

**Rayat Shikshan Sanstha's**

**SADGURU GADAGE MAHARAJ COLLEGE, KARAD.**

**(An Autonomous College - Affiliated to Shivaji University, Kolhapur)**

**Accredited<sup>A+</sup> with CGPA 3.63 by NAAC; RUSA Beneficiary and NAAC Designated Mentor  
College**

**Website: [www.sgm.edu.in](http://www.sgm.edu.in)**

**Estd.: 1954**





**Bachelor of Computer Application (BCA)**

**Under the Faculty of Commerce & Management**

**Choice Based Credit System (CBCS)**

**Regulations in accordance with National Education Policy to be implemented from**

**Academic Year 2022-23**

 <p>Estd. 1962 "A++" Accredited by NAAC (2021) With CGPA 3.52</p>	<p><b>SHIVAJI UNIVERSITY, KOLHAPUR - 416 004, MAHARASHTRA</b></p> <p>PHONE : EPABX - 2609000, www.unishivaji.ac.in, bos@unishivaji.ac.in</p> <p><b>शिवाजी विद्यापीठ, कोल्हापूर - ४१६ ००४, महाराष्ट्र</b></p> <p>दूरध्वनी - ईपीएबीएक्स - २६०९०००, अभ्यासमंडळे विभाग - ०२३१-२६०९०९४</p>	
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No 00169 दि. 12 SEP 2022

प्रति,

मा. प्राचार्य/संचालक,  
सर्व संलग्नित महाविद्यालये/संस्था,  
शिवाजी विद्यापीठ,  
कोल्हापूर

**विषय : नवीन राष्ट्रीय शैक्षणिक धोरण २०२० नुसारची शैक्षणिक नियमावली.**

महोदय/महोदया,

आपणास विदित आहे की, नवीन राष्ट्रीय शैक्षणिक धोरण २०२० या शैक्षणिक वर्षापासून लागू करण्यात आले आहे. विद्यापीठ अधिकार मंडळानी नवीन शैक्षणिक धोरणानुसार शैक्षणिक नियमावलीस मंजूरी दिली आहे. सदर नियमावली शैक्षणिक वर्ष २०२२-२३ पासून लागू केली आहे. सोबत सदर नियमावलीची प्रत जोडली आहे. तसेच सदरची नियमावली विद्यापीठाच्या [www.unishivaji.ac.in](http://www.unishivaji.ac.in) (Online Syllabus) या संकेतस्थळावर उपलब्ध आहे. सदर नियमावली सर्व संबंधितांच्या निदर्शनास आणावी.

नवीन शैक्षणिक धोरणात वेळोवेळी होणा-या बदलांच्या अनुशंगाने नियमावलीत आवश्यकते बदल करण्यात येतील. व ते आपल्या निदर्शनास आणले जातील.

कळावे,

आपला विश्वासू,



उपकुलसचिव

प्रत : माहितीसाठी.

१. स्वीय सहाय्यक, मा. कुलगुरु कार्यालय
२. स्वीय सहाय्यक, मा. प्र. कुलगुरु कार्यालय.
३. स्वीय सहाय्यक, मा. कुलसचिव कार्यालय.

माहितीसाठी व पुढील योग्यत्या कार्यवाहीसाठी

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| <ol style="list-style-type: none"> <li>१. मा. संचालक, परीक्षा व मुल्यमापन मंडळ, कार्यालय</li> <li>२. अधिष्ठाता, वाणिज्य व व्यवस्थापन विद्याशाखा.</li> <li>३. अधिष्ठाता, मानवविज्ञान विद्याशाखा.</li> <li>४. प्र. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा.</li> <li>५. प्र. अधिष्ठाता, आंतरविद्याशाखीय अभ्यास विद्याशाखा</li> <li>६. परीक्षक नियुक्ती विभाग.</li> <li>७. संलग्नता टी. १ व २ विभाग.</li> <li>८. पी.जी. आस्थापना विभाग.</li> </ol> | <ol style="list-style-type: none"> <li>९. पी. जी. प्रवेश विभाग.</li> <li>१०. दूरशिक्षण केंद्र.</li> <li>११. पात्रता विभाग.</li> <li>१२. संगणक केंद्र./आय. टी. सेल.</li> <li>१३. सभा विभाग.</li> <li>१४. पी. जी. बी. यु. टी. आर. विभाग.</li> <li>१५. सर्व ऑन परीक्षा विभाग.</li> </ol> |
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**Programme Structure for Bachelor of Computer Application (160Credits)**

**Major subject With Multiple Entry Multiple Exit Options**

SEM	Discipline Specific Core Courses (DSC)(L+P)(Credits)	Discipline Specific Elective Courses (DSE)(L+P)(Credits)	Ability Enhancement Compulsory Courses (AECC)(L+P)(Credits)	Skill Enhancement Courses (SEC)		Total Credits
				Vocational Courses (L+P) (Credits) (Non CGPA)	Value Based Courses (P) (Credits) (Non-CGPA)	
I	<p align="center"><b>BCA</b></p> 3 Theory Papers 4 credits each (4x3=12) 2 Comp. Lab 2 credits each (2x2=4)  <b>Total:-12+4=16</b>	-	<p align="center"><b>AECC-I, AECC-II</b></p> 2 Theory Papers 4 credits each (4x2=8)	<p align="center"><b>SEC-1(2)</b></p> Multidisciplinary	-	<b>26</b>
II	<p align="center"><b>BCA</b></p> 4 Theory Papers 4 credits each (4x4=16) 2 Comp. Lab 2 Credits each (2x2=4)  <b>Total:-16+4=20</b>	---	<p align="center"><b>AECC-III</b></p> 1 Theory Paper 4 credits each (4x1=4)	<p align="center"><b>SEC-2 (2)</b></p> Multidisciplinary	---	<b>26</b>
<b>Total</b>						<b>52</b>
<b>Level 5: Exit with Certificate in Computer Application (with the completion of courses equal to minimum of 52 credits)</b>						
III	<p align="center"><b>BCA</b></p> 4 Theory Papers 4credits each (4x4=16) 2 Comp. Lab 2 Credits each (2x2=4)  <b>Total:-16+4=20</b>	---	<p align="center"><b>AECC-IV</b></p> 1 Theory Paper 4 credits each (4x1=4)	<p align="center"><b>SBC-3 (2)</b></p> Multidisciplinary (Skill Development-III)	---	<b>26</b>
IV	<p align="center"><b>BCA</b></p> 3 Theory Paper 4 credits each (4x3=12) 2 Comp. Lab 2 Credits each (2x2=4) 2 Credits for Mini Project <b>Total:-12+4+2=18</b>	---	<p align="center"><b>AECC-V,AECC-VI</b></p> 2 Theory Paper 4 credits each (4x2=8)  4 Credit for Env. <b>AECC-4 (4)</b> Env.Studies (Project)	---	---	<b>30</b>
<b>Total</b>						<b>56</b>

**Level 6:Exit with Diploma in Computer Application (with the completion of courses equal to minimum of 108 credits)**

V	<b>BCA</b> 3 Theory Paper 4credits each <b>(4x3=12)</b> 2 Comp. Lab 2 credits each <b>(2x2=4)</b> <b>Total=12+4=16</b>	<b>DSE-I,DSE-II</b> 2 Theory Papers 4 Credits each <b>(4x2=8)</b>	—	<b>SBC- 5(2)</b> Multidisciplinary (Skill Development-IV)	---	<b>26</b>
VI	<b>BCA</b> 2 Theory Paper 4credits each <b>(4x2=8)</b> 2 Comp. Lab 2 credits each <b>(2x2=4)</b> 4 credits for Major project <b>(4x1=4)</b> <b>Total=8+4+4=16</b>	<b>DSE-III,DSE-IV</b> 2 Theory Papers 4 Credits each <b>(4x2=8)</b>	---	<b>SBC- 6(2)</b> Multidisciplinary (Skill Development-V)	---	<b>26</b>
<b>Total</b>						<b>52</b>
	<b>106</b>	<b>16</b>	<b>28</b>	<b>09</b> (Non CGPA)	<b>01</b> (Non CGPA)	<b>160</b>

**Level 7 : Exit with three years Bachelor of Computer Application BCA (with the completion of courses equal to minimum of 160 credits)**

VII	<b>BCA</b> 3 Theory papers 4 credits each <b>(4x3=12)</b> 2 Comp. Lab 2 Credits each <b>(2x2=4)</b> <b>Total=12+4= 16</b>	<b>DSE-V, DSE-VI</b> 4 credits each <b>(4x2=8)</b>	--	<b>SBC- 7(2)</b> Multidisciplinary (Skill Development-VI)	---	<b>26</b>
VIII	<b>BCA</b> <b>Major Research</b> <b>Project</b> <b>Credit=16</b>		---	---	---	<b>16</b>
<b>Total</b>						<b>42</b>
	<b>138</b>	<b>24</b>	<b>28</b>	<b>11</b> (Non CGPA)	<b>01</b> (Non CGPA)	<b>202</b>

**Note:**

1. For first year Sem-I and Sem-II students have to select provided DSC and AECC courses.
2. For second year Sem-III and Sem-IV, students have to select provided five DSC and AECC courses.
3. For third year Sem-V and Sem-VI, students have to select DSC and DSE courses provided at respective semester.
4. The DSC courses from Sem-I to Sem-VI have 100 marks papers passing mini.40 marks

**BCA-II Program Structure:****BCA-II (Sem-III)**

Course Code	Title of Paper	Credit	Internal	External	Total
DSC CA C1	RDBMS	4	20	80	100
DSC CA C2	Computer Network and Internet	4	20	80	100
DSC CA C3	Data Structure using C	4	20	80	100
DSC CA C4	Human Resource Management and Materials Management	4	20	80	100
AEC CA C4	Elements of Statistics	4	20	80	100
DSC CA L5	Lab Course-V Based on DSC CA C1	2	-	50	50
DSC CA L6	Lab Course VI based on DSC CA C3	2	-	50	50
SBC-III	<b>Skill Development III</b>	2	-		50
CCC	Indian Constitution	-	-	-	-
		26	150	500	650

**BCA-II (Sem-IV)**

Course Code	Title of Paper	Credit	Internal	External	Total
DSC CA D1	Object Oriented Programming Using C++	4	20	80	100
DSC CA D2	Software Engineering	4	20	80	100
DSC CA D3	PHP	4	20	80	100
AEC D5	Entrepreneurship Development	4	20	80	100
AEC D6	Cost Accounting	4	20	80	100
AEC D7	Mini Project	2		50	50
AEC-D8	Environmental Studies	4	20	80	100
DSC CA L7	Lab Course-VII Based on DSC CA D1	2	-	50	50
DSC CA L8	Lab Course-VIII Based on DSC CA D3	2	-	50	50
		30	120	630	750

Exit option with Diploma in Computer Applications. (With the completion of courses equal to **108 credits.**)

Structure of Program and Evaluation are as follows:

RayatShikshanSanstha's

SADGURU GADAGE MAHARAJ COLLEGE, KARAD.

COURSE STRUCTURE UNDER AN AUTONOMY

Bachelor of Computer Application(BCA)

BCA-II SEMESTER– III (Duration – 6 Months)

S r. No	SUBJECT CODE	TEACHING SCHEME						EXAMINATION SCHEME								
		THEO RY			SUBJECT CODE	PRACTICAL		THEORY				PRACTIC AL				
		Credits	No. of lectures	Hours		Credits	No. of lectures	Hours	Hours	Theory	Internal	Total Marks (Min.)	Total Marks	Hour	Min	Max
1	DSC CA C1	4	4	3.2		-	-	-	3	80	20	32+8=40	100	-	-	-
2	DSC CA C2	4	4	3.2		-	-	-	3	80	20	32+8=40	100	-	-	-
3	DSC CA C3	4	4	3.2		-	-	-	3	80	20	32+8=40	100	-	-	-
4	DSC CA C4	4	4	3.2		-	-	-	3	80	20	32+8=40	100	-	-	-
5	AEC CA C6	4	4	3.2		--	--	--	3	80	20	32+8=40	100	-	-	-
6					DSC CA L5	2	2	3.2						3	20	50
7					DSC CA L6	2	2	3.2						3	20	50
8	SEC CA-III					2	3	2.4								50
<b>Total of SEM I</b>		<b>20</b>	<b>20</b>	<b>16</b>		<b>6</b>	<b>8.5</b>	<b>09</b>	<b>15</b>	<b>400 + 100 = 500</b>				<b>500+100=650</b>		

TOTAL NO OF CREDITS FOR SEMESTER – III : 26

BCA II SEMESTER– IV (Duration – 6 Months)

S r. No	SUBJECT CODE	TEACHING SCHEME						EXAMINATION SCHEME									
		THEO RY			SUBJECT CODE	PRACTICAL		THEORY				PRACTIC AL					
		Credits	No. of lectures	Hours		Credits	No. of lectures	Hours	Hours	Theory	Internal	Total Marks (Min.)	Total Marks	hour	Min	Max	Marks
1	DSC CA D1	4	4	3.2		-	-	-	3	80	20	32+8=40	100				
2	DSC CA D2	4	4	3.2		-	-	-	3	80	20	32+8=40	100				
3	DSC CA D3	4	4	3.2		-	-	-	3	80	20	32+8=40	100				
4	AEC CA D7	4	4	3.2		-	-	-	3	80	20	32+8=40	100				
5	AEC CA D8	4	4	3.2		--	--	--	3	80	20	32+8=40	100				
6	AEC CA D9	4	4	3.2					3	80	20	32+8=40	100				
7					DSC CA L7	2	2	3.2							20	50	
8					DSC CA L8	2	2	3.2							20	50	
9					DSC CA PR	2	2	3.2							20	50	
<b>Total of SEMII</b>		<b>24</b>	<b>24</b>	<b>19</b>		<b>6</b>	<b>8.5</b>	<b>09</b>	<b>15</b>	<b>500+100 = 600</b>				<b>600+150=750</b>			
<b>Grand Total</b>		<b>44</b>	<b>44</b>	<b>35</b>		<b>12</b>	<b>17</b>	<b>18</b>	<b>--</b>					<b>650+750=1400</b>			



**TOTAL NO OF CREDITS FOR SEMESTER - IV: 30****TOTAL NO OF CREDITS FOR SEMESTER - III + IV: 56**

• Student contact hours per week : 36.8Hours(Min.)	• Total Marks for BCA-I: 1400
• Theory lectures and practical : 48 Minutes Each	• Total Credits for BCA-II (Semester III & IV) : 56
• <b>DSC - Discipline Specific Core Courses for BCA Theory:</b> for Semester- III (DSC C1,C2,C3,C4) and for Semester- IV (DSC D1,D2,D3)	
• <b>AECC- Theory:</b> for Ability Enhancement Compulsory Course (AECC-C6 and AECC-D7,D8,D9)	
• <b>DSC L -Discipline Specific Core Courses Lab for BCA Practical:</b> for (DSCL6,L6,L7,L8,MPR)	
• Practical Examination will be conducted as a semester pattern for 50 Marks per Lab course.	
• The examination of each DSC course will be of 100 marks. Minimum 40 marks (40%) out of 100 are required for passing.	
• Students can exit after Level 5 with Certificate Course in Computer Application (with the completion of courses equal to minimum of <b>56 credits</b> ).	
• Students can exit after Level 6 with Diploma in Computer Application (with the completion of courses equal to minimum of <b>108 credits</b> ).	
• Students can exit after Level 7 with Bachelor of Computer Application (with the completion of courses equal to minimum of <b>160 credits</b> ).	
• <b>SBC:</b> Skill Based Courses (1 credit). Students have to select one for each semester from the pool of courses available at their respective colleges.	
• <b>VBC:</b> Value Based Courses (1Credit). Students have to select one for each semester from the pool of courses available at their respective colleges.	

## DSC CA C1 -RDBMS

**Credit:04**

**Marks:100**

**Course objectives:**

1. To enable students understand and use RDBMS concepts
2. To learn how to design and create database and to implement data base for application

Module	Content	
I	<b>Introduction to RDBMS</b> <ul style="list-style-type: none"><li>• Concept of RDBMS</li><li>• Difference between DBMS and RDBMS</li><li>• Terminologies: relation, attribute, domain, tuple, entities</li><li>• Entity relationship model</li><li>• Relational Model: Structure of Relational Database</li><li>• Concept of Relational Algebra</li><li>• Role and Responsibilities of DBA</li></ul> <b>Database Protection:</b> Security Issues, Threats to Databases, Security Mechanisms	15
II	<b>Basics of MySQL</b> <ul style="list-style-type: none"><li>• Difference between SQL and MySQL</li><li>• Creating a Database and Tables</li><li>• DDL,DML,DCL,TCL Commands</li><li>• Clauses- Order by, where and group by</li><li>• Functions in MySQL<ul style="list-style-type: none"><li>○ Aggregate functions(avg, count, min, max, sum)</li><li>○ String Functions(concat, instr,mid, length, strcmp, trim, ltrim, rtrim)</li><li>○ Math Functions(abs, ceil, floor, mod,pow, sqrt)</li><li>○ Date and Time Functions( adddate, datediff, day, month, year, hour, min, sec)</li></ul></li></ul>	15
III	<b>Subqueries and Joins in MySQL</b> <ul style="list-style-type: none"><li>• Subqueries<ul style="list-style-type: none"><li>➤ Concepts of Sub queries</li><li>➤ sub queries with IN, EXISTS,NOT EXISTS</li><li>➤ subqueries restrictions</li><li>➤ Nested subqueries</li><li>➤ ANY/ALL clause</li><li>➤ correlated sub queries</li><li>➤ Group by and Having clause</li></ul></li><li>• Concepts of Join<ul style="list-style-type: none"><li>➤ Types of Join:- Inner Join, Outer Join, Left Join, Right Join, Cross Join</li></ul></li><li>• <b>Views</b> (creating, altering dropping, renaming and manipulating views)</li></ul>	15



IV	<b>MySQL control statements and stored procedures</b> <ul style="list-style-type: none"> <li>• Control Statements- If, case and loop</li> <li>• Stored procedures – Creating and executing procedures with and without parameters</li> <li>• Cursors- Declare, open, fetch, close</li> <li>Triggers- Create, show and drop trigger, Types of trigger</li> </ul>	
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**Course Outcomes:** At the end of this course it is expected that the students will be able:

CO1: Enhance the knowledge and understanding of database analysis and design  
CO2: Enhance programming skills and techniques using SQL and PL/SQL  
CO3: Use the relational Model and how it is supported by SQL and PL/SQL

CO4: To solve database problems using SQL and PL/SQL by using Cursors and Triggers.

**Books Recommended:**

1. SQL, PL/SQL: The Programming Language- Ivan Bayross- (BPB)
2. Structured Query Language- by Osborne
3. SQL by Scott Ullman.
4. SQL & PL/SQL Black Book for Oracle by Dr,P.S.Deshpande.

## DSC CA C2 -Computer Network and Internet

**Credit:04**

**Marks:100**

### Course objectives:

1. To learn the student Computer network structure and use of implementation
2. To learn use of Internet and utilize in life.

<b>UNIT No.</b>	<b>Description</b>	<b>No. of Periods</b>
I	<b>Introduction to Computer Network:</b> Definition of a Computer Network, concept of Network, Components of a computer network, use of computer networks. Simplex, Half duplex & Full duplex. Components of computer networks-files server, workstation. Network devices-hub, repeater, bridge, router, gateway. Classification of computer network- geographical spread (LAN,WAN, MAN).	15
II	<b>Data Transmission &amp; Topologies:</b> Data transmission-serial and parallel transmission. Data communication-analog and digital transmission. Transmission Medias- I) Guided media - twisted pair, coaxial cable, optical fibers. II) Unguided media-radio waves, microwaves, infrared. Topologies- bus, star, ring, mesh, tree.	15
III	<b>TCP/IP and OSI Model:</b> <b>Introduction-</b> Concept of Error detection & control code. Flow control- Stop and Wait protocol, sliding window protocol. Routing & Routing algorithms- shortest path, flooding, distance vector. Switching techniques- circuit, packet & message switching, Connection oriented and connectionless services. <b>TCP/IP Model-</b> Introduction, Working and Functions of – Process/Application layer, Host to Host/Transport layer, Internet layer, Network access/Link layer. <b>OSI Model-</b> Introduction, Working and Functions of – Physical layer, Data Link Layer, Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer.	15
IV	<b>Internet</b> Introduction to internet. Evolution of Internet, Difference in Internet, Intranet & Extranet. Domain Name System (DNS). Web browsers & its features, Search engines, Netiquette, Introduction to Web 3.0, Advantages of Web 1.0, 2.0 and 3.0. Internet security threats and security solutions.	15

### Course Outcomes:

1. Understand the concept of computer network.
2. Identify different components required to build different networks.
3. Recognize the functions of network layers and different protocols.
4. Discuss the important features of the Internet and Web.

**Books Recommended:**

1. Computer Networks Andrew Tanenbaum, Pearson Education
2. Computer Networks Fundamentals and applications, R S Rajesh, K S Easwarakumar, R Balasubramanian, VIKAS Publishing House Pvt. Ltd.
3. Data Communication and Networks, James Irvin, David Harle Wiley
4. Computer Networks protocols, Standards and Interface Black C. Prentice Hall of India  
Computer Communication Networks William Stalling Prentice Hall of India

## DSC CA C3-Data Structure Using C

Credit: 04

Marks:100

### Course objectives

1. Understand the concept of Abstract Data Type.
2. Understand basic data structures such as arrays, linked lists, stacks, queues, and Tree with its applications
3. Understand various searching & sorting techniques

Module	Content	
I	<b>Introduction to data structures</b> <ul style="list-style-type: none"><li>• Introduction to Data Structures</li><li>• Data and Information</li><li>• Data structures and its types</li></ul> Data structures operations	15
II	<b>Sorting and Searching Methods</b> <ul style="list-style-type: none"><li>• Introduction to Sorting and searching</li><li>• Bubble Sort</li><li>• Insertion sort</li><li>• Selection sort</li><li>• Merge sort</li><li>• Linear search</li></ul> Binary search and hashing concept	15
III	<b>Stacks and Queues</b> <ul style="list-style-type: none"><li>• Concept of Abstract Data types</li><li>• Introduction to stack</li><li>• Primitive Stack operations: Push &amp; Pop</li><li>• Array and Linked Implementation of Stack in C</li><li>• Application of stack: Prefix and Postfix</li><li>• Expressions, Evaluation of postfix expression</li><li>• Definition of queue.</li><li>• Operations on queue.</li><li>• Types of queue-Linear, Circular.</li></ul> Applications of queue	15
IV	<b>Linked Lists and Trees</b> <ul style="list-style-type: none"><li>• Introduction to linked lists</li><li>• Implementation of Linked list</li><li>• Operations on linear linked list, circular linked list, doubly linked list</li><li>• Sequential and linked lists</li><li>• Operations such as<ul style="list-style-type: none"><li>○ Traversal</li><li>○ Insertion</li><li>○ Deletion</li><li>○ Searching</li></ul></li><li>• Trees : definition, terminologies, representation, types</li></ul> Tree Traversal- (Preorder, Inorder, Postorder)	15

**Course Outcomes:** At the end of this course it is expected that the students will be able:

CO1: Use and implement appropriate data structure for the required problems using a programming language such as C++.

CO2: Write programs for various searching & sorting techniques.

CO3: Implementing various data structures viz. Stacks, Queues.

CO4: Implementation of Linked Lists and Trees.

**Books Recommended:**

1. Data Structure Using C++ by Yashavant Kanetkar
2. Classic Data Structures-D. Samanta, Prentice Hall India Pvt. Ltd.
3. Data Structures using C and C++-Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum, Pearson Education
4. Data Structures: A Pseudo code approach with C, Richard Gilberg, Behrouz A. Forouzan, Cengage Learning
5. Data Structures Using C & C++ by Rajesh K. Shukla, Wiley India Pvt. Ltd  
Algorithms and Data Structures, Niklaus Wirth, Pearson Education

## DSC CA C4-Human Resource Management and Material Management

Credit:04

Marks:100

### Course objectives

1. To provide knowledge of concepts of human resource management within the organization
2. To know the proper recruitment and selection procedure in organization

Module	Content	
I	<b>Human Resource Management:</b> Definitions, Objectives, Functions, Scope and Activities of HRM, Human Resources Planning: Definition and objectives of Human Resource planning, HRP process, Concept of Recruitment and Selection -Recruitment policy-Sources of Recruitment-Selection procedure – Promotion and demotion policy- Transfer policy.	15
II	<b>Performance Appraisal, Training and Development, Wage and salary Administration</b> Performance Appraisal Concept and objectives of performance Appraisal Process of Performance Appraisal and methods Training and Development: Meaning and Definition- Need- Objectives Importance of Training-Training Methods-Evaluation of Training Programme. Wage and Salary Administration Methods of wage payments- Employee Remuneration factors determining the level of remuneration- Profit sharing Fringe Benefits and welfare incentives. Wages & Salary Administration	15
III	<b>Introduction to Material Management:</b> Definition, Objectives, Importance of Material Management. Functions of Material Management, Integrated approach to Material Management, Challenges in Material Management, Future of Material Management in India and Role of Computer in Material Management.	15
IV	Purchasing & Inventory Management Purchasing-Definition, Objectives, Purchasing as a profit centre, 5R in purchasing, Purchasing cycle. Inventory Management-Definition, types of inventory, inventory costs, need of inventory. EOQ, Basic EOQ model. Vendor Managed Inventory, Selective Inventory control techniques. 15  <b>Note:</b> Students should study your own institute/college from the perspectives of first two units. Students should study the different heads of salary sheet from office of institute/college/any business organisation. The details of every heads should be learnt i.e. PF, ESI, Income Tax, DA, HRA and the like.	15

### Course Outcomes:

1. Students should understand the concept of Human Resource Management within the organization.
2. To know the proper Recruitment and Selection Procedure in organization.

### Books Recommended:

1. Human resource management by Ian Breadseface.
2. Human resource management by S. S. Khankar.
3. Human resource management by Biswajeet Patanayak.
4. Human Resource Management 6E, By Aswathappa
5. Human Resource Management By Gary Dessler
6. The HR Scorecard By Brian Becker, Mark Huselid, Dave Ulrich

**AEC CA C4- Elements of Statistics**

**Credit:04**

**Marks:100**

**Course objectives:**

1. To learn the basics of statistical techniques in computer.
2. To understand the methods of data analysis using statistical data.

<b>Unit No.</b>	<b>Descriptions</b>	<b>No. of Periods</b>
I	<p><b>Introduction to Statistics</b></p> <p>1.1 Meaning and Scope of Statistics, Primary and Secondary data.</p> <p>1.2 Frequency, Frequency distribution, Qualitative and quantitative data, Discrete and Continuous variables.</p> <p>1.3 Representation of frequency distribution by graphs: Histogram, Frequency polygon, Frequency curve, Ogive curve. Representation of Statistical data by Bar diagram and Pie chart.</p> <p>1.4 Numerical examples based on 1.2, 1.3.</p>	15
II	<p><b>Measures of Central Tendency and Dispersion</b></p> <p>2.1 Measures of central Tendency (Averages)</p> <p>2.1.1 Meaning of averages, Requirements of good average.</p> <p>2.1.2 Definitions of Arithmetic mean (A.M.), Combined mean, Median, Quartiles, Mode, Relation between mean, median and mode.</p> <p>2.1.3 Merits and Demerits of Mean, Median and Mode. 2.1.4 Numerical examples based on 2.1.2. 2.1.5 Determination of Median and Mode by Graph.</p> <p>2.2 Measures of Dispersion (Variability):</p> <p>2.2.1 Meaning of Variability, Absolute and Relative measures of dispersion.</p> <p>2.2.2 Definitions of Q.D., M.D., S.D. and Variance, Combined variance and their relative measures, Coefficient of Variation (C.V.).</p> <p>2.2.3 Numerical examples based on 2.2.2.</p>	15
III	<p><b>Analysis of Bivariate data:</b></p> <p>3.1 Correlation:</p> <p>3.1.1 Concept of Correlation, Types of correlation (Positive, Negative, Linear and Non-linear), Methods of studying correlation: Scatter diagram, Karl Pearson's Correlation Coefficient (r) and Spearman's Rank Correlation Coefficient (R).</p> <p>3.1.2 Interpretation of <math>r = +1</math>, <math>r = -1</math>, <math>r = 0</math>.</p> <p>3.1.3 Numerical examples on 3.1.1 and 3.1.2</p> <p>3.2 Regression:</p> <p>3.2.1. Concept of Regression, Definitions of regression coefficients and Equations of regression lines. Properties of regression coefficients (Statements only)</p> <p>3.2.2 Numerical examples on 3.2.1.</p>	15
IV	<p><b>Sampling Techniques and Time Series Analysis:</b></p> <p>4.1 Sampling Techniques:</p> <p>4.1.1 Definitions of Sample, Population, Sampling, Sampling Method and Census method. Advantages of sampling method over census method.</p> <p>4.1.2 Types of sampling: Simple Random Sampling (with and without replacement), Stratified Random Sampling, Merits and Demerits of S.R.S. and Stratified Sampling. 4.1.3 Simple examples on Stratified Sampling.</p> <p>4.2 Time Series: (Analysis and Forecasting)</p> <p>4.2.1 Meaning and components of Time Series</p> <p>4.2.2 Methods of determination of trend by (I) Method of Moving Averages. (II) Method of Progressive Averages. (III) Method of Least Squares (St.Line only)</p> <p>4.2.3 Numerical examples on 4.2.2.</p>	15



**Course Outcomes:**

- 1) Explain various term used in Statistics.
- 2) Describe the Measures of Central Tendency and Dispersion
- 3) Understand Analysis of Bivariate data(Correlation and Regression)
- 4) Elaborate Sampling Techniques and Time Series Analysis.

**Books Recommended:**

- 1) Mathematical Statistics by H.C. Saxena and J. N. Kapur
- 2) Business Statistics by G. V. Kumbhojkar
- 3) Fundamentals of Statistics by S. C. Gupta
- 4) Business Statistics by S. S. Desai
- 5) Business Statistics - SIM-Shivaji University, Kolhapur

## DSC CA L5 Lab Course-V Based on DSC CA C1

**Credit:02**

**Marks:50**

### Course objectives:

1. Learn how to use and implement database and operations on it.
2. Different query operations on databases

Sr.No.	List of Practical's:
1	Create the tables with appropriate constraints.
2	Perform the following: <ul style="list-style-type: none"><li>➤ Viewing all existing databases</li><li>➤ Creating a Database</li><li>➤ Viewing all Tables in a Database</li><li>➤ Creating Tables (With and Without Constraints)</li><li>➤ Inserting/Updating/Deleting Records in a Table</li><li>➤ Saving (Commit) and Undoing (rollback)</li></ul>
3	Perform the following: <ul style="list-style-type: none"><li>➤ Altering a Table</li><li>➤ Dropping/Truncating/Renaming Tables</li><li>➤ Granting and revoking permissions</li></ul>
4	Perform the following: <ul style="list-style-type: none"><li>➤ Simple Queries</li><li>➤ Simple Queries with Aggregate functions</li><li>➤ Queries with Aggregate functions (group by and having clause)</li></ul>
5	Queries involving <ul style="list-style-type: none"><li>➤ Date Functions</li><li>➤ String Functions</li><li>➤ Math Functions</li></ul>
6	Join Queries <ul style="list-style-type: none"><li>➤ Inner Join</li><li>➤ Outer Join</li><li>➤ Left Join</li><li>➤ Right Join</li></ul>
7	Subqueries <ul style="list-style-type: none"><li>➤ With IN clause</li><li>➤ With EXISTS clause</li></ul>
8	Subqueries <ul style="list-style-type: none"><li>➤ Nested subqueries</li><li>➤ ANY/ALL clause</li></ul>
9	Views <ul style="list-style-type: none"><li>➤ Creating Views (with and without check option)</li><li>➤ Dropping views</li></ul>
10	Stored Procedures, cursors and triggers <ul style="list-style-type: none"><li>➤ Creating stored procedure with and without parameters</li><li>➤ Creating cursor</li><li>➤ Creating triggers</li></ul>

### Course Outcomes:

1. Design database for business applications.
2. Use of queries, sub queries, join, view and stored procedures on databases.

**DSC CA L6 Lab Course-VI Based on DSC CA C3**

**Credit:02**

**Marks:50**

**Course objectives:**

1. Student should learn implementation of data structure in development.
2. To learn operations on data structure.

<b>Course Code:</b> <b>CCL307</b>	<b>Lab Course VI based on CC303 and AEC304</b>	<b>Credit :02</b>	<b>Marks:50</b>
<b>Course Outcomes</b>	After completion of this course student should be able to- 1. Implement various data structures viz. Stacks, Queues, Linked Lists and Trees 2. Apply MS Excel features for Data Manipulation and Analysis.		
<b>Sr.No.</b>	<b>Practical's on CC303</b>		
1	Write a program to implement stack using static method.		
2	Programs to implement applications of stack.		
3	Write a program to implement Queue using static method.		
4	Programs to implement applications of queue.		
5	Write a program to create linked list, add node to linked list and Remove node from linkedlist.		
6	Write a program to implement types of linked list.		
7	Write a program to implement stack and queue dynamically.		
8	Write a program to sort given elements using bubble sort, insertion sort, selection sort		
9	Write a program to search given element using Linear Search.		
10	Write a program to search given element using Binary Search.		
	<b>Practical's on</b>		
	Ten Lab assignments based on using following Excel features: <ul style="list-style-type: none"> <li><input type="checkbox"/> Create workbook</li> <li><input type="checkbox"/> Excel Charts</li> <li><input type="checkbox"/> Apply Custom Data Formats</li> <li><input type="checkbox"/> Use Advanced Fill Options</li> <li><input type="checkbox"/> Apply Advanced Conditional Formatting and Filtering</li> <li><input type="checkbox"/> Apply Custom Styles and Templates</li> <li><input type="checkbox"/> Use Custom Views</li> <li><input type="checkbox"/> Functions</li> <li><input type="checkbox"/> Apply functions in formulas</li> <li><input type="checkbox"/> Mathematical Functions</li> <li><input type="checkbox"/> Financial functions</li> <li><input type="checkbox"/> Useful Data Functions</li> <li><input type="checkbox"/> Some Other Useful Functions</li> <li><input type="checkbox"/> Look up data by using functions</li> <li><input type="checkbox"/> Apply advanced date and time functions</li> <li><input type="checkbox"/> Functions for Manipulating Text</li> <li><input type="checkbox"/> Pivot tables</li> </ul>		

**Course Outcomes:**

1. Implement various data structures viz. Stacks, Queues, Linked Lists and Trees
2. Apply MS Excel features for Data Manipulation and Analysis.

## BCA-II SEM-IV

### DSC CA D1-Object Oriented Programming Using C++

Credit:04

Marks:100

#### Course objectives

1. To understand the difference between procedure oriented programming and object oriented programming.
2. To enable students to understand Object Oriented Concepts through C++.
3. To learn the concept of polymorphism and inheritance

UNIT No.	Description	No. of Periods
I	Programming with C++ 1.1 Difference between POP & OOP 1.2 Introduction 1.3 Data types 1.4 Constants & variables 1.5 Arrays 1.6 Operators 1.7 Operator precedence 1.8 Control structures (selective and iterative) 1.9 Function & Pointer	15
II	Introduction to object oriented programming 2.1 Basic concept of OOP 2.2 Benefits and futures 2.3 Class-Definition, Syntax 2.4 Member functions and data members 2.5 Access specifiers, static data member & static member functions 2.6 Array of object friend function 2.7 Object as function argument friend class.	15
III	Constructor, Destructors 3.1 Constructor- Definition, syntax, rules 3.2 Types of Constructors- decant, parameterized, copy 3.3 Destructor- definition, syntax, rules 3.4 Function Overloading & Inline Function – Definition, syntax, rules	15
IV	Polymorphism and Inheritance 4.1 Polymorphism: Meaning, compile Time and Run time 4.2 Virtual functions and Pure virtual function 4.3 Inheritance: meaning, types- single, multilevel, multiple.	15

#### Course Outcomes:

1. Understand the OOP'S concept of programming language.
2. Develop new technical concepts.
3. Implanting polymorphism and Inheritances.

**Book Recommended:**

- 1) Object oriented programming with C++ - by E Balagurusamy
- 2) Object Oriented Programming with C++ by Robert Lafore
- 3) Object Oriented Programming in C++ by Dr. G. T. Thampi, Dr. S. S. Mantha, DreamTech Press
- 4) Practical Programming in C++ by Steve Oualline, O'Reilly
- 5) The C++ Code book by D. Ryan Stephens, Christopher Diggins, Jonathan Turkanis, and Jeff Cogswell, O'Reilly
- 6) The C++ Programming Language (3rd Edition) by Bjarne Stroustrup
- 7) C++ the Complete Reference 5th Edition Herbert Schildt, McGraw-Hill
- 8) Jumping into C++ by Alex Allain
- 9) Programming with C++, Third Edition by D Ravichandran
- 10) Mastering C++ by Venugopal, McGraw Hill Education

## DSC CA D2- Software Engineering

Credit:04

Marks:100

### Course Objectives:

1. To learn software development processes and model.
2. To learn techniques of software development process.

UNIT No.	Description	No. of Periods
I	<p><b>Introduction to Software Engineering:</b> Introduction to system, Characteristics of system, types of system, Program vs Software, Definition of Software Engineering, importance, principles of software engineering, Difference between software engineering and software programming, Members involved in software development. SDLC (General software development life cycle with all phases)</p> <p><b>Software process models:</b> Overview of software models (Waterfall, Prototyping and Spiral model).</p>	15
II	<p><b>Requirement Engineering:</b> What is Requirement Engineering, Types of requirements, Requirement elicitation techniques- Traditional methods and Modern methods, Verification and validation process, Formal technical review, Principles of Requirement Specification, Software Requirement Specification document, Characteristics of good SRS.</p>	15
III	<p><b>Analysis and System Design tools:</b> Data Flow Diagrams (DFD), Data Dictionary, Entity-Relationship Diagrams, Decision Tree and Decision Table. Input and Output Design- I/O design considerations, Structured Chart, HIPO chart, Characteristics of Good Design, <i>CASE STUDIES</i> – Library Management System, Inventory Management System.</p>	15
IV	<p><b>Software Testing and Software Quality Assurance Software Testing:</b> Definition, Test characteristics, Types of testing: Black-Box Testing , White-Box Testing ,Unit testing , Integration testing, Validation testing, System testing.</p> <p><b>Software Quality Assurance:</b> <b>Introduction-</b> Quality, and its attributes, quality control, quality assurance, cost of quality, SQA activities, SQA plan.</p>	15

### Course Outcomes

1. Understand life cycle models, requirement elicitation techniques, understand the concept of analysis and design of software.
2. Develop SRS document.



3. Use of analysis and design tools for system development.

Apply software engineering concepts in software development to develop quality software.

**References (Books, Websites etc):**

1. Software Engineering a Practitioners Approach by S. Pressman & Roger, Seventh Edition, McGraw Hill International Edition.

2. Software Engineering by Sommerville, , 7th edition, Pearson Publication

3. Software Engineering by K.K. Aggarwal & Yogesh Singh, New Age International Publishers.

4. Web sites of NPTEL / Swayam 5. [www. edx.com](http://www.edx.com)

## DSC CA D3- PHP

Credit:04

Marks:100

### Course objectives:

1. To learn basics of PHP and uses of PHP controls.
2. To learn how to implement PHP controls in development.

Unit No.	Description	No. of Periods
I	<b>Introduction:</b> PHP introduction, Basic Syntax, PHP variables and constants, Types of data in PHP, Expressions, scopes of a variable (local, global), Operators: Arithmetic, Assignment, Relational, Logical, Bitwise, ternary and MOD operator.	15
II	<b>Control Structures:</b> PHP if else conditional statements (nested if and else), switch case, while, for and do while loop, goto, break, continue and exit. <b>String and Regular Expression:</b> Creating and accessing String , Searching & Replacing String , Formatting, joining and splitting String ,String Related Library functions.	15
III	<b>Arrays:</b> Anatomy of an Array, Creating index based and Associative array, Accessing array, Looping with Index based array, with associative array using each() and foreach(). <b>Functions:</b> Need of Function, Scope of Function Global and Local, declaration and calling of a function, PHP Function with arguments, Default Arguments in Function, Function argument with call by value, call by reference,	15
IV	<b>Working with Forms:</b> Processing Form Input, Validating Form Input: Required Fields, Numbers, Email Addresses, Drop-Down Menus, Radio <b>Buttons, Checkboxes, Dates and Times.</b>	15

### Course Outcomes:

1. Understand the environment of PHP programming Language.
2. Develop web applications using PHP.

### Books Recommended:

1. PHP & MySQL for Dummies by Janet Valade
  2. PHP and MySQL Web Development by Luke Welling, Laura Thompson
  3. Programming PHP by RasmusLerdorf, Kevin Tatroe
- PHP Cookbook by David Sklar& Adam Trachtenberg

## AEC CA D5- Entrepreneurship Development

Credit:04

Marks:100

### Course objectives:

1. To learn Business Plans, Finance, Opportunity in different businesses.
2. To learn Entrepreneurship techniques.

UNIT No.	Description	No. of Periods
I	<b>Introduction to Entrepreneurship :</b> Evolution, Concept and definition of an entrepreneur, Characteristics, function and types of entrepreneurs, Qualities of an Entrepreneur, Growth of Entrepreneurship in India, Role of Entrepreneurship in Economic Development, Women Entrepreneurship in India.	15
II	<b>Business Opportunity Identification:</b> Search for Business Ideas, Market Assessment, Sources of Information and Environmental Analysis, Entrepreneurial opportunities in India, Business Opportunity identification and selection.	15
III	<b>Business Plan Preparation and Project Finance</b> Meaning of Business plan, Significance and Contents of a Business Plan, developing Business Plan, Presenting Business Plan and Preparation of project report. Project Finance: Introduction, Types of Finance, Sources of Finance, Venture Capital, Start-up and Make-in-India program, MUDRA. Support Agencies: Support to Entrepreneurs by DIC, SIDBI, SIDCO, SSIB, NSIC, SISI, Other Institutions etc. Entrepreneurship promotion by Government through various schemes.	15
IV	<b>Digital Entrepreneurship:</b> Meaning and Introduction, New Opportunities and Challenges, Choosing a Digital Business Idea, Creating a Digital Business Design. Digital Business Model. Digital business platforms. Different Electronic interface to consumers. Components of business website. IT Entrepreneurs: Azim Premji, N.R. Narayan Murthy and Shiv Nadar	15

### Course Outcomes

1. Define characteristics, function and types of entrepreneurs and know the role of Entrepreneurship in Economic Development.
2. Identify Business Opportunities and prepare business plan.
3. Know project finance agencies.  
Understand New Opportunities and Challenges in digital entrepreneurship.

### References Books:

1. Dr. Dilip Sarwate, Entrepreneurship Development and Project Management, Everest Publishing house
2. Vasant Desai, Dynamics of Entrepreneurship development and Management, Himalaya Publishing House

3. David H Holt, Entrepreneurship and New Venture Creation, Prentice Hall
  4. Paul Ajit Kumar, Paul, Entrepreneurship Development, Himalaya Publishing House Mumbai
  5. Raj Shankar – Entrepreneurship: Theory and Practice – Vijay Nicole Imprints Pvt. Ltd.
- S.S. Khanka – Entrepreneurial Development – S. Chand And

## AEC CA D6-Cost Accounting

Credit:04

Marks:100

### Course objectives:

1. To learn Cost Accounting Skills.
2. To learn financial accounting techniques.

UNIT No.	Description	No. of Periods
I	<b>Introduction to Cost Accounting</b> Meaning of cost, cost unit, cost center, cost accounting, objectives, advantages and limitations of cost accounting, difference between financial and cost accounting.	10
II	<b>Elements of Cost</b> Material, Labor and Overheads and preparation of cost sheet, tenders and quotations.	20
III	<b>Pricing of Materials</b> Methods of pricing material issues – LIFO, FIFO, Simple Average, Weighted Average Method.	15
IV	<b>Reconciliation of Cost and Financial Accounts.</b>	15

### Course Outcomes:

1. Student knows the cost accounting.
2. Understand the financial transactions.

### Book Recommended:

1. Jawahar Lal - Cost Accounting
2. M. N.Arora - Cost Accounting - Principles and Practice
3. D.K. Mittal and Luv Mittal - Cost Accounting
4. Ravi M. Kishore - Cost Accounting
5. B.M. Lall Nigam and I.C.Jain - Cost Accounting, Principles, Methods and Techniques

## AEC CA D7-Mini Project

Credit:02

Marks:50

### Course objectives:

1. To learn the development process.
2. To learn designing using languages.

	<b>Guidelines for Project</b>
	<ol style="list-style-type: none"><li>1. A group of maximum <b>two to four</b> students prepare a mini project under the guidance of internal teacher.</li><li>2. Students should adopt SDLC approach</li><li>3. Project guide should provide progress report to each group &amp; student should follow it.(Encl. Progress report )</li><li>4. Number of Copies: The student should submit two Hard-bound copies of the Project Report.</li><li>5. The project report is duly signed by Principal or Head of Department, Project Guide and Student.</li><li>6. Acceptance/Rejection of Project Report:<ul style="list-style-type: none"><li>o The student should submit progress report with draft project report to the guide.</li><li>o Respective guide has right to suggest modifications for resubmission or accept the project.</li><li>o Only on acceptance of draft project report, the student should make the final copies.</li></ul></li></ol>
	<p>Following format for the submission of the Project Report.</p> <p><b>a. Paper:</b> The Report shall be typed on white paper, A4 size, for the final submission. The Report to be submitted must be original and subsequent copies may be photocopied on any paper.</p> <p><b>b. Typing:</b> The typing shall be of standard letter size, 1.5 spaced and on <b>both</b> side of the paper. (Normal text should have Times New Roman, Font size 12. Headings can have bigger size)</p> <p><b>c. Margins:</b> The typing must be done in the following margins: Left -----1.5 inch, Right--- 1 inch Top ----- 1 inch, Bottom--- 1 inch</p> <p><b>d. Front Cover:</b> The front cover should contain the following details: TOP : The title in block capitals of 6mm to 15mm letters. CENTRE: Full name in block capitals of 6mm to 10mm letters. BOTTOM: Name of the University, Course, Year of submission -all in block capitals of 6mm to 10mm letters on separate lines with proper spacing with center alignment.</p> <p><b>e. Blank Sheets:</b> At the beginning and end of the report, two white black papers should be provided, one for the purpose of binding and other to be left blank.</p>

IV

**Documentation Format**

- a) Cover Page
- b) Institute/College Recommendation
- c) Guide Certificate
- d) Declaration
- e) Acknowledgement
- f) Index
- g) Chapter Scheme

**1) Introduction to Project**

- Introduction
- Existing System
- Need and scope of Computer System
- Organization Profile(Optional & applicable for live project only)

**2) Proposed System**

- Objectives
- Requirement Engineering.
  - Requirement Gathering
  - Software Requirements

**3) System Analysis**

- System Diagram
  - DFD
  - ERD
  - UML(if applicable)

(Note: Use advanced tools and techniques as per requirement.)

**4) System Design**

- Database Design
- Input Design & its samples
- Output Design (on screen)

**5) Implementation**

- System Requirement
  - Hardware
  - Software
- Installation process
- User Guideline

**6) Reports (with valid Data)**

(Minimum 4 reports)

**7) Conclusion and Suggestions**

- Conclusion
- Limitations
- Suggestion
- Suggestion

**Annexure**

- Source code(Include Main Logic source code)
- Questioner/Schedule(if used)
- Student Guide Meet Record



	<b>References</b>
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1. Books
2. Journals
3. Periodicals and Newspapers
4. Web/Blogs

**Course Outcomes**

1. Utilize the software development techniques, skills and modern tools.
2. Implement fundamental domain knowledge of core courses for developing simple business applications.

**Course Objectives:**

1. To learn Implementation of C++ OOP'S concepts
2. To learn class-object communication.

**Unit 1: Simple C++ Programs without Class.**

- a) Using Control structures
- b) Illustrating function and

**Unit 2: Programs based on Class**

- a) Defining class & creating an object
- b) Using various accesses specifies
- c) Using static data members.
- d) Creating array of object
- e) Friend class and friend function.

**Unit 3: Programs based on Constructor, Destructor**

- a) Creating constructor, parameterized, copy, multiple constructors
- b) Program using destructor.

**Unit 4: Programs on Polymorphism, Inheritance& File handling**

- a) Programs based on following concepts
  - i) Compile Time
  - ii) Run Time
  - iii) Virtual Function
- b) Inheritance - Simple, Multiple, multilevel.
- c) Function overloading and Operator overloading
- d) File handling – Creating file, Reading data, Writing new data, Closing a file

**Course Outcomes:**

1. Students get knowledge about OOP'S concepts.
2. Student should understand the programming implementation.

## DSC CA L8 Lab Course-VIII Based on DSC CA D3

**Credit: 02**

**Marks: 50**

### **Course Objectives:**

1. To learn Use of PHP language.
2. To learn PHP controls and implementations.

### **List of Practical's**

1. Write a PHP program to swap two numbers with and without using third variable.
2. Write a PHP program to find the factorial of a number.
3. Write a PHP program to count the total number of words in a string.
4. Write a program in PHP to find the occurrence of a word in a string.
5. Write a PHP program to demonstrate various functions of regular expression.
6. Write a PHP program to find area of triangle and rectangle using functions.
7. Write a PHP program to find the GCD of two numbers using user- defined functions.
8. Write a Program for demonstrating sorting functions.
9. Write a Program using arrays.
10. Design a simple web page using PHP.

### **Course Outcomes:**

1. Understand the PHP implementations in programming languages.
2. Using PHP designing web pages with effects.