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 (3ʳᵈ Cycle) by NAAC

VIRUDHUNAGAR – 626 001

OUTCOME BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM REGULATIONS AND SYLLABUS
(With effect from Academic Year 2020 - 2021)

V.V.Vanniaperumal College for Women, Virudhunagar, established in 1962, offers 20 UG Programmes, 14 PG Programmes, 6 M.Phil. 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 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 system. Average (CGPA) is made to ensure uniformity in evaluation.

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 and Computer Applications.
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,Computer Science, Information Technology, Computer Applications (MCA*)
Commerce & Management	:	Commerce, Business Administration (MBA*)

* AICTE approved Programmes

PRE-DOCTORAL PROGRAMMES (M.Phil.)

Arts & Humanities	:	History, English, Tamil
Physical & Life Sciences	:	Mathematics, Biochemistry
Commerce & Management	:	Commerce

OUTLINE OF CHOICE BASED CREDIT SYSTEM - UG

1. Core Courses
2. Discipline Specific Elective Courses(DSEC)
3. Allied Courses
4. Skill Enhancement Courses(SEC)
5. Non Major Elective Courses(NMEC)
6. Ability Enhancement Compulsory Courses(AECC)
7. Generic Elective Courses(GEC)
8. Internship / Field Project
9. Self Study Courses
10. Extra Credit Courses(optional)

List of Non Major Elective Courses (NMEC)
(2020-2023)
UG PROGRAMMES

Name of the Course	Semester	Department
History of India upto A.D.1858	III	History(EM)
இந்தியவரலாறுகி.பி.1858வரை	III	History(TM)
Indian National Movement(A.D1885-1947)	IV	History(EM)
இந்திய தேசிய இயக்கம்(கி.பி.1885–1947)	IV	History(TM)
English for Professions I	III	English
English for Professions II	IV	
இக்காலநீதிஇலக்கியம்	III	Tamil
உரைநடை இலக்கியம்	IV	
Basic Hindi –I	III	Hindi
Basic Hindi – II	IV	
Practical Banking	III	Commerce
Basic Accounting Principles	IV	
Business Management	III	BusinessAdministration
Entrepreneurship	IV	
Quantitative Aptitude–I	III	Mathematics
Statistics and Operation Research	IV	
Physicsin Everydaylife	III	Physics
Fundamentals of Electronics	IV	
Industrial Chemistry	III	Chemistry
Drugs and Natural Products	IV	
Applied Zoology	III	Zoology
Animal Science	IV	
Basic Food Science	III	HomeScience–NutritionandDietetics
Basic Nutrition and Dietetics	IV	
Women and Health	III	Biochemistry
Lifestyle associated disorders	IV	
Medical Lab Technology	III	Microbiology
Applied Microbiology	IV	
Infectious Diseases	III	Biotechnology
Organic Farming	IV	
Basics of Fashion	III	CostumeDesignAnd Fashion
Interior Designing	IV	
Introduction to Computers and Office Automation	III	ComputerScience
Introduction to Internet andHTML5	IV	
Spreadsheet	III	InformationTechnology
Introduction to HTML	IV	
Fundamentals of Computers	III	ComputerApplications
WebDesign withHTML	IV	
Horticulture–I	III	
Horticulture– II	IV	Botany
மருத்துவ தாவரவியல் -I	III	
மருத்துவ தாவரவியல்-II	IV	
Library and Information Science–I	III	LibraryScience
Library and Information Science-II	IV	

மேல்நிலைக் கல்வி வரை தமிழை முதன்மைப் பாடமாக எடுத்துப் படிக்காத மாணவிகள் கீழ்க்கண்ட பாடங்களைக் கட்டாயம் படிக்க வேண்டும்
1. அடிப்படைத் தமிழ் - எழுத்தறிதல்
2. அடிப்படைத் தமிழ் - மொழித்ரதிறனறிதல்

List of Non Major Elective Courses (NMEC)

(2023-2024 onwards)

UG PROGRAMMES

Name of the Course	Semester	Department
History of India upto A.D.1858	III	History(EM)
இந்திய வரலாறு கி.பி. 1858 வரை	III	History (TM)
Indian National Movement (A.D 1885-1947)	IV	History(EM)
இந்திய தேசிய இயக்கம் (கி.பி. 1885 – 1947)	IV	History(TM)
English for Professions I	III	English
English for Professions II	IV	
இக்கால நீதி இலக்கியம்	III	Tamil
உரைநடை இலக்கியம்	IV	
Basic Hindi – I	III	Hindi
Basic Hindi – II	IV	
Fundamental Hindi - I	III	
Fundamental Hindi - II	IV	
Practical Banking	III	Commerce
Basic Accounting Principles	IV	
Financial Literacy I	III	
Financial Literacy II	IV	
Self-Employment And Start-Up Business	III	Commerce CA
Fundamentals Of Marketing	IV	
Women Protection Laws	III	Commerce (Professional Accounting)
Basic Labour Laws	IV	
Business Management	III	Business Administration
Entrepreneurship	IV	
Quantitative Aptitude I	III	Mathematics
Basic Statistics		
Quantitative Aptitude II	IV	
Operations Research		
Physics in Everyday life –I	III	Physics
Physics in Everyday life –II	IV	
Industrial Chemistry	III	Chemistry
Drugs and Natural Products	IV	
Applied Zoology	III	Zoology
Animal Science	IV	
Basic Food Science	III	Home Science – Nutrition and Dietetics
Basic Nutrition and Dietetics	IV	
Women and Health	III	Biochemistry
Lifestyle Associated Disorders	IV	
Medical Lab Technology	III	Microbiology
Applied Microbiology	IV	
Infectious Diseases	III	Biotechnology

Organic Farming	IV	
Basics of Fashion	III	Costume Design And Fashion
Interior Designing	IV	
Introduction to Computers and Office Automation	III	Computer Science
Introduction to Internet and HTML 5	IV	
MS Office	III	Information Technology
Introduction to HTML	IV	
Fundamentals of Computers	III	Computer Applications
Web Design with HTML	IV	
Horticulture – I	III	Botany
Horticulture – II	IV	
மருத்துவ தாவரவியல் - I	III	
மருத்துவ தாவரவியல் - II	IV	
Library and Information Science – I	III	Library Science
LibraryandInformation Science–II	IV	
Cadet Corps for Career Development I	III	National Cadet Corps
Cadet Corps for Career Development II	IV	

மேல்நிலை கல்வி வரை தமிழை முதன்மை பாடமாக எடுத்து படிக்காத மாணவிகள் கீழ்கண்ட பாடங்களை கட்டாயம் படிக்க வேண்டும்

1. அடிப்படைத் தமிழ் - எழுத்தறிதல்
2. அடிப்படைத் தமிழ் - மொழித்திறனறிதல்

List of Ability Enhancement Compulsory Courses (AECC)
& Generic Elective Courses (GEC)Offered

ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)

1. Value Education

2. Environmental Studies

GENERIC ELECTIVE COURSES 1

1. Human Rights

2. Women Studies

GENERIC ELECTIVE COURSES2

1. Constitution of India

2. Modern Economics

3. Adolescent Psychology

4. Disaster Management

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 channelize their teaching methodologies and evaluation strategies to attain the 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 Applications

To enrich the students to be technologically skilled, ethical responsibilities, technical and professional values and face the challenges of the ever changing world.

Mission of the Department of Computer Applications

- To impart the fundamental principles of computer science, and continue to develop their technical competencies.
- To train students for careers as socially responsible IT professionals, entrepreneurs and researchers
- To empower the student in rural communities with effective communication skills

and high ethical values.

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 B.C.A. Programme

The students will be able to

PEO1: Effectively utilizing their knowledge of computing principles and mathematical theory to develop sustainable solutions to current and future computing problems.

PEO2: Graduates are trained to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur.

PEO3: Shine as socially committed computer professionals having mutual respect, efficient programming skills and satisfy the needs of society.

Key Components of Mission Statement	Programme Educational Objectives		
	PEO1	**PEO2**	**PEO3**
continues development of technical competency	√	√	
train students for careers as IT professionals	√	√	
empower the student in rural communities	√		√

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 effectively the acquired knowledge and skill in the field of Arts, Physical Science, Life Science, Computer Science, Commerce and Management for higher studies and employment. (*Disciplinary Knowledge*)

2   communicate proficiently and confidently with the ability to express original/complex ideas effectively in different situations. (*Communication Skills*)

3   identify, formulate and solve problems in real life situations scientifically / systematically by adapting updated skills in using modern tools and techniques. (*Scientific Reasoning and Problem Solving*)

4   critically analyze, synthesize and evaluate data, theories and ideas to provide valid suggestions for the betterment of the society. (*Critical Thinking and Analytical Reasoning*)

5   use ICT in a variety of self-directed lifelong learning activities to face career challenges in the changing environment. (*Digital Literacy, Self - Directed   and Lifelong Learning*)

6   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*)

7   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 UG Programme**.** Programme Specific Outcomes denote what the students would be able to do at the time of graduation. They are Programme specific. It is mandatory that each PO should be mapped to the respective PSO.

On completion of B.C.A. Programme, the students will be able to

PO1 - *Disciplinary Knowledge*

PSO 1.a: Apply the acquired knowledge in computer science and in interdisciplinary fields for successful career and higher studies.

PSO1.b: Make use of the technical knowledge in various technology field of computer science to identify the problem, analyze, design and develop the system as the solution to the problem.

PO2 – *Communication Skills*

PSO2: ability to express the computer knowledge by preparing documentation and communicate to the society with effective presentation.

PO3 – *Scientific Reasoning and Problem Solving*

PSO3.a: Apply theoretical foundations of computer applications with emphasis on strong practical training that enable them to solve real world problems related to sustainable environment.

PSO3.b: Analyze needed information and/or eliminate extraneous information towards

solving contextual problems.

PO4 – *Critical Thinking and Analytical Reasoning*

PSO 4.a: Analyze, sketch and attain the innovative solutions to the problems related to Computer Industry.

PSO 4.b: Critically evaluate the software systems and find the optimum solution for the betterment of society.

PO5 – *Digital Literacy, Self - Directed and Lifelong Learning*

PSO5: Utilize modern computing tools, skills and techniques necessary for facing issues in finding software solutions in their career.

PO6 – *Co-operation/Team Work and Multi-Cultural Competence*

PSO6: Apply their leadership qualities, and cooperative spirit to achieve the project targets.

PO7 – *Moral and Ethical Awareness*

PSO 7: Solve and work with a professional context pertaining to ethics, cultural and cyber regulations

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	✓	-	✓

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.
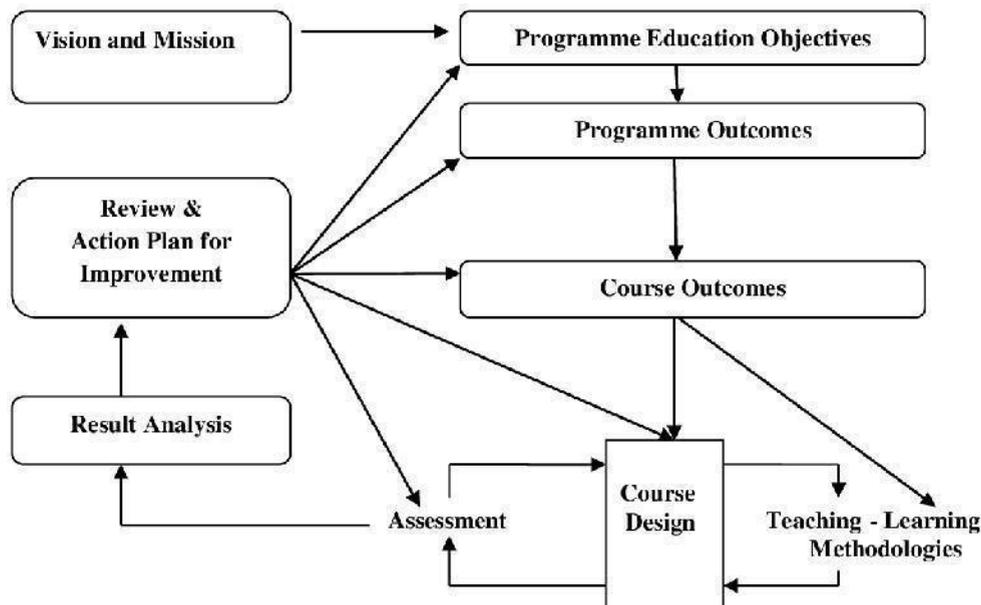
It is important to determine the methods of assessment. A comprehensive assessment strategy may be outlined using the revised Bloom's Taxonomy levels.

BLOOM'S TAXONOMY
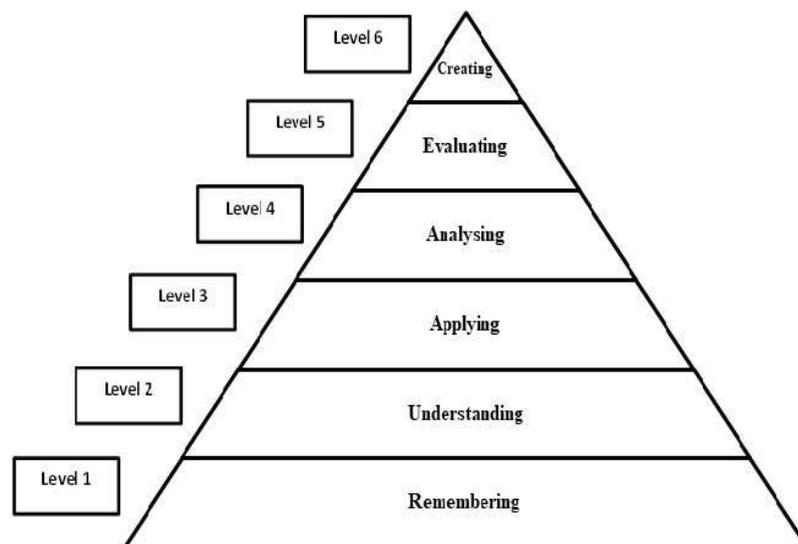
CO – PO Mapping of Courses

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, 2and 1respectively.

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

PO/PSOs COs	PO1/ PSO1	PO2/ PSO2	PO3/ PSO3	PO4/ PSO4	PO5/ PSO5	PO6/ PSO6	PO7/ PSO7
CO1							
CO2							
CO3							
CO4							
CO5							

ELIGIBILITY FOR ADMISSION

The Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Education, Tamil Nadu or any other examination accepted by Academic Council with Mathematics as one of the subjects.

DURATION OF THE PROGRAMME

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

MEDIUM OF INSTRUCTION

English

COURSES OFFERED

Part I	:	Tamil/Hindi/Alternate Course
Part II	:	English
Part III	:	Core Courses
	:	Allied Courses
	:	Elective Courses: Discipline Specific Elective Courses
	:	Self Study Course
Part IV	:	Skill Enhancement Courses (SEC)
	:	Field Project/Internship
	:	Non-Major Elective Courses (NMEC)
	:	Ability Enhancement Compulsory Courses (AECC)
	:	Generic Elective Courses (GEC)
	:	Self Study Course
Part V	:	National Service Scheme/ Physical Education/ Youth Red Cross Society/ Red Ribbon Club/ Science Forum/ Eco Club/ Library and Information Science/ Consumer Club/ Health and Fitness Club and National Cadet Corps/ Rotaract Club

B.2. EVALUATION SCHEME

B.2.1 PART II

Components	Internal Assessment Marks	External Examination Marks	Total Marks
Theory	15	75	100
Practical	5+5	-	

INTERNAL ASSESSMENT

Distribution of Marks

Mode of Evaluation		Marks
Periodic Test	:	15
Practical	:	10
Total	:	25

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

B.2.1.1 PART II (II UG – 2023-2024 onwards)

Components	Internal Assessment Marks	External Examination Marks	Total Marks
Test	15	60	100
Practical	10	15	

INTERNAL ASSESSMENT

Distribution of Marks

Mode of Evaluation		Marks
Periodic Test	:	15
Practical	:	10
Total	:	25

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

EXTERNAL ASSESSMENT

Distribution of Marks

Mode of Evaluation		Marks
Theory	:	60
Practical	:	15
Total	:	75

B.2.1 PART I & PART III - Core Courses, Discipline Specific Elective Courses & Allied Courses

Components	Internal Assessment Marks	External Examination Marks	Total Marks
Theory	25	75	100
Practical	40	60	100
Project	100	-	100

INTERNAL ASSESSMENT

Distribution of Marks

Theory

Mode of Evaluation			Marks
Periodic Test		:	15
Assignment	Core: I UG-K4 Level, II & III UG- K5 Level	:	5
	Part I &Allied: K4 Level		
	DSEC: K5 Level		
Quiz	K2 Level	:	5
Total		**:**	**25**

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

Two Assignments   - Best of the two will be considered

Three Quiz Tests   - Best of the three will be considered

Practical

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

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

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

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1-4)	Multiple Choice	4	4	1	4
B Q. No.(5-7)	Internal Choice-Either Or Type	3	3	7	21
C Q. No.(8-9)	Internal Choice-Either Or Type	2	2	10	20
				Total	**45***

*The total marks obtained in the Periodic Test will be calculated for 15 marks

EXTERNAL EXAMINATION

Question Pattern   **Duration: 3 Hours**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1-10)	Multiple Choice	10	10	1	10
B Q. No.(11 -15)	Internal Choice – Either Or Type	5	5	7	35
C Q. No.(16-18)	Internal Choice – Either Or Type	3	3	10	30
				Total	**75**

PROJECT

Assessment by Internal Examiner only

Distribution of Marks

Mode of Evaluation		Marks
Project Work and Report	:	60
Presentation and Viva -Voce	:	40
Total	**:**	**100**

B.2.2 PART III - SELF STUDY COURSE

Core Courses Quiz - Online

Assessment by Internal Examiner only

- Question Bank is prepared by the Faculty Members of the Departments.

- No. of Questions to be taken 700.

- Multiple Choice Question pattern is followed.

- Online Test will be conducted in VI Semester for 100 Marks.

- Model Examination is conducted after two periodic tests.

Distribution of Marks

Mode of Evaluation		Marks
Periodic Test	:	40
Model Examination	:	60
Total	**:**	**100**

Two Periodic Tests   - Better of the two will be considered

B.2.3. PART IV - Skill Enhancement Courses &Non Major Elective Courses

INTERNAL ASSESSMENT

Distribution of Marks

Theory

Mode of Evaluation			Marks
Periodic Test		:	25
Assignment	SEC: K4 Level	:	10
	NMEC:K3 Level		
Quiz	K2 Level	:	5
Total		**:**	**40**

Three Periodic tests   - Average of the best two will be considered
Two Assignments   - Best of the two will be considered
Three Quiz Tests   - Best of the three will be considered

Practical

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

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

Question Pattern for Periodic Tests   **Duration: 1 Hour**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1- 3)	Internal Choice (Either-or Type)	3	3	5	15
B Q. No.(4)	Internal Choice (Either-or Type)	1	1	10	10
Total					**25**

EXTERNAL EXAMINATION

Question Pattern   **Duration: 2 Hours**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1- 3)	Internal Choice (Either-or Type)	6	6	5	30
B Q. No.(4)	Internal Choice (Either-or Type)	3	3	10	30
				Total	**60**

B.2.4. PART IV- Ability Enhancement Compulsory Courses (AECC) & Generic Elective Courses (GEC)

Assessment by Internal Examiner only

- Model Examination is conducted after two periodic tests.

- Book and Study Material prepared by the Faculty Members of the respective departments will be prescribed.

Distribution of Marks

Mode of Evaluation			Marks
Periodic Test		:	30
Assignment	K2 Level	:	10
Model Examination		:	60
Total		**:**	**100**

Two Periodic tests   - Better of the two will be considered

Two Assignments   - Better of the two will be considered

Question Pattern for Periodic Test   **Duration: 1Hour**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1- 3)	Internal Choice (Either-or Type)	3	3	6	18
B Q. No.(4)	Internal Choice - Either or Type	1	1	12	12
Total					**30**

Question Pattern for Model Examination   **Duration: 2 Hours**

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	6	30
B Q. No. (6- 8)	Internal Choice (Either-or Type)	3	3	10	30
Total					**60**

B.2.5. PART IV – Self Study Course
Practice for Competitive Examinations - Online

 Assessment by Internal Examiner only

- Question Bank prepared by the Faculty Members of the Institution.

- Multiple Choice Question pattern is followed.

- Online Test will be conducted in V Semester for 100 Marks.

- Model Examination is conducted after two periodic tests.

Subject wise Allotment of Marks

Subject		Marks
Tamil	:	10
English	:	10
History	:	10
Mathematics	:	10
Current affairs	:	10
Commerce, Law & Economics	:	10
Physical Sciences	:	10
Life Sciences	:	15
Computer Science	:	5
Food and Nutrition	:	5
Sports and Games	:	5
Total		**100**

Distribution of Marks

Mode of Evaluation		Marks
Periodic Test	:	40
Model Examination	:	60
Total	**:**	**100**

Two Periodic Tests   - Better of the two will be considered

B.2.6. Part V – Extension Activities

Assessment by Internal examiner only

Distribution of Marks

Mode of Evaluation		Marks
Attendance	:	5
Performance	:	10
Report/Assignment/Project/Camp/Practical	:	10
Total	**:**	**25***

*The marks obtained will be calculated for 100 marks

B.2.7 EXTRA CREDIT COURSES (OPTIONAL)

* For theory course, the mode of evaluation is only internal for a maximum of 100 Marks.

Question Pattern   **Duration: 3 Hours**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1- 10)	Multiple Choice	10	10	1	10
B Q. No.(11 -15)	Internal Choice – Either or Type	5	5	9	45
C Q. No.(16-20)	Open Choice	5	3	15	45
				Total	**100**

ELIGIBILITY FOR THE DEGREE

The candidate will not be eligible for the Degree without completing the prescribed Courses of study, lab work, *etc.* and a minimum Pass marks in all the Courses. Attendance, progress and conduct certification from the Head of the Institution will be required for the students to write the examination.

➢ No Pass minimum for Internal Theory & Practical Assessment.

➢ Pass minimum for External Examination is 27 marks out of 75 for Core Courses, Discipline Specific Elective Courses and Allied Courses.

> ➢ Pass minimum for External Examination is 21 marks out of 60 for Skill Enhancement Courses and Non Major Elective Courses.
>
> ➢ The aggregate minimum pass percentage is 40.
>
> ➢ Pass minimum for External Practical Examination is 21 marks out of 60 marks.
>
> ➢ Pass minimum for Ability Enhancement Compulsory Course and Generic Elective Course is 40.
>
> ➢ Pass minimum for Self Study Courses is 40.

ATTENDANCE

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

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

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

(d) 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 2020-2021onwards.

- 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.

Attainment Levels of COs

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

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

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

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 attainment of 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 against 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/ Extracurricular	For participation in Co-curricular / Extracurricular 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

Extracurricular Activities)]

Expected Level of Attainment for each of the Programme Outcomes

POs		Level of Attainment
Value >=	70%	Excellent
Value >=	60 % and Value <70%	Very Good
Value >=	50 % and Value <60%	Good
Value >=	40% and Value <50%	Satisfactory
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 5 years of completion of the programme only through indirect methods.

Target for PEO Attainment

Assessment Criteria	Target (UG)	Target (PG)
Record of Employment	25% of the class strength	30% of the class strength
Progression to Higher Education	40% 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
Value >=	70%	Excellent
Value >=	60 % and Value <70%	Very Good
Value >=	50 % and Value <60%	Good
Value >=	40% and Value <50%	Satisfactory
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 EDUCATIONALOBJECTIVES

The college has always been involving the key stake holders 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 analyzed 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 B.C.A. 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 (3rd Cycle) by NAAC
VIRUDHUNAGAR – 626 001
BACHELOR OF COMPUTER APPLICATIONS (UG) (3026)
Outcome Based Education with Choice Based Credit System
Programme Structure - Allotment of Hours and Credits
For those who join in the Academic Year 2020-2021

Components	Semester						Total Number of Hours/ Credits
	I	II	III	IV	V	VI	
Part I : Tamil /Hindi	6 (3)	6 (3)	5 (3)	5 (3)	-	-	22 (12)
Part II : English	6 (3)	6 (3)	6 (3)	6 (3)	-	-	24 (12)
Part III : Core Courses, Discipline Specific Elective Courses and Allied Courses							
Core Course	5 (4)	5 (4)	4 (4)	4 (4)	5 (5)	5 (5)	28 (26)
Core Course	-	-	4 (3)	-	5 (5)	5 (5)	14 (13)
Core Course	-	-	-	-	5 (5)	5 (5)	10 (10)
Core Course Practical	5 (3)	5 (3)	4 (2)	4 (2)	5 (2)	4 (2)	27 (14)
DSEC	-	-	-	-	4 (4)	5 (4)	9 (8)
DSEC Practical	-	-	-	-	4 (2)	4 (2)	8 (4)
Project	-	-	-	-	0(1)	-	0(1)
Allied Course	4 (4)	4 (4)	4 (4)	4 (4)	-	-	16 (16)
Self Study Course	-	-	-	-	-	0 (1)	0 (1)
Part IV : Skill Enhancement Courses, Non Major Elective Courses, Ability Enhancement Compulsory Courses and Generic Elective Courses							
SEC	2 (2)	2 (2)	-	2 (2)	-	2 (2)	8 (8)
SEC	-	2 (2)	-	2 (2)	-	-	4 (4)
Non Major Elective Course	-	-	2 (2)	2 (2)	-	-	4 (4)
AECC1 - Value Education	2 (2)	-	-	-	-	-	2 (2)
AECC2 - Environmental Studies	-	-	-	-	2(1)	-	2 (1)
GEC -1	-	-	1 (1)	-	-	-	1 (1)
GEC -2	-	-	-	1 (1)	-	-	1 (1)
Self Study Course					0 (1)	-	0 (1)
Part V : Extension Activities	-	-	-	0 (1)	-	-	0 (1)
Total	**30 (21)**	**30 (21)**	**30 (22)**	**30 (24)**	**30 (26)**	**30 (26)**	**180 (140)**
Extra Credit Course					0 (2)	-	0 (2)

DSEC: Discipline Specific Elective Course   SEC: Skill Enhancement Course
AECC: Ability Enhancement Compulsory Course   GEC: Generic Elective Course

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

PART I - TAMIL

S.No.	Sem.	Code	Title of Paper	Credits	Marks
1.	I	20UTAG11	பொதுத்தமிழ் தாள் I	3	100
2.	II	20UTAG21	பொதுத்தமிழ் தாள் II	3	100
3.	III	20UTAG31C	கணினி தமிழ் I	3	100
4.	IV	20UTAG41C	கணினி தமிழ் II	3	100
			Total	**12**	**400**

PART I – HINDI

S. No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	20UHDG11/ 22UHDG11	Hindi - Paper I Prose – I & II, Ancient Stories - I, General Essays, Functional Hindi – I & Grammar/ General Hindi - I	3	100
2.	II	20UHDG21/ 22UHDG21	Hindi - Paper II Drama, One Act Play, Letter, Correspondence, Functional Hindi – II & Grammar/ General Hindi - II	3	100
3.	III	20UHDG31/ 22UHDG31	Hindi - Paper III Ancient Poetry, Drama, Indian History, Hindi Grammar & Functional Hindi III/ Advanced Hindi - I	3	100
4.	IV	20UHDG41/ 22UHDG41	Hindi - Paper IV Modern Poetry, Hindi Literary Essays, Letter Correspondence, Conversation & Functional Hindi IV/ Advanced Hindi - II	3	100
			TOTAL	**12**	**400**

PART II – ENGLISH

S. No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	20UENG11A/ 20UENG11B/ 20UENG11C	English – Paper I English for Advanced Learners – I English for Career Guidance – I English for Communicative Competence-I	3	100
2.	II	20UENG21A/ 20UENG21B/ 20UENG21C	English – Paper II English for Advanced Learners – II English for Career Guidance – II English for Communicative Competence –	3	100

3.	III	20UENG31A/ 20UENG31B/ 20UENG31C/ 22UENG31	English – Paper III English for Advanced Learners – III English for Career Guidance – III English for Communicative Competence – III/ Communicative English- I	3	100
4.	IV	20UENG41A/ 20UENG41B/ 20UENG41C/ 22UENG41	English – Paper IV English for Advanced Learners – IV English for Career Guidance – IV English for Communicative Competence – IV/ Communicative English- II	3	100
			Total	**12**	**400**

PART III – CORE, DISCIPLINE SPECIFIC ELECTIVE COURSES

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1	I	20UCAC11	Programming in C	4	100
2	I	20UCAC11P	Programming in C Lab	3	100
3	II	20UCAC21	Programming in C++	4	100
4	II	20UCAC21P/ 20UCAC21PN	Programming in C++Lab	3	100
5	III	20UCAC31/ 20UCAC31N	Data Structures	4	100
6	III	20UCAC32/ 20UCAC32N	Operating Systems	3	100
7	III	20UCAC31P	Data Structures using C++ Lab	2	100
8	IV	20UCAC41/ 20UCAC41N	Java Programming	4	100
9	IV	20UCAC41P	Java Programming Lab	2	100
10	V	20UCAC51	VB.Net Programming	5	100
11	V	20UCAC52	Computer Networks	5	100
12	V	20UCAC53	Software Engineering	5	100
13	V	20UCAC51P	VB.Net Programming Lab	2	100
14	V	20UCAE51 20UCAE52 20UITE51	Computer Graphics (or) Microprocessor using 8085 (or) System software	4	100
15	V	20UCAE51P 20UCAE52P 20UITE51P	Computer Graphics Programming Lab(or) Microprocessor Lab (or) System Testing Lab	2	100
16	V	20UCAC5PR	Project	1	100
17	VI	20UCAC61	Web Programming	5	100
18	VI	20UCAC62	Database Management Systems	5	100
19	VI	20UCAC63	Data Mining	5	100
20	VI	20UCAC61P	Web Programming Lab	2	100
21	VI	20UCAQ61	Core Courses Quiz - Online	1	100

22	VI	20UCAE61	Mobile Application development (or)	4	100
		20UCAE62	Python Programming (or)		
		20UITE61	Embedded system		
23	VI	20UCAE61P	Mobile Application development Lab (or)	2	100
		20UCAE62P	Python Programming Lab (or)		
		20UITE61P	R Programming Lab		
Total				**77**	**2300**

PART III – ALLIED COURSES

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	20UCAA11	Discrete Mathematics	4	100
2.	II	20UCAA21	Resource Management Techniques	4	100
3.	III	20UCAA31	Numerical Aptitude	4	100
4.	IV	20UCAA41	Financial Management	4	100
Total				**16**	**400**

PART IV – SKILL ENHANCEMENT COURSES

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	20UCAS11P	MS-Office Lab	2	100
2.	II	20UCAS21P/ 20UCAS21PN	Photoshop Lab	2	100
3.	II	20UCAS22/ 20UCAS22N	Digital Logic	2	100
4.	IV	20UCAS41/ 20UCAS41N	Computer Organization	2	100
5.	IV	20UCAS42P/ 20UCAS42PN	Flash Lab	2	100
6.	VI	20UCAS61P	Database Lab	2	100
Total				**12**	**600**

PART IV – NON MAJOR ELECTIVE COURSES

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1	III	20UCAN31	Fundamentals of Computers	2	100
2	IV	20UCAN41	Web Design with HTML	2	100
Total				**4**	**200**

PART IV – ABILITY ENHANCEMENT COMPULSORY COURSES AND GENERIC ELECTIVE COURSES

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	20UGVE11	Value Education	2	100
2.	V	20UGES51	Environmental Studies	1	100
3	III	20UGEH31	Human Rights/	1	100
		20UGEW32	Women Studies		
4.	IV	20UGEC41	Constitution of India/	1	100
		20UGEM42	Modern Economics/		
		20UGEA43	Adolescent Psychology/		
		20UGED44	Disaster Management		
5.	V	20UGCE51	Practice for Competitive Examinations - Online	1	100
			Total	**6**	**500**

PART V -EXTENSION ACTIVITIES

S.No.	Sem.	Code	Title of the Course	Credit
1	I, II, III & IV	20UVNS1, 20UVNS2	National Service Scheme	1
2		20UVPE1	Physical Education	
3		20UVYR1 20UVYR2	Youth Red Cross Society	
4		20UVRR1	Red Ribbon Club	
5		20UVSF1	Science Forum	
6		20UVEC1	Eco Club	
7		20UVLI1	Library and Information Science	
8		20UVCC1	Consumer Club	
9		20UVHF1	Health and Fitness Club	
10		20UVNC1 20UVNC2	National Cadet Corps	
11		20UVRO1	Rotaract Club	

EXTRA CREDIT COURSES (Optional)

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1	V	20UCAO51	Pointers in C and C++	2	100

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001
BACHELOR OF COMPUTER APPLICATIONS (B.C.A)
Programme Code – 3026
PROGRAMME CONTENT
SEMESTER I

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	**Part I**		Tamil / Hindi Course I	20UTAG11/ 20UHDG11	6	3	3	25	75	100
2	**Part II**		English Course I	20UENG11A/ 20UENG11B/ 20UENG11C	6	3	3	25	75	100
3	**Part III**	Core Course 1	Programming in C	20UCAC11	5	4	3	25	75	100
4		Core Course 2	**Core Practical 1:** Programming in C Lab	20UCAC11P	5	3	3	40	60	100
5		Allied Course 1	Discrete Mathematics	20UCAA11	4	4	3	25	75	100
6	**Part IV**	SEC 1	MS-Office Lab	20UCAS11P	1 T^*+1P'	2	2	40	60	100
7		AECC – 1	Value Education	20UGVE11	2	2	-	100	-	100
				Total	**30**	**21**				**700**

T^* - Tutorial P' - Practical

BACHELOR OF COMPUTER APPLICATIONS - SEMESTER II

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	**Part I**		Tamil / Hindi Course II	20UTAG21/ 20UHDG21	6	3	3	25	75	100
2	**Part II**		English Course II	20UENG21A/ 20UENG21B/ 20UENG21C	6	3	3	25	75	100
3	**Part III**	Core Course 3	Programming in C++	20UCAC21	5	4	3	25	75	100
4		Core Course 4	**Core Practical 2:** Programming in C++ Lab	20UCAC21P	5	3	3	40	60	100
5		Allied Course 2	Resource Management Techniques	20UCAA21	4	4	3	25	75	100
6	**Part IV**	SEC 2	Photoshop Lab	20UCAS21P	1 T*+1P'	2	2	40	60	100
7		SEC 3	Digital Logic	20UCAS22	2	2	2	40	60	100
	Total				30	21				700

BACHELOR OF COMPUTER APPLICATIONS - SEMESTER III

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Mark		
								Int.	Ext.	Total
1	**Part I**		கணினி தமிழ் I / Hindi Course III	20UTAG31C/ 20UHDG31	5	3	3	25	75	100
2	**Part II**		English Course III	20UENG31A/ 20UENG31B/ 20UENG31C	6	3	3	25	75	100
3	**Part III**	Core Course 5	Data Structures	20UCAC31	4	4	3	25	75	100
4		Core Course 6	Operating Systems	20UCAC32	4	3	3	25	75	100
5		Core Course 7	**Core Practical 3:** Data Structures using C++ Lab	20UCAC31P	4	2	3	40	60	100
6		Allied Course 3	Numerical Aptitude	20UCAA31	4	4	3	25	75	100
7	**Part IV**	NMEC 1	Fundamentals of Computers	20UCAN31	2	2	2	40	60	100
8		GEC 1	1. Human Rights/ 2. Women Studies	20UGEH31/ 20UGEW32	1	1	2	100	-	100
				Total	30	22				800

BACHELOR OF COMPUTER APPLICATIONS - SEMESTER IV

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	**Part I**		கணினி தமிழ் II / Hindi Course IV	20UTAG41C/ 20UHDG41	5	3	3	25	75	100
2	**Part II**		English Course IV	20UENG41A/ 20UENG41B/ 20UENG41C	6	3	3	25	75	100
3	**Part III**	Core Course 8	Java Programming	20UCAC41	4	4	3	25	75	100
4		Core Course 9	**Core Practical 4:** Java Programming Lab	20UCAC41P	4	2	3	40	60	100
5		Allied Course 4	Financial Management	20UCAA41	4	4	3	25	75	100
6	**Part IV**	SEC 4	Computer Organization	20UCAS41	2	2	2	40	60	100
7		SEC 5	Flash Lab	20UCAS42P	1 T*+1P'	2	2	40	60	100
8		NMEC 2	Web Design with HTML	20UCAN41	2	2	2	40	60	100
9		GEC 2	1. Constitution of India/ 2. Modern Economics/ 3. Adolescent Psychology/ 4. Disaster Management 5. Disaster Management	20UGEC41/ 20UGEM42/ 20UGEA43/ 20UGED44 20UGED44N	1	1	2	100	-	100
10	**Part V**		Extension Activity		-	1	100			
			Total		30	24				1000

BACHELOR OF COMPUTER APPLICATIONS - SEMESTER V

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam Hours	Marks		
								Int.	Ext.	Total
1	**Part III**	Core Course 10	VB .Net Programming	20UCAC51	5	5	3	25	75	100
2		Core Course 11	Computer Networks	20UCAC52	5	5	3	25	75	100
3		Core Course 12	Software Engineering	20UCAC53	5	5	3	25	75	100
4		Core Course 13	**Core Practical 5:** VB.Net Programming Lab	20UCAC51P	5	2	3	40	60	100
5		DSEC 1	**Discipline Specific Elective Course 1** System software	20UITE51	4	4	3	25	75	100
			Computer Graphics	20UCAE52						
			Microprocessor using 8085	20UCAE53						
6		DSEC 2	**Discipline Specific Elective Course 2 Practical** System Testing Lab	20UITE51P	4	2	3	40	60	100
			Computer Graphics Programming Lab	20UCAE52P						
			Microprocessor Lab	20UCAE53P						
7			Project	20UCAC5PR	0	1	-	100		
8	**Part IV**	Self-Study Course	Practice for Competitive Examinations - Online	20UGCE51	-	1	-	100		
9		AECC 2	Environmental Studies	20UGES51	2	1	2	100		
Total					**30**	**26**				**900**

BACHELOR OF COMPUTER APPLICATIONS - SEMESTER VI

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	Part III	Core Course 14	Web Programming	20UCAC61	5	5	3	25	75	100
2		Core Course 15	Database Management Systems	20UCAC62	5	5	3	25	75	100
3		Core Course 16	Data Mining	20UCAC63	5	5	3	25	75	100
4		Core Course 17	**Core Practical 6:** Web Programming Lab	20UCAC61P	5	2	3	40	60	100
5		DSEC 3	**Discipline Specific Elective Course 3** Mobile Application development	20UCAE61	4	4	3	25	75	100
			Python Programming	20UCAE62						
			Embedded system	20UITE63						
6		DSEC 4	**Discipline Specific Elective Course 4 Practical** Mobile Application development Lab	20UCAE61P	4	2	3	40	60	100
			Python Programming Lab	20UCAE62P						
			R Programming Lab	20UITE63P						
7		Self Study Course	Core Courses Quiz – Online	20UCAQ61	-	1	-	100	-	100
8	**Part IV**	SEC 6	Database Lab	20UCAS61P	1 T*+1P ,	2	2	40	60	100
Total					**30**	**26**				**800**

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001
BACHELOR OF COMPUTER APPLICATIONS
REVISED PROGRAMME CONTENT
SEMESTER I

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	**Part I**		Tamil / Hindi Course I	20UTAG11/ 20UHDG11	6	3	3	25	75	100
2	**Part II**		English Course I	20UENG11A/ 20UENG11B/ 20UENG11C	6	3	3	25	75	100
3	**Part III**	Core Course 1	Programming in C	20UCAC11	5	4	3	25	75	100
4		Core Course 2	**Core Practical 1:** Programming in C Lab	20UCAC11P	5	3	3	40	60	100
5		Allied Course 1	Discrete Mathematics	20UCAA11	4	4	3	25	75	100
6	**Part IV**	SEC 1	MS-Office Lab	20UCAS11P	1 T*+1P'	2	2	40	60	100
7		AECC – 1	Value Education	20UGVE11	2	2	-	100	-	100
				Total	**30**	**21**				**700**

T* - Tutorial P' - Practical

SEMESTER II

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	**Part I**		Tamil / Hindi Course II	20UTAG21/ 20UHDG21	6	3	3	25	75	100
2	**Part II**		English Course II	20UENG21A/ 20UENG21B/ 20UENG21C	6	3	3	25	75	100
3	**Part III**	Core Course 3	Programming in C++	20UCAC21	5	4	3	25	75	100
4		Core Course 4	**Core Practical 2:** Programming in C++ Lab	20UCAC21PN	5	3	3	40	60	100
5		Allied Course 2	Resource Management Techniques	20UCAA21	4	4	3	25	75	100
6	**Part IV**	SEC 2	Photoshop Lab	20UCAS21PN	1 T*+1P'	2	2	40	60	100
7		SEC 3	Digital Logic	20UCAS22N	2	2	2	40	60	100
Total					**30**	**21**				**700**

BACHELOR OF COMPUTER APPLICATIONS - SEMESTER III

S. No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Mark		
								Int.	Ext.	Total
1	**Part I**		fzpdpjkpo; I / Hindi Course III	20UTAG31C/ 20UHDG31	5	3	3	25	75	100
2	**Part II**		English Course III	20UENG31A/ 20UENG31B/ 20UENG31C	6	3	3	25	75	100
3	**Part III**	Core Course 5	Data Structures	20UCAC31N	4	4	3	25	75	100
4		Core Course 6	Operating Systems	20UCAC32N	4	3	3	25	75	100
5		Core Course 7	**Core Practical 3:** Data Structures using C++ Lab	20UCAC31P	4	2	3	40	60	100
6		Allied Course 3	Numerical Aptitude	20UCAA31	4	4	3	25	75	100
7	**Part IV**	NMEC 1	Fundamentals of Computers	20UCAN31	2	2	2	40	60	100
8		GEC 1	1. Human Rights/ 2. Women Studies	20UGEH31/ 20UGEW32	1	1	2	100	-	100
Total					**30**	**22**				**800**

BACHELOR OF COMPUTER APPLICATIONS - SEMESTER IV

S.No.	Components		Title of the Course	Course Code	Hour s per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	**Part I**		கணினிதமிழ் II/ Hindi Course IV	20UTAG41C/ 20UHDG41	5	3	3	25	75	100
2	**Part II**		English Course IV	20UENG41A/ 20UENG41B/ 20UENG41C	6	3	3	25	75	100
3	**Part III**	Core Course 8	Java Programming	20UCAC41	4	4	3	25	75	100
4		Core Course 9	**Core Practical 4:** Java Programming Lab	20UCAC41P N	4	2	3	40	60	100
5		Allied Course 4	Financial Management	20UCAA41	4	4	3	25	75	100
6	**Part IV**	SEC 4	Computer Organization	20UCAS41N	2	2	2	40	60	100
7		SEC 5	Flash Lab	20UCAS42P N	1 T*+1P'	2	2	40	60	100
8		NMEC 2	Web Design with HTML	20UCAN41	2	2	2	40	60	100
9		GEC 2	1. Constitution of India/ 2. Modern Economics/ 3. Adolescent Psychology/ 4. Disaster Management 5. Disaster Management	20UGEC41/ 20UGEM42/ 20UGEA43/ 20UGED44 20UGED44N	1	1	2	100	-	100
10	**Part V**		Extension Activity		-	1		100		
Total					**30**	**24**				**1000**

BACHELOR OF COMPUTER APPLICATIONS - SEMESTER V

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam Hours	Marks		
								Int.	Ext.	Total
1	**Part III**	Core Course 10	VB .Net Programming	20UCAC51	5	5	3	25	75	100
2		Core Course 11	Computer Networks	20UCAC52	5	5	3	25	75	100
3		Core Course 12	Software Engineering	20UCAC53	5	5	3	25	75	100
4		Core Course 13	**Core Practical 5:** VB.Net Programming Lab	20UCAC51P	5	2	3	40	60	100
5		DSEC 1	**Discipline Specific Elective Course 1** System software	20UITE51	4	4	3	25	75	100
			Computer Graphics	20UCAE52						
			Microprocessor using 8085	20UCAE53						
6		DSEC 2	**Discipline Specific Elective Course 2 Practical** System Testing Lab	20UITE51P	4	2	3	40	60	100
			Computer Graphics Programming Lab	20UCAE52P						
			Microprocessor Lab	20UCAE53P						
7			Project	20UCAC5PR	0	1	-		100	
8	**Part IV**	Self-Study Course	Practice for Competitive Examinations - Online	20UGCE51	-	1	-		100	
9		AECC 2	Environmental Studies	20UGES51	2	1	2		100	
Total					**30**	**26**				**900**

BACHELOR OF COMPUTER APPLICATIONS - SEMESTER VI

S.No.	Components		Title of the Course	Course Code	Hours per week	Credits	Exam. Hours	Marks		
								Int.	Ext.	Total
1	**Part III**	Core Course 14	Web Programming	20UCAC61	5	5	3	25	75	100
2		Core Course 15	Database Management Systems	20UCAC62	5	5	3	25	75	100
3		Core Course 16	Data Mining	20UCAC63	5	5	3	25	75	100
4		Core Course 17	**Core Practical 6:** Web Programming Lab	20UCAC61P	5	2	3	40	60	100
5		DSEC 3	**Discipline Specific Elective Course 3** Mobile Application development	20UCAE61	4	4	3	25	75	100
			Python Programming	20UCAE62						
			Embedded system	20UITE63						
6		DSEC 4	**Discipline Specific Elective Course 4 Practical** Mobile Application development Lab	20UCAE61P	4	2	3	40	60	100
			Python Programming Lab	20UCAE62P						
			R Programming Lab	20UITE63P						
7		Self Study Course	Core Courses Quiz – Online	20UCAQ61	-	1	-	100	-	100
8	**Part IV**	SEC 6	Database Lab	20UCAS61P	1 T*+1P'	2	2	40	60	100
Total					**30**	**26**				**800**

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2020 -2021 onwards)

Semester I		Hours/Week: 5	
Core Course1	**PROGRAMMING IN C**	Credits: 4	
Course Code		Internal	External
20UCAC11		25	75

COURSE OUTCOMES

On successful completion of the course, the learner should be able to

CO1: outline the history of C, model of computer, structure of C, constants, variables, data types, operators, expression, control statement, input and output operations.[K1]

CO2: understand the concept of top-down modular programming, collection of similar data, group of logically related data, pointers and basic file operations. [K2]

CO3: illustrate the basics of computers, elements of C Programming, management of input and output operations, statements that alter the flow of execution, user defined and derived data types, array, pointer and file handling functions. [K2]

CO4: apply the knowledge of basic structures, operators, expressions, management of input/ output operations, control structures, branching, array, user defined functions, structures, dynamic memory allocation, file management. [K3]

CO5: analyze various operators, decision making and iterative statements, homogeneous and heterogeneous data, pointers and files. [K4]

UNIT I

Computer Basics: Algorithms – Simple Model of Computer – Characteristics of Computers– Problem Solving Using Computers: Flowchart. **Overview of C**: History of C- Importance of C- basic Structure of a C – Programming style. **Constants, Variables and Data types**: Introduction -Character Set- C Tokens – Keywords and Identifiers- Constants – Variables – Data Types – Declaration of variables – Declaration of Storage class – Assigning values to variables - Defining symbolic constants – Declaring variables as constant - Declaring a variables as volatile. **Operators and Expressions**: Introduction- Arithmetic operators - Relational operators - Logical operators - Assignment operators –

Increment and Decrement operators - Conditional operators - Bitwise operators - Special operators – Arithmetic expression – Evaluation of expression – Precedence of arithmetic operators – Type conversions in expression – Operator precedence and Associativity – Mathematical functions.

(15 Hours)

UNIT II

Managing Input/output operations: Introduction - Reading a character - Writing a character- Formatted input - output. **Decision Making and Branching**: Introduction - Decision making with if statement - simple if statement - if...else statement - Nesting of if … else statement – else if ladder – Switch statement – The ?: operator – goto statement. **Decision Making and Looping**: Introduction - The while statement – The do statement – The for statement – Jumps in loop – Concise Test Expressions.

(15 Hours)

UNIT III

Arrays: Introduction - One dimensional array – Declaration of one-dimensional arrays – Initialization of one-dimensional arrays -Two dimensional array – Initializing two-dimensional arrays - Multi dimensional array- Dynamic arrays – More about Arrays. **Character arrays and Strings**: Introduction – Declaring and initialization string variables- Reading strings from terminal - Writing strings to screen -Arithmetic operations on characters - Putting strings together – Comparison of two strings – String Handling function-Table of strings – Other features of strings. (15 Hours)

UNIT IV

User defined functions: Introduction - Need for user-defined functions – A multi function program- Elements of user defined functions – Definition of functions -Return values and their types- Function calls -Function Declaration – Category of Functions –No Arguments and No Return Values – Arguments but No Return Values – Arguments with Return Values – No Arguments but Return a value – Functions that Return Multiple Values - Nesting of functions – Recursion. **Structures and Unions**: Introduction - Defining a structure, declaring structure variables – Accessing structure members –Structure Initialization – Copying and comparing structure variables – Operations on individual members - Arrays of structures.

(15 Hours)

UNIT V

Pointers: Introduction - Understanding pointers - Accessing the address of a variable – Declaring Pointer Variables - Initialization of Pointer Variables- Accessing a variable Through its Pointer- Chain of pointers- Pointer expressions- Pointer Increments and scale factor- Pointers and arrays. **Files Management in C:** Introduction -Defining and Opening - Closing a file - Input/output operations on files-Random access to files-Command Line arguments.   (15 Hours)

TEXT BOOKS

1. V.Rajaraman, Neeharika Adabala, (2015). *Fundamentals of Computers, 6e, PHI Learning* Delhi: Private Limited

2. E.Balagurusamy, (2018).*Programming in ANSIC*, *7e,* Chennai: McGrawHill Education (India) Private Limited.

   Unit I: Text Book 1: Chapter 1 – 1.1, 1.2, 1.3, 1.4.1

   Text Book 2: Chapters 1, 2, 3

   Unit II: Text Book 2: Chapters 4, 5, 6

   Unit III: Text Book 2: Chapters 7, 8

   Unit IV: Text Book 2: Chapter 9 (Page No 267 to 292),

                     Chapter 10 (Page No. 320 to330)

   Unit V: Text Book 2: Chapter 11 (Page No. 353 to367),

                     Chapter 12 (Page No. 391 to 399, Page No. 402 to 411)

REFERENCE BOOKS

1. Gottfried, (2006). *Programming with C (Schaum's outline series),* Tata McGraw Hill.

2. Yashavant Kanetkar, (2010.). *Let Us C,* 10th edition, BPB Publications.

Course Code 20UCAC11	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	-	-	-	-	-	-	-
CO2	H	M	M	M	M	-	-	-	-	-
CO3	M	M	M	H	H	L	L	M	-	-
CO4	M	M	L	M	H	L	L	M	-	-
CO5	-	M	L	-	-	-	-	H	-	-

J.Porkodi   B.Sakthi

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 (3ʳᵈ Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2020 – 2021 onwards)

Semester I		Hours/Week: 5	
Core Course2	**PROGRAMMING IN C LAB**	Credits: 3	
Course Code **20UCAC11P**		Internal 40	External 60

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1: apply the specification of syntax, rules for numerical, constants, variables and data types. **[**K3]

CO2: write C programs using arrays, operators, decision making/looping statements, functions, structure, pointer and files. [K3]

CO3: execute the programs with required input. [K3]

CO4: prepare the record with the neat output. [K3]

CO5: test program with modification and justify the result. [K4]

Write a C program

1. To find the sum of digits of a number.

2. To reverse a given number & check if it is a palindrome.

3. To evaluate sine series.

4. To find the Nth Fibonacci number.

5. To check if a number is prime or not.

6. To sort an array.

7. To count the occurrences of a number in a set.

8. To check if a number is Adam number.

9. To reverse a given string & check if it is a palindrome.

10. To perform string manipulations (concatenation, length, reverse, copy)

11. To find factorial value, Fibonacci, GCD value using recursion.

12. To add and subtract two matrices.

13. To multiply two matrices.

14. To find row wise sum of a matrix of order M x N.

15. To solve quadratic equation using switch case.

16. To perform binary search using function.

17. To find NCR and NPR values using functions.

18. To calculate mean, standard deviation, variance using functions.

19. To prepare pay bill using structure.

20. To prepare mark sheet using structure.

21. To perform inventory calculations using structure.

22. To prepare mark sheet using file.

23. To prepare EB bill using file.

Course Code 20UCAC11P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	H	-	-	-	-	-	-	-
CO2	H	H	M	M	M	-	-	-	-	L
CO3	M	M	M	H	M	L	L	M	-	-
CO4	M	-	L	M	-	L	L	M	-	-
CO5	-	M	L	-	-	-	-	H	L	-

J.Porkodi   B.Sakthi
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A
(2020 – 2021 onwards)

Semester I		Hours/Week: 4	
Allied Course 1	**DISCRETE MATHEMATICS**	Credits: 4	
Course Code		Internal	External
20UCAA11		25	75

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1:   understand the basic concepts of relations, functions, mathematical induction, theory of matrices, graph theory. [K1]

CO2:   discuss the types of relations, functions, matrices, graphs with examples. [K2]

CO3:   explain proofs of theorems with examples. [K2]

CO4:   apply and solve the problems in relations, functions, matrices and graphs. [K3]

CO5:   explain the algorithms for problems in relations and functions and point out the solutions using algorithms on graphs. [K4]

UNIT I

   Relations: Relations-Operation on relations-equivalence relation –closure and Warshall's algorithm-partitions and Equivalence classes.

(12 Hours)

UNIT II

   Functions & Mathematical induction: Functions and operators-one-one, onto functions- special type of functions-invertible functions-Compositions of functions. Techniques   of proofs -mathematical induction

(12 Hours)

UNIT III

   Recurrence relations & generating functions: Recurrence-an introduction- Polynomial and their relations-Solutions of finite order homogeneous (linear) relations- Solutions of non- homogeneous relations-generating functions.

(12 Hours)

UNIT IV

Matrix algebra: Introduction-operations-inverse, Rank of matrix-Solution of Simultaneous linear equations-Eigen values and Eigen vectors.

(12 Hours)

UNIT V

Graph theory: Basic concepts : Definitions Only – degrees – subgraphs – matrices – walks –trials – paths – connectedness & components (theorem statements only) – Applications –connector problem – Krushkal's algorithm – shortest path problem – Dijikstra's algorithm. (12 Hours)

TEXT BOOKS

1. Dr.M.Venkatraman, Dr.N.Sridharan &N.Chandrasekara, *Discrete Mathematics*, TheNational publishing Company.(For Unit : I to IV)

   Unit I: Chapters 2

   Unit II: Chapters 3, 4

   Unit III: Chapter 5 (5.1 to 5.7)

   Unit IV: Chapter 6

2. S.Arumugam & Ramachandran, *Introduction to Graph Theory,* Scitech Publications(Unit V)

   Unit V: Chapter 2: Section 2.0 to 2.4, 2.8

   Chapter 4: Section 4.0 to 4.2

   Chapter 11: Section 11.0 to 11.2

REFERENCE BOOKS

1. S.Arumugam & Issac, *Modern Algebra,* New Delhi: SCITECH Publications.
2. Johnson baugh, (2009). *Discrete Mathematics*, 6/E, Pearson Prentice Hall,
3. Purna Chandra Biswal, *Discrete Mathematics and Graph theory.*

Course Code 20UCAA11	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	L	H	M	M	L	-
CO2	H	L	H	M	M	L	-
CO3	H	-	L	L	M	L	-
CO4	H	-	M	M	M	L	-
CO5	H	-	M	L	M	L	-

J.Porkodi   K.Chitra Lakshmi
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 (3rd Cycle) by NAAC
VIRUDHUNAGAR – 626 001

B.C.A
(2020-2021 onwards)

Semester I		Hours/Week: 2	
Skill Enhancement Course 1	**MS-OFFICE LAB**	Credits: 2	
Course Code **20UCAS11P**		Internal 40	External 60

COURSE OUTCOMES
On successful completion of the course, the learners will be able to

CO1: examine the given problem and identify the basic tools and features in MS-Word, MS- Excel, MS-Power Point and MS-Access. [K3]

CO2: design document using required tools and elements to create professional and academic documents/presentations. [K3]

CO3: execute the steps to solve real world problems. [K3]

CO4: present the analysis of data using chart and record effectively. [K3]

CO5: explain the necessity of tools used and deduce the answers for any queries raised. [K4]

MS-Word

1. Prepare the document using formatting the text.
2. Prepare the document using mathematical equations.
3. Prepare resume in MS-Word.
4. Prepare the document using Table.
5. Draft a letter using Mail Merge option.

MS-Excel

6. Classify the data using Frequency function and make out a suitable chart.
7. Create a suitable worksheet with necessary information and use data sort to display results. Also use data filters to consider at least five different criteria.
8. Prepare a salary bill in a work sheet
9. Calculate Mean, Median and Mode for the series using statistical functions.

10. Create worksheet with necessary information using a goal seek concept.

11. Calculate commission to salesmen on the basis of their total sales.

MS-PowerPoint

12. Create Advertisement using PowerPoint presentation (minimum five slides with Text and Pictures).

13. Create PowerPoint presentation to explain sales performance of your company over a period of five years. Insert a suitable picture from clip art. Use suitable animation features.

MS-Access

14. Create table for a mark list of students. Calculate total, average and grade and display the results using Queries.

15. Create a report for the students' profile using Report Wizard.

Course Code 20UCAS11P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	H	M	-	-	-	-	-	-	-
CO2	M	H	M	M	H	-	-	-	L	L
CO3	-	H	-	M	-	L	-	M	-	L
CO4	M	H	L	M	H	L	L	M	-	-
CO5	H	M	L	-	-	-	-	H	-	-

J.Porkodi   B.Subashini

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2020 -2021 onwards)

Semester II		Hours/Week: 5	
Core Course 3	**PROGRAMMING IN C++**	Credits: 4	
Course Code		Internal	External
20UCAC21		25	75

COURSE OUTCOMES

On successful completion of the course, the learns should be able to

CO1: describe the procedural and object oriented paradigm with concepts of stream classes, functions, pointer and inheritance. [K1]

CO2: list different types of operators and polymorphism. [K2]

CO3: explain the concepts of object-oriented programming, function, constructor, overloading, inheritance and string class. [K2]

CO4: make the use of functions, inheritance, virtual function, overloading, Streams, string manipulation, constructor and destructor to solve complex problems. [K3]

CO5: analyze various ideas related with the function, string, inheritance and constructor for the real time application. [K4]

UNIT I

Principles of Object-Oriented Programming: Basic Concepts of Object Oriented Programming - Benefits of OOP. **Beginning with C++:** What is C++ - Applications of C++ - A Simple C++ Program –More C++ statements - Structure of a C++ program. **Tokens, Data types:** Introduction – Tokens – Keywords – Identifiers and Constants – Basic Data Types – User-Defined Data Types – Storage Classes - Derived Data Types – Symbolic Constants.

(12 Hours)

UNIT II

Expressions and Control Structures: Type Compatibility – Declaration of Variables – Dynamic Initialization of Variables – Reference Variables – Operators in C++ - Scope Resolution Operator – Type Cast Operator – Expressions and their Types - Control Structures. **Functions in C++:** Introduction – The main function – Function Prototyping – Call by Reference - Return by Reference - Inline Functions – Default Arguments - Function Overloading - Math Library Functions. **Classes and Objects:** Specifying a Class – Defining Member Functions– C++ Program with Class - Making an Outside Function Inline – Nesting of Member Functions – Private Member Functions – Arrays with in a Class – Memory Allocation for Objects- Arrays of Objects– Friendly Functions.

(15 Hours)

UNIT III

Constructors and Destructors: Introduction – Constructors - Parameterized Constructors – Constructors with Default Arguments – Copy Constructor – Dynamic Constructors - Destructors. **Operator Overloading:** Introduction - Defining Operator Overloading - Overloading unary operators - Overloading Binary Operators – Overloading Binary Operators using Friends – Rules for Overloading Operators.

(18 Hours)

UNIT IV

Inheritance: Extending Classes: Introduction - Defining derived classes – Single Inheritance – Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance - Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes. **Pointers, Virtual Functions and Polymorphism:** Pointers – Pointer to Objects – this Pointer – Polymorphism –Virtual Functions.   (15 Hours)

UNIT V

Managing Console I/O Operations: Introduction – C++ Streams - C++ Stream Classes – Unformatted I/O operation – Formatted Console I/O Operations - Managing Output with Manipulators. **Manipulating Strings:** Introduction – Creating (string) Objects – Manipulating String Objects – Relational Operations – String Characteristics – Accessing Characters in Strings – Comparing and Swapping.   (15 Hours)

TEXT BOOK

E.Balagurusamy,*(2018).Object-Oriented Programming with C++,*7thEdition, India: McGraw Hill Education Private Ltd.

Unit	Chapter	Section
I	1	1.5, 1.6
	2	2.1 to 2.4, 2.6
	3	3.1 to 3.9
II	3	3.10 to 3.15, 3.19, 3.20, 3.25
	4	4.1 to 4.7, 4.10, 4.12
	5	5.3 to 5.10,5.13, 5.15
III	6	6.1 to 6.3, 6.5, 6.7, 6.8 6.11
	7	7.1 to7.5,7.8
IV	8	8.1 to 8.9
	9	9.2 to 9.5, 9.7
V	10	10.1 to 10.6
	15	15.1 to 15.7

REFERENCE BOOKS

1. K.R.Venugopal, Rajkumar Buyya, (2017). *Mastering C++, 2ndEdition,* India: McGraw Hill Education Private Limited.

2. Pohl,I, *(2004). Object Oriented Programming using C+,* Second Edition, New Delhi: Pearson Education.

3. Budd,*T., (2008). An Introduction to OOP*, Third Edition, New Delhi: Pearson Education.

Course Code 20UCAC21	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	-	-	-	-	-	-	-
CO2	H	M	M	M	M	-	-	-	-	-
CO3	M	M	M	H	H	L	L	M	-	-
CO4	M	M	L	M	H	L	L	M	-	-
CO5	-	M	L	-	-	-	-	H	-	-

J.Porkodi   V.G. Jyothi Mani

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 (3ʳᵈ Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A
~~(2020 – 2021 onwards)~~

Semester II		Hours/Week: 5	
Core Course 4	**PROGRAMMING IN C++ LAB**	Credits: 3	
Course Code **20UCAC21P**		Internal 40	External 60

COURSE OUTCOMES

On successful completion of the course, the learns should be able to

CO1:   make use of classes, objects, methods, functions and constructors. [K3]

CO2:   write programs using C++ features such as composition of objects, Operator overloading, function overloading, virtual functions, inheritance Polymorphism. [K3]

CO3:   execute the programs with required input. [K3]

CO4:   present output effectively and prepare the record with the neat output. [K3]

CO5:   test program with modification and justify the result. [K4]

Write a C++ program

1.   To demonstrate returning objects from classes

2.   To demonstrate passing objects as function arguments

3.   To swap two numbers without using intermediate variable

4.   To check if a number is prime or not, using objects

5.   To find larger of two numbers using inline function

6.   To calculate simple interest using function using rate of interest as default argument

7.   To perform Area calculation using Function overloading (Minimum three functions)

8.   To perform String manipulation (three different types) using function overloading

9.   To find minimum of two numbers between two class objects using friend function

10.   To find the sum of the digit of a given number using constructor overloading

11.   To overload unary minus operator to change sign of given 3elements

12.   To overload Binary plus operator to add two complex numbers

13. To create telephone directory using single inheritance

14. To prepare a student's mark sheet using multiple inheritance

15. To prepare pay slip of an employee using hierarchical inheritance

16. To create bank account using multilevel inheritance

17. To prepare EB bill for a customer using hybrid inheritance

18. To format the output using system defined manipulators

19. To sort array of generic data

| Course Code 20UCAC21P | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	H	-	-	-	-	-	-	-
CO2	H	M	M	M	M	-	-	-	-	L
CO3	M	M	M	H	M	L	L	M	-	-
CO4	M	L	L	M	-	L	L	M	-	-
CO5	-	L	L	-	-	-	-	H	L	-

J.Porkodi   V.G. Jyothi Mani

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2022 – 2023 onwards)

Semester II		Hours/Week: 5	
Core Course 4	**PROGRAMMING IN C++ LAB**	Credits: 3	
Course Code		Internal	External
20UCAC21PN		40	60

COURSE OUTCOMES

On successful completion of the course, the learns should be able to

CO1: make use of classes, objects, methods, functions and constructors. [K3]

CO2: write programs using C++ features such as composition of objects, operator overloading,

function overloading, inheritance Polymorphism for developing skills. [K3]

CO3: execute the programs with required input. [K3]

CO4: present output effectively and prepare the record with the neat output. [K3]

CO5:test program with modification and justify the result. [K4]

Write a C++ program

1.   To demonstrate returning objects from classes

2.   To demonstrate passing objects as function arguments

3.   To swap two numbers without using intermediate variable

4.   To check if a number is prime or not, using objects

5.   To find larger of two numbers using inline function

6.   To calculate simple interest using function using rate of interest as default argument

7.   To perform Area of different shape calculation using Function overloading
     (Minimum three functions)

8.   To perform String manipulation (three different types) using function overloading

9.   To find minimum of two numbers between two class objects using friend function

10. To perform Bank Transaction using Constructor and destructor.

11. To overload unary minus operator to change sign of given 3elements

12. To overload Binary plus operator to add two complex numbers.

13. To create telephone directory using single inheritance

14. To prepare a student's mark sheet using multiple inheritance

15. To prepare pay slip of an employee using hierarchical inheritance

16. To create bank account using multilevel inheritance

17. To prepare EB bill for a customer using hybrid inheritance

18. To format the output using system defined manipulators

19. To sort array of generic data.

20. To perform transform the matrix.

21. To find the biggest number using nesting member function.

22. To find the mean value using friend function.

Course Code 20UCAC21PN	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	H	-	-	-	-	-	-	-
CO2	H	M	M	M	M	-	-	-	-	L
CO3	M	M	M	H	M	L	L	M	-	-
CO4	M	L	L	M	-	L	L	M	-	-
CO5	-	L	L	-	-	-	-	H	L	-

J.Porkodi   V.G. Jyothi Mani

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A

(2020 – 2021 onwards)

Semester II		Hours/Week: 4	
Allied Course 2	**RESOURCE MANAGEMENT TECHNIQUES**	Credits: 4	
Course Code **20UCAA21**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: define the basic concepts of operations research, linear programming problem, assignment problem and transportation problem. [K1]

CO2: discuss models, phases, characteristics of operations research, and mathematical formulation in linear programming problem, dual, assignment problem and transportation problem. [K2]

CO3: explain various methods of linear programming problem, assignment problem and transportation problem. [K2]

CO4: solve the problems in linear programming problem, assignment problem and transportation problem. [K3]

CO5: explain the algorithms for problems in linear programming problem, assignment problem and transportation problem. [K4]

UNIT I

Development of OR – Definition of OR – Modeling in OR – General methods for solving OR models – Main Characteristics and phases of OR study – Tools Techniques and methods – Scientific methods in OR – Scope of OR .

(12 Hours)

UNIT II

Linear programming problems - Mathematical formulation of L.P.P - Slack and surplus variables – Graphical solution of L.P.P, Standard form of L.P.P., Matrix form of L.P.P – Simplex Method (Without Computational Procedure) (12 Hours)

UNIT III

Theorems without proof: Artificial variables techniques, two phase method
Duality in linear programming (Conversion only) Duel Simplex method.

(12 Hours)

UNIT IV

Mathematical formulation of assignment problem – Methods for solving the assignment problem

(12 Hours)

UNIT V

Mathematical formulation of transportation problem – Optimal solution of T.P –
Methods for obtaining initial feasible solution – degeneracy in T.P – Unbalanced T.P

(12 Hours)

TEXT BOOK

Sharma, S.D.(1997). *Operations Research*, KedarNathRamnath& co.

Unit I: Chapter 1 : Sections 1.1 to 1.11

Unit II: Chapter 1: Sections 1.1 to 1.6, Chapter 3: 3.1 to 3.4

Unit III: Chapter 3: Sections 3.5 to 3.8, Chapter 5: Sections 5.1 to 5.8

Chapter 6: Sections 6.1 to 6.3

Unit IV: Chapter 9: Sections 9.1 to 9.7

Unit V: Chapter 10: Sections 10.1 to 10.12

REFERENCE BOOKS

1. P.K. Gupta, Man Mohan, Kantiswarup, *Operations Research*, Sultan ChandPublications.

2. Shankara Iyer, P. (2008). *Operations Research*, Tata McGraw Hill.

3. Sharma, S.C.(2006). Introductory *Operation Research*, Discovery Publishing House.

Course Code 20UCAA21	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	L	H	M	M	H	-
CO2	H	-	H	M	M	M	-
CO3	H	L	H	L	M	M	-
CO4	H	-	H	M	M	M	-
CO5	H	-	H	M	M	M	-

J.Porkodi   K.ChitraLakshmi

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 (3ʳᵈ Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A
(2020 -2021 onwards)

Semester II		Hours/Week: 2	
SEC 2	**PHOTOSHOP LAB**	Credits: 2	
Course Code		Internal	External
20UCAS21P		40	60

COURSE OUTCOMES

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

CO1: examine the given design problem, identify the basic tools and features in Photoshop.[k3]

CO2: design Photoshop document implementing the required tools and elements to get a good photo effect. [K3]

CO3: execute the steps to produce required output. [K3]

CO4: present output effectively and prepare the record. [K3]

CO5: explain the necessity of tools used, deduce the changes to be incorporated over the developed application using the acquired knowledge. [K4]

Create the following programs

1. Use of basic Photoshop tools and techniques
2. Changing the background
3. Filters in Photoshop
4. Create rainbow, rain effects
5. Create 3D Photo cube
6. Animate the flame of a candle
7. Product advertisement
8. Cube creation
9. CD Logo creation
10. Glowing Effect
11. Animation
12. Image with in text
13. Photo effect

14. Glossy text effect
15. Hair coloring effect

Course Code 20UCAS21P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	H	L	-	-	-	-	-	-	-
CO2	H	M	M	M	M	-	-	-	L	L
CO3	-	H	-	M	H	-	L	M	-	L
CO4	H	H	L	M	-	L	L	M	-	-
CO5	H	M	L	-	-	-	-	H	-	-

J.Porkodi   B.Subashini

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2022 – 2023 onwards)

Semester II		Hours/Week: 2	
SEC 2	**PHOTOSHOP LAB**	Credits: 2	
Course Code		Internal	External
20UCAS21PN		40	60

COURSE OUTCOMES

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

CO1: examine the given design problem, identify the basic tools and features in Photoshop. [K3]

CO2: develop skill, design Photoshop document implementing the required tools and elements to get a good photo effect. [K3]

CO3: execute the steps to produce required output. [K3]

CO4: present output effectively and prepare the record. [K3]

CO5: explain the necessity of tools used, deduce the changes to be incorporated over the developed application using the acquired knowledge. [K4]

Create the following Design
1. Changing the background
2. Filters in Photoshop
3. Text Effect
4. Photo Collage
5. Create rainbow, rain effects
6. Create 3D Photo cube
7. Animate the flame of a candle
8. Product advertisement
9. Create Postcard
10. CD Logo creation
11. Glowing Effect

12. Image within text

13. Realistic water reflection

14. Glossy text effect

15. Hair coloring effect

16. Photoshop Effects: Focus with light

Course Code 20UCAS21PN	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	H	L	-	-	-	-	-	-	-
CO2	H	M	M	M	M	-	-	-	L	L
CO3	-	H	-	M	H	-	L	M	-	L
CO4	H	H	L	M	-	L	L	M	-	-
CO5	H	M	L	-	-	-	-	H	-	-

J. Porkodi   B.Subashini

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2020 - 2021 Onwards)

Semester II		Hours/Week: 2	
SEC 3	**DIGITAL LOGIC**	Credits: 2	
Course Code		Internal	External
20UCAS22		40	60

COURSE OUTCOMES

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

CO1: define number system, codes, basics of Boolean algebra. [K1]

CO2: describe the concept of arithmetic circuits, combinational circuits, flip- flops, counters and registers. [K1]

CO3: demonstrate number systems, codes, Boolean algebra, K-map, binary arithmetic, combinational and sequential circuits. [K2]

CO4: solve number conversions and Boolean expressions, apply gates to design, combinational and sequential circuits. [K3]

CO5: compare and analyze number systems, codes, Boolean algebra, combinational and sequential circuits. [K4]

UNIT I

Number System and Codes: Introduction – Number Systems – Arithmetic Operation – 1's and 2's Complements – 9's Complement – 10's Complement – Binary Coded Decimal (BCD) – Codes: Weighted Binary Codes - Non-weighted Code.

(5 Hours)

UNIT II

Boolean algebra and Minimization Techniques: Boolean Logic Operations – Basic Laws of Boolean Algebra – Demorgan's Theorems – Sum of Product and Product of Sums – Karnaugh Map. (6 Hours)

UNIT III

Arithmetic Circuits: Procedure for the Design of Combinational Circuits – Half-Adder –Full-Adder – K-Map Simplification – Half-Subtract or – Full-Subtract or - Serial Adder - 4-bit Serial Adder/Subtract or.

(6 Hours)

UNIT IV

Combinational Circuits: Multiplexers (Data Selectors) – De multiplexers (Data Distributors)– Decoders: Basic Binary Decoder – 3-to-8 Decoder – 4-to-16 Decoder – Encoders: Octal-to- Binary Encoder – Decimal-to-BCD Encoder – Priority Encoder.

(6 Hours)

UNIT V

Flip-Flops: Flip-flops – S-R Flip-flop – D Flip-flop – J-K Flip-flop – T Flip-flop – Master –Slave Flip-flops. **Counters**: Asynchronous (Ripple or Serial) Counter. **Registers**: Introduction - Shift Registers: Serial-in-Serial-out Shift Register.

(7 Hours)

TEXTBOOK

Salivahanan,S., Arivazhagan, S., *Digital Circuits and Design*, Fifth Edition, Oxford Higher Education.

Unit	Chapter	Section
I	1	1.1, 1.2, 1.4 – 1.8, 19:1.9.1, 1.9.2
II	2	2.3 – 2.7
III	5	5.2 – 5.7, 5.12, 5.14
IV	6	6.2, 6.4, 6.5.1 – 6.5.3, 6.7.1 – 6.7.3
V	7	7.3 -7.7, 7.10
	8	8.2
	9	9.1, 9.2: 9.2.1

REFERENCE BOOKS

1. M.Morris Mano, *Computer System Architecture*, Third Edition, Pearson Publications.

2. M.Morris Mano, (2013). *Digital Logic and Computer Design*, Fifteenth Impression, Pearson PrenticeHall.

3. Donald D.Givone, (2002). *Digital Principles and Design*, Fifteenth Reprint 2009, Tata McGraw Hill edition

Course Code 20UCAS22	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	-	M	-	-	-	-	-	-	-
CO2	H	H	M	-	M	-	-	-	-	-
CO3	-	H	L	M	M	L	-	M	-	-
CO4	H	-	L	H	H	L	L	M	-	-
CO5	M	M	L	-	-	-	-	M	-	-

J.Porkodi   R.Umaselvi

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A

(2022 – 2023 onwards)

Semester II		Hours/Week: 2	
SEC3	**DIGITAL LOGIC**	Credits: 2	
Course Code		Internal	External
20UCAS22N		40	60

COURSE OUTCOMES

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

CO1: define number system, codes, basics of Boolean algebra. [K1]

CO2: describe the concept of logic gates, arithmetic circuits and combinational circuits.[K1]

CO3: demonstrate number systems, codes, boolean algebra, K-map, logic gates, binary

arithmetic, Combinational circuits. [K2]

CO4: solve number conversions and boolean expressions, apply gates to design,

combinational circuits. [K3]

CO5: compare and analyze number systems, codes, boolean algebra, logic gates,

combinational circuits. [K4]

UNIT I

Number System and Codes: Introduction – Number Systems – Arithmetic Operation – 1's and 2's Complements – 9's Complement – 10's Complement – Binary Coded Decimal(BCD) – Codes: Weighted Binary codes – Non-weighted code.　　　**(6 Hours)**

UNIT II

Boolean algebra and Minimization Techniques: Boolean Logic Operations – Basic Laws of Boolean　Algebra – Demorgan's Theorems – Sum of Product and Product of Sums - Karnaugh Map.　　　　　　　　　　　　　　　　　　　　　**(6 Hours)**

UNIT III

Logic Gates: Introduction, OR gate, AND gate, NOT gate, NAND gate , NOR gate, Universal gates, Exclusive OR, Exclusive NOR.　　　　　　　　　　**(5 Hours)**

UNIT IV

Arithmetic Circuits: Procedure for the Design of Combinational Circuits – Half-Adder – Full-Adder – K-Map Simplification – Half-Subtractor – Full-Subtractor - Serial Adder - 4-bit Serial Adder/Subtractor. **(7 Hours)**

UNIT V

Combinational Circuits: Multiplexers (Data Selectors) – Demultiplexers (Data Distributors) – Decoders: Basic Binary Decoder – 3-to-8 Decoder – 4-to-16 Decoder – Encoders: Octal-to-Binary Encoder – Decimal-to-BCD Encoder – Priority Encoder.

(6Hours)

TEXTBOOK:

S.Salivahanan, S.Arivazhagan, *Digital Circuits and Design*, Fifth Edition, Oxford Higher Education, 2013.

Unit	Chapter	Section
I	1	1.1, 1.2, 1.4 – 1.8, 1.9:1.9.1, 1.9.2
II	2	2.3 – 2.7
III	3	3.1-3.3
IV	5	5.2 – 5.7, 5.12, 5.14
V	6	6.2, 6.4, 6.5.1 – 6.5.3, 6.7.1 – 6.7.3

REFERENCE BOOKS

1. M.Morris Mano, *Computer System Architecture*, Third Edition, Pearson Publications.

2. M.MorrisMano,*Digital Logic and Computer Design*, Fifteenth Impression, 2013, Pearson Prentice Hall

3. Donald D.Givone, *Digital Principles and Design*, Fifteenth reprint 2009, Tata McGraw Hill edition 2002

Course Code 20UCAS22N	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	-	M	-	-	-	-	-	-	-
CO2	H	H	M	-	M	-	-	-	-	-
CO3	-	H	L	M	M	L	-	M	-	-
CO4	H	-	L	H	H	L	L	M	-	-
CO5	M	M	L	-	-	-	-	M	-	-

J.Porkodi   R.Nagajyothi

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2020 -21 onwards)

Semester III	DATA STRUCTURES	Hours/Week: 4	
Core Course 5		Credits: 4	
Course Code **20UCAC31**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1: gain knowledge on the basis of data structures, linear data structures array, linked list, stack, queue and non-linear data structures tree and graph. [K1]

CO2: understand the concepts of storage representation and operations of linear and non-linear data structures. [K2]

CO3: make use of the various data structures for solving real time problem. [K3]

CO4: analyze various linear & non-linear data structures and its operations. [K4]

CO5: choose a data structure for solving a given problem and evaluate the complexity. [K5]

UNIT I

Introduction and overview: Introduction – Basic Terminology; Elementary Data Organization- Data Structures – Data Structure Operations – Algorithms: Complexity, Time-Space Trade-off. **Preliminaries:** Introduction – Mathematical Notation and Functions- Algorithmic Notation – Control Structures – Complexity of Algorithms – Other Asymptotic notations for Complexity of Algorithms Ω, Θ, o– Sub algorithms-Variables and Data types

(12 Hours)

UNIT II

Arrays, records and pointers: Introduction – Linear Arrays- Representation of Linear Arrays in Memory – Traversing Linear Arrays- Inserting and Deleting – Multidimensional Arrays, Pointers; Pointer Arrays, Records; Record Structures. **Linked List:** Introduction – Linked List –Representation of Linked Lists in memory – Traversing a Linked List Searching a Linked List – Memory allocation; Garbage Collection – Insertion into Linked List – Deletion from Linked List –Header Linked List – Two ways Lists

(12 Hours)

UNIT III

Stacks, Queues, Recursion: Introduction – Stacks – Array Representation of Stacks – Linked Representation of Stacks – Arithmetic Expressions; Polish Notation – Quick Sort, an Application of Stacks- Recursion – Towers of Hanoi – Implementation of Recursive Procedure by stacks – Queues – Linked Representation of Queues – Deques – Priority Queues.   (12 Hours)

UNIT IV

Trees: Introduction – Binary Trees – Representing Binary trees in Memory – Traversing Binary Trees- Traversal Algorithms using stacks. **Graphs and their applications:** Introduction – Graph theory terminology – Sequential Representation of Graphs; Adjacency Matrix; Path Matrix – Warshall's Algorithm; Shortest paths – Linked representation of a Graph – Operations on Graphs – Traversing a Graph.

(12 Hours)

UNIT V

Sorting and searching: Introduction – Sorting – Insertion Sort – Selection Sort – Merging – Merge Sort – Radix Sort–Searching and Data Modification.

(12 Hours)

TEXT BOOK

Seymour Lipschutz*, (2009).Data Structures,* Fifteenth reprint, Tata McGraw-Hill
Publications.

UNIT	CHAPTERS	SECTIONS
I	1,2	1.1 - 1.5, 2.1 - 2.8
II	4, 5	4.1 - 4.5, 4.9- 4.11 , 5.1 – 5.10
III	6	6.1 – 6.13
IV	7, 8	7.1 – 7.5, 8.1 – 8.7
V	9	9.1 – 9.8

REFERENCE BOOKS

1. G.A.VijayalakshmiPai,(2008). *Data Structures and Algorithm Concepts, Techniques and Applications,* McGraw Hill.

2. Sartajsahni, (2000).*Data Structures and Applications in c++,* McGraw Hill.

3. Chitra, Rajan*,(2005).Data Structures*, 1.Edition,VijayNicolePublishers.

Course Code 20UCAC31	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	-	H	-	L	-	-	-	-	-
CO2	H	-	H	-	M	-	-	-	-	-
CO3	H	H	M	H	M	L	L	M	-	L
CO4	M	M	M	-	M	M	L	L	-	-
CO5	M	H	L	L	-	-	-	M	-	L

J.Porkodi   J.Porkodi
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2023 – 2024 onwards)

Semester III		Hours/Week: 4	
Core Course 5	**DATA STRUCTURES**	Credits: 4	
Course Code		Internal	External
20UCAC31N		25	75

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1: gain knowledge on the basis of data structures, linear data structures array, linked list, stack, queue and non-linear data structures tree. [K1]

CO2: understand the concepts of storage representation and operations of linear and non-linear data structures. [K2]

CO3: make use of the various data structures for solving real time problems. [K3]

CO4: analyze various linear & non- linear data structures and its operations. [K4]

CO5: choose a data structure for solving a given problem and evaluate the complexity. [K5]

UNIT I

Introduction and overview: Introduction – Basic Terminology; Elementary Data Organization- Data Structures – Data Structure Operations – Algorithms: Complexity, Time- Space Trade-off. **Preliminaries:** Introduction – Mathematical Notation and Functions- Algorithmic Notation – Control Structures – Complexity of Algorithms – Other Asymptotic notations for Complexity of Algorithms Ω, Θ, o.   (12Hours)

UNIT II

Arrays, records and pointers: Introduction – Linear Arrays- Representation of Linear Arrays in Memory –Traversing Linear Arrays- Inserting and Deleting – Sorting: Bubble Sort - Searching: Linear Search - Binary Search. **Linked List:** Introduction – Linked List –Representation of Linked Lists in memory – Traversing a Linked List -Searching a Linked List**:** Binary Search Trees – Insertion into Linked List – Deletion from Linked List . (12 Hours)

UNIT III

Stacks, Queues: Introduction – Stacks – Array Representation of Stacks – Linked Representation of Stacks – Arithmetic Expressions; Polish Notation – Quick Sort, an Application of Stacks. Queues – Linked Representation of Queues – Deques.

(12 Hours)

UNIT IV

Trees: Introduction – Binary Trees – Representing Binary trees in Memory – Traversing Binary Trees-Binary Search Trees. (12 Hours)

UNIT V

Tress: Searching and inserting in Binary Search Trees-AVL search trees-.**Sorting and searching:** Introduction – Sorting – Insertion Sort – Selection Sort –Merge Sort.

(12 Hours

TEXT BOOK
Seymour Lipschutz*, (*2009).*Data Structures,* Fifteenth reprint, Tata McGraw-Hill Publications

UNIT	CHAPTERS	SECTIONS
I	1,2	1.1 - 1.5, 2.1 - 2.6
II	4, 5	4.1 - 4.8, 5.1 – 5.5, 5.7, 5.8
III	6	6.1 – 6.13
IV	7, 8	7.1 – 7.4 & 7.7
V	9	7.8-7.10, 9.1 – 9.4 & 9.6

REFERENCE BOOKS

1. G.A.VijayalakshmiPai,(2008). *Data Structures and Algorithm Concepts, Techniques and Applications,* McGraw Hill.

2. Sartajsahni, (2000).*Data Structures and Applications in c++,* McGraw Hill.

3. Chitra, Rajan,*(2005).DataStructures*, 1.Edition,VijayNicolePublishers.

Course Code 20UCAC31N	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	-	H	-	L	-	-	-	-	-
CO2	H	-	H	-	M	-	-	-	-	-
CO3	H	H	M	H	M	L	L	M	-	L
CO4	M	M	M	-	M	M	L	L	-	-
CO5	M	H	L	L	-	-	-	M	-	L

J.Porkodi   J.Porkodi

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2020 -21 onwards)

Semester III		Hours/Week: 4	
Core Course 6	**OPERATING SYSTEMS**	Credits: 3	
Course Code		Internal	External
20UCAC32		25	75

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1: describe the concepts of process, deadlocks, memory management, virtual memory and file system, examine computer system structures. [K1]

CO2: outline the process and memory management policies, explain file system, disk and I/O structure. [K2]

CO3: identify memory, disk and swap space management, solve the problems to achieve process synchronization. [K3]

CO4: explain how the file systems are implemented, classify CPU scheduling and Disk scheduling, examine deadlocks. [K4]

CO5: measure process scheduling, summarize paging and segmentation, assess page replacement algorithms and disk scheduling algorithms. [K5]

UNIT I

Introduction: What is an operating system? – Mainframe systems-Desktop systems **Operating System Structures:** System components – Operating system services. **Processes:** Process Concept - Process Scheduling - Operations on processes - Cooperating processes. (12 Hours)

UNIT II

CPU Scheduling: Basic concepts - Scheduling criteria — Scheduling algorithms: First Come First Served Scheduling – Shortest Job First Scheduling – Priority Scheduling - Round Robin Scheduling. **Process Synchronization:** Background – The Critical-Section problem-– Semaphores (12 Hours)

UNIT III

Deadlocks: System model – Deadlock Characterization – Methods for handling Deadlocks - Deadlock prevention– Deadlock avoidance, Deadlock detection – Recovery from deadlock. **Memory Management:** Background – Swapping – Contiguous memory Allocation – Paging (Basic method, Protection)–Segmentation. (12 Hours)

UNIT IV

Virtual Memory: Background – Demand paging- Page replacement. **File-System Interface:** Directory structure: single Level Directory – Two Level Directory – Tree Structured Directories. **File-System Implementation:** Directory implementation - Allocation methods (Contiguous, Linked and Indexed Allocation methods) (12 Hours)

UNIT V

Computer System Structures: Computer System operation- I/O Structure - Storage Structure. **Mass-Storage Structure:** Disk structure – Disk scheduling, Disk management, Swap space management. (12 Hours)

TEXT BOOK

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, (2007). *Operating System Concepts,* Windows XP Update, 6.Edition. Wiley India (P.)Ltd.

Unit	Chapters	Sections
I	1, 3, 4	1.1 - 1.3, 3.1 - 3.2, 4.1 - 4.4
II	6, 7	6.1, 6.2, 6.3.1 - 6.3.4 , 7.1, 7.2, 7.4
III	8,9	8.1 – 8.7, 9.1 – 9.3,9.4.1,9.4.3,9.5
IV	10, 11, 12	10.1,10.2,10.4, 11.3.1-11.3.3, 12.3,12.4.1-12.4.3
V	2, 14	2.1-2.3, 14.1-14.4

REFERENCE BOOKS

1.   Milan MilenKovic, (1997).Operating System Concepts and Design,TMG.

2.   Deitel, H.M. (2005).OperatingSystems,2 Edition.PearsonEducation,

3.   GaryNutt, (2002).Operating System – Modern Perspective, 2 Edition.Pearson
      Education.

Course Code 20UCAC32	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	-	-	-	-	-	-	-
CO2	-	M	M	M	M	-	-	-	-	-
CO3	M	M	M	H	H	L	L	M	-	-
CO4	M	-	L	M	H	L	L	M	-	-
CO5	-	M	L	-	-	-	-	H	-	-

J.Porkodi   B.Sakthi

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A
(2023 – 2024 onwards)

Semester III		Hours/Week: 4	
Core Course 6	**OPERATING SYSTEMS**	Credits: 3	
Course Code		Internal	External
20UCAC32N		25	75

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1: describe the concepts of process, deadlocks, memory management, virtual memory, file system and I/O systems, examine computer system structures. [K1]

CO2: outline the process and memory management policies; explain file system, disk and I/O systems. [K2]

CO3: identify memory, disk and swap space management and I/O systems; solve the problems to achieve process synchronization. [K3]

CO4: explain how the file systems are implemented, classify CPU scheduling and Disk scheduling, examine deadlocks. [K4]

CO5: measure process scheduling, summarize paging and segmentation, assess page replacement algorithms and disk scheduling algorithms. [K5]

UNIT I

Introduction: Introduction to operating system – Computer System Organization - Computer-System Architecture. **Operating System Structures:** Operating system services - System Calls. **Processes:** Process Concept - Process Scheduling - Operations on processes .

(12 Hours)

UNIT II

CPU Scheduling: Basic concepts - Scheduling criteria — Scheduling algorithms: First Come First Served Scheduling – Shortest Job First Scheduling – Priority Scheduling - Round Robin Scheduling. **Process Synchronization:** Background – The Critical-Section problem— Semaphores   (12 Hours)

UNIT III

Deadlocks: System model – Deadlock Characterization – Methods for handling Deadlocks - Deadlock prevention– Deadlock avoidance, Deadlock detection – Recovery from deadlock. **Memory Management:** Background – Swapping – Contiguous memory Allocation – Paging (Basic method, Protection)–Segmentation.   (12 Hours)

UNIT IV

Virtual Memory: Background – Demand paging- Page replacement. **File-System Interface:** Directory structure: single Level Directory – Two Level Directory – Tree Structured Directories. **File-System Implementation:** Directory implementation - Allocation methods (Contiguous, Linked and Indexed Allocation methods)   (12 Hours)

UNIT V

Mass-Storage Structure: Overview of Mass-storage structure – HDD scheduling, Swap space management. **I/O Systems:** Overview - I/O Hardware - Polling - Interrupts - Direct Memory Access.   (12 Hours)

TEXT BOOK

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, (2018). *Operating System Concepts,* Windows XP Update, 10th Edition.Wiley India (P.)Ltd.

Unit	Chapters	Sections
I	1, 3, 4	1.1 - 1.3, 2.1, 2.3, 3.1 - 3.3
II	5, 6	5.1 - 5.3, 5.3.1 - 5.3.4, 6.1, 6.2, 6.6
III	8, 9	8.1, 8.3 - 8.8, 9.1 - 9.3, 9.3.1, 9.3.3, 9.5
IV	10, 13, 14	10.1,10.2,10.4, 13.3, 13.3.1, 13.3.2, 13.3.3, 14.3, 14.4, 14.4.1, 14.4.2, 14.4.3
V	11, 12	11.1, 11.2, 11.6, 12.1, 12.2, 12.2.2, 12.2.3, 12.2.4

REFERENCE BOOKS

1. Milan MilenKovic, (1997).Operating System Concepts and Design,TMG.

2. Deitel, H.M. (2005).OperatingSystems,2 Edition.PearsonEducation,

3. GaryNutt, (2002).Operating System – Modern Perspective, 2 Edition.Pearson Education.

Course Code 20UCAC32N	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	-	-	-	-	-	-	-
CO2	-	M	M	M	M	-	-	-	-	-
CO3	M	M	M	H	H	L	L	M	-	-
CO4	M	-	L	M	H	L	L	M	-	-
CO5	-	M	L	-	-	-	-	H	-	-

J.Porkodi   B.Sakthi

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester III		Hours/Week: 4	
Core Course7	**DATA STRUCTURES USING C++ LAB**	Credits: 2	
Course Code **20UCAC31P**		Internal 40	External 60

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1: illustrate the arrays for solving real life problems. [K3]

CO2: demonstrate programs using stack, queue, linked list for data manipulation using array and linked list concept. [K3]

CO3: show the skill of working with sorting and searching techniques. [K3]

CO4: apply the usage of stack and queue by developing a program with neat output. [K3]

CO5: identify constructive techniques for building binary tree and binary search tree With modification. [K4]

Write C++ programs for the following

1. To perform insertion and deletion operations in one dimensional dynamic array.

2. To search an element in one dimensional dynamic array.

3. To change the sign of node values in a singly Linked list.

4. To count number of odd and even values in a singly linked list.

5. To perform the insertion operation in a singly Linked list.

6. To perform the deletion operation in a singly Linked list.

7. To perform search operation in a singly linked list.

8. For merging two singly linked lists.

9. To reverse the given singly linked list.

10. To perform push and pop operations in a stack – (represent stack as array).

11. To perform push and pop operations in a stack – (represent stack as linked list).

12. To perform insertion and delete operations in a queue – (represent queue as array).

13. To perform insertion and delete operations in a queue – (represent queue as linked list).

14. To traverse a binary search tree – (Inorder, Preorder, Postorder).

15. To perform Bubble sort.

16. To perform Insertion sort.

17. To perform Selection sort.

18. To perform Merge sort.

19. To perform Radix sort.

20. To perform linear and binary search using array.

Course Code 20UCAC31P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	H	-	L	M	M	-	-	-
CO2	H	H	L	-	-	M	-	-	M	-
CO3	M	H	L	L	-	M	-	-	-	M
CO4	H	M	-	-	-	-	M	L	L	-
CO5	H	M	M	-	L	M	-	-	L	L

J.Porkodi   J.Porkodi
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2020 -21 onwards)

Semester III		Hours/Week: 4	
Allied Course3	**NUMERICAL APTITUDE**	Credits: 4	
Course Code **20UCAA31**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: observe the real life situations and relate it with aptitude problems. [K1]

CO2: discuss the concept of problems on numbers, ages, ratio, time and work, simple interest. [K2]

CO3: express the practical problem using the fundamentals of mathematics. [K2]

CO4: apply the knowledge gained in aptitude and enhance their knowledge for successful career. [K3]

CO5: estimate the numerical aptitude problems and get optimum solution for the betterment of humanity. [K4]

UNIT I

      Problems on Numbers   (12 Hours)

UNIT II

      Problems on Ages, Profit & Loss   (12 Hours)

UNIT III

    Ratio and Proportion, Fourth, Third and mean proportional, Comparison of ratios, Compound ratio, Variation   (12 Hours)

UNIT IV

      Time and Work   (12 Hours)

UNIT V

      Simple Interest   (12 Hours)

TEXT BOOK

Agarwal, R.S. (2008). Quantitative *Aptitude*, S.Chand Publishers.

Unit	Chapter	Section
I	7	7, 7A (full)
II	8, 11	8, 8A (Full),
		11, 11A (1-30 problems only)
III	12	12 (1-60 problems only)
IV	15	15, 15A (1-40 Problems only)
V	21, 21A	21, 21A (1-50 Problems only)

REFERENCE BOOKS

1. Tyagi, R.K. *Quantitative Aptitude for competitive Examinations,* 2018-19 Edition. Er.

   Deepak Agarwal, *Quantitative Aptitude,* Disha Publisher.

Course Code 20UCAA31	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	L	H	H	L	M	-
CO2	H	L	H	M	L	M	-
CO3	H	-	H	M	L	M	-
CO4	H	-	H	L	L	M	-
CO5	H	-	H	M	L	M	-

Mrs.J.Porkodi   M r s . K.Muthulakshmi

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2020 -21 onwards)

Semester IV		Hours/Week: 4	
Core Course 8	**JAVA PROGRAMMING**	Credits: 4	
Course Code **20UCAC41**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: gain knowledge on the concept of object oriented programming and fundamentals of Java. [K1]

CO2: understand the behaviour of programs involving the basic programming constructs. Identify the introductory concepts of classes, methods, inheritances, interfaces, packages, multithreading, exceptions, applet & graphics programming. [K2]

CO3: apply OOP concepts in problem solving. [K3]

CO4: analyze and use Java in a variety of applications. [K4]

CO5: choose real world applications and solve it using Java Application and Applet. [K5]

UNIT I

Java Evolution: Java History – Java Features - How Java differs from C and C++ - Java and Internet – Java and World Wide Web – Web Browsers – Hardware and Software Requirements – Java Supports Systems – Java Environment. **Overview of Java Language**: Introduction – Simple Java Program – More of Java – An Application with two classes – Java Program Structure – Java Tokens – Java Statements – Installing and Configuring Java- Implementing a Java Program –Java Virtual Machine- Command Line Arguments. **Constants, Variables and Data Types:** Introduction – Constants – Variables – Data Types – Declaration of Variables - Giving Values to Variables – Scope of Variables – Symbolic Constants – Type Casting – Getting Values of Variables – Standard Default values. **Operators and Expressions:** Introduction – Arithmetic Operators - Relational Operators – Logical Operators – Assignment Operators - Increment and Decrement Operators– Conditional Operators – Bitwise Operators – Special Operators – Arithmetic Expressions –Evaluation of

Expressions– Type Conversions in Expressions – Operators precedence and Associatively –Mathematical Functions.   (12 Hours)

UNIT II

Decision Making and Branching: Introduction – Decision making with If Statement – Simple If – The If... Else Statement – Nesting of If … Else Statements – The Else If Ladder – The Switch Statement – The? : Operator. **Decision Making and Looping:** Introduction – While Statement – Do Statement – For statement – Jumps in Loops – Return statement – Labeled Loops. **Classes, Objects And Methods:** Introduction – Defining a Class – Fields Declaration– Methods Declaration – Creating Objects – Accessing Class Members – Constructors – Method Overloading – Static Members – Nesting of methods – Inheritance: Extending A Class – Overriding Methods – Final Variables and Methods – Final Classes – Finalizer Methods

– Abstract methods and classes – Methods with Varargs – Visibility Control.

(12 Hours)

UNIT III

Arrays, Strings and Vectors: Introduction – One Dimensional arrays – Creating an array – Two-Dimensional Arrays – Strings – Vectors – Wrapper Classes – Enumerated types – Annotations. **Interfaces: Multiple Inheritance:** Introduction – Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables. **Packages: Putting classes Together:** Introduction – Java API Packages – Using System Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes – Static Import.

(12 Hours)

UNIT IV

Multithreaded Programming: Introduction – Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread Methods – Thread Exceptions – Thread Priority – Synchronization – Implementing the Runnable Interface – Inter-Thread Communication. **Managing Errors and Exceptions:** Introduction- Types of errors-Exceptions- Syntax of Exception Handling Code – Multiple Catch Statement – Using Finally Statement – Throwing Our Own Exceptions – Improved Exception Handling in Java SE 7 -Using Exceptions for Debugging.   (12 Hours)

UNIT V

Applet Programming: Introduction – How Applets differ from Applications – Preparing to write Applets – Building Applet code – Applet Life Cycle – Creating an executable Applet – Designing a web page – Applet Tag – Adding Applet to a HTML file – Running the Applet – More about Applet tag – passing parameters to Applets – Aligning the display –More about HTML Tags – Displaying Numerical Values – Getting Input from the User – Event Handling. **Graphics Programming using AWT:** Introduction – The Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing Arcs – Drawing Polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts.

(12 Hours)

TEXTBOOK

Balagurusamy, E. (2019). *Programming with Java*, McGraw Hill Education (India) Private Limited, Chennai, 6th Edition.

Unit	Chapters
I	2, 3.1-3.11, 4, 5
II	6,7,8
III	9,10,11
IV	12,13
V	14, 15.1-15.9

REFERENCE BOOKS

1. Chitra, A. *(2002). Internet and Java Programming*, New Delhi: Indian Society for Technical Education – Learning Materials Centre.

2. Patrick Naughton, *(2002). Herbert Schildt, *Java2 – The Complete Reference,* 5th Edition. New Delhi: Tata McGraw Hill.

Course Code 20UCAC41	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	L	-	-	-	-	-	-	-
CO2	H	H	-	M	M	-	-	-	-	-
CO3	M	M	M	H	M	L	L	H	-	-
CO4	M	H	L	M	H	M	L	M	-	-
CO5	M	-	L	L	L	-	-	M	-	-

J.Porkodi   V. QueenJemila

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

2020 -21 onwards)

Semester IV	**JAVA PROGRAMMING LAB**	Hours/Week: 4	
Core Course: 9		Credits: 2	
Course Code **20UCAC41P**		Internal 40	External 60

COURSE OUTCOMES

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

CO1: apply the perspectives of Java to solve the problems. [K3]

CO2: develop programs implementing classes, methods, inheritances, interfaces, packages, multithreading, exceptions, applet & graphics programming. [K3]

CO3: build and modify the codes to produce required output. [K3]

CO4: present output effectively and prepare the record. [K3]

CO5: test for programs with modifications and justify the results. [K4]

Write a Java program

1. To demonstrate methods Declaration and creating objects from classes.

2. To demonstrate returning objects from classes.

3. To perform palindrome checking using objects.

4. To check if a number is prime or not, using objects.

5. To find the largest values of two numbers using nesting of member function.

6. To find the sum of the digit of a given number using constructor overloading.

7. To perform Area calculation using parametric/ default constructor.

8. To prepare a student's mark sheet using single inheritance.

9. To create bank account using multilevel inheritance.

10. To perform matrix Multiplication using array.

11. To sort the student names using string arrays.

12. To perform manipulation of strings (Minimum three function).

13. To prepare pay slip of an employee using interface.

14. To create telephone directory using package.

15. To prepare EB bill for a customer using package.

16. To implement Multi Thread concept to prepare Multiplication table.

17. To perform Built-in-Exception (Minimum three Exception).

18. To create bank transaction using User-Defined-Exception.

19. To prepare Applet for drawing a human face.

20. To draw polygons

Course Code 20UCAC41P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	-	-	-	-	-	-	-
CO2	H	H	L	H	M	-	-	-	L	-
CO3	M	M	L	H	M	L	L	H	-	-
CO4	L	L	L	M	M	L	L	M	-	-
CO5	H	M	L	-	-	-	-	M	-	L

J.Porkodi   V.Queen Jemila
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2022 – 2023 onwards)

Semester IV		Hours/Week: 4	
Core Course: 9	**JAVA PROGRAMMING LAB**	Credits: 2	
Course Code		Internal	External
20UCAC41PN		40	60

COURSE OUTCOMES

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

CO1: apply the perspectives of Java to solve the problems. [K3]

CO2: develop programs implementing classes, methods, inheritances, interfaces, packages, multithreading, exceptions, applet & graphics programming. [K3]

CO3: build and modify the codes to produce required output. [K3]

CO4: present output effectively and prepare the record. [K3]

CO5: test for programs with modifications and justify the results. [K4]

Write a Java program

1. To perform palindrome checking using objects.

2. To check if a number is prime or not, using objects.

3. To find the largest values of two numbers using nesting of member function.

4. To find the sum of the digit of a given number using constructor overloading.

5. To perform Area calculation using parametric/ default constructor.

6. To prepare a student's mark sheet using single inheritance.

7. To create bank account using multilevel inheritance.

8. To perform matrix Multiplication using array.

9. To represent the Array List class.

10. To sort the student names using string arrays.

11. To perform manipulation of strings (Minimum three function).

12. To prepare pay slip of an employee using interface.

13. To prepare EB bill for a customer using package.

14. To implement Multi Thread concept to prepare Multiplication table

15. To count the number of characters, lines and words in a string.

16. To perform Built-in-Exception (Minimum three Exception).

17. To create bank transaction using User-Defined-Exception.

18. To develop application with passing parameters using Applet.

19. To handling Mouse events and Key events

20. To prepare Applet for drawing a human face.

21. To draw polygons

| Course Code 20UCAC41PN | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	-	-	-	-	-	-	-
CO2	H	H	L	H	M	-	-	-	L	-
CO3	M	M	L	H	M	L	L	H	-	-
CO4	L	L	L	M	M	L	L	M	-	-
CO5	H	M	L	-	-	-	-	M	-	L

J.Porkodi   V.QueenJemila

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 (3rd Cycle) by NAAC
VIRUDHUNAGAR – 626 001

B.C.A.
(2020 -21 onwards)

Semester IV		Hours/Week: 4	
Allied Course 4	**FINANCIAL MANAGEMENT**	Credits: 4	
Course Code		Internal	External
20UCAA41		25	75

COURSE OUTCOMES

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

   CO1: describe the basic concepts of financial management and Tally. [K1]

   CO2: interpret the financial statements. [K2]

   CO3: apply the rules of accounting for preparing financial statements and

      accounting reports. [K3]

   CO4: analyze the financial statements, accounting vouchers and reports. [K4]

   CO5: evaluate the financial position of a concern. [K5]

UNIT I

   Accounting Principles –Rules for Accounting – Journal – Rules for Journalizing – Ledger – Trial Balance

(12 Hours)

UNIT II

   Final Accounts of sole trading concerns – Preparation of Trading, Profit and Loss Account- Balance Sheet (Problems without adjustments)

(12 Hours)

UNIT III

   Fund flow statement-statement of changes in working capital – Funds from operations Fund flow statement (Simple problems only)

(12 Hours)

UNIT IV

Ratios – Managerial uses and Limitations – Solvency ratios- Profitability ratios (Simple problem sonly)

(12 Hours)

UNIT V

Financial Accounting Package (Tally 9): Important features of Tally – Accounts vouchers – Accounting reports.   (12 Hours)

Note

Composition of Question Pattern is

Theory - 40%

Problems - 60%

TEXT BOOKS

1. Reddy, T.S., & Murthy, A.(2016).   *Financial Accounting*, 6th Edition. Chennai: Margham Publications.

2. Arulanandam, M.A., &Raman, K.S.(2016). *Advanced Accountancy*, Mumbai: Himalaya Publishing House.

3. Ramachandran.R & Srinivasan.R, (2012).   *Management Accounting*, Fifteenth Enlarged Edition. Kalyanapuram: Sriram Publications.

4. Nellaikannan. C (2008). *Tally*, 3rd Edition.TirunelveliNels Publications.

REFERENCE BOOKS

1. Jain S.P &Narang. L (2004*.) Advanced Accountancy*, New Delhi: Kalyani Publishers Limited.

2. Boopathi manickam P.S, (2009).   *Financial and Management Accounting*, 5th Edition. Madurai: P.S.G Publications.

Course Code 20UCAA41	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	L	-	-	M	-	-
CO2	H	L	L	M	M	-	-
CO3	H	L	L	M	L	-	-
CO4	H	L	L	M	H	-	-
CO5	H	L	L	M	L	L	L

K.Nivedha

J.Porkodi   R.Mahalakshmi

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A
(2020 – 21 onwards)

Semester IV		Hours/Week: 2	
SEC 4	**COMPUTER ORGANIZATION**	Credits: 2	
Course Code **20UCAS41**		Internal 40	External 60

COURSE OUTCOMES

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

CO1: reproduce the concepts of computer registers, instructions, timing & control, processor organization, I/O devices, interfaces, I/O data transfer. [K1]

CO2: identify the inner working of arithmetic & logic unit in evaluating arithmetic operations and different memory hierarchies. [K1]

CO3: generalize basics of computer organization, central processing unit, computer arithmetic, I/O device organization and classification of memory. [K2]

CO4: make use of the information regarding computer instructions, codes, registers, timing, CPU, evaluation of arithmetic operations, I/O organization and memory. [K3]

CO5: explore knowledge about basic computer organization, processing unit, computer arithmetic, I/O and memory organization. [K4]

UNIT I

Basic Computer Organization and Design: Instruction Codes – Computer Registers – Computer Instructions – Timing and Control.

(6 Hours)

UNIT II

Central Processing Unit: General Register Organization – Stack Organization – Instruction Formats –Addressing Modes.

(6 Hours)

UNIT III

Computer Arithmetic: Addition and Subtraction – Multiplication Algorithms – Division Algorithms.

(6 Hours)

UNIT IV

Input-Output Organization: Peripheral Devices – Input-Output Interface – Asynchronous Data Transfer.

(6 Hours)

UNIT V

Memory Organization: Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory.

(6 Hours)

TEXT BOOK

Morris Mano, M. (2017).*Computer System Architechture,* 3rd Edition. Pearson, Sixteenth Impression.

Unit	Chapter	Section
I	5	5.1 – 5.4
II	8	8.2 – 8.5
III	10	10.2 – 10.4
IV	11	11.1 – 11.3
V	12	12.1 – 12.4

REFERENCE BOOKS

1. Carl Hamacher, SafwatZaky, ZvonkoVranesic, *Computer Organization*, 5thEdition.McGraw Hill Education.
2. SajjanG.Shiva, *Computer Organization*, Fifth Edition.CRCPress.
3. John P.Hayes, *Computer Architecture and Organization*, 3rd Edition. McGraw Hill Education.

Course Code 20UCAS41	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	-	L	-	-	-	-	-	-	-
CO2	M	M	L	L	-	-	-	-	-	-
CO3	M	M	M	M	M	-	L	M	-	-
CO4	H	M	L	M	M	L	M	M	-	-
CO5	H	H	L	-	-	L	L	H	-	-

J.Porkodi   M.Priyavani

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A
(2022 – 2023 onwards)

Semester IV		Hours/Week: 2	
SEC 4	**COMPUTER ORGANIZATION**	Credits: 2	
Course Code		Internal	External
20UCAS41N		40	60

COURSE OUTCOMES

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

CO1: reproduce the concepts of computer registers, instructions, timing & control, processor organization, I/O devices, interfaces, I/O data transfer, Mode of transfer. [K1]

CO2: identify the inner working of arithmetic & logic unit in evaluating arithmetic operations and different memory hierarchies. [K1]

CO3: generalize basics of computer organization, central processing unit, computer arithmetic, I/O organization, Interrupts, DMA and classification of memory. [K2]

CO4: make use of the information regarding computer instructions, codes, registers, timing, CPU, evaluation of arithmetic operations, I/O organization, Interrupts, DMA and Memory. [K3]

CO5: explore knowledge about basic computer organization, processing unit, computer arithmetic, I/O & Mode of Transfer and memory organization. [K4]

UNIT I

Basic Computer Organization and Design: Instruction Codes – Computer Registers – Computer Instructions – Timing and Control.   (6 Hours)

UNIT II

Central Processing Unit: General Register Organization – Stack Organization – Instruction Formats –Addressing Modes.   (6 Hours)

UNIT III

  Computer Arithmetic: Addition and Subtraction – Multiplication Algorithms – Division Algorithms.   (6 Hours)

UNIT IV

  Input-Output Organization: Peripheral Devices – Input-Output Interface – Modes of Transfer.   (6 Hours)

UNIT V

  Input-Output Organization: Priority Interrupt – Direct memory access (DMA).**Memory Organization:** Memory Hierarchy – Main Memory.   (6 Hours)

TEXT BOOK

  Morris Mano, M. (2017).*Computer System Architecture,* 3rd Edition. Pearson, Sixteenth Impression.

Unit	Chapter	Section
I	5	5.1 – 5.4
II	8	8.2 – 8.5
III	10	10.2 – 10.4
IV	11	11.1 – 11.2, 11.4
V	11, 12	11.5,11.6, 12.1 – 12.2

REFERENCE BOOKS

Carl Hamacher, SafwatZaky, ZvonkoVranesic, *Computer Organization*, 5thEdition.McGraw Hill Education.

1. SajjanG.Shiva, *Computer Organization*, Fifth Edition.CRCPress.

2. John P.Hayes, *Computer Architecture and Organization*, 3rd Edition. McGraw Hill Education.

J.Porkodi   V.G.Jyothimani
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 (3ʳᵈ Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A
(2020 – 21 onwards)

Semester IV		Hours/Week: 2	
SEC 5	**FLASH LAB**	Credits: 2	
Course Code **20UCAS42P**		Internal 40	External 60

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1: demonstrate the various effects of text in flash. [K3]

CO2: apply effect to various objects and give effects. [K3]

CO3: make use of basic tools of action scripts, develop applications in Flash. [K3]

CO4: write programs for designing CD, Filmstrip. [K3]

CO5: select the required tools to create animated graphics with sound effects. [K4]

A) Text Effects

1. Typewriting
2. Marquee
3. Zooming
4. Rotating text
5. Jumbling text
6. Handwriting
7. Reflective text
8. Knock out effect

B) Animation

9. Bouncing a ball
10. Shape tweening
11. Rotating & scaling of object
12. Sizing the object

13. Rangoli

14. Pencil drawing

15. Blinking star

16. Moving a vehicle

C) Action Scripts

17. Arithmetic operation

18. Odd/Even number check.

19. Random colors

20. Rotating an image inside custom shape.

Course Code 20UCAS42P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	M	-	-	-	-	-	-	-
CO2	-	H	M	M	M	-	-	-	L	-
CO3	M	M	L	H	M	L	L	M	-	-
CO4	H	-	L	H	-	-	L	M	-	-
CO5	H	M	L	-	-	-	-	H	-	L

J.Porkodi   B.Sakthi

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2022 – 23 onwards)

Semester IV		Hours/Week: 2	
SEC 4	**Flash Lab**	Credits: 2	
Course Code 20UCAS42PN		Internal 40	External 60

COURSE OUTCOMES

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

CO1: demonstrate the various effects of text in flash. [K3]

CO2: apply effect to various objects and give effects. [K3]

CO3: make use of basic tools of action scripts, develop applications in Flash. [K3] CO4: write programs for designing cartoons. [K3]

CO5: select the required tools to create animated graphics with sound effects. [K4]

A) Create the following Text Effects
1. Typewriting
2. Marquee
3. Zooming
4. Rotating text
5. Jumbling text
6. Handwriting
7. Reflective text
8. Knock out effect
9. Disappearing a Text
10. Spinning a Text

B) Create The Following Animation

11. Bouncing a ball

12. Shape tweening

13. Rotating & scaling of object

14. Sizing the object

15. Rangoli

16. Pencil drawing

17. Blinking star

18. Moving a vehicle

19. Honey bee

C) Create The Following Action Scripts Program

20. Arithmetic operation

21. Odd/Even number check.

22. Random Colors

23. Rotating an image inside a custom shape.

24. Zooming Image

25. User Interface

D) Sound Effect

26. Create a Digital Clock

Course Code 20UCAS42PN	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	M	-	-	-	-	-	-	-
CO2	-	H	M	M	M	-	-	-	L	-
CO3	M	M	L	H	M	L	L	M	-	-
CO4	H	-	L	H	-	-	L	M	-	-
CO5	H	M	L	-	-	-	-	H	-	L

J.Porkodi   B.Sakthi

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A

(2020 -21 onwards)

Semester V		Hours/Week: 5	
Core Course: 10	**VB.NET PROGRAMMING**	Credits: 5	
Course Code **20UCAC51**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learner should be able to

CO1 : define .NET framework with its assemblies and class,list the important features of VB.NET, highlight the problems solved by using looping statements in VB.NET, state the concepts of delegates. [K1]

CO2 : summarize the different types of datatypes in VB.NET, explain methods, arrays, inheritance, polymorphism, interface, delegates and exception handling. [K2]

CO3 : illustrate the concept of boxing and unboxing, jagged arrays, interface, namespace, components, delegates, user defined exception handling and database connectivity using ADO.NET. [K3]

CO4 : compare value datatypes and referenced datatypes, classify the types inheritance and usage of Thread methods. Point out the important properties and method of docking, timer, progress bar, link label, trackbar, panel, tree view controls. [K4]

CO5 : choose the real-world problems solved by class, inheritance, methods, delegates, exceptions and database connectivity. [K5]

UNIT I

NET Framework and VB.NET: Introduction – Evolution of the .NET Framework– Overview of the .NET Framework – DLL, COM, COM+, DCOM and Assemblies – VB.NET Language –

Development of a simple VB.NET Program. **Features in VB.NET:** Introduction – start page – The IDLE Main Window–Class View Window–Object Browser – Code Window–Intellisense– Compiling the Code**. Variables, Constants and Expressions:** Introduction –Value Types and Reference Types–Variable Declaration and Initialisation–Value Data Types – Reference Data Types –Boxing and Unboxing–Arithmetic operators–Textbox control–Label Control–Button Control.

(15 Hours)

UNIT II

Control Statements: Introduction – If Statements – Radio Button Control–Checkbox Control– GroupBox Control–ListBox Control–Checked ListBox Control–ComboBox Control–Select Case Statement– While Statement–Do Statement–For Statement. **Methods and Arrays: Introduction**–Types of Methods–Arrays–One Dimensional Array–Multidimensional Arrays– Jagged Arrays.

(15 Hours)

UNIT III

Classes, Properties and Indexers: Introduction – Defining and Usage of a Class–Constructor Overloading–Copy Constructor–Instance and Shared Class Members–Shared Constructors– Properties–Indexers. **Inheritance and Polymorphism:** Introduction–Virtual Methods–Abstract Classes and Abstract Methods–Sealed Classes. **Interfaces, Namespaces and Components:** Introduction–Defining and Usage of Interfaces–Multiple Implementation of Interface–Interface Inheritance–Namespaces–Components–Access Modifiers. (15 Hours)

UNIT IV

Delegates, Events and Attributes: Introduction – Delegates–Events–Attributes–Reflection. **Exception Handling:** Introduction–Default Exception Handling Mechanism–User-Defined Exception Handling Mechanism–Backtracking–Throw Statement–Custom Exception. **Multi- Threading:** Introduction–Usage of Threads–Thread Class–Start, Abort, Join, Suspend Resume and Sleep Methods –Thread Priority–Synchronization. (15 Hours)

UNIT V

  Additional Windows Controls: Introduction – Docking Controls–Timer Control– ProgressBar Control–LinkLabel Control–TrackBar Control– Panel Control–Treeview Control– Splitter Window–Menu Control–SDI and MDI–Dialog Boxes–Toolbar Control–StatusBar Control. **Database Connectivity:** Introduction – Advantages of ADO.NET–Manage Data

Providers–Deploying a Simple ADO.NET Based Applications– Creation of a Data Table–Retrieving Data From Tables–Table Updating–Disconnected Data Access Through Dataset Object.   (15 Hours)

Text Book

Muthu, C.(2008)*Visual Basic.NET* ,McGraw Hill Publications.

Reference Books

1. Matthew MacDonald , (2003). *Microsoft Visual Basic .NET Programmer's Cookbook*Jul.

2. Jonathan S. Harbour, (2002). *Microsoft Visual Basic .NET Programming for the Absolute Beginner* Sep 20.

3. JMatthew MacDonald, (2002). *The Book of VB .NET: .NET Insight for VB Developers*, Feb.

4. Steven Roman, Ron Petrusha, and Paul Lomax,*VB.NET Language Pocket Reference*Dec 2002

Unit	Chapter	Section
I	1,2,3	1.1-1.6, 2.1-2.9, 3.1-3.10
II	4,5	4.1- 4.12, 5.1-5.6
III	6,7,8	6.1-6.8,7.1-7.4, 8.1-8.7
IV	9, 10,11	9.1-9.5,10.1-10.6,11.1-11.7
V	14,15	14.1-14.14, 15.1-15.8

Course Code 20UCAC51	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	-	M	-	-	-	-	-	-	-
CO2	H	M	M	-	-	M	-	-	-	-
CO3	M	H	-	M	M	-	-	M	-	-
CO4	H	-	L	M	M	-	-	M	-	-
CO5	M	H	L	-	-	-	L	H	-	-

Mrs. J.Porkodi   Mrs.V. Queen Jemila
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A
(2020 -21 onwards)

Semester V		Hours/Week: 5	
Core Course: 11	**COMPUTER NETWORKS**	Credits: 5	
Course Code **20UCAC52**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learner should be able to

CO1 : State the concepts of network hardware, software, media, recognize the design issues of datalink layer & network layer, describe transport layer services and enumerate concepts of DNS & Email. [K1]

CO2 : Summarize features of transmission media, discuss error detection & correction, demonstrate routing algorithms, and explain the elements of transport protocols, components of email. [K2]

CO3 : Illustrate various communication satellites, protocols of datalink layers, interpret congestion control, concepts of error control & flow control [K3]

CO4 : Analyze switching, compare multiple access protocols, distinguish IPV4 & IPV6, point-out features of TCP, working of DNS. [K4]

CO5 : Assess the working of telephone network, judge performance of sliding window protocols, choose required internet control protocols, recommend TCP/UDP usage, and summarize various resource records of DNS and working of email. [K5]

UNIT I

Introduction: Network Hardware - Network software - reference models. **Physical Layer**: guided transmission media - wireless transmission - communication satellites – **The Public Switched Telephone Network:** switching – the mobile telephone system.   (15 Hours)

UNIT II

The Data Link Layer: Data link layer design issues - error detection and correction - elementary data link protocols - sliding window protocols – **The Medium Access Control Sub layer**: the channel allocation problem - **Multiple access protocols**: ALOHA, Carrier Sense Multiple Access protocols. (15 Hours)

UNIT III

The Network Layer: Network layer design issues - routing algorithms: shortest path algorithm - flooding - distance vector routing - link state routing - hierarchical routing - broadcast routing - multicast routing - **Congestion Control Algorithms**: approaches to congestion control – Traffic aware routing – admission control – traffic throttling – load shedding – **The Network layer in the Internet**: IP version 4 Protocol - IP Address – IP version 6 - Internet control protocols. (15 Hours)

UNIT IV

The Transport Layer: **Transport layer service**: services provided to upper layers - transport service primitives - **Elements of transport protocols**: addressing - connection establishment - connection release - error control and flow control – The **Internet Transport Protocols: UDP :** Introduction to UDP - **Internet Transport Protocols: TCP : I**ntroduction to TCP - the TCP protocol - TCP segment header - TCP connection establishment - connection release - TCP sliding window. (15 Hours)

UNIT V

The Application Layer: DNS: The DNS Name space – Domain resource records – Name servers - Electronic Mail: Architecture and services – The user agent – Message formats – Message Transfer – Final Delivery. (15 Hours)

Text Book

Andrew S.Tanenbaum& David J.Wetherall, *Computer Networks*, 5ᵗʰEdition 2011. Prentice Hall.

Unit	Chapter	Section/Pages
I	1	1.2 to 1.4
	2	2.2 to 2.4,2.6.5, 2.7
II	3	3.1 to 3.4
	4	4.1, 4.2.1, 4.2.2
III	5	5.1, 5.2.2 to 5.2.8,5.3, 5.6.1 to 5.6.4
IV	6	6.1.1, 6.1.2,6.2.1 to 6.2.4,6.4.1, 6.5.1,6.5.3 to 6.5.6,6.5.8
V	7	7.1, 7.2

Reference Books

1. Forouzan, (2003). *Data Communication and Networking*, Tata McGraw Hill Education Private Ltd.

2. William Stallings, (2003). *Data and Computer Communications*, 7th edition, Pearson education.

3. Kurose & Ross, (2013), *Computer Networking- A Top Down Approach, 6th edition*, Pearson.

Course Code 20UCAC52	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	M	M	-	-	-	-	-	-	-
CO2	M	M	L	M	H	-	-	-	-	-
CO3	H	M	M	M	M	L	L	M	-	-
CO4	H	M	L	H	M	L	L	H	-	-
CO5	M	H	L	-	-	-	-	M	-	-

Mrs. J.Porkodi   Mrs.M.Priyani

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A
(2020 -21 onwards)

Semester V		Hours/Week: 5	
Core Course: 12	**SOFTWARE ENGINEERING**	Credits: 5	
Course Code **20UCAC53**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learner should be able to

CO1 : recall the concepts of software engineering basics, planning, cost estimation, SRS, design, verification, validation and maintenance. [K1]

CO2 : elaborateabout software project base ideas, planning activities, software cost, requirement specification, design activities, verification, validation techniques and maintenance. [K2]

CO3 : use the software engineering concepts to choose appropriate life cycle model based on size, effort, quality factors, estimate cost, plan, define requirements, design, review, debug, test and maintain software. [K3]

CO4 : examine project size, quality & productivity factors, planning activities, SRS, design, verification, validation and maintenance activities. [K4]

CO5 : create project document, estimate needed programmer month, development time, programmers, measure software complexity. [K5]

UNIT I

Introduction to Software Engineering: Introduction – Some definitions – Some size factors - Quality and productivity factors – Managerial issues. **Planning a Software Project:**Introduction – Defining the problem – Developing a solution strategy – planning the

development process: The Phased Life cycle model –The Cost Model – The Prototype Model – Successive Versions. (15 Hours)

UNIT II

Planning a Software Project: Planning an organizational structure: Project Structure – Programming Team Structure – Management By Objectives. **Software Cost Estimation**: Introduction – Software Cost factors – Software cost estimation techniques – staffing level estimation – estimating software maintenance costs. (15 Hours)

UNIT III

Software Requirements Definition: Introduction – The software requirements specification – formal specification techniques. (15 Hours)

UNIT IV

Software Design: Introduction – Fundamental Design Concepts – Modules and modularization Criteria – Design Notations – Design Techniques – Detailed Design Considerations – Real Time and distributed system design – Test plans. (15 Hours)

UNIT V

Verification and Validation Techniques: Introduction – Quality assurance – Walkthroughs and Inspections – Static analysis – symbolic execution – Unit Testing and Debugging – System testing.**Software Maintenance:** Introduction – Managerial aspects of software maintenance – Configuration management – source code metrics. (15 Hours)

Text Book

Richard E.Fairley, (2011). *Software Engineering Concepts*, Tata McGraw Hill book Company.

Unit	Chapter	Section
I	1,2	1.1 to 1.4, 2.1 to 2.3: 2.3.1,2.3.3-2.3.5
II	2,3	2.4, 3.1 to 3.4
III	4	4.1, 4.2
IV	5	5.1 to 5.7
V	8	8.1 to 8.6
	9	9.2 to 9.4

Reference Books

1. Roger S.Pressman,*Software Engineering A Practitioner's Approach*, Seventh Edition, McGraw Hill education, Indian Edition.

2. V.R. Kavitha,*Software Engineering*, Magnus Publications.

3. R.A. Khan, A. Agrawal,*Software Engineering A Practitioners Approach*, Narosa Publishing House.

Course Code 20UCAC53	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	M	M	-	-	-	-	-	-	-
CO2	M	M	M	-	-	-	-	-	-	-
CO3	M	H	M	M	M	-	-	M	-	-
CO4	H	H	L	M	M	-	-	M	-	-
CO5	H	H	L	-	-	L	L	H	L	L

Mrs. J.Porkodi   Mrs.R.NancyBeaulah
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester V		Hours/Week: 5	
Core Course: 13	**VB.NET PROGRAMMING LAB**	Credits: 2	
Course Code **20UCAC51P**		Internal 40	External 60

COURSE OUTCOMES

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

CO1 : apply the concepts of class and objects and write programs. [K3]

CO2 : use looping statements, write VB.NET programs. [K3]

CO3 : illustrate the concept of boxing and unboxing, jagged arrays, interface, namespace, components, delegates and write programs. [K3]

CO4 : use various windows form controls solve real world problems inVB.NET.[K3]

CO5 : develop application software using VB.NET programming language. [K4]

Write a VB.NET Programs for

1. Design a Calculator using Basic tools.

2. Perform any Number generation, Checking using radio buttons and group box.

3. Program using checkbox and list box.

4. Sorting using Arrays

5. Perform matrix multiplication using Array concepts.

6. Perform transpose of a matrix using Array concepts

7. Calculate Area, circumference, volume of shapes using class.

8. Program for demonstrating the properties.

9. Program for demonstrating the Inheritance.

10. Program for demonstrating the Usage Interface

11.   Binomial coefficients (NCR) calculation using delegates.

12.   Program for demonstrating the creation and handling of Events.

13.   Program for demonstrating the creation and handling of Attributes.

14.   Program for Threading.

15.   Program for Files.

16.   Program for File manipulations.

17.   Program using Timer.

18.   Database connection using binding.

19.   Database connection using coding.

Course Code 20UCAC51P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	-	M	-	M	-	M	-	-	-
CO2	H	M	M	-	-	M	-	-	-	-
CO3	M	-	-	M	-	-	-	M	-	-
CO4	H	M	L	M	M	-	-	-	-	-
CO5	M	H	L	-	-	-	L	H	-	L

Mrs. J.Porkodi   Mrs.V. Queen Jemila
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester V		Hours/Week: 4	
DSEC1	**SYSTEM SOFTWARE**	Credits: 4	
Course Code **20UITE51**		Internal 25	External 75

COURSE OUTCOMES

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

CO1 : recall the relationship between system software and machine architecture, assembler features, loader functions, macro processor and compiler functions. [K1]

CO2 : outline the concepts of one pass, two pass and multi pass assemblers, loaders and linkers, SIC, macro processors and lexical analysis phase for the generation of machine codes.[K2]

CO3 : construct simplified instructional computer machine dependent and independent assembler, compiler, macro processor to generate executable files.[K3]

CO4 : examine the architecture of RISC, CISC ,the functions of assemblers, loaders, macro processors design options and compilers for the object program enhancement. [K4]

CO5 : measures evaluation processes, system software tools and functionality of linkers and compilers for the core functions of operating systems.[K5]

UNIT I
Background: Introduction – System Software and Machine Architecture – The Simplified Instructional Computer (SIC) – Traditional (CISC) machines – RISC Machines.   (12 Hours)

UNIT II

    Assemblers: Basic Assembler Functions – Machine-Dependent Assembler Features – Machine-Independent Assembler Features – Assembler Design Options. (12 Hours)

UNIT III

  Loaders and Linkers: Basic Loader Functions – Machine-Dependent Loader Features - Machine-Independent Loader Features - Loader Design Options   (12 Hours)

UNIT IV

    Macro Processors: Basic Macro Processor Functions – Machine-Independent Macro Processor Features – Macro Processor Design Options   (12 Hours)

UNIT V

  Compilers: Basic Compiler Functions – Machine-Dependent Complier Features - Machine-Independent Complier Features   (12 Hours)

Text Book

Leland L. Beck &Manjula, D. (2009).*System Software - An Introduction to Systems Programming*.3rd Edition. India: Pearson Education.

Unit	Chapter	Section
I	1	1.1 - 1.5
II	2	2.1 - 2.4
III	3	3.1 - 3.4
IV	4	4.1 - 4.3
V	5	5.1 - 5.3

Reference Books

1. Dhamdhere. (2006). *System Programming and Operating Systems*. India: Tata McGraw Hill Education Private Limited.

2. Donovan. (2001). *Systems Programming*. India:Tata McGraw Hill Education Private Limited.

Course Code 20UITE51	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	H	M	H	L	M	M	L	M	M	-
CO2	H	H	L	M	H	L	-	L	M	L
CO3	H	L	M	M	M	M	M	H	-	L
CO4	H	H	M	L	H	H	M	L	L	H
CO5	H	H	M	L	H	H	M	M	-	-

Dr . (Mrs). A.Bharathi Lakshmi   Mrs.K.Kasthuri
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester V		Hours/Week: 4	
DSEC1	**COMPUTER GRAPHICS**	Credits: 4	
Course Code **20UCAE52**		Internal 25	External 75

COURSE OUTCOMES

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

CO1 : identify the applications of Computer Graphics, recognize the devices of the graphics system, describe the output primitive attributes, the concepts of geometric transformations, visible-surface, viewing pipeline and clipping operations. [K1]

CO2 : understand the basics of computer graphics , 2D and 3D Transformations, attributes of output primitive, clipping algorithms, graphical user interfaces and interactive input methods. [K2]

CO3 : use geometric transformations on graphics objects and their application in composite form, and to know how graphical input and output devices work, solve the problems on viewing transformations. [K3]

CO4 : analyse how primitive graphical objects are generated in the computer, compare the algorithms for drawing a point, line, circle., classify the visible-surface detection methods. [K4]

CO5 : create programs for real time applications by implementing algorithms of computer graphics. [K5]

UNIT I

A Survey of Computer Graphics: Computer Aided Design – Presentation Graphics – Computer Art – Entertainment – Education and Training – Visualization – Image Processing – Graphical User Interfaces. **Overview of Graphics System**: Video Display Devices, Refresh Cathode-Ray Tubes, Raster-Scan Displays, Random-Scan Displays, Color CRT Monitors, Direct-View Storage Tubes, Flat-Panel Displays –Raster-Scan Systems: Video Controller,

Raster-Scan Display Processor – Random-Scan Systems – Graphics Monitors and Workstations. (12 Hours)

UNIT II

Overview of Graphics System – Input Devices: Keyboards, Mouse, Trackball and Spaceball, Joysticks, Data Glove, Digitizers, Image Scanners, Touch Panels, Light Pens, Voice Systems – Graphics Software: Coordinate Representations, Graphics Functions, Software Standards, PHIGS Workstations. **Output Primitives**: Points and Lines – Line Drawing Algorithms : DDA Algorithm, Bresenham's Line Algorithm, Parallel Line Algorithm – Circle-Generating Algorithms: Properties of Circles, Midpoint Circle Algorithm – Pixel Addressing and Object Geometry: Screen Grid Coordinates, Maintaining Geometric Properties of Displayed Objects – Filled-Area Primitives: Boundary-Fill Algorithm and Flood Fill Algorithm - Character Generation. (12 Hours)

UNIT III

Attributes Of Output Primitives: Line Attributes: Line Type, Line Width, Pen And Brush Options, Line Color – Character Attributes: Text Attributes, Marker Attributes. **Two-Dimensional Geometric Transformations**: Basic Transformations: Translation, Rotation, Scaling - Matrix Representations and Homogeneous Coordinates – Composite transformation: Translations, Rotations, General Pivot-Point Rotation, fixed-point Scaling - Other Transformations: Reflection, shear. **Three-Dimensional Geometric Transformations**: Translation, Coordinate-Axes Rotation, Scaling, Reflections and Shears. (12 Hours)

UNIT IV

Two Dimensional Viewing: The Viewing Pipeline – Viewing Coordinate Reference Frame – Window-To-Viewport Coordinate Transformation – Two-Dimensional Viewing Functions – Clipping Operations – Line Clipping: Cohen-Sutherland Line Clipping – Text Clipping – Exterior Clipping. (12 Hours)

UNIT V

Graphical User Interfaces And Interactive Input Methods: The User Dialogue: Windows and Icons, Accommodating Multiple Skill Levels, Consistency, Minimizing Memorization, Backup and Error Handling, Feedback - Input Of Graphical Data - Logical Classification Of Input Devices: Locator Devices, Stroke Devices, String Devices, Valuator Devices, Choice Devices, Pick Devices - Input Functions: - Interactive Picture Construction Techniques.

Visible-Surface Detection Methods: Classification of visible-Surface Detecting Algorithm – Back-Face Detection – Depth – Buffer Method. (12 Hours)

Text Book

Donald Hearn, M. Pauline Baker*,*(2011), *Computer Graphics C Version*, Second Edition, Prentice Hall of India Private Limited.

Unit	Chapter	Section
I	1	Chapter 1 Full
	2	2.2, 2.3 (Page No 56 to 67)
II	2	2.5, 2.7
	3	3.1, 3.2, 3.5, 3.6, 3.10, 3.11, 3.14
III	4	4.1, 4.5
	5	5.1, 5.2, 5.3 (Page No 211, 212, 213), 5.4
IV	6	6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7 (Page No 246 to 250), 6.10, 6.11
V	8	8.1, 8.2, 8.3, 8.5
	13	13.1, 13.2, 13.3

Reference Book

1. Malay K.Pakhira, (2010).*Computer Graphics Multimedia and Animation–* 2nd Edition. PHI Learning Private Limited.

2. Andries van Dam; F. Hughes John; James D. Foley; Steven K. Feiner(2020), "*Computer Graphics Principles and Practice in C: Principles & Practice in C*", Second Edition, Pearson.

3. Marcshner,2015, Fundamentals of Computer Graphics Paperback.

Course Code 20UCAE52	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	H	M	-	M	-	-	-	-
CO2	H	H	M	M	M	-	-	-	-	L
CO3	M	M	M	H	M	L	L	M	-	-
CO4	M	-	L	M	-	L	L	M	-	-
CO5	-	M	L	-	-	-	-	H	L	-

Mrs. J.Porkodi   Mrs.V.G.Jyothi Mani
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 (3rd Cycle) by NAAC
VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester V		Hours/Week: 4	
DSEC1	**MICROPROCESSOR USING 8085**	Credits: 4	
Course Code **20UCAE53**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learner should be able to

CO1: outline the fundamentals of 8085, its architecture and instruction sets. [K1]

CO2: understand the 8085 addressing modes, instructions and programming techniques, counters, time delays, stack, subroutines, code conversions, BCD arithmetic operations and interrupts. [K2]

CO3: illustrate the implementations of counters, time delays, stack, subroutines, code conversions, BCD arithmetic operations and interrupts, [K3]

CO4: classify the instructions based on its data format and storage, categories the types of memory, analyse memory map and address range of a memory chip, interfacing concepts, counters and time delays. [K4]

CO5: create simple assembly language program for real time applications using 8085 instructions.[K5]

UNIT I

Introduction to 8085 Assembly Language Programming: The 8085 Programming Model – Instruction Classification– Instruction, Data Format and Storage – Overview of the 8085 Instruction Set.**Microprocessor Architecture and Microcomputer Systems:** Microprocessor Architecture and its Operations – Memory – I/Os with 8-bit Addresses – I/Os with 16-bit Addresses. (12 Hours)

UNIT II

8085 Microprocessor Architecture and Memory Interfacing: The 8085 MPU- Example of an 8085-based Microcomputer – Memory Interfacing.**Interfacing I/O Devices:** Basic Interfacing concepts – Interfacing Output Displays – Interfacing Input Devices - Memory mapped I/O. (12 Hours)

UNIT III

Introduction to 8085 Instructions: Data transfer operations – Arithmetic operations – Logic operations – Branch operations.**Programming Techniques with Additional Instructions:** Programming Techniques: Looping, Counting and Indexing – Additional data transfer and 16 bit Arithmetic Instructions – Arithmetic operations related to Memory – Logic operations Rotate and Compare. (12 Hours)

UNIT IV

Counters and Time Delays: Counters and Time Delays – Illustrative Program: Hexadecimal Counter – Illustrative Program: Zero-to-Nine (Modulo Ten) Counter. **Stack and Subroutines:** Stack – Subroutine – Restart, Conditional Call, and Return Instructions. (12 Hours)

UNIT V

Code Conversion, BCD Arithmetic and 16 bit Data Operations: BCD to Binary Conversion – Binary to BCD Conversion – BCD to Seven Segment LED Code Conversion – Binary to ASCII and ASCII to Binary Code Conversion – BCD Addition – BCD Subtraction – Introduction to Advanced Instructions and Applications – Multiplication – Subtraction with Carry. **Interrupts:** The 8085 Interrupt – 8085 Vectored Interrupts. (12 Hours)

Text Book

Ramesh S Gaonkar, *Microprocessor Architecture, Programming, and Applications with the 8085*, Penram International Publishing (India) Pvt. Ltd., Mumbai, Sixth edition, 2013.

Unit	Chapter	Section
I	2	2.1, 2.2, 2.3, 2.5
	3	3.1, 3.2, 3.3
II	4	4.1, 4.2, 4.3
	5	5.1, 5.2, 5.3, 5.4
III	6	6.1, 6.2 6.3, 6.4
	7	7.1, 7.2, 7.3, 7.4, 7.5
IV	8	8.1, 8.2, 8.3
	9	9.1, 9.2, 9.3
V	10	10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9
	12	12.1, 12.2

Reference Books

1. Sunil Mathur, (2011). *Microprocessor 8085 and its Interfacing*, Second edition, New Delhi: PHI Learning Private Ltd.

2. Ajay Wadhwa, (2010). *Microprocessor 8085: Architecture, Programming and Interfacing,* New Delhi: PHI Learning Private Ltd.

3. Hall Douglas V., Microprocessors and Its Interfacing, Publisher, McGraw-Hill Education – Europe.

Course Code 20UCAE53	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	H	M	-	M	-	-	-	-
CO2	H	H	M	M	M	-	-	-	-	L
CO3	M	M	M	H	M	L	L	M	-	-
CO4	M	-	L	M	-	L	L	M	-	-
CO5	-	M	L	-	-	-	-	H	L	-

Mrs. J.Porkodi   Mrs.R.Nagajyothi
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester V		Hours/Week: 4	
DSEC2	**SYSTEM TESTING LAB**	Credits: 2	
Course Code **20UITE51P**		Internal 40	External 60

COURSCOURSE OUTCOMES

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

CO1 : construct and test sample programs by using different testing techniques and learn test case designing. [K3]

CO2 : identify the Fault cases in the program with that its logic validation data analysis before they are used. [K3]

CO3 : discover and test different a range of software testing techniques and strategies for the real time projects.[K3]

CO4 : develop the basic path testing cases and procedures for the verification process. [K3]

CO5 : analyze the different types of test cases to understand real world IT problem. [K4]

1. Design and develop a program in a language of your choice to solve the triangle problem defined as follows:

   i. Accept three integers which are supposed to be the three sides of triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all.

   ii. Derive test cases for your program based on decision-table approach, execute the test cases and discuss the results.

2. Decision table approach for the above triangle solving problem.

3. Boundary value analysis program for the above design plan.

4.   Equivalence class partitioning program for the above design plan

        i. Design and develop code and run the program in nay suitable language to solve the commission problem.

        ii. .Analyze it from the perspective of boundary value, derive test cases, execute these test cases and discuss the test results.

5.   Dataflow testing for the commission calculation for the above design and analyze problem.

6.   Equivalence Class partitioning test cases for the above design and analyze.

7.   Decision Table for Commission Problem.

8.   Binary Search - Path Testing.

9.   Quick Sort-Path Testing.

10.   Boundary Value Analysis test cases for NextDate function.

11.   Equivalence class test cases for NextDate function.

Course Code 20UITE51P	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	H	H	M	H	H	H	H	M	H	-
CO2	H	H	M	H	H	H	M	H	M	-
CO3	H	H	H	H	H	M	M	M	H	-
CO4	H	H	H	H	L	H	M	M	M	-
CO5	M	L	H	H	M	H	M	M	H	-

Dr.(Mrs). A.Bharathi Lakshmi   Mrs.K.Kasthuri

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 (3rd Cycle) by NAAC
VIRUDHUNAGAR – 626 001
B.C.A

(2020 -21 onwards)

Semester V		Hours/Week: 4	
DSEC2	**COMPUTER GRAPHICS PROGRAMMING LAB**	Credits: 2	
Course Code **20UCAE52P**		Internal 40	External 60

COURSE OUTCOMES
On successful completion of the course, the learners should be able to

CO1 : apply the specification of syntax and rules for C Graphics functions.[K3]

CO2 : write programs using C for drawing pixel, line, circle, text, filling and clipping objects, 2D and 3D transformations. [K3]

CO3 : execute the programs with required input. [K3]

CO4 : prepare the record with the neat output. [K3]

CO5 : analyze and test program with different inputs and justify the result. [K4]

Write a C program to

1. draw a pixel, line and circle.

2. draw a line using DDA algorithm.

3. draw a line using Bresenham's line drawing algorithm.

4. draw a circle using midpoint circle drawing algorithm.

5. translate and rotate an object in 2D.

6. reflect and scale an object in 2D.

7. translate and rotate an object in 3D.

8. reflect and scale an object in 3D.

9. fill an object using floodfill and boundary fill algorithm.

10. implementcohen Sutherland line clipping algorithm.

11. display text in different sizes, colors and font styles by using graphics functions.

Course Code 20UCAE52P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	-	-	-	-	-	-	-
CO2	H	H	M	M	M	-	-	-	-	L
CO3	M	L	L	H	M	L	L	M	-	-
CO4	M	-	L	M	-	L	H	M	-	L
CO5	M	M	L	-	-	-	-	H	M	-

Mrs. J.Porkodi   Mrs.V.G.Jyothimani

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 (3ʳᵈ Cycle) by NAAC
VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester V		Hours/Week: 4	
DSEC2	**MICROPROCESSOR LAB**	Credits: 2	
Course Code **20UCAE53P**		Internal 40	External 60

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1: apply the specification of syntax and rules for simple arithmetic, logical, shift operations and transfer/exchange of data in memory locations. [K3]

CO2: write programs using arrays, operators, decision making and looping statements. [K3]

CO3: execute the programs with required input. [K3]

CO4: prepare the record with the neat output. [K3]

CO5: analyze and test program with different inputs and justify the result. [K4]

Write an Assembly Language Program using 8085 Simulator

1. To transfer a block of data from memory location F000H to F100H.

2. To exchange data between two memory locations.

3. To add and subtract two 8 bit numbers.

4. To add and subtract two 16 bit numbers.

5. To find the maximum among two given numbers.

6. To multiply two numbers by repeated addition.

7. To calculate a factorial of a given number.

8. To sort a given set of data in ascending order and descending order.

9. To convert a binary number to ASCII number and vice-versa.

10. To convert an unpacked BCD into packed BCD and vice-versa.

Course Code 20UCAE53P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	H	-	-	-	-	-	-	-
CO2	H	H	M	M	M	-	-	-	-	L
CO3	M	M	M	H	M	L	L	M	-	-
CO4	M	-	L	M	-	L	L	M	-	-
CO5	-	M	L	-	-	-	-	H	L	-

Mrs. J.Porkodi   Mrs.R.Nagajyothi
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A
(2020 -21 onwards)

Semester V		Hours/Week: 0
Project	**PROJECT**	Credit: 1
Course Code **20UCAC5PR**		Internal 100

COURSE OUTCOMES

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

CO1 : explore on planning, analysis and design of a project. [K3]

CO2 : Identify methodologies and professional way of documentation and communication. [K3]

CO3 : determine the key stages in development of the project. [K3]

CO4 : execute the project using test data. [K3]

CO5 : analyse the developed project with the needs of the Industry. [K4]

Students are expected to select a project in the field of Computer Application and related interdisciplinary fields. Two students can do one project. Minimum pages for project report should be 20 pages. Two typed copies of the report on the completed project will be submitted to the Controller of Examination through the Head of the department in the month of November during V semester. Evaluation will be done internally.

Project work & Report   -   60 marks

Presentation & Viva-voce   -   40 marks

Course Code 20UCAC5PR	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	M	M	M	-	-	L	M
CO2	H	M	H	M	-	M	-	M	M	M
CO3	M	-	-	M	-	-	-	M	M	M
CO4	H	M	L	M	M	-	-	-	-	M
CO5	M	H	L	-	-	-	H	L	M	M

Mrs. J.Porkodi   Mrs.J.Porkodi
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester V		Hours/Week: 0	
Extra Credit Course	**POINTERS IN C AND C++**	Credits: 2	
Course Code **20UCAO51**		Internal 100	External -

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1 : understand the knowledge of pointers in C and C++

CO2 : learn various types of arrays with pointers.

CO3 : explore the concepts on strings with pointers.

CO4 : acquire knowledge on structure and pointer.

CO5 : know about memory allocation operators, void, this, smart pointer and pointers to members.

UNIT I

Introduction To Pointers: The & and * Operators – Compilation and Execution - Pointer Expressions – The Jargon of Pointers – char, int and float Pointers – Passing addresses to Functions - Functions Returning Pointers – Differences across Compilers.

UNIT II

Pointers and Arrays: Introduction to Arrays – Passing Array Elements to a Function – Pointers and Arrays – Accessing Array Elements using Pointers-Passing an Array to a Function – The Real Thing – Dynamic Memory Allocation- More Than One Dimension – Pointers and Two-Dimensional Arrays - Pointer to an Array – Passing 2-D Array to a Function – Array of Pointers- Three Dimensional Array– Returning Array from a Function.

UNIT III

Pointers and Strings: Introduction to Strings – Standard Library String Functions – Pointers and Strings – The const Qualifier – const Pointers - Returning const Values – Two Dimensional Array of Characters – Array of Pointers to Strings – Limitation of Array of Pointers to Strings.

UNIT IV

Pointers and Structures: Array of Structures – Intricacies of Structures - Structure Pointers – Offsets of Structure Elements.

UNIT V

Pointers in C++: void Pointers – The this Pointer – new and delete Operators – malloc()/ free()/ Versus new/ delete – Smart Pointers – Pointers to Members.

Text Book

Yashavant kanetkar (2019), *Understanding Pointers in C & C++,* BPB Publications, New Delhi.

Mrs. J.Porkodi   Mrs.R.Nagajyothi
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2020 -21 onwards)

Semester VI		Hours/Week: 5	
Core Course: 14	**WEB PROGRAMMING**	Credits: 5	
Course Code **20UCAC61**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learner should be able to

CO1 :   gain knowledge on the fundamentals of HTML tags, Javascript, PHP and JSP. [K1]

CO2 :   understand concepts of web page creation using HTML, Javascript, PHP and JSP. [K2]

CO3 :   make use of HTML, JavaScript, PHP and JSP to design simple web pages.[K3]

CO4 :   analyze how the web works and the steps of creating a website using HTML, JavaScript, PHP and JSP. [K4]

CO5 :   choose real time applications and create dynamic web pages. [K5]

UNIT I

   HTML and JavaScript Programming: HTML - Introducing HTML Document Structure – Creating Headings on a Web Page – Working with Links – Creating a Paragraph – Working with Images- Working with Tables – Working with Frames – Introduction to Forms and HTML controls – Introducing Cascading Style Sheets – Introducing DHTML – Introducing Javascript.

(15 Hours)

UNIT II

   Introducing PHP: Versions of PHP – Features of PHP – Introduction to HTML and XHTML – Advantages of PHP over other scripting languages – Creating a PHP Script – Running a PHP Script – Handling Errors in a PHP Script – Escape Characters – Using Variables – Using Constants – Exploring Data Types in PHP – Exploring Operators in PHP –

Conditional Statements – Looping Statements – Break, Continue and Exit Statements.

(15 Hours)

UNIT III

Working with Functions, Arrays, Files and Directories: Introduction – User-Defined Functions in PHP – Built-in Functions in PHP – Recursive, Variable and Callback Functions – Introducing Arrays – Types of Arrays – Traversing Arrays using Loops and ArrayIterators – Built-in Array Functions – Working with Files – Working with and Directories   (15 Hours)

UNIT IV

Working with Forms and Database: Introducing to Web Forms – Working with the <form> Tag and Form Elements – Processing a Web Form – Validating a Form – Introducing Databases – Using PHP and MySql – Working with Cookies – Working with Sessions

(15 Hours)

UNIT V

Working with JSP: Understanding JSP – Describing the JSP Life Cycle – Creating Simple JSP Pages – Working with JSP Basic Tags and Implicit Objects – Using JavaBeans and Action Tags in JSP.   (15 Hours)

Text Book

Kogent Learning Solutions Inc., Web Technologies HTML, JavaScript, PHP, Java, JSP,XML and AJAX Black Book, DreamTech Press, New Delhi, 2012.

Unit	Chapter
I	1
II	3,4,5
III	6
IV	7, 8 (Page No: 261 - 270)
V	12 (Page No: 261 - 270)

Reference Books

1. Steve Suhering, Tim Converse, Joyce Pak, *PHP6 and MySQL Bible,* Wiley India Pvt. Ltd.

2. Julie C. Meloni, *Sams Teach Yourself PHP, MySQL and Apache All in One*, Fourth Edition, Pearson Publications.

3. Mike MCGrath*, (*2007). *Java Server Pages in easy steps,* New Delhi: Dreamtech Press.

Course Code 20UCAC61	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	M	M	-	-	-	-	-	-	-
CO2	M	M	M	M	M	-	-	-	-	-
CO3	H	M	L	M	H	L	L	H	L	-
CO4	H	M	L	H	M	L	L	M	L	-
CO5	H	H	L	-	-	-	-	M	L	L

Mrs.J.Porkodi   Mrs.S.Swetha

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 (3ʳᵈ Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2020 -21 onwards)

Semester VI		Hours/Week: 5	
Core Course: 15	**DATABASE MANAGEMENT SYSTEMS**	Credits: 5	
Course Code **20UCAC62**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learner should be able to

CO1 : gain knowledge on the fundamentals of data models, SQL, data security, integrity, recovery and PL/SQL . [K1]

CO2 : understand concepts of database design, normalization, relational algebra and PL/SQL. [K2]

CO3 : make use of database system, relational model, functional dependency, relational algebra, database security and recovery. [K3]

CO4 : classify the database modelling and analyze how SQL queries, PLSQL exceptions, triggers, function and procedure works. [K4]

CO5 examine RDBMS terminology, data normalization, operations in relational algebra, calculus and procedural features of SQL and PLSQL. [K5]

UNIT I

Introduction to DBMS: Introduction –Why a Database - Characteristics of Data in the Database – Database Management System – Why DBMS – Types of Database Management Systems**. Introduction to RDBMS**: Introduction – RDBMS Terminology – The Relational data structure – Relational Data Integrity – Relational Data Manipulation – Codd's Rules. **Database architecture and Data modeling**: Introduction – Conceptual, Physical and logical Database Models – Database Design – Design Constraints – Functional Dependencies.

(15 Hours)

UNIT II

Entity Relationship modeling: Introduction – E-R Model – Components of an E-R Model – E-R Diagram Conventions – E-R Modeling Symbols. **Enhanced Entity-Relationship model**: Introduction – Super Class and Subclass Entity Types – Attribute Inheritance – Specialization – Generalization – Categorization. **Data Normalization**: Introduction –First Normal Form(1NF) – Second Normal Form(2NF) – Third Normal Form (3NF) – Boyce codd Normal Form(BCNF) - Fourth Normal Form(4NF) – Fifth Normal Form(5NF) – Domain Key Normal Form – Denormalization.   (15 Hours)

UNIT III

Relational algebra and relational calculus: Relational Algebra – Relational Algebraic Operations – Relational Calculus. **Introduction to SQL:** Introduction – Characteristics of SQL – SQL Datatypes and Literals – Types of SQL Commands – SQL Operators – Arithmetic operators – comparison operators – logical operators – set operators – operator precedence. **Triggers:** Introduction – What is a trigger? – Types of Trigger – Trigger syntax – Combining trigger types – Setting Inserted values – Disabling and Enabling triggers – Replacing triggers – Dropping triggers – Advantages and limitations of triggers.   (15 Hours)

UNIT IV

Database security: Introduction – Database Environment – Data Security Risks – Dimensions of Database Security – Data Security Requirements – Database Users – Protecting the data within the database: Database privileges – Granting and Revoking Privileges and Roles – Data Encryption. **Data integrity**: Introduction – Types of Integrity Constraints – Restrictions on Integrity Constraints. **Backup and recovery:** Introduction – Database Backups – Why Plan Backups – Causes of Failures – Recovery Facilities – Recovery Techniques.   (15 Hours)

UNIT V

Introduction to PL/SQL: Introduction – PL/SQL Variables – PL/SQL data types – PL/SQL precompilers – Conditional and sequential control statements – Control structures – Cursors – Iterative control statements – PL/SQL Exceptions – PL/SQL Blocks – PL/SQL Triggers – Types of triggers – Procedures and packages.   (15 Hours)

Text Book

Alexis Leon and Mathews Leon, Data base Management Systems, Leon Vikas Publishing, Chennai, 2002.

Unit	Chapter
I	5, 7, 8
II	9, 10, 11
III	12, 14, 25
IV	27, 28, 30
V	Appendices – D

Reference Books

1. Abraham Silberschatz, Henry F.Korth, S.Sudarsan, Database System Concepts, 7th Edition, McGraw Hill, 2011.

2. C.J.Date, (2002). *An Introduction to Database Systems* - Seventh Edition, Pearson Education Pvt. Ltd.

3. Raghu Ramakrishnan& Johannes Gehrke, (2000). *Database management systems*, 2nd Edition, McGraw Hill International Edition.

Course Code 20UCAC62	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	M	M	-	-	-	-	-	-	-
CO2	M	H	M	M	M	-	-	-	-	-
CO3	H	M	L	M	H	L	L	H	L	-
CO4	H	H	L	H	L	L	L	M	M	L
CO5	H	H	L	-	-	-	-	M	L	-

Mrs.J.Porkodi   MrsJ.Porkodi
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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2020 -21 onwards)

Semester VI		Hours/Week: 5	
Core Course: 16	**DATA MINING**	Credits: 5	
Course Code **20UCAC63**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learner should be able to

CO1 : gain the knowledge about the basics of data mining, data objects, pre-processing, data warehouse, mining patterns, classification and cluster analysis concepts. [K1]

CO2 : classify data, patterns, data visualization, OLAP, mining methods, classification methods and cluster analysis methods. [K2]

CO3 : apply the data mining techniques in real time problems. [K3]

CO4 : analyze the different technology used in data mining. [K4]

CO5 : perform evaluation of pattern, classification and clustering in real time problems. [K5]

UNIT I

Introduction: Data Mining - Kinds of Data that Can Be Mined- Kinds of Patterns that Can Be Mined - Technologies Used - Kinds of Applications - Major Issues in Data Mining. **Getting to Know Your Data:** Data Objects and Attribute Types - Basic Statistical Descriptions of Data - Data Visualization – Measuring Data Similarity and Dissimilarity.

(15 Hours

UNIT II

Data Pre-processing: Data Pre-processing An Overview - Data Cleaning - Data Integration - Data Reduction - Data Transformation and Data Discretization. **Data**

Warehousing and Online Analytical Processing: Data Warehouse: Basic Concepts -   Data warehouse Modelling: Data Cube and OLAP.   (15 Hours)

UNIT III

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and Methods: Basic concepts - Frequent Item set Mining Methods - Patterns that are Interesting - Pattern Evaluation Methods.   (15 Hours)

UNIT IV

Classification: Basic Concepts - Decision Tree Induction - Bayes Classification Methods - Rule Based Classification- Model Evaluation and Selection - Techniques to Improve Classification Accuracy   (15 Hours)

UNIT V

Cluster Analysis Basic Concepts and Methods: Cluster Analysis - Partitioning Methods - Hierarchical Methods - Density Based Methods - Grid Based Methods - Evaluation of Clustering.   (15 Hours)

Text Book

Jiawei Han, Micheline Kamber, Jian Pei, *Data Mining Concepts and Techniques* - Third Edition, Morgan Kaufmann Publisher, 2016

Unit	Chapter
I	1, 2
II	3, 4 (4.1 to 4.2)
III	6
IV	8
V	10

Reference Books

1. Insight into Data Mining Theory and Practice, K.P. Soman, Shyam Diwakar and V. Ajay, Easter Economy Edition, Prentice Hall of India, 2006.

2. Introduction to Data Mining with Case Studies, G. K. Gupta, Easter Economy Edition, Prentice Hall of India, 2006.

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A

(2020 -21 onwards)

Semester VI		Hours/Week: 5	
Core Course: 17	**WEB PROGRAMMINGLAB**	Credits: 2	
Course Code **20UCAC61P**		Internal 40	External 60

COURSE OUTCOMES

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

CO1 : use the knowledge of HTML, CSS code and Javascript to create personal or business websites with current professional standards. [K3]

CO2 : write programs to implement creative skills in design and create websites. [K3]

CO3 : key in the programs, test the programs with required input and get expected outputs with neat formatting and prepare the record work. [K3]

CO4 : explain the given program and deduce the results/answers for any queries raised. [K3]

CO5 : reconstruct the program to incorporate required modification and justify the desired result. [K4]

1. Develop webpage using basic tags in HTML

2. Design webpage using Tables and Frames

3. Develop webpage using Forms

4. Develop webpage using CSS

5. Design to validate the form input using JavaScript

6. Write PHP code to demonstrate the method of passing data to PHP page

7. Write PHP code to read users personal information and validate the enrolment based on age (Using if)

8. Develop PHP page to generate the prime numbers within the given range

9. Design a web page to read marks of students and display the highest score.

10. Write PHP code to generate Fibonacci series using functions.

11. Write PHP code to calculate the binomial coefficient using recursive function

12. Write PHP code to show the contents of a text file to the user using file functions

13. Write PHP code to insert details of employees into a database

14. Write PHP code to prepare the salary bill of the employees from database

15. Write PHP code to demonstrate the usage of cookies

16. Write PHP code to demonstrate the concept of session and session data

17. Write JSP code to demonstrate the usage of forward tags

18. Write JSP code to in include dynamic content into the page (Using jsp:include)

19. Write JSP code to demonstrate the usage of exception handling

20. Develop JSP to display the number of visitors of a website using Java Beans

Course Code 20UCAC61P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	-	-	-	-	-	-	-
CO2	H	H	M	M	M	-	-	-	-	L
CO3	M	M	L	H	M	L	L	H	-	-
CO4	M	-	L	M	-	L	L	M	L	-
CO5	-	M	L	-	-	-	-	M	L	-

Mrs.J.Porkodi   Mrs.S.Swetha

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester VI		Hours/Week: 4	
DSEC 3	**MOBILE APPLICATION DEVELOPMENT**	Credits: 4	
Course Code		Internal	External
20UCAE61		25	75

COURSE OUTCOMES

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

CO1 : recite the concepts of Android programming basics, Activities, Fragments, Intents, UI, Views, inserting pictures, menus and data persistence. [K1]

CO2 : interpret about Android basics, Activities, Fragments, Intents, UI, Views, apps with pictures, menus and data storage in memory card, Databases. [K2]

CO3 : identify the needed views to design the UI and use Activities, Fragments, intents, picture insertion, menu, Data storage in Android Apps. [K3]

CO4 : figure out the elements needed for the UI designing such as views, menu, images and combine the concepts such as activities, fragment, intent and data persistence. [K4]

CO5 : design simple Android Apps using Android basics, Activities, Fragments, Intents, UI, Views, pictures, menus and data persistence. [K5]

UNIT I

Getting Started with Android Programming: What is Android - Obtaining the Required Tools **– Activities, Fragments and Intents:** Understanding Activities - Linking Activities using Intents – Fragments – Calling Built-in Applications using Intents - Displaying Notifications. (12 Hours)

UNIT II

Getting to know the Android User Interface: Understanding the Components of a screen - Adopting to Display Orientation - Managing Changes to Screen Orientation – Utilizing the Action Bar – Creating the User Interface Programmatically - Listing for UI Notifications.

(12 Hours)

UNIT III

Designing your screen interface using Views: Using Basic Views – Using Picker Views – Using List Views to display Long Lists – Understanding Specialized Fragments.

(12 Hours)

UNIT IV

Displaying Picture and Menus with Views: Using Image Views to display pictures - Using Menu with Views - Some Additional Views. (12 Hours)

UNIT V

Data Persistence: Saving and Loading User Preferences - Persisting Data to Files - Creating and using Databases. (12 Hours)

Text Book

Wei - Meng Lee, *Beginning Android 4 Application Development*, Wiley India Pvt. Ltd., 2015.

Unit	Chapter
I	1,2
II	3
III	4
IV	5
V	6

Reference Books

1. Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, *Mobile Computing*, Second Edition, Tata McGraw Hill Education, 2010.

2. Frank Ableson W, RobiSen, Chris King, Enrique Ortiz C, *Android in Action*, Third Edition, Dreamtech Press, 2015.

3. Jerome Dimarzio J F, *Android A Programmers Guide*, McGraw Hill Education, 2015.

Course Code 20UCAE61	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	M	M	-	-	-	-	-	-	-
CO2	M	M	M	M	M	-	-	-	-	-
CO3	M	M	M	M	M	L	L	M	L	-
CO4	H	M	L	H	M	L	L	M	L	-
CO5	H	H	L	-	-	-	-	H	L	L

Mrs. J.Porkodi   Mrs. R. Nancy Beaulah

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A
(2020 -21 onwards)

Semester VI		Hours/Week: 4	
DSEC 3	**PYTHON PROGRAMMING**	Credits: 4	
Course Code **20UCAE62**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learner should be able to

CO1 : gain knowledge on the fundamentals of Python Programming, basic branching, mutable & immutable objects, errors and data storage. [K1]

CO2 : understand the functions, control structures, strings, objects, exception and manage databases in Python. [K2]

CO3 : apply the essential concepts such as control structures, functions, strings, files and objects to deal with complex applications. [K3]

CO4 : demonstrate the use of operators, functions, strings, objects, files and databases. [K4]

CO5 : design and implement a program to solve a real world problems using operators, functions, statements, strings, objects, files and exceptions. [K5]

UNIT I

Python Programming: An Introduction: IDLE-An Interpreter for Python – Python Strings – Relational Operators – Logical Operators – Bitwise Operators – Variables and Assignment Statements – Keywords – Script Mode. **Functions:** Built-in Functions – Function Definition and Call – Importing User-defined Module – Assert Statement – Command Line Arguments.   (12 Hours)

UNIT II

Control Structures: if Conditional Statement – Iteration (for and while Statements). **Scope:** Objects and Object ids – Scope of Objects and names – Namespaces – Scope.

(12 Hours)

UNIT III

Strings: Strings – String Processing Examples – Pattern Matching. **Recursion:** Recursive Solutions for Problems on Numeric Data – Recursive Solutions for Problems on Strings – Recursive Solutions for Problems on Lists – Problem of Tower of Hanoi.

(12 Hours)

UNIT IV

Mutable and Immutable Objects: Lists – Sets – Tuples – Dictionary. **List Manipulation:** Sorting – Searching.   (12 Hours)

UNIT V

Files and Exceptions: File Handling – Writing Structures to a File – Errors and Exceptions – Handling Exceptions Using try…except – File Processing Example. Managing Databases using Structured Query Language (SQL)   (12 Hours)

Text Book

Sheetal Taneja & Naveen Kumar, Python Programming A Modular Approach with Database, *Mobile and Web Applications*, Pearson India Education Services Pvt. Ltd, First Impression, 2018.

Unit	Chapter	Section
I	2 & 3	2.1 - 2.8, 3.1 - 3.5
II	4 & 5	4.1 - 4.2, 5.1 - 5.2
III	6 & 7	6.1 - 6.3, 7.1 - 7.4
IV	8 & 9	8.1 - 8.4, 9.1 - 9.2
V	10 &14	10.1 - 10.5, 14.3

Reference Books

1. Kenneth A. Lambert, *Fundamentals of Python*: First Programs, CENGAGE Learning, 2012.

2.2. Robert Sedgewick, Kevin Wayne, Robert Dondero, *Introduction to Programming in Python:* An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.

3. Timothy A. Budd, *Exploring Python,* Mc-Graw Hill Education (India) Private Ltd., 2015.

Course Code 20UCAE62	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	M	M	-	-	-	-	-	-	-
CO2	M	M	M	M	H	-	-	-	-	-
CO3	M	M	M	M	M	L	L	H	L	-
CO4	H	M	L	H	M	L	L	M	L	-
CO5	H	H	L	-	-	-	-	H	L	L

Mrs. J.Porkodi   Mrs.B.Subashini

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester VI		Hours/Week: 4	
DSEC 3	**EMBEDDED SYSTEM**	Credits: 4	
Course Code **20UITE63**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: list the Hardware, Software, design technologies, Microcontrollers and program modeling concepts used in designing Embedded Systems to acquire the knowledge of the components of Information Technology. [K1]

CO2: outline the Embedded System architecture, design process, Microcontrollers, designing C, C++ and Java programs that gain ability to familiarize the latest trends in technological development. [K2]

CO3: identify the features of the microcontrollers and provide the exact solutions for any embedded applications that helps in applying standard Software Engineering practices. [K3]

CO4: analyze suitable microcontroller along with appropriate interfacing circuits and implement with software programs that enhances the practice in the core information technologies of human computer interaction. [K4]

CO5: determine the key concepts of embedded systems such as I/O, interrupts and interaction with peripheral devices through software to carry out societal IT projects. [K5]

UNIT I

Introduction to Embedded Systems: Embedded System – Processor Embedded into a System – Embedded Hardware Units and Devices in a System – Embedded Software in a System and an Overview of Programming Languages – Introduction to Embedded-system Design – Introduction to Embedded-system Architecture – Introduction to Embedded-system Model – Classification of Embedded Systems – Skills required for an Embedded-system Designer – Examples of the Embedded Systems. **Embedded Systems Design and Development Process:** Embedded System-On-Chip(SoC) and use of VLSI Circuit – Complex System Design and Processors.

(12 Hours)

UNIT II

Embedded Systems Design and Development Process: Build Process in Embedded Systems – Design process in Embedded System – Design Challenges in Embedded-System Design – Challenges in Embedded-System Design: Optimizing the Design Metrics – Challenges and Issues related to Embedded-Software Development – Embedded-System Design Technologies – Formalism of System Design – Design Process and Design Examples. **I/O Devices, Communication Buses and Distributed Networked Embedded Architectures:** /O types and Examples – Serial Communication Devices – Timer and Counting Devices.

(12 Hours)

UNIT III

8051, AVR and ARM Microcontrollers, Real-World Interfacing and the Inputs and Outputs using Buses: Introduction to Microcontrollers and Microprocessors – Embedded versus External Memory Devices – Example of a Microcontroller–8051 Architecture – ATMEL AVR Microcontroller – ARM Microcontrollers – Computer-system Buses – Real-World Interfacing – I/O performance – I/O Buses – Network-Oriented Bus Arbitration – Buses – Multilevel Buses.

(12 Hours)

UNIT IV

Programming Concepts and Embedded Programming in C, C++ and Java: Programming in Assembly Language and in High Level Language 'C' – 'C' Program Elements: Header and Source Files and Preprocessor Directives – Program Elements: Macros

and Functions – Program Elements: Data Types, Data Structures, Modifiers, Statements, Loops and Pointers – Use of Loops, Infinite Loops and Conditions – Use of Function Calls – Multiple Function Calls in Cyclic Order – Function Pointers and Function Queues – Queuing of Functions on Interrupts and Interrupt-Service-Routine Queues.   (12 Hours)

UNIT V

Programming Concepts and Embedded Programming in C, C++ and Java: Embedded C and C++: Overview of Additional Features – Object Oriented Programming – Embedded Programming in C++ – Optimisation of Codes and Memory Needs in Embedded C++ Programs to Eliminate the Disadvantages – Embedded Programming in Java. **Program Modeling Concepts:** Program Models – Data-Flow Graph-Based Program Models – State-Machine Programming Models for Event-Controlled Programs – Modeling of Multiprocessor Systems – UML Modeling.   (12 Hours)

Text Book

Raj Kamal,*Embedded Systems Architecture, Programming and Design*, Third Edition, New Delhi: Tata McGraw Hill Education Private Limited.

UNIT	CHAPTER	SECTION
I	1	Full
	2	2.1, 2.2
II	2	2.3 – 2.11
III	3	Full
	5	5.1, 5.2, 5.6
IV	7	7.1 – 7 .9
V	7	7.10 – 7.14
	8	Full

Reference Books

1. Wayne Wolf, *Computers as Components: Principles of Embedded Computing System Design*, Second Edition, New Delhi: Tata McGraw Hill Publications.

2. Frank Vahid, Tony Givargis, *Embedded System Design: A Unified Hardware/Software Introduction*, Second Edition, New Delhi: Tata McGraw Hill Education Publications.

3. Peter Marbell,*Embedded System Design*, Second Edition, New York: Springer Publications.

Course Code 20UITE63	PO1		PO2		PO3	PO4	PO5		PO6	PO7
	PSO 1. a.	PSO 1. b.	PSO 2. a.	PSO 2. b.	PSO 3	PSO 4	PSO 5.a.	PSO 5. b.	PSO 6	PSO 7
CO1	H	M	M	H	M	L	H	M	L	L
CO2	H	H	L	H	M	M	M	H	L	L
CO3	H	H	H	M	H	H	H	M	L	L
CO4	H	H	L	M	H	M	H	M	L	L
CO5	H	H	M	H	H	H	M	M	L	L

Dr.(Mrs).A.Bharathi Lakshmi Dr.(Mrs).A.Bharathi Lakshmi

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 (3ʳᵈ Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.C.A

(2020 -21 onwards)

Semester VI		Hours/Week: 4	
DSEC 4	**MOBILE APPLICATION DEVELOPMENT LAB**	Credits: 2	
Course Code **20UCAE61P**		Internal 40	External 60

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1 : identify the packages, classes and methods needed for the problem. [K3]

CO2 : make use of views, menu, images to design UI and write programs using activities, fragment, intent and data persistence. [K3]

CO3 : key-in the programs and test the programs with required input and get expected outputs with neat formatting and prepare the record work. [K3]

CO4 : explain the UI design, activities in App and deduce the answers for any queries raised. [K3]

CO5 : reconstruct the program to adapt the necessary modifications and justify the desired result. [K4]

1. Create an App for String Manipulation using Radio Button view.
2. Create an App to list text suggestions using Auto Complete Text View.
3. Create an App to display progress value of seek bar.
4. Create an App to display star rating using Rating Bar.
5. Design an App for Image Gallery using Button View.
6. Design an App for Image Transition Effect.
7. Create an App to fill a shape using Gradient color.
8. Create an App for NCR calculation.
9. Create an App for Fibonacci Series

10. Create an App to implement different types of animation using XML.

11. Changing Background and Text Color of a Text View.

12. Create an App to display Date Picker Dialog.

13. Create an App to display Time Picker Dialog.

14. Create an App for Menu creation.

15. Create an App to display notifications.

16. Create an App to display Alert Dialog.

17. Create Applications using SQLite database

Course Code 20UCAE61P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	M	-	-	-	-	-	-	-
CO2	H	M	M	M	M	-	-	-	-	L
CO3	M	M	L	H	M	L	L	M	-	L
CO4	M	-	L	M	-	L	L	M	L	-
CO5	-	M	L	-	-	-	-	H	L	-

Mrs. J.Porkodi   Mrs. R. Nancy Beaulah

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 (3rd Cycle) by NAAC
VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester VI		Hours/Week: 4	
DSEC 4	**PYTHON PROGRAMMINGLAB**	Credits: 2	
Course Code **20UCAE62P**		Internal 40	External 60

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1 : identify the basic concepts of functions, strings, mutable and immutable objects. [K3]

CO2 : write programs implementing string, files and make connections with databases in applications. [K3]

CO3 : key-in the programs and test the programs with required input and get expected outputs with neat formatting and prepare the record work. [K3]

CO4 : explain the programs implemented using Python and deduce the answers for any queries raised. [K3]

CO5 : reconstruct the program to adapt the necessary modifications and justify the desired result. [K4]

1. Program to display Calendar
2. Program to calculate HCF & LCM
3. Program to display simple calculator
4. Program to calculate the square root of a number without using built-in function
5. Program to perform linear search
6. Program to perform binary search
7. Program using string methods
8. Program implementing manipulation of matrices
9. Program for various sorting methods

10. Program using built-in functions of List

11. Program using set operations

12. Program using set functions

13. Program using built-in functions of tuple

14. Program implementing dictionary and dictionary methods

15. Program for file manipulation

16. Program using exception handling

17. Program using command line arguments

18. Program using database connectivity

19. Program to upload data into the database table

20. Program to retrieve the data from the database table

Course Code 20UCAE62P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	M	-	-	-	-	-	-	-
CO2	H	H	M	M	M	-	-	-	-	L
CO3	M	M	L	H	M	L	L	M	-	-
CO4	M	-	L	M	-	L	L	M	L	-
CO5	-	M	L	-	-	-	-	H	L	-

Mrs. J.Porkodi   Mrs. B.Subashini

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 (3rd Cycle) by NAAC
VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester VI		Hours/Week: 4	
DSEC 4	**R PROGRAMMING LAB**	Credits: 2	
Course Code **20UITE63P**		Internal 40	External 60

COURSE OUTCOMES

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

CO1 : utilize the R language syntax including control statements, loops and functions to write programs for a wide variety of real world problems in mathematics and research field. [K3]

CO2 : apply the control structures like looping and conditional statements in R to store, process and sort the data in easier manner. [K3]

CO3 : interpret the concepts of arrays and vectors in R to implement sorting and searching problems to enhance their knowledge. [K3]

CO4 : discover the capabilities of R data expression for data verification and Recursion procedure for building performance efficient R programs. [K3]

CO5 : analyze the different packages in R language to manipulate the large set of data that will improve their lifelong learning. [K4]

1. R Program to Add Two Vectors

2. Find Sum, Mean and Product of Vector in R Programming

3. R Program to Generate Random Number from Standard Distributions

4. R Program to Find Minimum and Maximum of n numbers

5. R Program to Sort a Vector

6. R Program to Find the Factorial of a Number

7. R Program to print Multiplication Table

8. R Program to Check Prime Number

9. R Program to check Armstrong Number

10. R Program to Print the Fibonacci Sequence

11. R Program to Check for Leap Year

12. Check if a Number is Odd or Even in R Programming

13. R Program to Check if a Number is Positive, Negative or Zero

14. R Program to Find the Sum of Natural Numbers

15. R program to Find the Factorial of a Number Using Recursion

16. R Program to Find the Factors of a Number using function

17. Fibonacci Sequence Using Recursion in R

18. R Program to Find H.C.F. or G.C.D.

19. R Program to Make a Simple Calculator

20. Sum of Natural Numbers Using Recursion

21. Data Manipulation with dplyr package

22. Data Manipulation with data.table package

23. Study and implementation of Data Visualization with ggplot2

24. Study and implementation data transpose operations in R.

Course Code 20UITE63P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	M	-	-	-	-	-	-	-
CO2	H	M	M	M	M	-	-	-	-	L
CO3	M	M	L	H	M	L	L	M	-	L
CO4	M	-	L	M	-	L	L	M	L	-
CO5	-	M	L	-	-	-	-	H	L	-

Dr.(Mrs).A.BharathiLakshmi   Mrs.G.Chandraprabha

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 (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

B.C.A
(2020 -21 onwards)

Semester VI		Hours/Week: 2	
SEC 6	**DATABASE LAB**	Credits: 2	
Course Code **20UCAS61P**		Internal 40	External 60

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1 : write SQL statements using commands. [K3]

CO2 : make use of PL/SQL exception, cursor, trigger, procedure and function . [K3]

CO3 : build and execute the codes to produce required output. [K3]

CO4 : present output effectively and prepare the record. [K3]

CO5 : test the program and justify the results. [K4]

Write SQL statements using the following

1. Data definition commands. Create, Alter and drop

2. Data Manipulation commands. Insert, Delete, Update

3. Set operations

4. Aggregate functions

5. Date functions

6. String functions

Write PL/SQL program for the following programs.

1. Programs using Conditional controls, iterative controls and sequential controls

2. Programs using exception handling

3. Programs using explicit cursors

4. Programs using implicit cursor.

5. Programs using database trigger.

6. Programs to design procedures using in, out, in out parameter

7. Programs to design procedures using functions

Course Code 20UCAS61P	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9
CO1	H	H	M	-	-	-	-	-	-
CO2	M	M	H	M	M	-	-	-	-
CO3	H	M	L	H	M	L	L	M	-
CO4	M	-	L	M	-	L	-	L	L
CO5	-	M	L	-	-	-	-	H	M
CO6	H	M	M	-	-	-	-	-	-

Mrs. J.Porkodi   Mrs.J.Porkodi

Head of the Department   Course Designer