorithms. **Failure Recovery and Fault Tolerance: Recovery:** Basic Concepts – Classification of Failures –Backward Error Recovery: Basic Approaches– Recovery in Concurrent System – Synchronous Check pointing and Recovery - Asynchronous Check pointing and Recovery. (18 Hours)

UNIT V

Fault Tolerance: Issues –Commit Protocols – Nonblocking Commit Protocols – Voting Protocols. **Virtual Machines**: Overview – History – Benefits and Features – Types of Virtual Machines and Their Implementations – Virtualization and Operating-System Components – Examples. (18 Hours)

SELF STUDY

UNIT IV: Solutions to the Byzantine Agreement Problem – Applications of Agreement Algorithms.

TEXT BOOKS

1. Mukesh Singhal and N. G. Shivaratri, 40th reprint (2016), *Advanced Concepts in Operating Systems*, First Edition , McGraw- Hill Publication, New Delhi.

2. Abraham Silberschatz, Peter.B. Galvin, G. Gagne, *Operating System Concepts*, 9th Edition, Addison Wesley Publishing Co, Boston.

BOOK	UNIT	CHAPTER	SECTIONS
		1	1.1-1.3,1.4
	I	2	2.2-2.5
		3	3.2-3.9
		4	4.1,4.5,4.7
	II	6	6.5,6.6,6.10,6.11
I		7	7.4,7.6,7.7.1-7.7.3
		9	9.2-9.4
	III	10	10.2,10.3,10.5,10.6
		11	11.3,11.4,11.6
	IV	8	8.3-8.5
		12	12.2,12.3,12.5,12.6,12.8,12.9
	V	13	13.2,13.4-13.6
II	V	16	16.1-16.3,16.5-16.7

REFERENCE BOOKS

1. William Stallings (2014), *Operating System: Internals and Design Principles*, Nineth Edition, Pearson Education, New Delhi.

2. Andrew S. Tanenbaum. (2014), *Modern Operating Systems,* Fourth Edition, Addison Wesley Publishing Co, Prentice Hall.

3. Sape Mullender. (2011), *Distributed Systems*, Addison Wesley Publishing Co, Boston.

4. Mike Ebbers, John Kettner (2011). Wayne O‟Brien, Bill Ogden, *Introduction to the New Mainframe: z/OS Basics*, Third Edition, International Business Machines Corporation.

WEB REFERENCES

1. https://onlinecourses.nptel.ac.in/noc20_cs04/preview
2. https://www.udacity.com/course/advanced-operating-systems--ud189
3. https://minnie.tuhs.org/CompArch/Resources/os-notes.pdf

Course Code 24PCSC22	PO1		PO2	PO3	PO4	PO5	PO6		PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6.a	PSO 6.b	PSO 7	PSO 8
CO1	2	-	1	1	-	-	2	1	-	-
CO2	2	-	2	1	1	-	2	1	1	-
CO3	2	2	2	1	1	2	3	2	-	-
CO4	2	2	2	2	2	3	3	3	1	-
CO5	3	3	3	3	3	3	3	3	-	-

Strong (3)   Medium (2)   Low (1)

Mrs. P. Aruna Devi   Ms. M. Porkalai Selvi
Head of the Department   **Course Designer**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Re-accredited with 'A++' Grade (4th Cycle) by NAAC
VIRUDHUNAGAR
Quality Education with Wisdom and Values

M.Sc. COMPUTER SCIENCE
(for those who join in 2024 -2025)

Semester II		Hours/Week: 6	
Core Course -6 Practical 2	**DATA MINING PRACTICAL USING R**	Credits: 4	
Course Code		Internal	External
24PCSC21P		40	60

COURSE OUTCOMES

On completion of the course, the learners will be able to

CO1: write R programs to import library and desirable dataset with its proper statements. [K2]

CO2: write R programs with necessary data mining algorithms and plot the outputs. [K2]

CO3: execute algorithms with different parameters to obtain the desired output. [K3]

CO4: implement appropriate data mining algorithms for the specified problem in R. [K3]

CO5: evaluate the performance of data mining algorithms in R. [K4]

List of Programs

1. Implement Apriori Algorithm.
2. Implement Eclat Algorithm.
3. Implement FP Growth Algorithm.
4. Generate Decision Trees.
5. Implement ID3 Algorithm.
6. Implement K Means Clustering Algorithm.
7. Implement K Nearest Neighbor Algorithm.
8. Implement Bayes Classification Algorithm.
9. Data Manipulation with dplyr package
10. Data Manipulation with data.table package
11. Create dataset.

12. Import dataset from various file formats.

13. Create various Scatter Plots.

14. Create Mosaic Plots.

15. Study and implement Data Visualization with ggplot2.

Course Code 24PCSC21P	PO1		PO2	PO3	PO4	PO5	PO6		PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6.a	PSO 6.b	PSO 7	PSO 8
CO1	3	3	3	2	1	2	3	3	2	2
CO2	3	2	2	2	2	-	2	2	2	2
CO3	3	2	2	2	2	2	2	2	1	2
CO4	3	2	2	2	2	2	2	3	1	1
CO5	3	3	2	2	2	2	2	3	1	1

Strong (3)   Medium (2)   Low (1)

Mrs. P.Aruna Devi   Mrs.R.Sabitha
Head of the Department   **Course Designer**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Reaccredited with 'A++' Grade (4th Cycle) by NAAC

VIRUDHUNAGAR

Quality Education with Wisdom and Values

M.Sc. COMPUTER SCIENCE
(for those who join in 2024 -2025)

Semester II		Hours/Week: 4	
Elective Course -3 (DSEC)	**MULTIMEDIA PRACTICAL**	Credits: 3	
Course Code **24PCSE21P**		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the learners will be able to

CO1: write steps to do the multimedia project. [K2]

CO2: choose appropriate text and image effects for a multimedia project. [K2]

CO3: develop an e–content to promote on social media with audio, video and textual multimedia elements.[K3]

CO4: create multimedia animations .[K3]

CO5: perform a functional test on the multimedia projects. [K4]

Develop Flash Programs for the following

Movie Creation:

1. Implement Text effects with Zooming, Rotating and Jumping.

2. Perform

       i)   frame by frame animation

       ii)   animation using guided path.

3. Perform bouncing ball on steps animation using Motion Tweening Component.

4. Perform count down animation using shape Tweening.

5. Perform

       i) Image Morphing.

       ii) Text Morphing.

6. Create an animation to represent the growing moon.

7. Create animation to simulate movement of a cloud.

8. Design a Commercial advertisement banner.

9. Create Photo slides show.

10. Start and stop Pendulum using Action Script.

Video making :

11. Develop an e –content for any topic of your course to promote on social media.

(Note : Your document must have audio with narration)

Design the following in Photoshop

1. Create Photo Collage.

2. Edit colors in an image.

3. Apply Filters in Photoshop.

4. Create Silhouette.

5. Animate Candle Flame.

6. Create Scenary.

Designing the following in Canva

1. Create Flier for an association meeting.

2. Create Ad for a textile shop.

3. Design Pamphlet for Zumba class.

4. Create a video with photos and add text and audio.

Course Code 24PCSE21P	PO1		PO2	PO3	PO4	PO5	PO6		PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6.a	PSO 6.b	PSO 7	PSO 8
CO1	3	3	3	2	2	2	2	2	1	-
CO2	3	3	3	2	3	2	3	2	2	-
CO3	3	3	3	2	3	3	3	3	2	1
CO4	3	3	3	3	3	3	3	3	3	1
CO5	3	3	3	3	3	3	3	3	3	1

Strong (3)   Medium (2)   Low (1)

Mrs. P. Aruna Devi   Mrs. S.Veni
Head of the Department   **Course Designer**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A++' Grade (4th Cycle) by NAAC

VIRUDHUNAGAR

Quality Education with Wisdom and Values

M.Sc Computer Science
(for those who join in 2024 -2025)

Semester II		Hours/Week: 4	
Elective Course – 4 (Generic)	**OPTIMIZATION TECHNIQUES**	Credits: 3	
Course Code 24PCSE22		Internal 25	External 75

Course Outcomes

On completion of the course the students will be able to

CO1:explain the basic concepts of sequencing, game theory, replacement problems and linear, non-linear programming problem. [K2]

CO2: apply Optimization Techniques to find solutions to real life problems.[K3]

CO3: solve the given problem in constrained, un constrained linear, nonlinear problems [K3]

CO4: analyze various optimization techniques in obtaining optimum solution to the problems[K4]

CO5:evaluate the problems inconstrained, un constrained linear, nonlinear problems .[K4]

UNIT I

Integer Programming: Introduction – Pure and mixed integer programming problems –

Gomory's ALL -I.P.P. method - Construction of Gomory's constraints – Fractional cut method : All

Integer LPP – Fractional cut method : Mixed integer LPP – Branch and bound method.

(12 Hours)

UNIT II

Games and Strategies: Introduction – Two –Person Zero-Sum Games – Some Basic Terms – The

Maximin - Minimax Principle- Games Without Saddle Points – Mixed Strategies – Graphic Solution

of 2 x n and m x2 Games-Dominance Property. (12 Hours)

UNIT III

Network Routing Problem: Minimal Spanning Tree Problem-Shortest Route Problem-Maximal

Flow Problem-Minimum cost Flow Problem.

Network Scheduling by PERT/CPM: Introduction-Network: Basic Components-Logical Sequencing-

Rules of Network Construction-Concurrent Activities-Critical Path Analysis. (12 Hours)

UNIT IV

Classical Optimization Theory(Problems only): Unconstrained Problems-Necessary and Sufficient Conditions- The Newton-Raphson Method-Constrained Problems- Equality Constraints- Inequality Constraints- Karush-Kuhn-Tucker (KKT) Conditions. (12 Hours)

UNIT V

Nonlinear Programming Algorithms(Problems only): Unconstrained Algorithms – Direct Search Method – Gradient Method- Constrained Algorithms- Separable Programming – Quadratic Programming – Chance- Constrained Programming – Linear Combinations Method – SUMT Algorithm. (12 Hours)

TEXT BOOK

1. Kanti Swarup, P.K., Gupta., and Man Mohan.(2018) *Operations Research*, Sultan Chand & Son,

2. Hamdy A. Taha., Natarajan A.M., Balasubramanie P., and Tamilarasi A. (2002), *Operations Research an Introduction*, Pearson Prentice Hall, Eighth Edition.

Unit	Text Book	Chapter	Section
I	1	7	7.1-7.7
II	1	17	17.1-17.7
III	1	24 25	24.3,24.4,24.6,24.7 25.1-25.6
IV	2	18	18.1,18.1.1,18.1.2,18.2,18.2.1,18.2.2
V	2	19	19.1,19.1.1,19.1.2,19.2,19.2.1,19.2.2, 19.2.3,19.2.4,19.2.5

REFERENCE BOOKS

1. S.Arumugam and A. Thangapandi Isaac, *Topics in Operations Research* ,Scitech publications.

2. Sharma S.D(2008), *Operations Research*, KedarNath, Ram Nath Publications, (Fourteenth Edition).

Web Resources

Web resources from NDL Library, E-content from open-source libraries

Course Code 24PCSE22	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	3	3	1	2
CO2	3	3	3	3	3	1	2
CO3	3	3	3	3	3	1	2
CO4	3	2	3	3	3	3	2
CO5	3	2	3	2	3	3	2

Strong (3)   Medium (2)   Low (1)

Dr.M.C. Maheswari   G.Nagalakshmi
Head of the Department   **Course Designer**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Re-accredited with 'A++' Grade (4th Cycle) by NAAC
VIRUDHUNAGAR
Quality Education with Wisdom and Values
M.Sc. COMPUTER SCIENCE
(for those who join in 2024 -2025)

Semester II		Hours/Week: 4	
Elective Course-5 (NME)	**WEB PROGRAMMING**	Credits: 2	
Course Code **24PCSN21**		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the learners will be able to

CO1: discuss Internet technologies, internet browsers, head, body sections and lists in HTML. [K1]

CO2: review tables, style sheets, frames and forms in HTML. [K2]

CO3: describe various tags and create elegant web page using HTML [K2]

CO4: apply various style sheets, form and frame set tag to design a web page.[K3]

CO5: distinguish appropriate usage of HTML tags for elegant view of webpage. [K4]

UNIT I

Introduction to the Internet: Computers in Business – Networking – Internet – Electronic Mail (E-Mail) – Resource Sharing – Gopher – World Wide Web – Usenet – Telnet – Bulletin Board Service – Wide Area Information Service. **Internet Technologies:** Modem – Internet Addressing – Physical Connections – Telephone Lines. **Internet Browsers:** Internet Explorer – Netscape Navigator. (12 Hours)

UNIT II

Introduction to HTML: Designing a Home Page – History of HTML – HTML Generations – HTML Documents – Anchor Tag – Hyper Links – Sample HTML Documents. **Head and Body Sections:** Header Section – Title – Prologue – Links – Colorful Web Page – Comment Lines – Some Sample HTML Documents. (12 Hours)

UNIT III

Designing the Body Section: Heading Printing – Aligning the Heading – Horizontal Rule – Paragraph – Tab Settings – Images and Pictures – Embedding PNG Format Images.**Ordered and Unordered Lists:** Lists – Unordered Lists – Heading in a List – Ordered Lists – Nested Lists.

(12 Hours)

UNIT IV

Table Handling: Tables – Table Creation in Html – Width of the Table and Cells – Cells Spanning Multiple Rows/Columns – Coloring Cells – Column Specification – Some Sample Tables. **DHTML and Style Sheets:** Defining Styles – Elements of Styles – Linking a Style Sheet to an HTML Document – In-line Styles – External Style Sheets – Internal Style Sheets – Multiple Styles.

(12 Hours)

UNIT V

Frames: Frameset Definition – Frame Definition – Nested Framesets. **Forms:** Action Attribute – Method Attribute – Enctype Attribute – Drop Down List – Sample Forms.

(12 Hours)

TEXT BOOK

Xavier, C. (2015). *World Wide Web Design with HTML*, New Delhi: Tata McGraw Hill Education Private Limited.

UNIT	CHAPTERS	SECTIONS
I	1	1.1 – 1.11
	2	2.1 – 2.4
	3	3.1, 3.2
II	4	4.1 - 4.7
	5	5.1 – 5.7
III	6	6.1 – 6.7
	7	7.1 – 7.5
IV	8	8.1 – 8.7
	9	9.1 – 9.7
V	10	10.1 – 10.3
	12	12.1 – 12.5

REFERENCE BOOKS

1. Deitel, P.T. (2009). *Internet & World Wide Web How To Program*, United States of America: Pearson International Edition.
2. Steven Holzner.(2000). *HTML Black Book*, New Delhi: Dreamtech Press.
3. Wendy Willard**.** (2007).*HTML: A Beginner's Guide*, New Delhi: McGraw Hill Professional.

Course Code 24PCSN21	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO 1	2	2	-	-	1	-	-	-
CO 2	2	2	-	-	2	-	-	1
CO 3	3	2	1	-	3	-	-	1
CO 4	3	3	2	2	3	-	-	-
CO 5	3	3	Strong (3)	2	Medium (2)	- Low (1)	2

Mrs. P. Aruna Devi
Head of the Department

Mrs. P. Aruna Devi
Course Designer