



G. VENKATASWAMY NAIDU COLLEGE, KOVILPATTI – 2

(An Autonomous Institution)

(Re-Accredited by NAAC with 'A' Grade & STAR College scheme by DBT-MST, Govt. of India)

Bachelor of Computer Applications Course Structure (BCA)

Under Choice Based Credit System & OBE

1. INTRODUCTION OF THE PROGRAMME:

Bachelor of Computer Applications (B.C.A) is a 3 years undergraduate degree programme which is divided into six semesters. Students will be taught subjects which are related to the technological applications that are required in today's practical work field. Students who opt for a Bachelor of Computer Applications (BCA) will get skills and information not only about Computer and Information Technology but also in communication, organization and management. One also get to learn programming languages such as Java, C++, HTML, SQL, PHP, R Programming etc. Information about various computer applications and latest developments in IT and communication systems is also provided. It can land one either with a job or a startup business that we always wished or had an eye on.

2. ELIGIBILITY FOR ADMISSION:

Pass in HSC : Math's/Computer/Commerce Group Preferred.

Duration of the Programme : 3 Years

Medium of instruction: English

DEPARTMENT OF COMPUTER APPLICATIONS

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The objectives of this Programme is to equip/prepare the students as a

GPO No.	Programme Educational Objective
PEO1	Graduates are prepared for employment in the IT industry by demonstrating the required domain knowledge. (50%)
PEO2	Graduates are motivated to become global leaders through practical training, hands-on and project experience, and career and entrepreneurial skill development. (30%)
PEO3	Graduates are addressed and trained to be creative, to develop innovative ideas about social issues, and to be directed toward problems with solutions. (20%)

Programme Outcomes - (PO) (Aligned with Graduate Attributes)

At the completion of the Undergraduate Programme, the student will be able to accomplish the following outcomes:

GPO No.	Programme Outcomes
PO1	Acquires knowledge of Computing Fundamentals, Basic Mathematics, Computing Specialization, and Domain Knowledge of proper computing models from defined problems.
PO2	Analysis and synthesizes computing systems through quantitative and qualitative techniques.
PO3	Modern tool usage for Design and Development - Able to analyse and identify the customer requirements in multidisciplinary domains, create high level design and implement robust software applications using the latest technological skills.
PO4	Capable of adapting to new technologies and constantly upgrading their skills with an attitude towards independent and lifelong learning.
PO5	Communicates effectively in both verbal and written form.
PO6	Perform professionally with social, cultural and ethical responsibility as an individual as well as in multifaceted teams with a positive attitude.
PO7	Develop practical skills that will allow you to provide solutions to industry, society, and business.



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(STAR College scheme by DBT-MST, Govt. of India)

Department of Computer Applications (B.C.A.)

Revised Course Structure for

Under Choice Based Credit System & OBE

(For those admitted from the academic year 2021 and onwards)

Category	Course Type	Course Code	Course	Contact Hours	Exam Hours	Marks			Credit
						CIA	ESE	Total Marks	
SEMESTER I									
PART - I	Language	U21TA1L1	Tamil-I	6	3	25	75	100	4
PART -II	English	U21EN1L1	English for Enrichment –I	6	3	25	75	100	4
PART –III	Core: 1	U21CA101	Computing fundamentals & C Programming	5	3	25	75	100	4
	Additional Core: 1	U21PS1PE	Professional English for Physical Sciences - I	-	3	25	75	100	4
	Elective Generic:1 (Allied)	U21CA1A1	Discrete Mathematics	4	3	25	75	100	2
	Core Lab: 1	U21CA1P1	C Programming – Lab	5	3	40	60	100	3
	Elective Generic Lab: 1 (Allied)	U21CA1AP	Office Software tools – Lab	2	3	40	60	100	2
PART- IV	Ability Enhancement: I	U21AE101	Environmental Studies	2	2	-	50	50	2
Total				30				750	25
SEMESTER II									
PART - I	Language	U21TA2L2	Tamil-II	6	3	25	75	100	4
PART -II	English	U21EN2L2	English for Enrichment – II	6	3	25	75	100	4
PART -III	Core: 2	U21CA202	Implementations of Data Structure using C++	5	3	25	75	100	4
	Additional Core: 2	U21PS2PE	Professional English for Physical Sciences-II	-	3	25	75	100	4
	Elective Generic:2 (Allied)	U21CA2A2	Computer-Based Financial Accounting	4	3	25	75	100	2
	Core Lab: 2	U21CA2P2	Data Structure using C++ -Lab	5	3	40	60	100	3
	Elective Generic Lab:2 (Allied)	U21CA2AP	Business Accounting Software – Lab	2	3	40	60	100	2
	Comprehension (Self-Study Course I Online Exam)	U21CA2C1	Comprehension in Computer Application– I	-	1	-	50	50	1
PART –IV	Foundation Course	U21FC201	Yoga & Value Education	2	-	50	-	50	1
TOTAL				30				800	25

SEMESTER III									
PART - I	Language	U21TA3L3	Tamil-III	6	3	25	75	100	4
PART -II	English	U21EN3L3	English – III	6	3	25	75	100	4
PART-III	Core: 3	U21CA303	Java programming and RDBMS	4	3	25	75	100	4
	Core Lab: 3	U21CA3P3	Java programming and RDBMS - Lab	5	3	40	60	100	4
	Core Elective: 1	U21CA3E1A	Web Technology	5	3	25	75	100	4
		U21CA3E1B	Big Data Analytics						
		U21CA3E1C	E-Commerce						
PART-IV	Employability Enhancement – I	U21CA3EEA	Blender - Animation Techniques	2	-	50	-	50	2
		U21CA3EEB	Bootstrap-Web Application						
	Ability Enhancement – II	U21AE302	Media and Information Literacy Communication	2	2	-	50	50	2
TOTAL				30				600	24
SEMESTER IV									
PART - I	Language	U21TA4L4	Tamil-IV	6	3	25	75	100	4
PART -II	English	U21EN4L4	English – IV	6	3	25	75	100	4
PART-III	Core: 4	U21CA404	Cloud Computing using Python	4	3	25	75	100	4
	Core: 5	U21CA405	Android Programming	4	3	25	75	100	4
	Core- Lab: 4	U21CA4P4	Python Lab	3	3	40	60	100	2
	Core Elective: 2	U21CA4E1A	Data communication and Networks	5	3	25	75	100	4
		U21CA4E1B	Client/Server Computing						
		U21CA4E1C	Data Mining						
	Comprehension – II (Self-Study Course-Online Exam)	U21CA4C2	Comprehension in Computer Application– II	-	1	-	50	50	1
	Institutional Training/Minor Project	U21CA5IT	Institutional Training/Minor Project	-	-	-	-	-	-
PART-IV	Employability Enhancement – II	U21CA4EEA	Computer Hardware and Troubleshooting	2	-	50	-	50	2
		U21CA4EEB	Photoshop						
PART-V	Extension Activities - NSS, NCC, YRC, Physical Education, Consumer Club, Youth Welfare Nature Club & Electoral Literacy Club.			Completion					1
TOTAL				30				700	26

SEMESTER V									
PART-III	Core: 6	U21CA506	.NET	5	3	25	75	100	4
	Core: 7	U21CA507	Statistical Computing Using R Programming	5	3	25	75	100	3
	Core: 8	U21CA508	Software Engineering	6	3	25	75	100	4
	Core Lab: 5	U21CA5P5	.NET-Lab	6	3	40	60	100	4
	Core Lab: 6	U21CA5P6	Statistical Computing Using R Programming-Lab	6	3	40	60	100	3
	Institutional Training/ Minor Project	U21CA5IT	Institutional Training/Minor Project	-	3	40	60	100	3
PART-IV	Skill Enhancement – I	U21SE5S1	Women Studies	2	2	-	50	50	2
PART-V	Self-Study Course	General Studies		Completion					1
TOTAL				30				650	24
SEMESTER VI									
PART-III	Core-9	U21CA609	PHP with My SQL	5	3	25	75	100	4
	Core-10	U21CA610	Operating System (Linux/Unix)	5	3	25	75	100	4
	Core -11	U21CA611	IoT Applications	5	3	25	75	100	4
	Core Lab -7	U21CA6P7	PHP with My SQL Lab	4	3	40	60	100	3
	Core Lab -8	U21CA6P8	Linux-Lab	4	3	40	60	100	3
	Major Group Project & Viva Voce	U21CA6MP	Major Group Project & Viva Voce	5	3	40	60	100	6
	Comprehension – III (Self-Study - Online Exam)	U21CA6C3	Comprehension in Computer Application – III	-	1	-	50	50	1
PART-IV	Skill Enhancement – II	U21CA6S2	BA SH –Open Source	2	2	-	50	50	2
	Extra Department Course Open Elective Self Study Course	To be selected from the courses offered by other departments		-	3	-	100	100	3
PART-V	Spoken Tutorial/MOOC (Self Study Course - Online)			Completion					2
TOTAL				30				800	32

OPEN ELECTIVE OFFERED BY DEPARTMENTS (Extra Department Course) :

S.No	Name of the Department	Course Title	Course Code
1.	Mathematics	Quantitative Aptitude	U21MA6OE
2.	Physics	Physics in everyday life	U21PH6OE
3.	Chemistry	Chemistry in day-to-day Life	U21CH6OE
4.	Botany	Herbal Medicine	U21BO6OE
5.	Computer Science	MS-Office	U21CS6OE
6.	Electronics	Electronic Gadgets and Home Appliances	U21EL6OE
7.	Costume Design & Fashion	Basic Illustration	U21CF6OE
8.	Information Technology	Fundamentals of Computer and Networking	U21IT6OE
9.	Statistics	Applied Statistics	U21ST6OE
10.	English	Practical English	U21EN6OE
11.	Business Administration	Inspiring Leaders	U21BB6OE
12.	Commerce	Fundamentals of Stock Market	U21CO6OE
13.	Professional Accounting	Indian Business Environment	U21PA6OE
14.	Business Analytics	Business Ethics	U21BA6OE
15.	Computer Applications	Computer Basics	U21CA6OE

Category	Total
Part 1	16
Part 2	16
Part 3	104
Part 4	16
Part 5	4
Total Credit	156
Core Credit	104
Total Marks	4300

B.C.A. - U.G., SEMESTER – V SYLLABUS

CORE – 6: .NET

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Part – III	Core – 6	U21CA506	.NET	70	5	-	4

Contact hours per semester: 75

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
Third	V	25	75	100

Preamble

To highlight the features of ASP.NET and apply it to develop various applications. To understand the concepts of .Net framework as a whole and the technologies that constitute the framework. To make the students get experience and be ready for the large scale projects in IT industry.

Course Outcomes (COs)

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

S.No	Course Outcome	Knowledge Level (RBT)
CO1	Remember ASP.NET framework namespace contents.	K1
CO2	Understand the console and GUI applications using asp .Net.	K2
CO3	Apply the web form controls and session tools	K3
CO4	Analyze the ADO Data controls in .NET framework controls	K4
CO5	Evaluate the XML web services in .NET framework	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO Mapping (Course Articulation Matrix)

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	3	2	2	2
CO2	2	3	3	3	2	1	1
CO3	3	3	3	2	2	2	2
CO4	2	2	2	2	2	1	2
CO5	2	3	2	1	2	2	2
Total Contribution of COs to Pos	12	12	11	11	10	8	9
Weighted Percentage of COs Contribution to Pos	80.00	80.00	73.33	73.33	66.67	53.33	60.00

1-Low

2-Moderate

3-High

COURSE CONTENT

Unit I: NET Frame Work:

(L-14 Hours)

The .NET Frame Work: Learning the .NET Languages – Introduction to ASP.NET and IIS – Types, Objects and Name Spaces – ASP .NET Application – Building ASP.NET Website.

Unit II: Web Form Fundamentals:

(L-14+T-2 Hours)

Web Form Fundamentals: HTML Controls – Web Controls – Validation Controls – Navigation Controls – Data Controls – Login Controls – CSS – Working with CSS in Web Developer – More Programs.

Unit III: State Management:

(L-14+T-1 Hours)

State Management : Session – View – Query String – Cookies – Tracing – Logging – Error Handling – User Controls – ASP.NET Ajax – Example Programs.

Unit IV: ADO.NET:

(L-14+T-1 Hours)

ADO.NET: Over View of ADO.NET – ADO.NET Access – Data Binding – Data List – DATA Grid and Repeaters – Working with Data base – Sample Programs.

Unit V: XML:

(L-14+T-1 Hours)

XML : Using XML – XSD – XSLT – Web Services – Creating Web Services – Using Web Services – Caching – ASP.NET Security.

TEXT BOOKS:

1. Mathew Mac. Donald, “ASP.NET The complete Reference”, Tata McGraw – Hill Publishing Company Ltd., New Delhi.
2. ImaSpanjaars, ASP.NET 3.5 in C# and V.B. : “Wiley India Pvt Ltd.

REFERENCE BOOKS:

1. Upgrading Microsoft Visual Basic 6.0 to .NET - by d Robinson, Michael Bond, Robert Ian Oliver, WP Publishers.
2. ASP.NET and VB.NET Web Programming –by Matt J. Crouch, Pearson.
3. Visual Basic.NET - by ShirishChavan, Pearson
4. O'REILLY, Jesse Liberty, Dan Hurwitz and Brain Mac Donald, “Learning ASP.NET 3.5”, II Edition.

WEB REFERENCES:

1. <https://gacbe.ac.in/pdf/ematerial/18MCS41C-U4.pdf>
2. <https://notesmarket.netlify.app/assets/5th-sem/dotnet/Dot-Net-Technologies-Notes-Ms-Poonam-Verma.pdf>
3. https://icsvvu.in/eresource/MSc_MCA_BCA-ASP.NET-Lokesh%20Rathore.pdf

TUTORIAL PRACTICES:

Unit	Tutorial Activity	Pedagogy	Sessions
1	NET Frame Work : Learning the .NET Languages	PDF	1
	Introduction to ASP.NET and IIS – Types, Objects and Name Spaces – ASP .NET Application – Building ASP.NET Website	Presentation	1
2	Web Form Fundamentals : HTML Controls – Web Controls – Validation Controls	Assignment	1
3	Session – View – Query String – Cookies – Tracing – Logging – Error Handling	Quiz	1
		Video Lecture	
4	Using XML – XSD – XSLT – Web Services – Creating Web Services – Using Web Services	Assignment	1

CORE - 7: STATISTICAL COMPUTING USING R PROGRAMMING

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
PART-III	Core - 7	U21CA507	Statistical Computing Using R Programming	65	10	-	3

Contact hours per semester: 75

Contact hours per week: 5

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
Third	V	25	75	100

Preamble

The objective of the course is Students will understand the Understand basics of R Programming, Learn Data frames and manipulation in R, Can work on Control structure.

Course Outcomes (COs)

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

S.No.	Course Outcome	Knowledge Level (RBT)
CO1	To understand and able to use basic programming concepts	K1
CO2	Apply critical programming language concepts such as data types, iteration, control structures, functions, and Boolean operators by writing R programs and through examples	K2
CO3	To automate data analysis, working collaboratively and openly on code	K3
CO4	To know how to generate dynamic documents	K4
CO5	Able to create a continuous test driven development approach	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO Mapping (Course Articulation Matrix)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	3	3	3	3	1
CO2	3	2	2	2	2	2	2
CO3	3	3	1	2	1	2	2
CO4	2	2	3	3	3	2	3
CO5	2	2	2	3	3	2	2
Total Contribution of COs to POs	13	12	11	13	12	11	10
Weighted Percentage of COs Contribution to POs	86.67	80.00	73.33	86.67	80.00	73.33	66.67

1-Low

2-Moderate

3-High

COURSE CONTENT

UNIT- I INTRODUCTION

(L - 13 +T-2 Hours)

Introduction to R-Features of R-Installation of R-Getting started: Window Sections of Studio-First Interaction-Command line versus Scripts-Comments-Help in R-Directory. Variables in R: Naming variables-Assigning values to variables-Finding Variables-Removing Variables.

Input of data: Input of Data from Terminal-Input of Data through R-Objects. **Output in R:** Print () function-Cat () function. **In-Built Functions in R:** Mathematical functions-Trigonometric Functions-Logarithmic function-Date and time functions-Sequence Function-Repeat Function-String Functions.

UNIT- II DATA TYPES OF R

(L - 13 +T-2 Hours)

Vectors: Class Of vector-Elements of vector-Accessing vector elements-functions for vectors. **Matrices:** Creating Matrix-Accessing Matrix Elements-Functions for Matrices.

Arrays: Creating an Array-Accessing Elements of array-Functions for Array.

UNIT-III LISTS

(L - 13 +T-2 Hours)

Lists: Creating List-Accessing List Elements-Functions for List.

Factors: Creating Factor-Accessing Factors-Functions for Factors.

Data Frame: Creating a data frame-Accessing data from Data Frame-Functions for Data Frame.

UNIT-IV Import and Export of Data, Visualization Techniques

(L - 13 + T- 2 Hours)

Import and Export of Data in Text File: Reading from Text Data Format-Writing to Text Data Format

Import and Export of Data in Excel: Reading from Excel Format-Writing to Excel Format.

Basic Visualization: Pie Chart-Ba Chart-Histograms-Line Chart-Kernel Density Plots.

UNIT-V Statistical Analysis

(L – 13 +T-2 Hours)

Basic Statistics: Descriptive Statistics-Measures of Central Tendency-Measures of Variability-Quantile-Rank-Skewness and Kurtosis.

Tables in R: Creating a table-Marginal Distributions-Calculations of Proportions

Correlation and Covariance: Coefficient of Correlation-Coefficient of Covariance-Correlation and Covariance at Successive Lags-Chi-Square Test for Correlation.

TEXT BOOKS:

1. Data Analytics with R,”Dr.Bharti Motwani”,2021
2. Roger D. Peng,” R Programming for Data Science “, 2012
3. Norman Matloff,”The Art of R Programming- A Tour of Statistical Software Design”, 2011

REFERENCE BOOKS:

1. Garrett Golemund, Hadley Wickham,”Hands-On Programming with R: Write Your Own Functions and Simulations” , 1st Edition, 2014
2. Venables ,W.N.,andRipley,”S programming“, Springer, 2000.

WEB REFERENCES:

1. https://swayam.gov.in/nd1_noc19_ma33/preview
2. <https://data-flair.training/blogs/object-oriented-programming-in-r/>
3. <http://www.r-tutor.com/elementary-statistics>
4. <https://www.tutorialspoint.com/r/>

TUTORIAL PRACTICES:

Unit	Tutorial Activity	Pedagogy	Sessions
1	Comments-Help in R-Directory	PDF	1
	In-Built Functions in R	Presentation	1
2	Functions for vectors.	Assignment	1
	Accessing Matrix Elements	Presentation	1
3	List Elements	Quiz	1
	Functions for Data Frame.	Video Lecture	1
4	Import and Export of Data in Excel	YouTube videos	1
	Basic Visualization	Presentation	1
5	Measures of Central Tendency	Presentation	1
	Coefficient of Correlation-Coefficient of Covariance	Assignment	1

CORE –8: SOFTWARE ENGINEERING

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Part - III	Core – 8	U21CA508	Software Engineering	75	15	-	4

Contact hours per semester: 90

Contact hours per week: 6

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
Third	V	25	75	100

Preamble

The program will prepare our students to be successful professionals in the field with solid fundamental knowledge of software engineering. Be successful professionals in the field with solid fundamental knowledge of software engineering.

Course Outcomes (COs)

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

S.No.	Course Outcome	Knowledge Level (RBT)
CO1	Understand software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment	K1
CO2	Apply to work in one or more significant application domains	K2
CO3	Analyze as an individual and as part of a multidisciplinary team to develop and deliver quality software	K3
CO4	Evaluate current theories, models, and techniques that provide a basis for the software lifecycle	K4
CO5	Create an ability to use the techniques and tools necessary for engineering practice	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO Mapping (Course Articulation Matrix)

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	1	1	2	2	3
CO2	2	3	3	3	1	2	2
CO3	3	3	3	2	3	1	2
CO4	2	2	2	2	2	3	3
CO5	2	3	2	2	2	2	1
Total Contribution of Cos to Pos	11	12	11	10	10	10	11
Weighted Percentage of COs Contribution to Pos	73.33	80.00	73.33	66.67	66.67	66.67	73.33

1-Low

2-Moderate

3-High

COURSE CONTENT

UNIT I: INTRODUCTION

(L – 15 + T-3 HOURS)

Evolution: From an Art form on Engineering Discipline: Evolution of an Art into an Engineering Discipline. – Software Development of Projects: Program versus Product – Emergence of Software Engineering: Early Computer Programming – High Level Language Programming – Control Flow-based Design – Data Structure Oriented Design – Object Oriented Design.

Software Life Cycle Models: - A few Basic Concepts – Waterfall Model and its Extension: Classical Waterfall Model – Iterative Waterfall Model – Prototyping Model – Evolutionary Model. – Rapid Application Development (RAD): Working of RAD. –Spiral Model.

UNIT II: SOFTWARE PROJECT MANAGEMENT (L-15 + T-3 HOURS)

Responsibilities of a Software Project Manager – Project Planning- Project Estimation Techniques-Risk Management. Requirements Analysis and Specification: - Requirements Gathering and Analysis.

Software Requirements Specifications (SRS): Users of SRS Document – Characteristics of a Good SRS Document – Important Categories of Customer Requirements – Functional Requirements – How to Identify the Functional Requirements? – Organization of the SRS Document.

UNIT III: SOFTWARE DESIGN (L-15 + T-3 HOURS)

Overview of the Design Process: Outcome of the Design Process – Classification of Design Activities. – How to characterize a good Software Design? Function-Oriented Software Design:

Overview of SA/SD Methodology – Structured Analysis – Developing the DFD Model of a System: Context Diagram – Structured Design – Detailed Design.

UNIT IV: USER INTERFACE DESIGN (L-15+T-3 HOURS)

Characteristics of a good User Interface - Basic Concepts – Types of User Interfaces – Fundamentals of Components based GUI Development: Window System. Coding and Testing: - Coding – Software Documentation.

Testing: Basic Concepts and Terminologies – Testing Activities. – Unit Testing – Black-box Testing: Equivalence Class Partitioning – Boundary Value Analysis. – White-box Testing.

UNIT V: SOFTWARE RELIABILITY AND QUALITY MANAGEMENT (L-15+T-3 HOURS)

Software Reliability: Hardware versus Software Reliability. – Software Quality – Software Quality Management System – ISO 9000: What is ISO 9000 Certification? – ISO 9000 for Software Industry – Shortcomings of ISO 9000 Certification.

Software Maintenance: - Characteristics of Software Maintenance: Characteristics of Software Evolution – Software Reverse Engineering.

TEXT BOOKS:

1. Fundamentals of Software Engineering Fourth Edition by Rajib Mall – PHI Learning Private Limited 2015.
2. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition 2005.

REFERENCE BOOKS:

1. Software Engineering (WBUT), 2nd Edition, Rohit Khurana (Author), 2016.
2. Software Engineering 9th Edition by Ian Sommerville - Pearson Education Asia. 2005.

WEB REFERENCES:

1. <https://engineering.futureuniversity.com/BOOKS%20FOR%20IT/Software-Engineering-9th-Edition-by-Ian-Sommerville.pdf>
2. <http://biet.ac.in/pdfs/R13M.TechSoftwareEngg..pdf>.

TUTORIAL PRACTICES:

Unit	Tutorial Activity	Pedagogy	Sessions
1	Software Development of Projects	PDF	1
	A few Basic Concepts	Presentation	1
	Data Structure Oriented Design – Object Oriented Design	Exercises	1
2	Project Planning	Assignment	1
	Users of SRS Document	Presentation	1
	Users of SRS Document	Quiz	1
3	Classification of Design Activities	Video Lecture	1
	Function-Oriented Software Design	Quiz	1
	Developing the DFD Model of a System	https://engineering.futureuniversity.com	1
4	Types of User Interfaces	YouTube videos	1
	Coding and Testing	Presentation	1
	Software Documentation	PDF	1
5	Software Quality	Presentation	1
	ISO 9000 for Software Industry	Assignment	1
	Software Reverse Engineering	Quiz	1

CORE LAB 5-.NET –Lab

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Part – III	Core Lab –5	U21CA5P5	.NET-Lab	-	-	90	4

Contact hours per semester: 90

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
Third	V	40	60	100

Preamble

This course introduces the concepts of C programming. It provides technical skill, basic concepts like control statements, pointers, structures and file handling techniques.

Course Outcomes (COs)

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

S.No	Course Outcome	Knowledge Level (RBT)
CO1	Remember web application with variety of controls	K1
CO2	Understand the Microsoft .NET Framework and ASP.NET page structure	K2
CO3	Access the data using inbuilt data access tools	K3
CO4	Analysis Web Application in web services	K4
CO5	Evaluate secured web application	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO Mapping (Course Articulation Matrix)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	1	1	1
CO2	3	2	3	3	1	1	2
CO3	2	2	2	3	2	2	1
CO4	2	2	3	2	2	2	2
CO5	3	1	2	3	3	2	2
Total Contribution of COs to POs	13	9	12	13	9	8	8
Weighted Percentage of COs Contribution to POs	86.67	60.00	80.00	86.67	60.00	53.33	53.33

1-Low

2-Moderate

3-High

LIST OF PROGRAMMING IN .NETLAB EXPERIMENTS

1. Write C# program for understanding C# basics involving
 - a. variables and data types
 - b. conditional logic
 - c. loops
 - d. Method calling
2. Write c# program for object oriented of c# such as
 - a. program using classes
 - b. object based Manipulation
 - c. Namespace and assemblies
3. Write a Program to generate the Login control
4. Write a program using Web control Events and using AutoPostBack
5. Write a program to create an Interactive Web Pages.
6. Write a program using Exception Handling
7. Design ASP. NET Pages for State Management using
 - a. cookies
 - b. Session State
 - c. Application State
- 8 .Write a program using Rich Control and AdRotator Control
9. Write a program to display the selected date in the calendar.
10. Write a program to perform validation operation
11. Design the Master Page and apply the various styles and themes
12. Write a program to create link in data list.
13. Write a program to display how data bind using dropdown list
14. Write a program to implement paging concept data grid and dataset
15. Create Student Mark List SQL Provider.

TEXT BOOKS:

1. Mathew Mac. Donald, “ASP.NET The complete Reference”, Tata McGraw – Hill Publishing Company Ltd., New Delhi.
2. ImaSpanjaars, ASP.NET 3.5 in C# and V.B. : “Wiley India Pvt Ltd.

REFERENCE BOOKS:

1. Upgrading Microsoft Visual Basic 6.0 to .NET - by d Robinson, Michael Bond, Robert Ian Oliver, WP Publishers.
2. ASP.NET and VB.NET Web Programming –by Matt J. Crouch, Pearson.
3. Visual Basic.NET - by ShirishChavan, Pearson
4. O'REILLY, Jesse Liberty, Dan Hurwitz and Brain Mac Donald, “Learning ASP.NET 3.5”, II Edition.

WEB REFERENCES:

1. <https://gacbe.ac.in/pdf/ematerial/18MCS41C-U4.pdf>
2. <https://notesmarket.netlify.app/assets/5th-sem/dotnet/Dot-Net-Technologies-Notes-Ms-Poonam-Verma.pdf>
3. https://icsvvu.in/eresource/MSc_MCA_BCA-ASP.NET-Lokesh%20Rathore.pdf

CORE LAB – 6: STATISTICAL COMPUTING USING R PROGRAMMING-LAB

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
PART-III	CoreLab:6	U21CA5P6	Statistical Computing Using R Programming-Lab	-	-	90	3

Contact hours per semester: 90

Contact hours per week: 6

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
Third	V	40	60	100

Preamble

The objective of the course is Students will understand the Understand basics of R Programming, Learn Data frames and manipulation in R, Can work on Control structure.

Course Outcomes (COs)

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

S.No.	Course Outcome	Knowledge Level (RBT)
CO1	Understand basics of R Programming	K1
CO2	Learn Data frames and manipulation in R	K2
CO3	Can work on Control structure	K3
CO4	Working knowledge of Data visualization	K4
CO5	Simulate Data Transpose operations	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO Mapping (Course Articulation Matrix)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	3	3	3	3	3
CO2	2	2	2	1	2	2	2
CO3	3	3	2	2	2	3	3
CO4	3	2	3	3	2	1	1
CO5	3	3	2	3	2	3	1
Total Contribution of COs to POs	14	13	12	12	11	12	10
Weighted Percentage of COs Contribution to POs	93.33	86.67	80.00	80.00	73.33	80.00	66.67

1-Low**2-Moderate****3-High****LIST OF EXPERIMENTS**

1. Study of basic Syntaxes in R
2. Implementation of vector data objects operations
3. Implementation of matrix, array and factors and perform va in R
4. Implementation and use of data frames in R
5. Create Sample (Dummy) Data in R and perform data manipulation with R
6. Study and implementation of various control structures in R
7. Data Manipulation with dplyr package
8. Data Manipulation with data.table package
9. Study and implementation of Data Visualization with ggplot2
10. Study and implementation data transpose operations in R

TEXT BOOKS:

1. Roger D. Peng,” R Programming for Data Science “, 2012
2. Norman Matloff,”The Art of R Programming- A Tour of Statistical Software Design”, 2011

REFERENCE BOOKS:

1. Garrett Golemund, Hadley Wickham,”Hands-On Programming with R: Write Your Own Functions and Simulations” , 1st Edition, 2014
2. Venables ,W.N.,andRipley,”S programming“, Springer, 2000.

WEB REFERENCES:

1. https://swayam.gov.in/nd1_noc19_ma33/preview
2. <https://data-flair.training/blogs/object-oriented-programming-in-r/>
3. <http://www.r-tutor.com/elementary-statistics>
4. <https://www.tutorialspoint.com/r/>

INSTITUTIONAL TRAINING / MINOR PROJECT

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Part – III	Institutional Training / Minor Project	U21CA5IT	Institutional Training / Minor Project	-	-	-	3

SEC 1 - WOMEN STUDIES

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Part – IV	Skill Enhancement –I	U21SE5S1	WOMEN STUDIES	30	-	-	2

Contact hours per Semester: 30

Contact hours per week: 2

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	-	50	50

Preamble

This is an introductory course that emphasizes the roles of women, their experiences and contributions to society and enables students to analyse contemporary issues from feminist perspective.

Course Outcomes (Cos)

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

S. No.	Course Outcome	Knowledge Level
CO1	find methods to promote inclusion of women in development of all sectors	K1
CO2	demonstrate how gender has been socially constructed and maintained through a variety of institutions	K2
CO3	apply concepts and theories of Women's Studies to life experiences and processes	K3
CO4	analyse socio-political systems and contemporary issues from feminist perspective	K4
CO5	evaluate the extent to which women can contribute to preservation of environment and natural resources	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO Mapping (Course Articulation Matrix)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	1	1	2	2	2
CO2	2	3	3	3	2	2	2
CO3	3	3	3	2	2	2	2
CO4	2	2	2	2	3	1	1
CO5	2	3	2	1	1	1	1
Total Contribution of COs to POs	11	12	11	9	10	8	8
Weighted Percentage of COs Contribution to POs	73.33	80.00	73.33	60.00	66.67	53.33	53.33

1-Low

2-Moderate

3-High

COURSE CONTENT

Unit I: INTRODUCTION TO WOMEN'S STUDIES

(L-6 Hours)

Definition, need, scope, importance and challenges of Women's Studies- Emergence of Women's studies as an academic discipline in India – -Need for gender sensitisation - Women as individuals in families and societies- Matriarchy and matrilineal societies. Women's movements - global and local.

Unit II: ROLE OF WOMEN IN FAMILY:

(L-6 Hours)

Study of the evolution of women's role – Women as individuals in families-Gender roles in domestic/personal sphere- Women's roles, aspirations and familial expectations on women - Foeticide, Female infanticide, Sex selective abortion, Domestic violence, Gender issues, Gender violence, Maternal mortality rate, Property rights, Reproductive rights – Women's health and nutrition

Unit III: ROLE OF WOMEN IN SOCIETY:

(L-6 Hours)

Gender roles in social spheres- Choice of profession - Self , Family and Societal pressures, Decision making/ Leadership roles- myths and misconceptions- roles expected from women – stereotyping – Representation in media / politics / arts and literature / sports

Unit IV: AGAINST ALL ODDS- WOMEN ACHIEVERS:

(L-6 Hours)

Socio-cultural, socio-political and economic factors that deter women's talent- Life narratives of women achievers- SavitriBhaiPhule, Dr.Muthu Lakshmi Reddy, KiranMazumdar Shah, KalpanaChawla, SainaNehwal, SaniaMirza, DeepikaPalikkal, Mary Kom, P T Usha, SmritiMandanna, Arundhati Roy, Vandana Siva, Kamala Das, Indira Goswami, Amrita Pretham, Anita Desai, JhumpaLahiri, Kiran Desai, ShashiDeshpande.

Unit V: ROLE OF WOMEN IN NATIONAL DEVELOPMENT: (L-6 Hours)

Role of women in rural and community development- community bio-diversity conservation –gender and Agro biodiversity-role of women in seed preservation- sustainable development- Joint forest management,- Chipko movement, Narmada BachaoAndolan— India's - Neem patent victory-Living Democracy Movement for reclaiming life's diversity and freedom

TEXT BOOKS:

1. **Maithreyi Krishna Raj.** (1986). "Women Studies in India: Some Perspectives".Popular Prakasham, Bombay.
2. **SharmilaRege, (Ed.).** (2003). "Sociology of Gender: The Challenge of Feminist Sociological Knowledge".Sage Publications, NewDelhi.
3. **VeenaMajumdar.** (1974). "Report on the committee on the Status of Women: Towards Equality".Journal of WomenStudies.
4. **Kadambari,V.** 2009. Gender Studies: A Primer. Chennai: RJYND
5. **Devaki Jain and Pam Rajput (Ed).**(2003). "Narratives from the Women's Studies Family: Recreating Knowledge, Sage, and New Delhi.
6. **M.S.Swaminathan.** (1998). "Gender Dimensions in Biodiversity Management". Konark publishers pvt ltd, New Delhi.

REFERENCE BOOKS:

1. **Amy S. Wharton.** (2005). "The Sociology of Gender: An Introduction to Theory and Research". (Key Themes in Sociology) Blackwell Publishing, UK, Indian Reprint, Kilaso Books, New Delhi
2. **Jasbir Jain (Ed).** (2005). "Women in Patriarchy: Cross Cultural". Rawat Publications, Jaipur.
3. **Lerner, Gerda.** (1986). "The Creation of Patriarchy". Oxford University Press, New Delhi.
4. **Mala Khullar, (Ed).** (2005). "Writing the Women's Movement: A Reader". Zubaan, Kali for Women, New Delhi.
5. **Mies, Maria.** (1980). "Indian Women and Patriarchy". Concept Publishing Company, New Delhi.
6. **Promilla Kapur (Ed),** Empowering Indian Women, Publication Division, Government of India, New Delhi, 20
7. **Mitchell, J.** 1975. Women in a Man Made World. Chicago: Rand McNally & Co
8. **Putnam Tong, Rosemarie.** 2013. Feminist Thought: A More Comprehensive Introduction. USA: Westview.
9. **Russell, Bertrand.** 1936. Marriage and Morals. London: Bantam.
10. **Smith, Bonnie.** 2013. Women's Studies: The Basics. London: Routledge
11. **Drinkwater, Barbara, Ed.** 2000. Women in Sport. Oxford: Blackwell Science
12. **Spence, Jean and Sarah Jane et al.** 2010. Women Education and Agency 1600-2000. New York: Routledge Publishing House.
13. **Nancy.** 2011. Feminism and Science. Indianapolis: Indiana University Press.
14. **Tharu, Susie and K. Lalitha (ed).** 1991 & 1993. Women Writing in India, 2 Vols. New Delhi: Oxford University Press.
15. **P.K. Rao.** (2000) "Sustainable Development – Economics and Policy". Blackwell, New Delhi.
16. **Radha Kumar,** (1993). "The History of Doing". Kali for Women, New Delhi.
17. **Ronnie Vernooy, (Ed).** (2006). "Social and gender Analysis Natural Resource Management: Learning studies and lessons from Asia". Sage, New Delhi.
18. **Swarup, Hemlata and Rajput, Pam.** (2000). Gender Dimensions of Environmental and Development Debate: The Indian Experience". In Sturat S. Nagel, (ed). "India's Development and Public Policy". Ashgate, Burlington.
19. **Venkateshwara, Sandhay.** (1995). "Environment, Development and the Gender Gap" Sage Publications, New Delhi.

WEB REFERENCES

1. https://r.search.yahoo.com/_ylt=AwrhxWjc7_9geRUALADnHgx.;_ylu=Y29sbwMEcG9zAzUEdnRpZAMEc2VjA3Ny/RV=2/RE=1627414620/RO=10/RU=https%3a%2f%2fin.sagepub.com%2fen-in%2fsas%2findian-journal-of-gender-studies%2fjournal200917/RK=2/RS=wGNZp8L5sqXOSojTzCefS4hzShA-
2. https://r.search.yahoo.com/_ylt=Awr5kom8f9gJDAAXC_nHgx.;_ylu=Y29sbwMEcG9zAzEEdnRpZAMEc2VjA3Ny/RV=2/RE=1627414951/RO=10/RU=https%3a%2f%2fwgs.fas.harvard.edu%2fpast-thesis-topics/RK=2/RS=cjxRQNT0UmGS1Fia5z9Er8a8P.I-

B.C.A. - U.G., SEMESTER – VI SYLLABUS

CORE –9: PHP with My SQL

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Part - III	CORE – 9	U21CA609	PHP with My SQL	65	10	-	4

Contact hours per semester: 75

Contact hours per week: 5

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
Third	VI	25	75	100

Preamble

PHP is a widely used programming language which works on the principal of server side scripting to produce dynamic Web pages. To introduce how PHP can be combined with MySQL to integrate database functions into Websites.

Course Outcomes (COs)

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

S.No.	Course Outcome	Knowledge Level (RBT)
CO1	Remember basic concepts, syntax and uses of web programming languages.	K1
CO2	Understand basic of PHP as scripting Language and implement Arrays & Functions in PHP.	K2
CO3	Apply the framework supported by PHP and implement forms using PHP.	K3
CO4	Analysis the uses of cookies and files in PHP.	K4
CO5	evaluate a web application using PHP and MySQL as database	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO Mapping (Course Articulation Matrix)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	2	1	2	2	2
CO2	2	3	3	3	2	2	1
CO3	3	2	3	2	2	1	2
CO4	2	2	2	2	1	2	1
CO5	3	3	2	1	1	1	2
Total Contribution of COs to POs	12	11	12	9	8	8	8
Weighted Percentage of COs Contribution to POs	80.00	73.33	80.00	60.00	53.33	53.33	53.33

1-Low
2-Moderate
3-High

COURSE CONTENT

UNIT – I: INTRODUCTION

(L-13+T-2 Hours)

Introducing PHP and MySQL: Server-Side Applications - The PHP Story - The MySQL Story - PHP and MySQL: The Well-Matched Couple. **Setting up a PHP-MySQL Development Environment:** Obtaining the Software - Installing and Configuring the Software.

The Building Blocks of PHP: The Basics of PHP Scripts - Variables - Data Types - Operators and Expressions – Constants. **Flow Control Functions in PHP:** Switching Flow – Loops - Code Blocks and Browser Output.

UNIT – II: FUNCTIONS AND ARRAYS

(L-13+T-2 Hours)

Working with Functions: What Is a Function? - Calling Functions - Defining a Function - Returning Values from User-Defined Functions - Variable Scope - Saving State between Function Calls with the static Statement - More about Arguments - Testing for the Existence of a Function.

Working with Arrays: What Are Arrays? - Creating Arrays - Some Array-Related Constructs and Functions.

UNIT – III: FORMATTING THE OUTPUT

(L-13+T-2 Hours)

Working with Strings, Dates, and Time: Formatting Strings with PHP - Investigating Strings in PHP - Manipulating Strings with PHP - Using Date and Time Functions in PHP - Other String, Date, and Time Functions.

Working with Forms: Creating a Simple Input Form - Accessing Form Input with User-Defined Arrays - Combining HTML and PHP Code on a Single Page - Using Hidden Fields to Save - Redirecting the User - Sending Mail on Form Submission - Creating the Form - Creating the Script to Send the Mail - Working with File Uploads.

UNIT – IV: COOKIES AND FILES

(L-13+T-2 Hours)

Working with Cookies and User Sessions: Introducing Cookies - Setting a Cookie with PHP - Deleting a Cookie with PHP - Session Function Overview - Starting a Session - Working with Session Variables - Destroying Sessions and Unsettling Variables - Using Sessions in an Environment with Registered Users

Working with Files: Including Files - Using include once - Validating Files - Creating and Deleting Files - Opening a File for Writing, Reading, or Appending - Reading from Files - Writing or Appending to a File.

UNIT – V: BASIC SQL COMMANDS

(L-13+T-2 Hours)

Learning the MySQL: Data Types - Learning the Table-Creation Syntax - Using the INSERT Command - Using the SELECT Command - Using WHERE in Your Queries - Selecting from Multiple Tables - Using the UPDATE Command to Modify Records - Using the REPLACE Command - Using the DELETE Command - Frequently Used String Functions in MySQL - Using Date and Time Functions in MySQL. **Interacting with MySQL Using PHP:** MySQL or MySQLi Functions? - Connecting to MySQL with PHP - Working with MySQL Data.

TEXT BOOKS:

1. How to do everything with PHP & MySQL ,Vikram Viswani,2005,by The McGraw-Hill Companies.
2. Sams Teach Yourself PHP, MySQL® and Apache All in One, Julie C. Meloni, 2012,Fifth Edition.

REFERENCE BOOKS:

1. "Learning PHP, MySQL", books by 'O' Riley Press.
2. "Beginning PHP and MySQL From Novice to Professional" by W Jason Gilmore.
3. "Build Your Own Database Driven Web Site Using PHP & MySQL" by Kevin Yank.
4. "PHP Programming For Beginners: The Simple Guide to Learning PHP Fast!" by Tim Warren.

WEB REFERENCES:

1. [PHP Tutorial \(w3schools.com\)](http://w3schools.com)
2. [Learn PHP with the Top 25 PHP Tutorials: Resources, Websites, Courses \(stackify.com\)](http://stackify.com)
3. [PHP: PHP Manual - Manual](#)
4. [Learn PHP | Codecademy](#)
5. <https://www.mysql.com/>
6. [MySQL for Beginners | Free Online Course | Alison](#)

TUTORIAL PRACTICES

Unit	Tutorial Activity	Pedagogy	Sessions
1	PHP and MySQL: The Well-Matched Couple	Classroom Discussion	1
	Flow Control Functions in PHP	Assignment	1
2	Working with Arrays	YouTube Tutorials	1
	Working with Functions	Power point presentation	1
	Working with Strings, Dates, and Time	Classroom Discussion	1
	Working with Forms	Website Designing	1
4	Working with Files	Handouts Tutorials	1
	Working with Cookies and User Sessions	<i>YouTube Tutorials</i>	1
5	Learning the MySQL	Assignment	1
	Interacting with MySQL Using PHP	QUIZ	1

CORE –10: OPERATING SYSTEM (LINUX/UNIX)

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Part - III	Core – 10	U21CA610	Operating System (Linux/Unix)	70	5	-	4

Contact hours per semester: 75

Contact hours per week: 5

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
Third	VI	25	75	100

Preamble

General understanding of structure of modern computers to purpose, structure and functions of operating systems , illustration of key OS aspects by example, to provide efficient and fair sharing of resources among users and programs.

Course Outcomes (COs)

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

S.No.	Course Outcome	Knowledge Level (RBT)
CO1	Remember the concept to make the computer system convenient to use in an efficient manner. To hide the details of the hardware resources from the users.	K1
CO2	Understand to provide users a convenient interface to use the computer system.	K2
CO3	Apply the general architecture of computers to describe, contrast and compare differing structures for operating systems	K3
CO4	Analyse the high-level structure of the Linux kernel both in concept and source code to acquire a detailed understanding of one aspect (the scheduler) of the Linux kernel	K4
CO5	Evaluate the processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO Mapping (Course Articulation Matrix)

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	1	1	2	2	2
CO2	2	3	3	3	2	2	2
CO3	3	3	3	2	1	2	2
CO4	2	2	2	2	2	1	1
CO5	2	3	2	1	2	1	1
Total Contribution of COs to POs	11	12	11	9	9	8	8
Weighted Percentage of COs Contribution to POs	73.33	80.00	73.33	60.00	60.00	53.33	53.33

1-Low

2-Moderate

3-High

COURSE CONTENT

UNIT – I: INTRODUCTION

(L-14+T-1Hours)

Introduction and Operating-Systems Structures: Definition of Operating system, Operating System's role, Operating-System Operations, Functions of Operating System, Computing Environments Operating-System Structures: Operating-System Services, User and Operating-System Interface, System Calls, Types of System Calls, Operating-System Structure.

UNIT-II: PROCESS MANAGEMENT AND SCHEDULING ALGORITHMS (L-14+ T-1 Hours)

Processes: Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication- CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms (FCFS, SJF, SRTF, Priority, RR, Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling).

UNIT-III: DEADLOCKS AND RECOVERY MANAGEMENT (L-14+T-1Hours)

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock. Threads: Overview, Multicore Programming, Multithreading Model.

UNIT-IV: MEMORY MANAGEMENT

(L-14+T-1Hours)

Main Memory: Background, Logical address space, Physical address space, MMU, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table Virtual Memory: Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing.

UNIT-V: LINUX OS AND PROGRAMMING

(L-14+T-1Hours)

Shell introduction and Shell Scripting - What is shell and various type of shell, Various editors present in linux- Different modes of operation in vi editor - What is shell script, Writing and executing the shell script - Shell variable (user defined and system variables) - System calls, Using system calls - Pipes and Filters - Decision making in Shell Scripts (If else, switch), Loops in shell - Functions - Utility programs (cut, paste, join, tr , uniq utilities) - Pattern matching utility (grep).

TEXT BOOKS:

1. Operating System Concepts – Abraham Silberscartz, Peter Baer Galvin, and Greg Gange. Addison Wesley Publishing Company – Ninth Edition.
2. Beginning Linux Programming by Neil Matthew (Author), Richard Stones (Author) 4th Edition

REFERENCE BOOKS:

1. Operating system and concepts 8th Edition, Abraham Silberscartz, Peter Baer Galvin, and Greg Gange. Addison Wesley Publishing Company.
2. Operating System: Internal and Design Principles – Fifth Edition, William Stalling ,PHI Learning Private Limited.
3. Understanding Operating Systes: Ida M.Flynn ,AnnMcIverMcHoes.
4. Design of Unix Operting System by Maurice J. Bach.

WEB REFERENCES:

1. <https://annamalaiuniversity.ac.in/studport/download/sci/cis/resources/MCA-FIRST%20YEAR-19MCAC204-Operating%20System.pdf>
2. <https://swcarpentry.github.io/shell-novice/06-script/index.html>
3. <https://old.amu.ac.in/emp/studym/100020216.pdf>
4. greekforgeeks.org/introduction-linux-shell-shell-scripting/

TUTORIAL PRACTICES:

Unit	Tutorial Activity	Pedagogy	Sessions
1	Operating System and its Role	PDF	1
2	CPU Scheduling	Assignment	1
3	Deadlocks	Video lecture	1
4	Segmentation	Hand-outs	1
5	Shell Scripting	Presentation	1

CORE –11: IoT APPLICATIONS

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Part - III	Core –11	U21CA611	IoT Applications	65	10	-	4

Contact hours per semester: 75

Contact hours per week: 5

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
Third	VI	25	75	100

Preamble

- To apprise students with basic knowledge of IoT that paves a platform to understand physical and logical design of IOT.
- To teach a student how to analyse requirements of various communication models and protocols for cost-effective design of IoT applications on different IoT platforms.
- To introduce the technologies behind Internet of Things (IoT).
- To explain the students how to code for an IoT application using Arduino/Raspberry Pi open platform.

Course Outcomes (COs)

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

S.No.	Course Outcome	Knowledge Level (RBT)
CO1	Remember the concept of IoT.	K1
CO2	Understand the communication models and various protocols for IoT.	K2
CO3	Apply portable IoT using Arduino/Raspberry Pi /open platform.	K3
CO4	Analyse data analytics and use cloud offerings related to IoT.	K4
CO5	Evaluate applications of IoT in real time scenario.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO Mapping (Course Articulation Matrix)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	2	1	2	2	3
CO2	2	3	3	2	2	2	2
CO3	2	3	2	2	1	2	2
CO4	3	2	2	2	2	1	1
CO5	2	2	2	1	1	1	1
Total Contribution of COs to POs	11	12	11	8	8	8	9
Weighted Percentage of COs Contribution to POs	73.33	80.00	73.33	53.33	53.33	53.33	60.00

1-Low

2-Moderate

3-High

COURSE CONTENT

UNIT I: INTRODUCTION TO INTERNET THINGS

(L-13+T-2 Hours)

Evolution of Internet of Things – Enabling Technologies – IoT Architectures: oneM2M, IoT World Forum (IoTWF) and Alternative IoT Models – Simplified IoT Architecture and Core IoT Functional Stack – Fog, Edge and Cloud in IoT.

UNIT II: COMPONENTS IN INTERNET OF THINGS

(L-13+T-2 Hours)

Functional Blocks of an IoT Ecosystem – Sensors, Actuators, and Smart Objects – Control Units - Communication modules (Bluetooth, Zigbee, Wifi, GPS, GSM Modules)

UNIT III: PROTOCOLS AND TECHNOLOGIES BEHIND IOT

(L-13+T-2 Hours)

IOT Protocols - IPv6, 6LoWPAN, MQTT, CoAP - RFID, Wireless Sensor Networks, BigData Analytics, Cloud Computing, Embedded Systems.

UNIT IV: OPEN PLATFORMS AND PROGRAMMING**(L-13+T-2 Hours)**

IOT deployment for Raspberry Pi /Arduino platform-Architecture –Programming – Interfacing – Accessing GPIO Pins – Sending and Receiving Signals Using GPIO Pins – Connecting to the Cloud.

UNIT V: IOT APPLICATIONS**(L-13+T-2 Hours)**

Business models for the internet of things, Smart city, Smart mobility and transport, Industrial IoT, Smart health, Environment monitoring and surveillance – Home Automation – Smart Agriculture

TEXT BOOKS:

1. Robert Barton, Patrick Grossetete, David Hanes, Jerome Henry, Gonzalo Salgueiro, “IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things”, CISCO Press, 2017
2. Samuel Greengard, The Internet of Things, The MIT Press, 2015

REFERENCE BOOKS:

1. Perry Lea, “Internet of things for architects”, Packt, 2018
2. Olivier Hersent, David Boswarthick, Omar Elloumi , “The Internet of Things – Key applications and Protocols”, Wiley, 2012.

WEB REFERENCES:

1. [The Internet of Things: Definitions, Key Concepts, and Reference Architectures | Springer Link](#)
2. [A Reference Architecture for the Internet of Things \(wso2.com\)](#)
3. [IoT Reference Platform - Embedded Access \(embedded-access.com\)](#)

TUTORIAL PRACTICES

Unit	Tutorial Activity	Pedagogy	Sessions
1	IoT Architectures	Hand-Outs	1
	Fog, Edge and Cloud in IoT	Presentation	1
2	IoT Ecosystem	Assignment	1
	Control Units	YouTube Videos	1
3	IOT Protocols	QUIZ	1
	Embedded Systems	YouTube Videos	1
4	IOT deployment	Presentation	1
	Sending and Receiving Signals Using GPIO Pins	Assignment	1
5	Business models	YouTube Videos	1
	Home Automation	Presentation	1

CORE LAB –7: PHP with My SQL-LAB

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Part - III	Core Lab -7	U21CA6P7	PHP with My SQL Lab	-	-	60	3

Contact hours per semester: 60

Contact hours per week: 4

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
Third	VI	40	60	100

Preamble

- The objectives of this course are to have a practical understanding about how to write PHP code to solve problems.
- Display and insert data using PHP and MySQL.
- Test, debug, and deploy web pages containing PHP and MySQL.
- It also aims to introduce practical session to develop simple applications using PHP and MySQL.

Course Outcomes (COs)

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

S.No.	Course Outcome	Knowledge Level (RBT)
CO1	Remember the basic programming constructs of PHP.	K1
CO2	Understand the programs using functions, strings and arrays.	K2
CO3	Apply object oriented principles in PHP.	K3
CO4	Analysis the data driven applications by using PHP.	K4
CO5	Evaluate the database Connection with MySQL.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO Mapping (Course Articulation Matrix)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	2	1	2	2	2
CO2	2	2	3	2	2	2	1
CO3	3	2	2	2	2	1	2
CO4	2	3	2	2	1	2	1
CO5	3	3	2	2	2	1	2
Total Contribution of COs to POs	12	12	11	9	9	8	8
Weighted Percentage of COs Contribution to POs	80.00	80.00	73.33	60.00	60.00	53.33	53.33

1-Low

2-Moderate

3-High

LIST OF LAB EXERCISES

1. Write a php script to print all prime numbers below 100.
2. Write a php function program to find largest among three numbers using nested if-else.
3. Write a php script that receives form input by the method post to check the number is prime or not.
4. Write a php program to find factorial of a number using form.
5. Write a user defined function in php to check whether the given number is palindrome or not.
6. Write a php script to implement the concept of inheritance.
7. Write a php program to implement the concept function overloading.
8. Write a php program to insert new item in array on any position in php.
9. Write a php program to sort multi-dimensional array set by a specific key.
10. Write a php script that receives string as a form input.
11. Write a php script to implement constructor and destructor.
12. Write a php program to upload a file.
13. Write a php script with MySQL to implement database creation.
14. Write a php script with MySQL to create table

REFERENCE BOOKS:

1. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India
2. Web Technologies, Black Book, dreamtech Press
3. HTML 5, Black Book, dreamtech Press
4. Web Design, Joel Sklar, Cengage Learning
5. Developing Web Applications in PHP and AJAX, Harwani, McGrawHill
6. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel, Pearson

WEB REFERENCES:

1. https://www.tutorialspoint.com/php/php_and_mysql.htm
2. Practical Pymol for Beginners - PyMOLWiki
3. PL/SQL Tutorial (tutorialspoint.com)

Core Lab -8: LINUX LAB

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Part – III	Core Lab -8	U21CA6P8	LINUX LAB	-	-	60	3

Contact hours per semester: 60

Contact hours per week: 4

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
Third	VI	40	60	100

Preamble

Use basic fundamental utilities which are required again and again on daily basis to work on a modern operating system. Write useful shell scripts which greatly and effectively enhance the usefulness of computers, from the point of view of programmers and application developers. Understand basics of various OS related concepts, from programmer's point of view, like files, directories, kernel, inodes, APIs, system calls, processes, signals, etc.

Course Outcomes (COs)

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

S.No.	Course Outcome	Knowledge Level (RBT)
CO1	Remember the basic commands of linux operating system and can write shell scripts.	K1
CO2	Understand to create file systems and directories and operate them create processes background and fore ground etc..by fork() system calls	K2
CO3	Apply to learn the important Linux/UNIX library functions and system calls.	K3
CO4	Analyse the inner workings of Linux-like operating systems.	K4
CO5	Evaluate and develop applications where several processes need to communicate with each other.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO Mapping (Course Articulation Matrix)

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	2	2	1	1
CO2	3	3	3	3	1	2	2
CO3	2	1	2	3	1	1	2
CO4	1	3	3	2	2	2	2
CO5	2	3	2	3	3	2	1
Total Contribution of COs to POs	11	11	12	13	9	8	8
Weighted Percentage of COs Contribution to POs	73.33	73.33	80.00	86.67	60.00	53.33	53.33

1-Low

2-Moderate

3-High

LIST OF LINUX PROGRAMMING LAB EXERCISES

- Usage of following commands: ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
- Usage of following commands: cal, cat(append), cat(concatenate), mv, cp, man, date. 3. Usage of following commands: chmod, grep, tput (clear, highlight), bc.
- Write a shell script to check if the number entered at the command line is prime or not.
- Write a shell script to accept a login name. If not a valid login name display message – “Entered login name is invalid”.
- Write a shell script to display date in the mm/dd/yy format.
- Write a shell script to display the multiplication table any number,
- Write a shell script to find the sum of digits of a given number.
- Write a shell script to perform the tasks of basic calculator.
- Write a shell script to find the power of a given number.
- Write a shell script to find the factorial of a given number.
- Write a shell script to check whether the number is Armstrong or not.
- Program to show the pyramid of special character “*”.
- Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
- Write a shell script to find the LCD (least common divisor) of two numbers.

TEXT BOOKS:

1. Beginning Linux Programming by Neil Matthew (Author), Richard Stones (Author) 4th Edition
2. Design of Unix Operating System by Maurice J. Bach.

REFERENCE BOOKS:

1. Complete Reference of Linux Programming
2. Operating System: Internal and Design Principles – Fifth Edition, William Stalling

WEB REFERENCES:

1. <http://greekforgeeks.org/introduction-linux-shell-shell-scripting/>

COMPREHENSION – III (Self Study Online Exam)

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Part - III	Comprehension – III (Self Study Online Exam)	U21CA6C3	Comprehension in Computer Applications – III	-	-	-	1

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
Third	VI	-	50	50

SKILL ENHANCEMENT – II: BA SH – OPEN SOURCE

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Part - IV	Skill Enhancement– II	U21CA6S2	BA SH – OPEN SOURCE	30	-	-	2

Contact hours per semester: 30

Contact hours per week: 2

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
Third	VI	-	50	50

Preamble

Learn effective methods to create and use Bourne Again Shell (bash) scripts and utilities. Shell scripts are often the key to becoming a productive Unix/Linux system administrator. During this course you will learn to write scripts that demonstrate your ability to write shell scripts in Unix/Linux environment

Course Outcomes (COs)

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

S.No.	Course Outcome	Knowledge Level (RBT)
CO1	Remember the Structure of Scripting.	K1
CO2	Understand the variables and operators in BASH.	K2
CO3	Apply the Looping in Script.	K3
CO4	Analyse the arrays and functions in Scripting.	K4
CO5	Evaluate the files using Scripting.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO Mapping (Course Articulation Matrix)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	1	1	2	2	2
CO2	2	3	3	3	2	2	2
CO3	3	3	3	2	1	2	2
CO4	2	2	2	2	2	1	1
CO5	2	3	2	1	2	1	1
Total Contribution of COs to POs	11	12	11	9	9	8	8
Weighted Percentage of COs Contribution to POs	73.33	80.00	73.33	60.00	60.00	53.33	53.33

1-Low

2-Moderate

3-High

COURSE CONTENT

UNIT I : INTRODUCTION TO BASH

(L-6 Hours)

What is Bash? - History of Bash - Features of Bash - Bash Scripting - Filesystem and File Permissions - Hello World! Bash Script - Relative vs. Absolute path - Bash Comments - Quotes in Bash.

UNIT II: VARIABLES & OPERATORS

(L-6 Hours)

Bash Variables - Read User Input - Bash Date Formatting - Bash Sleep - Bash Arithmetic Operators.

UNIT III: BASH LOOPING

(L-6 Hours)

Bash If - Bash If Else - Bash Else If - Bash Case - Bash For Loop - Bash While Loop - Bash Until Loop - Bash String - Bash Find - Bash Split String - Bash Substring - Bash Concatenate String.

UNIT IV: ARRAYS & FUNCTIONS

(L-6 Hours)

Bash Array – Declaration – Initialization – Array operations – Bash Functions – Passing the arguments – Variable Scope – Return Values – Overriding Commands.

UNIT V: FILES

(L-6 Hours)

Bash Read File - Bash Write to a File - Bash check if file Exists - Git Bash - Zsh Vs. Bash - Bash Hash Command.

TEXT BOOKS:

1. Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell Programming, 2nd Edition.

REFERENCE BOOKS:

1. Shell Scripting: How to Automate Command Line Tasks Using Bash Scripting and Shell Programming
2. Linux Command Line and Shell Scripting Bible, 4th edition.

WEB REFERENCES:

1. Bash Scripting Tutorial – Linux Shell Script and Command Line for Beginners (freecodecamp.org)
2. Bash Arrays - Javatpoint



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Department of Bachelor of Computer Applications

Distribution of Marks and Question Paper Pattern for all UG Programmes

a)Distribution of Marks

Category	Total Marks	Distribution of Marks		Passing Minimum for (ESE)	Overall Passing Minimum
		CIA*	ESE**		
Theory (Both CIA and ESE)	100	25	75	30	40
Ability & Skill Enhancement (Only ESE)	50	-	50	20	20
Foundation Course & Employability Enhancement Course (Only CIA)	50	50	-	-	20
Extra Departmental Course (SSC)	100	-	100	-	40
Institutional Training	100	40	60	40	40
Comprehension in core subjects (Online Exam)	50	-	50	20	20
Practical & Project	100	40	60	24	40

b) Question Pattern:

Bloom's Category levels are followed in setting the question papers

Remember Level - K1
 Understand Level - K2
 Apply Level - K3
 Analyze Level - K4

Evaluate Level - K5
Create Level - K6

Question Pattern for Comprehension in Core Courses (ESE – 1-hour online Examination)

This course is one of the compulsory courses. This course is offered to facilitate the students to have comprehensive knowledge in the basic principles of the field of

study. The student would be given 1 hour with randomly selected 50 questions for a maximum 50 marks. The passing minimum is 40%. i.e. 20 marks out of 50. (No Negative scores for wrong answers).

Course	No of Questions	Marks	Total Marks
Comprehension in Core Courses – Online Examination	50	50 x 1 = 50 ALL Questions Carry EQUAL Marks	50

**Ability Enhancement & Skill Enhancement for UG Program
(Only ESE- 2 Hours Exam)**

Section	Marks		Total Marks
Section A	4 x 5 = 20 Four out of six (open choice) ALL Questions Carry EQUAL Marks	250 words (Paragraph Answer)	50
Section B	3 x 10 = 30 Three out of Five (Open choice) ALL Questions Carry EQUAL Marks	500 words (Essay Type)	

Employability Enhancement & Foundation Course for UG Program (100% CIA paper)

Section	Marks	Total Marks
Section A	2 x 1 = 2 (No choice) ALL Questions Carry EQUAL Marks	20
Section B	3 x 4 = 12 (Internal choice – Either/or) ALL Questions Carry EQUAL Marks	
Section C	1 x 6 = 6 (Internal choice – Either/or) ALL Questions Carry EQUAL Marks	

Three Test (3 x 20)

- 60 Marks

(All three Tests Compulsory)

Other Assessment Tools (2x20) – 40 Marks

- a) Assignments
- b) Quiz / Student Presentation

Total - 100 Marks (Reduced to 50)

- **The minimum mark to get a pass is 20 Marks.**
- **In case a candidate has not appeared for internal test I, II, re-test may be conducted with the approval of the HoD & Principal on reasonable grounds.**
- **If a candidate fails, He/She can re-appear for the same in the subsequent semesters.**

Open Elective Courses (SSC) for UG Program (ESE – 3 hours Examination) – Non CGPA course

A student shall take up one OPEN ELECTIVE course offered by other departments to complete the programme. The score obtained in this course will not be accounted for CGPA calculation. The enrolment is based on first come first served basis depending upon the available strength.

Section	Marks	Total Marks
Section A	10 x 10 = 100 Ten out of Fifteen (open choice) ALL Questions Carry EQUAL Marks	100

CIA Question Paper Pattern for UG Program

Section	Marks	Total Marks
Section A	2 x 1 = 2 (No choice) ALL Questions Carry EQUAL Marks	20
Section B	3 x 4 = 12 (Internal choice – Either/or) ALL Questions Carry EQUAL Marks	
Section C	1 x 6 = 6 (Internal choice – Either/or) ALL Questions Carry EQUAL Marks	

End Semester Examination & Model Exam Question Paper Pattern for UG Program

Section	Marks	Total Marks
Section A	10 x 1 = 10 (No choice) ALL Questions Carry EQUAL Marks	

Section B	5 x 5 = 25 (Internal choice – Either/or) ALL Questions Carry EQUAL Marks	75
Section C	5 x 8 = 40 (Internal choice – Either/or) ALL Questions Carry EQUAL Marks	

Extension Activities & Co-Curricular Activities:

The first year UG students shall enroll themselves for NSS, NCC, YRC, Physical Education, Consumer Club, Youth Welfare, Nature Club, Yoga Club & Electoral Literacy Club. Participation in any one of these activities during the first four semesters is mandatory. A report, regarding the successful completion of the activity, issued by the faculty incharge of these activities has to be submitted to the Controller of Examinations at the end of the sixth semester.

Procedure of Evaluation:

Sl. No	Criteria for Evaluation	Marks
1.	NSS, NCC	
	Attendance	10
	Participation in a minimum number of programmes	40
	Involvement	30
	Participation in the Camp	20
	Total	100
2.	YRC, Other Clubs	
	Attendance	10
	Participation in a minimum number of programmes	60
	Involvement	30
	Total	100
3.	Sports	
	Attendance	10
	Participation in Sports activated at College Level	20
	Participation in Sports activities at	20

	State/University Level	
	Test Conducted	50
	Total	100

CONTINUOUS INTERNAL ASSESSMENT(CIA):

Breakup of CIA Marks for Theory Courses for UG

Component s	Tests			Assignmen t	Quiz / Presentation	Total
	I	II	III (Model)			
UG Theory	20	20	75 (Reduced to 20)	2	3	25

INTERNAL TESTS:

Two tests for Continuous Assessment will be conducted on pre- determined dates that is 1st test (1 hour) commencing on the 35th day from the date of reopening, 2nd test (1 hour) on the 60th day. The Model Exam (3 hours) will be conducted after completing 80 working days.

Absentees for Internal Tests:

Appearance of CIA is mandatory to take up the ESE. However, if a student is not able to write the Internal Tests because of his/her participation in an important event related to NCC, NSS or Games/Sports representing the College/University/ any other valid reason, the student has to get the prior permission of the Principal through the proper channel and submit the same to the Office of the Controller of Examinations. Retest request should be submitted to the COE's Office within **7 days after the completion of I& II Internal test. Applications submitted after the deadline will not be considered for retest. There is no retest for Test III (Model Exam).**

Question paper pattern for Practical

Group Project & Viva Voce:

Each group (UG) comprising of 5 students will be allotted to a staff coordinator. A specific problem will be assigned to the students or they will be asked to choose a problem /area of their interest. The topic /area of work will be finalized at the end of the IV Semester (UG), allowing scope for the students to gather relevant literature during the vacation. The research work can be carried at the college or any other organization approved by the staff coordinator and the HoD.

Institutional/Industrial Training/Mini Project:

A student shall visit an Institution / Organization / Industry and learn its operations according to the nature of His/her discipline of study after obtaining a formal approval from the Department for a period of 15 days during His/ Her summer vacation between IV and V semester for UG Programs. The students who could not undergo the Institutional training may opt for Mini/Minor project, complete its components under the guidance of the faculty and submit a report for the work done as per the prescribed format. The students must maintain a work diary and prepare a report of the training/minor project undergone and submit the same to the HoD. On a stipulated date, there will be a viva voce with internal examiners at the end of the semester V.

Components for Project/Internship/Industrial Training:

a) CIA Evaluation

c) Regularity	10 Marks
ii) Review/Presentation	30 Marks
Total	<u>40 Marks</u>

b) ESE Evaluation

i) Work diary	- 10 Marks
ii) Report	- 30 Marks
iii) Viva voce	<u>- 20 Marks</u>
Total	<u>- 60 Marks</u>

Components for Practical:

c) CIA Evaluation

i) Lab Performance	- 10 Marks (Practical skill 5 Marks + Interactions 5 Marks)
ii) Regularity in Record Submission	- 5 Marks (Department to have the norms)
ii) Model Exam	<u>- 25 Marks</u>
Total	<u>40 Marks</u>

b) ESE Evaluation

i) Record	- 10 Marks
ii) Experiment	- 50 Marks
Total	- 60 Marks

SUBMISSION OF RECORD NOTE BOOKS FOR PRACTICAL EXAMINATIONS

Submission of bonafide record note books is mandatory to appear for the practical examination. If a candidate is unable to submit the record note book on valid grounds, she may be permitted to appear for the practical examinations, provided the head of the department certifies that the candidate has performed the experiments prescribed for the course and she will be awarded zero (0) marks for record note book.

GRADING SYSTEM

Based on the guidelines of Manonmaniam Sundaranar University on grading system the Following Grading System for the students admitted from 2020 – 2021 & onwards.

Conversion of Marks to Grade Points and Letter Grade:

RANGE OF MARKS	GRADE POINT	LETTER GRADE	DESCRIPTION
90 – 100	9.0 – 10.0	O	Outstanding
80 – 89	8.0 – 8.9	D+	Excellent
75 – 79	7.5 – 7.9	D	Distinction
70 – 74	7.0 – 7.4	A+	Very Good
60 – 69	6.0 – 6.9	A	Good
50 – 59	5.0 – 5.9	B	Average
40-49#	4.0-4.9	C	Satisfactory
00-39	0.0	U	Reappear
Absent	0.0	AAA	Absent

Classifications:

CGPA	GRADE	CLASSIFICATION OF FINAL RESULT
9.5 – 10.0	O+	First Class - Exemplary
9.0 and above but below 9.5	O	
8.5 and above but below 9.0	D++	First Class with Distinction
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A++	First Class
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	Second Class
5.0 and above but below 5.5	B	
4.5 and above but below 5.0	C+#	Third Class
4.0 and above but below 4.5	C#	
0.0 and above but below 4.0	U	Re - appear

Applicable only to U.G. Programme

* Applicable for the students who have passed the Part: III examinations in FIRST APPEARANCE within the study period of the respective semester.

- Cumulative Grade Point Average (CGPA) and final classifications are to be made for the programme
- Part –III components alone are considered for CGPA
- Part-I, Part-II, Part-IV & Part –V are not to be considered for finding the CGPA or for the classification of Part –III
- The maximum marks per course (subject) are to be fixed at 100. (if it is less or more than 100 it should be converted to 100)
- Grade point average – For a semester (GPA): $= \sum CGP / C$

Where C = Credits earned for the course in any semester

G= Grade Point obtained for the course in any semester

$$GPA = \frac{\text{Sum of the multiplication of grade points by the credits of the courses}}{\text{Sum of the credits of the courses in a semester}}$$

- Cumulative Grade Point Average – For the entire programme : (CGPA) is calculated by using the formula:

$$\text{CGPA} = \frac{\sum \text{CGP}}{\sum \text{C}} \quad \text{Where C = Credit Point GP=Grade Point}$$

Sum of the multiplication of grade points by the credits of the entire programme

CGPA =
Sum of the credits of the courses of entire programme

- CGPA is given only in Consolidated mark/Grade sheet

Ranking:

- Candidates who have passed all the courses (subjects) or completed all the components prescribed for the programme within the period of study are only eligible for Ranking.
- Ranking is based on the marks scored in Part – III subjects only.
- Candidates passing the Part – III subjects in First Attempt within the study period of respective semesters are only eligible for ranking.
- In case of Reappearance, the first appearance mark is only considered for ranking,
- Candidates absent for the courses (subjects) prescribed in Part – III with high marks in the subsequent appearance will not be considered for Ranking.

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PANEL OF EXAMINERS FOR PRACTICAL & CENTRAL VALUATION

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3	Dr.M.Sivasankari. Assistant Professor	Don Bosco College, KeelaEral, Mobile No : 6379310932
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6	Dr.M.GethiyalAugasta MCA.,M.Phi.,SET.,Ph.D Assistant .Professor	Dept of Computer Science Kamaraj College,Thoothukudi 9442258481
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