



## **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 (3<sup>rd</sup> Cycle) by NAAC

**VIRUDHUNAGAR - 626 001**

### **PEOs, POs, PSOs and COs**

#### **M.C.A.**

#### **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 Outcomes (POs)**

POs shall be based on Graduate Attributes (GAs) of the Programme. The GAs are the attributes expected of a graduate from a Programme in terms of knowledge, skills, attitude and values. The Graduate Attributes include Disciplinary Knowledge, Communication Skills, Critical Thinking, Problem Solving, Analytical Reasoning, Research Related Skills, Co-operation/Team Work, Scientific Reasoning, Reflective Thinking, Information/Digital Literacy, Multicultural Competence, Moral and Ethical Awareness/Reasoning, Leadership Qualities and Lifelong Learning.

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

- 1 Apply their in depth domain knowledge and practical skills in interdisciplinary fields for research-based endeavours, employment and entrepreneurship development. (*Disciplinary Knowledge*)
- 2 Communicate proficiently and confidently with the ability to present complex ideas in a concise manner to assorted groups. (*Communication Skills*)
- 3 Identify, formulate and solve problems in a consistent and systematic way with updated skills using modern tools and techniques. (*Scientific Reasoning and Problem Solving*)

- 4 Analyze the data, synthesise the findings and provide valid conclusion by critical evaluation of theories, policies and practices for the betterment of society. (*Critical Thinking and Analytical Reasoning*)
- 5 Explore and evaluate globally competent research methodologies to apply appropriately in interdisciplinary research; Develop and sustain the research capabilities to meet the emerging needs for the welfare of the society. (*Research Related Skills*)
- 6 Use ICT to mould themselves for lifelong learning activities to face career challenges in the changing environment. (*Digital Literacy, Self - directed and Lifelong Learning*)
- 7 Self-manage and function efficiently as a member or a leader in diverse teams in a multicultural society for nation building. (*Co-operation/Team Work and Multicultural Competence*)
- 8 Uphold the imbibed ethical and moral values in personal, professional and social life for sustainable environment. (*Moral and Ethical Awareness*)

#### **Programme Educational Objectives (PEOs)**

##### **The students will be able to**

- develop technical competence in various functional domains of computer applications.
- analyze real life problems, design computing systems appropriate to its solutions that are technically sound, economically feasible and socially acceptable.
- exhibit entrepreneurial skills and find novel solutions through technological based research.
- continue a lifelong professional development in computing that contributes innovative methodologies to solve complex problems for the betterment of the society

<b>Key Components of Mission Statement</b>	<b>PEO1</b>	<b>PEO2</b>	<b>PEO3</b>	<b>PEO4</b>
high-grade, value-based education	√	-	√	-
design and develop systems	√	√	√	√
consultancy service and research	-	√	√	√
meet the ever-changing needs of society.	√	√	-	√

## **Programme Specific Outcomes (PSOs)**

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

### **On successful completion of M.C.A Programme, the students will be able to**

#### **PO 1: *Disciplinary Knowledge***

**PSO 1.a :** Apply in depth knowledge of Computer Applications to analyze and design system that can provide more economic and affordable solutions in multidisciplinary environments and productively engage in research.

**PSO 1.b :** Make use of their professional skills in Computer Applications in obtaining jobs thereby becoming responsible citizens.

#### **PO 2: *Communication Skills***

**PSO 2.a:** Communicate efficiently the selected suitable data model, appropriate architecture and platform to implement a system with a range of audiences through well-organized, precise, and effective oral presentations.

**PSO 2.b :** Communicate effectively with the computing community as well as society by being able to comprehend effective documentations with presentations.

#### **PO 3: *Scientific Reasoning and Problem Solving***

**PSO 3 :** Identify and define problems and issues, recognizing their complexity, considering alternative viewpoints and solutions to the real world problems using latest techniques for sustainable environment.

#### **PO 4: *Critical Thinking and Analytical Reasoning***

**PSO 4 :** Investigate complex problems by employing analysis, interpretation and evaluation of data in the domain areas such as Machine learning, Digital Image processing, IoT, Cloud Computing, Security, Business Intelligence and Big data analytics to provide valid conclusion for nation building.

#### **PO 5: *Research Related Skills***

**PSO 5 :** Develop research capability by utilizing modern computer technologies, environments, and platforms in creating innovative career paths to be an entrepreneur, and contribute towards society.

#### **PO 6: *Digital Literacy, Self - directed and Lifelong Learning***

**PSO 6 :** Make use of latest ICT tools to develop effective e-content for problematic topics and engage in self-directed and lifelong learning with strong fundamentals in computer science, analytics, programming and problem solving.

**PO 7:** *Co-operation/Team Work and Multicultural Competence*

**PSO 7 :** Work professionally with positive attitude as an individual or in multidisciplinary teams and communicate effectively.

**PO 8:** *Moral and Ethical Awareness*

**PSO 8 :** Use of recent technology, skill and knowledge for computing practice with commitment on societal, moral and ethical values.



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**VIRUDHUNAGAR - 626 001**

<b>Semester I</b>	<b>DATA STRUCTURES</b>	<b>Hours/Week: 5</b>	
<b>Core Course-1</b>		<b>Credits: 5</b>	
<b>Course Code 22PCAC11</b>		<b>Internal 40</b>	<b>External 60</b>

## COURSE OUTCOMES

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

- CO1 : understand core concepts of linear data structures array, linked list, stack, queue and non-linear data structures trees, graphs, tables. [K2]
- CO2 : illustrate linear and non-linear data structures operations. [K3]
- CO3 : choose appropriate data structures to solve problems. [K3]
- CO4 : compare and analyze the linear and non-linear data structures with respect to various operations and complexity. [K4]
- CO5 : evaluate and prioritize the various data structures in terms of its operations. [K5]

Course Code 22PCAC11	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
	CO1	H	H	M	M	-	-	-	H	-
CO2	H	M	H	-	-	-	-	-	L	-
CO3	H	M	-	H	H	M	-	M	-	L
CO4	H	-	M	M	M	M	M	L	-	-
CO5	M	-	L	L	H	H	M	-	-	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester I</b>	<b>OPERATING SYSTEMS</b>	<b>Hours/Week: 5</b>	
<b>Core Course-2</b>		<b>Credits: 5</b>	
<b>Course Code</b> <b>22PCAC12</b>		<b>Internal</b> <b>40</b>	<b>External</b> <b>60</b>

### COURSE OUTCOMES

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

- CO1 : illustrate the basics of operating systems, classify process states, discuss different scheduling, outline the importance of memory hierarchy, and represent the file operations. [K2]
- CO2 : identify the modes of I/O, race conditions, apply a suitable scheduling policy, model contiguous and non- contiguous memory allocation, and different access methods. [K3]
- CO3 : identify the classes of OS, ways of managing memory hierarchy and plan for a suitable file organization method, manipulate Semaphores, choose appropriate deadlock handling method, and identify. [K3]
- CO4 : examine how program execution is controlled, the Process Synchronization Problem, Deadlock Handling in UNIX, distinguish static and dynamic memory allocation and comment on Unix File System. [K4]
- CO5 : assess different classes of OS, needs of semaphores, different deadlock handling methods, importance of paging and segmentation and disk scheduling methods. [K5]

Course Code 22PCAC12	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	H	M	-	L	-	-	-	-
CO2	M	H	M	M	M	L	-	M	-	L
CO3	-	M	H	-	M	L	-	-	-	-
CO4	M	-	-	M	H	M	M	M	-	-
CO5	H	M	H	H	H	H	-	H	-	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester I</b>	<b>RELATIONAL DATABASE MANAGEMENT SYSTEMS</b>	<b>Hours/Week: 5</b>	
<b>Core Course-3</b>		<b>Credits: 5</b>	
<b>Course Code 22PCAC13</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : Outline database system, relational model, formal query languages, atomic domains, functional dependency and normal forms, demonstrate transaction, concurrency, distributed and object based databases. [K2]
- CO2 : identify database languages and database users, solve relation operations and concurrency problems, and apply protocols in distributed transactions. [K3]
- CO3 : determine database system, relational model, formal query languages and functional dependency, solve various normal forms, utilize protocols to ensure serializability, apply object based concepts in SQL. [K3]
- CO4 : analyze the database systems and improve its design by normalization, deadlock handling in distributed databases, protocols in handling replication in distributed databases, approaches to handle objects persistence. [K4]
- CO5 : explain architecture of database systems, examine relation operations, interpret various normal forms, test for serializability of schedule, importance of distributed database and collection types and object orientation in object-based databases. [K5]

Course Code 22PCAC13	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
<b>CO1</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>L</b>	<b>-</b>	<b>-</b>
<b>CO2</b>	<b>H</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>L</b>	<b>L</b>
<b>CO3</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>	<b>-</b>	<b>L</b>	<b>L</b>
<b>CO4</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
<b>CO5</b>	<b>M</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>	<b>H</b>	<b>H</b>	<b>H</b>	<b>L</b>	<b>L</b>



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**VIRUDHUNAGAR - 626 001**

<b>Semester I</b>	<b>DATA STRUCTURES USING C# LAB</b>	<b>Hours/Week: 5</b>	
<b>Core Practical-1</b>		<b>Credits: 3</b>	
<b>Course Code</b> <b>22PCAC11P</b>		<b>Internal</b> <b>40</b>	<b>External</b> <b>60</b>

### COURSE OUTCOMES

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

- CO1 : illustrate linear and non-linear data structures. [K3]
- CO2 : write programs for implementing the various operations of linear and non-linear data structures. [K3]
- CO3 : key in and execute programs with required input and get expected outputs with neat formatting and prepare the record work. [K3]
- CO4 : explain the given program and answer questions related with that program. [K4]
- CO5 : rewrite program to incorporate modification and justification of the desired result. [K5]

Course Code <b>22PCAC11P</b>	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
<b>CO1</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>-</b>	<b>H</b>	<b>-</b>	<b>-</b>
<b>CO2</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>M</b>	<b>L</b>	<b>L</b>
<b>CO3</b>	<b>H</b>	<b>M</b>	<b>L</b>	<b>L</b>	<b>H</b>	<b>L</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>-</b>
<b>CO4</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO5</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>H</b>	<b>-</b>	<b>H</b>	<b>M</b>	<b>L</b>	<b>-</b>	<b>-</b>





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Semester I	<b>OPEN SOURCE TECHNOLOGY LAB</b>	<b>Hours/Week: 5</b>	
Core Practical-2		<b>Credits: 3</b>	
Course Code <b>22PCAC12P</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : identify the methods and process to use arrays, string, image, files, cookies, sessions and MYSQL database in web applications. [K3]
- CO2 : write programs implementing arrays, string, image, files, cookies, sessions and make connections with databases in web 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 PHP and MYSQL and deduce the answers for any queries raised. [K4]
- CO5 : reconstruct the program to adapt the necessary modifications and justify the desired result. [K5]

Course Code 22PCAC12P	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	M	M	M	L	-	H	-	-
CO2	H	M	-	-	M	M	L	M	L	L
CO3	H	M	L	L	H	L	M	M	-	-
CO4	H	M	M	M	-	M	M	-	-	-
CO5	H	M	H	H	-	H	M	L	-	-



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<b>Semester I</b>	<b>DATA COMMUNICATION AND NETWORKS</b>	<b>Hours/Week: 5</b>	
<b>DSEC-1</b>		<b>Credits: 5</b>	
<b>Course Code 22PCAE11</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : describe the basics of Data communication, OSI model, transmission media, functions of network, transport layers & need for DNS. [K2]
- CO2 : relate various reference models, guided and unguided transmission media and to know more about routing protocols and identify the QoS improving techniques at transport layer, various types of records of DNS. [K3]
- CO3 : illustrate addressing at various layers, framing techniques, address mapping, congestion control and dynamic DNS. [K3]
- CO4 : analyze the functions of each layer, compare various multiple access protocols, forwarding and routing, services provided by TCP and UDP, categorize components of email. [K4]
- CO5 : evaluate the reasons for various addressing methods, flow & error control at datalink layer, prioritize various routing protocols, plan for better QoS and optimum file transfer mechanism. [K5]

Course Code 22PCAE11	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
CO1	H	M	M	H	-	L	-	-	-	-
CO2	H	M	M	H	M	L	-	M	-	-
CO3	M	H	-	H	H	L	-	M	-	L
CO4	M	H	M	M	H	M	M	M	-	-
CO5	M	-	H	H	H	H	-	H	-	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester I</b>	<b>COMPUTER SECURITY</b>	<b>Hours/Week: 5</b>	
<b>DSEC-1</b>		<b>Credits: 5</b>	
<b>Course Code</b>		<b>Internal</b>	<b>External</b>
<b>22PCAE12</b>		<b>40</b>	<b>60</b>

### COURSE OUTCOMES

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

- CO1 : explain about network and security requirements, general purpose and trusted OS, unintentional oversights, summarize security features of OS, network attacks, firewall and IDS. [K2]
- CO2 : illustrate the topologies, protected objects, points of attack, network technology, articulate about threats, apply the use of cryptography in program security. [K3]
- CO3 : Make use of security features in programming, Firewalls and IDS. [K3]
- CO4 : categorize the network devices, controls, differentiate malicious and non-malicious codes, examine the security of operating systems & network and analyze types of IDS. [K4]
- CO5 : Criticize various routing protocols, security tools, kinds of malicious codes, firewalls and IDS, requirements and methods of protecting network communication, programming and operating system. [K5]

Course Code 22PCAE12	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
<b>CO1</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>L</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO2</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>L</b>
<b>CO3</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>H</b>	<b>L</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>-</b>
<b>CO4</b>	<b>-</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>-</b>
<b>CO5</b>	<b>M</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>H</b>	<b>-</b>	<b>-</b>



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Semester I	BUSINESS INTELLIGENCE	Hours/Week: 5	
DSEC-1		Credits: 5	
Course Code 22PCAE13		Internal 40	External 60

### COURSE OUTCOMES

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

- CO1 : understand the fundamentals of business intelligence, user types, CCR Model and its business intelligence Applications. [K2]
- CO2 : relate data mining with Knowledge delivery, efficiency and business intelligence. [K3]
- CO3 : apply various modeling techniques and method to various situations Ad Hoc Querying, role of mathematical models, Logistic and Production models, Emerging Technologies. [K3]
- CO4 : compare data analysis and knowledge delivery stages, Logistic and Production Models, cycle of a business intelligence analysis and Marking model Future Beyond Technology and Emerging Technologies. [K4]
- CO5 : choose appropriate technique, Parameterized Reports and Self-Service Reporting, virtual inputs and outputs, BI Search & Text Analytics, Machine Learning, Predicting the Future, business intelligence system. [K5]

Course Code 22PCAE13	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
CO1	M	M	M	H	-	L	-	-	-	-
CO2	M	M	H	M	M	L	-	-	-	L
CO3	M	H	H	-	M	L	-	M	-	-
CO4	-	H	-	M	M	M	M	M	L	-
CO5	-	H	-	M	H	M	M	M	-	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester II</b>	<b>BIG DATA ANALYTICS</b>	<b>Hours/Week: 5</b>	
<b>Core Course-4</b>		<b>Credits: 5</b>	
<b>Course Code</b>		<b>Internal</b>	<b>External</b>
<b>22PCAC21</b>		<b>40</b>	<b>60</b>

### COURSE OUTCOMES

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

- CO1 : understand the concepts of Big Data, Hadoop Ecosystem, Data analytics and its role in social media and mobile applications. [K2]
  
- CO2 : illustrate an application using Map Reduce and HBase and attain the results of applications using Big Data Analytics. [K3]
  
- CO3 : make use of Hadoop Ecosystem elements to provide Big Data solutions in Text Mining, Sentiment Analysis, Opinion Mining and Mobile Analytics. [K3]
  
- CO4 : examine the importance of Hadoop framework elements, Social Media Analytics and Mobile Analytical tools and compare Analysis and Reporting of Big Data. [K4]
  
- CO5 : assess the various Hadoop Ecosystem components, types of Analytics and Reporting, Social Media and Mobile Analytics tools. [K5]

Course Code 22PCAC21	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
<b>CO1</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>H</b>	<b>-</b>	<b>-</b>
<b>CO2</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>L</b>	<b>L</b>
<b>CO3</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>	<b>M</b>	<b>L</b>	<b>L</b>
<b>CO4</b>	<b>H</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>-</b>	<b>L</b>
<b>CO5</b>	<b>M</b>	<b>-</b>	<b>L</b>	<b>L</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>-</b>



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**VIRUDHUNAGAR - 626 001**

<b>Semester II</b>	<b>ADVANCED JAVA PROGRAMMING</b>	<b>Hours/Week: 5</b>	
<b>Core Course-5</b>		<b>Credits: 5</b>	
<b>Course Code</b> <b>22PCAC22</b>		<b>Internal</b> <b>40</b>	<b>External</b> <b>60</b>

### COURSE OUTCOMES

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

- CO1 : paraphrase the database concepts using JDBC, web programming concepts including HTTP, Servlets, JSP, JSTL, AJAX and Struts. [K2]
- CO2 : interpret the concepts of HTTP, JSTL, web application development models, components and Model-View-Controller architecture of struts. [K3]
- CO3 : employ basic web programming, JDBC, Servlets, JSP and AJAX in constructing dynamic web applications. [K3]
- CO4 : explore the evolution of web application through JDBC, HTTP, Servlets, JSP, JSTL, AJAX and Struts. [K4]
- CO5 : conclude the database connectivity, basics of web programming, HTTP, JSP, JSTL, AJAX and Struts. [K5]

Course Code <b>22PCAC22</b>	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
<b>CO1</b>	<b>H</b>	<b>H</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>L</b>	<b>L</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO2</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>H</b>	<b>L</b>	<b>L</b>	<b>M</b>	<b>M</b>	<b>-</b>
<b>CO3</b>	<b>M</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>L</b>	<b>L</b>	<b>H</b>	<b>-</b>	<b>-</b>
<b>CO4</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>-</b>
<b>CO5</b>	<b>H</b>	<b>-</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>L</b>



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**VIRUDHUNAGAR - 626 001**

<b>Semester II</b>	<b>INTERNET OF THINGS</b>	<b>Hours/Week: 5</b>	
<b>Core Course-6</b>		<b>Credits: 5</b>	
<b>Course Code</b> <b>22PCAC23</b>		<b>Internal</b> <b>40</b>	<b>External</b> <b>60</b>

### COURSE OUTCOMES

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

- CO1 : discuss the concepts of IoT, Framework of IoT, Machine-to-Machine connectivity, Design principles of Internet Connectivity. [K2]
- CO2 : Illustrate the applications of IoT, acquire the knowledge of Internet based communication protocols. [K3]
- CO3 : Manipulate data acquiring, organizing and processing the data. Apply sensor data communication protocols, examine the case studies of IoT. [K3]
- CO4 : analyze radio frequency identification technologies and Web Connectivity for Connected Devices Network using Gateway. [K4]
- CO5 : Compare Sensor technologies, Evaluate Design Complexity using Cloud PaaS. Summarize Web Connectivity for Connected Devices Network using Gateway, SOAP, REST, HTTP Restful and Web sockets. [K5]

Course Code <b>22PCAC23</b>	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
<b>CO1</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO2</b>	<b>H</b>	<b>-</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>-</b>
<b>CO3</b>	<b>H</b>	<b>H</b>	<b>-</b>	<b>L</b>	<b>M</b>	<b>-</b>	<b>L</b>	<b>-</b>	<b>-</b>	<b>L</b>
<b>CO4</b>	<b>H</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>H</b>	<b>-</b>	<b>H</b>	<b>M</b>	<b>-</b>
<b>CO5</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>H</b>	<b>-</b>	<b>L</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>-</b>



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VIRUDHUNAGAR - 626 001

Semester II	DATA ANALYTICS USING R LAB	Hours/Week: 5	
Core Practical-3		Credits: 3	
Course Code 22PCAC21P		Internal 40	External 60

### COURSE OUTCOMES

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

- CO1 : make use of data manipulations functions, data frame, import/export data from/to various sources like excel, CSV, text, SQL and data visualizations. [K3]
- CO2 : write programs using R built-in functions, data frame, importing/exporting data from/to various sources like excel, CSV, text, SQL, data visualizations with plots. [K3]
- CO3 : key in the programs, execute the programs with required input and get expected outputs with neat formatting and prepare the record work. [K3]
- CO4 : explain the given program written using python features and answer questions related with that program. [K4]
- CO5 : rewrite program to incorporate modification and justify the desired result. [K5]

Course Code 22PCAC21P	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
	CO1	H	H	M	M	M	L	-	H	-
CO2	H	M	-	-	M	M	L	M	L	L
CO3	H	M	L	L	H	L	M	M	-	-
CO4	H	M	M	M	-	M	M	-	-	-
CO5	H	M	H	H	-	H	M	L	-	-





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VIRUDHUNAGAR - 626 001

<b>Semester II</b>	<b>ADVANCED JAVA PROGRAMMING LAB</b>	<b>Hours/Week: 5</b>	
<b>Core Practical-4</b>		<b>Credits: 3</b>	
<b>Course Code 22PCAC22P</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : identify the necessary packages, classes and methods to make connection with the database in JDBC and pass input parameters to server side in JSP, Servlets, AJAX and struts. [K3]
- CO2 : write programs implementing JDBC, JSP, Servlet, AJAX, struts that use input, output and output formatting in appropriate ways. [K3]
- CO3 : key-in the programs and test the programs implemented through JDBC, JSP, Servlets, AJAX and struts to get the expected result. [K3]
- CO4 : explain the programs implemented through JDBC, JSP, Servlets, AJAX and struts and deduce the answers for any queries raised. [K4]
- CO5 : reconstruct the program to adapt the necessary modifications and justify the desired result. [K5]

Course Code 22PCAC22P	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	-	M	-	L	L	-	-	-
CO2	H	H	M	-	H	L	L	M	M	-
CO3	M	M	H	M	H	L	L	M	-	-
CO4	M	-	M	-	M	M	M	M	-	-
CO5	H	-	H	H	M	H	M	M	-	L



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VIRUDHUNAGAR - 626 001

<b>Semester II</b>	<b>COMPILER DESIGN</b>	<b>Hours/Week: 5</b>	
<b>DSEC-2</b>		<b>Credits: 5</b>	
<b>Course Code 22PCAE21</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : explain the structure of a compiler, context free grammars, role of lexical analyzer and its design, discuss code optimization and its generation. [K2]
- CO2 : develop regular expressions and finite automata, construct efficient parsers, identify the contents of the symbol table and its data structures. [K3]
- CO3 : construct basic parsing techniques, examine various syntax-directed translation schemes, illustrate how to optimize and effectively generate machine code. [K3]
- CO4 : point out the need of translators, compare parse trees and syntax trees, analyse regular expressions with finite automata, analyse the parsers, examine lexical and syntax analysis, classify various types of errors. [K4]
- CO5 : assess the steps in finite automata and regular expression, interpret the errors and code generation problems, summarize the DAG representation of basic blocks. [K5]

Course Code 22PCAE21	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	M	L	L	-	-	-	-	-	-
CO2	H	M	-	-	M	L	-	H	-	-
CO3	M	M	M	M	M	L	L	M	L	L
CO4	M	M	M	M	H	M	M	M	L	L
CO5	M	H	H	H	H	H	M	H	L	L



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**VIRUDHUNAGAR - 626 001**

<b>Semester II</b>	<b>CLOUD COMPUTING</b>	<b>Hours/Week: 5</b>	
<b>DSEC-2</b>		<b>Credits: 5</b>	
<b>Course Code 22PCAE22</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : understand the fundamentals of cloud computing and its architecture, cloud computing models, cloud infrastructure and platforms. [K2]
- CO2 : Illustrate applications using cloud computing, acquire knowledge on cloud data center, security issues and platforms. [K3]
- CO3 : make use of cloud benefits, cloud computing architecture, models and services. [K3]
- CO4 : examine the factors that affect cloud computing, models of cloud computing and its services. [K4]
- CO5 : evaluate and assess the various cloud models, cloud services and security in cloud environments and cloud computing platforms. [K5]

Course Code 22PCAE22	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
<b>CO1</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>L</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO2</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>L</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>L</b>
<b>CO3</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>L</b>	<b>-</b>	<b>M</b>	<b>L</b>	<b>-</b>
<b>CO4</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>-</b>
<b>CO5</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>H</b>	<b>-</b>	<b>-</b>



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VIRUDHUNAGAR - 626 001

Semester II	EMBEDDED SYSTEMS	Hours/Week: 5	
DSEC-2		Credits: 5	
Course Code 22PCAE23		Internal 40	External 60

### COURSE OUTCOMES

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

- CO1 : summarize the key concepts of physical and structural components, instructions, real time operating systems, embedded software development and testing. [K2]
- CO2 : employ the real time operating system, its architecture and its services in managing the responses of external events of 8051 microcontroller. [K3]
- CO3 : adapt 8051 microcontroller architecture, instruction set and hardware feature concept in exploring embedded system software development tools and debugging techniques. [K3]
- CO4 : analyze embedded systems based on microcontroller components, instructions, and real time operating systems. [K4]
- CO5 : evaluate the target embedded system software with respect to microcontroller and RTOS. [K5]

Course Code 22PCAE23	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	M	M	M	H	-	L	-	-	-	-
CO2	M	M	H	M	M	L	-	-	-	-
CO3	M	H	H	-	M	L	-	M	-	-
CO4	-	H	-	M	M	M	M	M	-	-
CO5	-	H	-	M	H	M	M	M	-	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester III</b>	<b>DIGITAL IMAGE PROCESSING</b>	<b>Hours/Week: 5</b>	
<b>Core Course-8</b>		<b>Credits: 5</b>	
<b>Course Code 20PCAC31</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : explain image fundamentals, image transforms, image operations and image enhancement, restoration, segmentation and compression. [K2]
- CO2 : apply various image processing operations and transforms for real time imaging applications. [K3]
- CO3 : develop imaging applications using image enhancement, restoration, segmentation and compression techniques. [K3]
- CO4 : examine various image processing operations, types of transforms and in methods of enhancements, segmentation and lossy and lossless compression. [K4]
- CO5 : assess various image transforms and enhancement algorithms and estimate the feasible factors of image compression and segmentation algorithms. [K5]

Course Code 20PCAC31	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	M	H	H	M	-	L	-	-	-	-
CO2	M	M	H	M	M	L	-	M	-	L
CO3	-	H	M	-	M	L	-	-	M	L
CO4	M	-	-	H	H	H	M	M	M	-
CO5	M	H	H	H	H	H	-	H	M	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester III</b>	<b>DIGITAL IMAGE PROCESSING</b>	<b>Hours/Week: 6</b>	
<b>Core Course-7</b>		<b>Credits: 5</b>	
<b>Course Code 22PCAC31</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : explain image fundamentals, image transforms, image operations and image enhancement, restoration, segmentation and compression. [K2]
- CO2 : apply various image processing operations and transforms for real time imaging applications. [K3]
- CO3 : develop imaging applications using image enhancement, restoration, segmentation and compression techniques. [K3]
- CO4 : examine various image processing operations, types of transforms and in methods of enhancements, segmentation and lossy and lossless compression. [I]
- CO5 : assess various image transforms and enhancement algorithms and estimate the feasible factors of image compression and segmentation algorithms. [K5]

Course Code 22PCAC31	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
	CO1	M	H	H	M	-	L	-	-	-
CO2	M	M	H	M	M	L	-	M	-	L
CO3	-	H	M	-	M	L	-	-	M	L
CO4	M	-	-	H	H	H	M	M	M	-
CO5	M	H	H	H	H	H	-	H	M	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester III</b>	<b>MACHINE LEARNING</b>	<b>Hours/Week: 5</b>	
<b>Core Course-9</b>		<b>Credits: 5</b>	
<b>Course Code</b> <b>20PCAC32</b>		<b>Internal</b> <b>40</b>	<b>External</b> <b>60</b>

### COURSE OUTCOMES

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

- CO1 : predict the well post learning problems, represent the decision tree, summarize the radial basis functions, distinguish inductive and analytical learning problems. [K2]
- CO2 : relate specific and generic hypothesis, construct decision tree for any Problem and practice least squared error hypothesis and case based reasoning. [K3]
- CO3 : calculate inductive bias from decision tree, relate Bayes Theorem with real world applications, demonstrate genetic algorithm and explanation-based learning. [K3]
- CO4 : illustrate candidate elimination algorithm, analyze classification problem using Bayes Optimal classifier. [K4]
- CO5 : summarize Bayesian belief Networks, evaluate genetic programming, compare reinforcement learning with deductive learning. [K5]

Course Code 20PCAC32	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	M	H	M	H	-	-	-	-	-	-
CO2	H	-	M	H	M	-	-	M	-	-
CO3	M	M	M	-	-	-	-	M	-	L
CO4	H	M	H	-	L	H	M	-	L	-
CO5	H	-	M	H	M	L	H	H	M	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester III</b>	<b>COMPUTER SECURITY</b>	<b>Hours/Week: 4</b>	
<b>Core Course-10</b>		<b>Credits: 4</b>	
<b>Course Code</b> <b>20PCAC33</b>		<b>Internal</b> <b>40</b>	<b>External</b> <b>60</b>

### COURSE OUTCOMES

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

- CO1 : explain about security & requirements, general purpose and trusted OS, unintentional oversights, summarize security features of OS, network attacks, firewall and IDS. [K2]
- CO2 : illustrate the protected objects, points of attack, network technology, articulate about threats, apply the use of cryptography in program security. [K3]
- CO3 : Make use of security features in programming, Firewalls and IDS. [K3]
- CO4 : categorize the controls, differentiate malicious and non-malicious codes, examine the security of operating systems & network and analyze types of IDS. [K4]
- CO5 : criticize security tools, kinds of malicious codes, firewalls and IDS, requirements and methods of protecting network communication, programming and operating system. [K5]

Course Code 20PCAC33	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
<b>CO1</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>L</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO2</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>L</b>
<b>CO3</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>H</b>	<b>L</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>-</b>
<b>CO4</b>	<b>-</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>-</b>
<b>CO5</b>	<b>M</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>H</b>	<b>-</b>	<b>-</b>





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<b>Semester III</b>	<b>DIGITAL IMAGE PROCESSING LAB</b>	<b>Hours/Week: 5</b>	
<b>Core Practical-5</b>		<b>Credits: 3</b>	
<b>Course Code</b> <b>20PCAC31P</b>		<b>Internal</b> <b>40</b>	<b>External</b> <b>60</b>

### COURSE OUTCOMES

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

- CO1 : make use of various image arithmetic and logical operations in Image processing applications. [K3]
- CO2 : write programs using DCT and HAAR transformations to build image processing applications. [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. [K4]
- CO5 : rewrite program to incorporate required modification and justify the desired result. [K5]

Course Code 20PCAC31P	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
<b>CO1</b>	<b>M</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>L</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO2</b>	<b>M</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>L</b>
<b>CO3</b>	<b>-</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>L</b>	<b>-</b>	<b>-</b>	<b>M</b>	<b>L</b>
<b>CO4</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>H</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>-</b>
<b>CO5</b>	<b>M</b>	<b>H</b>	<b>H</b>	<b>H</b>	<b>H</b>	<b>H</b>	<b>-</b>	<b>H</b>	<b>M</b>	<b>-</b>



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VIRUDHUNAGAR - 626 001

Semester III	<b>DIGITAL IMAGE PROCESSING</b>  <b>LAB</b>	<b>Hours/Week: 6</b>	
Core Practical-5		<b>Credits: 3</b>	
Course Code <b>22PCAC31P</b>		<b>Internal</b> 40	<b>External</b> 60

### COURSE OUTCOMES

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

- CO1 : make use of various image arithmetic and logical operations in Image processing applications. [K3]
- CO2 : write programs using DCT and HAAR transformations to build image processing applications. [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. [K4]
- CO5 : rewrite program to incorporate required modification and justify the desired result. [K5]

Course Code 22PCAC31P	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
CO1	M	H	H	M	-	L	-	-	-	-
CO2	M	M	H	M	M	L	-	M	-	L
CO3	-	H	M	-	M	L	-	-	M	L
CO4	M	-	-	H	H	H	M	M	M	-
CO5	M	H	H	H	H	H	-	H	M	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester III</b>	<b>ANDROID LAB</b>	<b>Hours/Week: 5</b>	
<b>Core Practical-6</b>		<b>Credits: 3</b>	
<b>Course Code</b> <b>20PCAC32P</b>		<b>Internal</b> <b>40</b>	<b>External</b> <b>60</b>

### COURSE OUTCOMES

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

- CO1 : make use of layouts, user interfaces, intents, multimedia and databases in android applications. [K3]
- CO2 : write programs in Integrated Development Environment using the required tools to develop Android applications. [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 answers for any queries raised. [K4]
- CO5 : rewrite program to incorporate modification and justify the desired result. [K5]

Course Code 20PCAC32P	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
<b>CO1</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>L</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CO2</b>	<b>M</b>	<b>H</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>	<b>-</b>	<b>M</b>	<b>M</b>	<b>L</b>
<b>CO3</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>H</b>	<b>L</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>L</b>
<b>CO4</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>-</b>
<b>CO5</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>-</b>	<b>-</b>



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**VIRUDHUNAGAR - 626 001**

<b>Semester III</b>	<b>PYTHON PROGRAMMING LAB</b>	<b>Hours/Week: 6</b>	
<b>Core Practical-6</b>		<b>Credits: 3</b>	
<b>Course Code 22PCAC32P</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : make use of control structures, mutable and immutable objects, string, built-in and user defined functions, import/export data from/to various sources like excel, CSV, text, SQL and data visualizations. [K3]
- CO2 : write programs using control structures, mutable and immutable objects, string, importing/exporting data from/to various sources like excel, CSV, text, SQL, data visualizations with plots. [K3]
- CO3 : key in the programs, execute the programs with required input and get expected outputs with neat formatting and prepare the record work. [K3]
- CO4 : explain the given program written using python features and answer questions related with that program. [K4]
- CO5 : rewrite program to incorporate modification and justify the desired result. [K5]

Course Code 22PCAC32P	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
CO1	H	H	H	M	-	-	-	H	-	-
CO2	H	M	H	-	-	-	-	-	L	-
CO3	H	M	-	H	H	M	-	M	-	L
CO4	M	-	M	M	M	L	M	L	-	-
CO5	M	-	L	H	H	M	M	-	-	-



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VIRUDHUNAGAR - 626 001

Semester III	PRACTICE FOR SET/NET – GENERAL PAPER	Hours/Week: 1	
Course Code		Credits: 1	
20PGOL31		Internal 100	External -

### COURSE OUTCOMES

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

- CO1 : discuss various concepts related to higher education system, teaching, communication, research, ICT and environmental studies. [K2]
- CO2 : apply the skills of communication, mathematical, internet and research aptitude in competitive examinations. [K3]
- CO3 : analyze the circumstances, instances, contents and arrive at / choose the best option. [K4]
- CO4 : interpret the data using ICT tools and logical reasoning. [K5]
- CO5 : build self learning activities to face challenges in their life. [K6]

Course Code 20PGOL31	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H	H	-	-	M	L	-	L
CO2	H	H	L	M	H	M	-	M
CO3	H	M	M	H	H	M	-	M
CO4	H	M	H	H	H	H	-	L
CO5	H	L	M	L	L	H	-	L



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VIRUDHUNAGAR - 626 001

Semester III	E-COMMERCE	Hours/Week: 0	
Extra Credit Course		Credits: 2	
Course Code 22PCAO31		Internal 100	External -

### COURSE OUTCOMES

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

- CO1 : understand the basis of E-Commerce and M-Commerce, know the legal framework of E-Commerce.
- CO2 : apply payment systems in E-Commerce and M-Commerce.
- CO3 : Explore the Infrastructure of E-Commerce and M-Commerce.
- CO4 : compare the layered architecture of M-Commerce with E-Commerce.
- CO5 : summarize the emerging market for multimedia ecommerce.

Course Code 22PCAO31	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	M	M	H	-	L	-	-	-	-
CO2	H	M	H	M	M	M	-	-	-	-
CO3	H	H	H	-	M	L	-	M	L	-
CO4	M	H	-	M	M	M	M	M	-	L
CO5	M	H	-	M	H	M	M	M	-	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester III</b>	<b>WEB TECHNOLOGY</b>	<b>Hours/Week: 5</b>	
<b>NMEC</b>		<b>Credits: 4</b>	
<b>Course Code</b> <b>20PCAN31</b>		<b>Internal</b> <b>40</b>	<b>External</b> <b>60</b>

### COURSE OUTCOMES

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

- CO1 : gain knowledge on the basis of web, web pages, HTML tags, CSS and Java Script. [K1]
- CO2 : understand the concepts of web page creation using HTML, CSS and Java Script. [K2]
- CO3 : make use of HTML, CSS and Java Script to design simple web pages. [K3]
- CO4 : analyze how the web works and the steps of creating a website using HTML, CSS and Java Script, examine G-Suite blog creation. [K4]
- CO5 : choose real time applications and create dynamic web pages and G-Suite blogs. [K5]

<b>Course Code</b> <b>20PCAN31</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>CO1</b>	<b>H</b>	<b>H</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>-</b>
<b>CO2</b>	<b>H</b>	<b>H</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>L</b>
<b>CO3</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>-</b>
<b>CO4</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>	<b>-</b>	<b>L</b>	<b>-</b>	<b>-</b>
<b>CO5</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>M</b>	<b>L</b>



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VIRUDHUNAGAR - 626 001

Semester IV	C# AND .NET PROGRAMMING LAB	Hours/Week: 6	
Core Practical-7		Credits: 3	
Course Code 20PCAC41P		Internal 40	External 60

### COURSE OUTCOMES

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

- CO1 : make use of object oriented concepts in C#, design forms with tools in NET and handling events. [K3]
- CO2 : write programs using object oriented aspects of C# and .NET tools. [K3]
- CO3 : key in and execute programs with required input and get expected outputs with neat formatting and prepare the record work. [K3]
- CO4 : explain the given program and answer questions related with that program. [K4]
- CO5 : rewrite program to incorporate modification and justification of the desired result. [K5]

Course Code 20PCAC41P	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	M	H	-	L	M	-	M	-	-
CO2	H	M	-	H	L	M	M	M	L	L
CO3	H	M	M	-	L	-	-	-	-	-
CO4	H	M	M	M	-	-	-	-	-	-
CO5	H	M	M	M	M	H	M	M	-	-





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**VIRUDHUNAGAR - 626 001**

<b>Semester IV</b>	<b>C# AND .NET PROGRAMMING</b>	<b>Hours/Week: 6</b>	
<b>Core Course-11</b>		<b>Credits: 4</b>	
<b>Course Code 20PCAC41</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : understand the basics and Object Oriented aspects of C#, application development on .NET programming. [K2]
- CO2 : illustrate applications using object oriented aspects of C#, form controls and event handling. [K3]
- CO3 : experiment programs using C# on .NET and develop web based applications on .NET. [K3]
- CO4 : examine how C# fits into the .NET platform, compare types of constructors, inheritance and various form controls, analyze data access components. [K4]
- CO5 : assess the steps involved in the development of .NET programming, interpret threading and exception handling and summarize various validating controls. [K5]

Course Code 20PCAC41	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
	<b>CO1</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>H</b>	<b>-</b>
<b>CO2</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>L</b>	<b>-</b>
<b>CO3</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>L</b>
<b>CO4</b>	<b>H</b>	<b>-</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>-</b>	<b>-</b>
<b>CO5</b>	<b>M</b>	<b>-</b>	<b>L</b>	<b>L</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>-</b>	<b>-</b>	<b>-</b>



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VIRUDHUNAGAR - 626 001

<b>Semester IV</b>	<b>C# AND .NET PROGRAMMING LAB</b>	<b>Hours/Week: 6</b>	
<b>Core Practical-7</b>		<b>Credits: 3</b>	
<b>Course Code 20PCAC41PN</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : make use of object oriented concepts in C#, design forms with tools in .NET and handle events. [K3]
- CO2 : write programs using object oriented aspects of C# and .NET tools. [K3]
- CO3 : key in and execute programs with required input and get expected outputs with neat formatting and prepare the record work. [K3]
- CO4 : explain the given program and answer questions related with that program. [K4]
- CO5 : rewrite program to incorporate modification and justification of the desired result. [K5]

Course Code 20PCAC41PN	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	M	H	-	L	M	-	M	-	-
CO2	H	M	-	H	L	M	M	M	L	L
CO3	H	M	M	-	L	-	-	-	-	-
CO4	H	M	M	M	-	-	-	-	-	-
CO5	H	M	M	M	M	H	M	M	-	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester IV</b>	<b>C# AND .NET PROGRAMMING</b>	<b>Hours/Week: 6</b>	
<b>Core Course-9</b>		<b>Credits: 5</b>	
<b>Course Code 22PCAC41</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : understand the basics and Object Oriented aspects of C#, application development on .NET programming. [K2]
- CO2 : illustrate applications using object oriented aspects of C#, form controls and event handling. [K3]
- CO3 : experiment programs using C# on .NET and develop web based applications on .NET. [K3]
- CO4 : examine how C# fits into the .NET platform, compare types of constructors, inheritance and various form controls, analyze data access components. [K4]
- CO5 : assess the steps involved in the development of .NET programming, interpret threading and exception handling and summarize various validating controls. [K5]

Course Code 22PCAC41	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H	H	M	M	-	-	-	H	-	-
CO2	H	M	H	-	-	-	-	-	L	-
CO3	H	M	-	H	H	M	-	M	-	L
CO4	H	-	M	M	M	M	M	L	-	-
CO5	M	-	L	L	H	H	M	-	-	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester IV</b>	<b>C# AND .NET PROGRAMMING LAB</b>	<b>Hours/Week: 6</b>	
<b>Core Practical-7</b>		<b>Credits: 3</b>	
<b>Course Code 22PCAC41P</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : make use of object oriented concepts in C#, design forms with tools in .NET and handling events. [K3]
- CO2 : write programs using object oriented aspects of C# and .NET tools. [K3]
- CO3 : key in and execute programs with required input and get expected outputs with neat formatting and prepare the record work. [K3]
- CO4 : explain the given program and answer questions related with that program. [K4]
- CO5 : rewrite program to incorporate modification and justification of the desired result. [K5]

Course Code 22PCAC41P	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
CO1	H	M	H	-	L	M	-	M	-	-
CO2	H	M	-	H	L	M	M	M	L	L
CO3	H	M	M	-	L	-	-	-	-	-
CO4	H	M	M	M	-	-	-	-	-	-
CO5	H	M	M	M	M	H	M	M	-	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester IV</b>	<b>MOBILE APPLICATION DEVELOPMENT LAB</b>	<b>Hours/Week: 6</b>	
<b>Core Practical-8</b>		<b>Credits: 3</b>	
<b>Course Code</b>		<b>Internal</b>	<b>External</b>
<b>22PCAC42P</b>		<b>40</b>	<b>60</b>

### COURSE OUTCOMES

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

- CO1 : make use of layouts, user interfaces, intents, fragments, multimedia and databases in android applications. [K3]
- CO2 : write programs in Integrated Development Environment using the required tools to develop Android applications. [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 answers for any queries raised. [K4]
- CO5 : rewrite program to incorporate modification and justify the desired result. [K5]

Course Code 22PCAC42P	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1.a	1.b	2.a	2.b	3	4	5	6	7	8
CO1	M	H	M	M	-	L	-	-	-	-
CO2	M	H	H	H	M	L	-	M	M	L
CO3	M	M	M	-	H	L	-	M	-	L
CO4	M	-	M	-	H	H	M	M	-	-
CO5	H	M	M	M	H	H	M	H	-	-



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**VIRUDHUNAGAR - 626 001**

<b>Semester IV</b>	<b>PROJECT WORK AND VIVA- VOCE (INDUSTRY/INSTITUTIONAL BASED)</b>	<b>Hours/Week: 18</b>	
<b>CoreProject-1</b>		<b>Credits: 8</b>	
<b>Course Code 20PCAC41PR</b>		<b>Internal 40</b>	<b>External 60</b>

### COURSE OUTCOMES

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

- CO1 : planning the requirements of software projects. [K3]
- CO2 : apply the concepts learnt to module and develop the project. [K3]
- CO3 : experiment the solution of the project using test data. [K3]
- CO4 : analyze the solution of the project using different analytical tools. [K4]
- CO5 : assess the requirements and evaluate functionality of the project. [K5]

Course Code 20PCAC41PR	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	M	-	-	M	-	-	-	L	-	-
CO2	M	H	-	-	M	L	M	M	-	L
CO3	M	M	-	-	M	-	M	-	-	-
CO4	H	M	M	-	M	M	M	M	-	-
CO5	H	M	H	M	H	M	H	-	L	-



## V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

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VIRUDHUNAGAR - 626 001

Semester IV	Project – Research Methodology & Ethics	Hours/Week: 18	
CoreProject		Credits: 8	
Course Code 22PCAC41PR		Internal 60	External 40

### COURSE OUTCOMES

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

CO1 - identify the problem in the specified domain using the disciplinary knowledge. [K3]

CO2 - make use of research methodology methods to solve the functions of the problem. [K3]

CO3 - apply the concepts learnt to develop the functionality of the project with ethics. [K3]

CO4 - test the functionality of the project using different types of testing tools. [K4]

CO5 - assess the requirements and evaluate functionality of the project with ethics. [K5]

Course Code 22PCAC41PR	PO1		PO2		PO3	PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2.a	PSO 2.b	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	M	-	-	M	-	-	-	L	-	-
CO2	M	H	-	-	M	L	M	M	-	L
CO3	M	M	-	-	M	-	M	-	-	-
CO4	H	M	M	-	M	M	M	M	-	-
CO5	H	M	H	M	H	M	H	-	L	-