SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
(An Autonomous Institution)
(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, ISO 9001:2000 Certified Institution &
Accredited by NAAC with "A" Grade)
Madagadipet, Puducherry - 605 107

SCHOOL OF ARTS AND SCIENCE

Department of Computational Studies

Bachelor of Computer Science

Minutes of 4th meeting of Board of Studies

Venue

Department of Computational Studies
First Floor, SAS Block

Date & Time
25-02-2022 & 11.00 am to 1.00pm

School of Arts and Science
Department of Computational Studies
Minutes of Board of Studies Meeting for B.Sc. CS

The Fourth meeting of Board of Studies for the course B.Sc. Computer Science was held through online on 25.02.2022 at 11:00 am in the Department of Computational Studies, School of Arts and Science, Sri Manakula Vinayagar Engineering College with the Head of the Department in the Chair.

The following members were present for the Fourth Meeting of Board of Studies.

S. No.	Name of the Member with Designation and official Address	Responsibility in the BoS
1	**Mr. M. SHANMUGAM** Associate Professor and Head, Department of Computational Studies, School of Arts and Science, SMVEC Email : shanmugam.muthalu@gmail.com,Mobile : 9444370963	Chairman
2	**Dr. R. RAMKUMAR** Associate Professor and Head, School of Computer Science, VET Institute of Arts and Science, Thindal , Erode. Email:ramkumar2006@gmail.com,Mobile: 9600966086	University Nominee
3	**Dr. V. J. CHAKRAVARTHY** Professor, PG Department of Computer Science, The New College (Autonomous), Chennai. Email:chakkuckm1808@gmail.com,Mobile: 9884161687	Subject Board (Academic Council Nominee)
4	**Dr. S. MANJU PRIYA** Professor, Department of Computer Science, Karpaga Academy of Higher Education, Coimbatore. Email:smanjupr@gmail.com,Mobile: 9600553725	Subject Board (Academic Council Nominee)
5	**Mr. C. VIMAL RAJ** Systems Architect, TCS, Chennai, Email:vimal06vishwa@gmail.com, Mobile: 9952578333	Industry Board
6	**Mr. S. VISU** Assistant Professor, Department of Computational Studies, School of Arts and Science , SMVEC, Email: visucs@smvec.ac.in, Mobile: 9791966297	Internal member
7	**Dr. A. ANTHONY PAUL RAJ** Assistant Professor, Sri Manakula Vinayagar Engineering College , School of Arts and Science , E-mail: anthonypaulrajsas@smvec.ac.in Mobile: 9942531512	Internal member
8	**Mrs. S. DIVYA** Assistant Professor, Department of Computational Studies, Sri Manakula Vinayagar Engineering College , School of Arts and Science E-mail: divyacs.sas@smvec.ac.in Mobile: 9791456258	Internal member

9	**Mr. N. VELAN** Assistant Professor, Department of Computational Studies, Sri Manakula Vinayagar Engineering College , School of Arts and Science , E-mail: velancs.sas@smvec.ac.in Mobile: 8344577751	Internal member
10	**Mrs. A. SHAMSATH BEGUM** Assistant Professor, Department of Computational Studies, Sri Manakula Vinayagar Engineering College , School of Arts and Science , E-mail: shamsathbegum.sas@smvec.ac.in Mobile: 9500399774	Internal member

Agenda of the Meeting

Item No. : BOS/2022/SAS/UG/CP/4.1	Welcome Address, Introduction about the Institution, Department and BoS Members
Item No.: BOS/2022/SAS/UG/CP/4.2	Confirmation of minutes of the Third meeting of the Board of Studies. The Head of the Department appraised the Board regarding the Minutes of the Third Meeting of BoS
Item No.: BOS/2022/SAS/UG/CP/4.3	To discuss and approve the improvisations in the Curriculum Structure of the Bachelor of Computer Science Programme from the AY 2021-22.
Item No.: BOS/2022/SAS/UG/CP/4.4	To discuss the modifications in the Syllabi for the Second and Third Year courses under R-2020 regulations for the B.Sc Computer Science students admitted in the Year 2020-2021 and in the 2021-22.
Item No.: BOS/2022/SAS/UG/CP/4.5	To consider any other item with the permission of the Chair .

Minutes of the Meeting

Item No.: BOS/2022/SAS/UG/CP/4.1

Mr. M. Shanmugam, Chairman, welcomed all the external and internal members. The meeting thereafter deliberated on agenda items that had been approved by the Chairman.

Item No.: BOS/2022/SAS/UG/CP/4.2

Chairman, BoS, appraised the minutes of third meeting of BoS and its implementation and then it was confirmed with the approval of BoS Boardise.

Item No.: BOS/2022/SAS/UG/CP/4.3

The Curriculum was discussed and recommended to Academic Council with the following improvisations.

Sl.No.	Regulation	Semester	Couse Title with Course Code	Unit No.	Particulars
1	R 2020	III	Problem Solving using Java – A20CPT305	Title of the Course	• The course title was changed from **Java Programming** into **Problem Solving using Java** due to the Common courses in BCA. (Page 7)
2	R 2020	III	Numerical Methods – A20MAD308	Course Code	• The Course Code was changed for the convenience of Offering Department. (Page 7)
3	R 2020	III	Programming in Java Lab – A20CPL305	Title of the Course	• The course title was changed from **Java Programming Lab** into **Programming in Java Lab** due to the Common courses in BCA. (Page 7)
4	R 2020	III	Exploring Java – A20CPC303	Title of the Course	• The course title was changed from **Java Programming** into **Exploring Java** due to the Common courses in BCA. (Page 7)

The above corrections have been made in the curriculum and the details are given in Annexure- I

Item No.: BOS/2022/SAS/UG/CP/4.4

Sl.No.	Regulation	Semester	Couse Title with Course Code	Unit No.	Particulars
1	R 2020	V	Python Programming – A20CPT509	Unit 5	• The Board members have suggested to add the contents in Unit 5. (Page 10)
2	R 2020	V	Artificial Intelligence - A20CPT511	Unit 2	• The Board members have suggested to move the content from Unit 3 to Unit 2. (Page 11)
3	R 2020	VI	.Net Technology - A20CPT612	Unit 1	• As per the instruction from board members, we have to add the content in Unit 1. (Page 12)
4	R 2020	VI	Software Engineering - A20CPT613	Unit 1 & 4	• The Board members have suggested to add the contents in Unit 1 and removing the contents in Unit 4. (Page 13)

5	R 2020	VI	Cloud Computing - A20CPT615	Unit 2	• The Board members have suggested to combine the contents and move in Unit 2. (Page 14)
6	R 2020	VI	Research Methodology - A20CPS606	The Complete Course	• The Board members have suggested to reduce the contents in all the units. (Page 15)
7	R 2020	IV	Data Mining - A20CPE406	Unit 4	• The Board members have suggested to combine the contents and move in Unit 4. (Page 17)
8	R 2020	V	System Software - A20CPE509	The Complete Course	• The Board members have suggested to reduce the contents in all the units.
9	R 2020	VI	Client Server Technology - A20CPE610	Unit 3	• The Board members have suggested to add the contents in Unit 3.

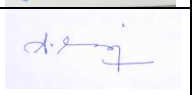
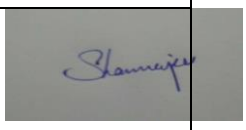
The above corrections have been made in the Syllabus and the details are given in Annexure- II .

Item No.: BOS/2022/SAS/UG/CP/4.5

Sl.No.	Regulation	Semester	Couse Title with Course Code	Unit No.	Particulars
1	R 2020	III	DSE Courses	Nil	The Board members have appreciated for the preparation of Discipline Specific Elective Papers.

The above curriculum is given in Annexure III.

S. No.	Name of the Member with Designation and official Address	Responsibility in the BoS	Signature
1	**Mr. M. SHANMUGAM** Associate Professor and Head, Department of Computational Studies, School of Arts and Science, SMVEC Email : shanmugam.muthalu@gmail.com Mobile : 9444370963	Chairman	
2	**Dr. R. RAMKUMAR** Associate Professor and Head, School of Computer Science, VET Institute of Arts and Science, Thindal , Erode. Email:ramkumar2006@gmail.com, Mobile: 9600966086	University Nominee	

3	**Dr. V. J. CHAKRAVARTHY** Professor, PG Department of Computer Science, The New College (Autonomous), Chennai. Email:chakkuckm1808@gmail.com Mobile: 9884161687	Subject Board (Academic Council Nominee)	
4	**Dr. S. MANJU PRIYA** Professor, Department of Computer Science, Karpaga Academy of Higher Education, Coimbatore. Email:smanjupr@gmail.com Mobile: 9600553725	Subject Board (Academic Council Nominee)	
5	**Mr. C. VIMAL RAJ** Systems Architect, TCS, Chennai. Email:vimal06vishwa@gmail.com Mobile: 9952578333	Industry Board	
6	**Mr. S. VISU** Assistant Professor, Department of Computational Studies, School of Arts and Science , SMVEC. Email: visucs@smvec.ac.in , Mobile: 9791966297	Internal member	
7	**Dr. A. ANTHONY PAUL RAJ** Assistant Professor, Sri Manakula Vinayagar Engineering College , School of Arts and Science , E-mail: anthonypaulrajsas@smvec.ac.in Mobile: 9942531512	Internal member	
8	**Mrs. S. DIVYA** Assistant Professor, Department of Computational Studies, Sri Manakula Vinayagar Engineering College , School of Arts and Science E-mail: divyacs.sas@smvec.ac.in Mobile: 9791456258	Internal member	
9	**Mr. N. VELAN** Assistant Professor, Department of Computational Studies, Sri Manakula Vinayagar Engineering College , School of Arts and Science , E-mail: velancs.sas@smvec.ac.in Mobile: 8344577751	Internal member	
10	**Mrs. A. SHAMSATH BEGUM** Assistant Professor, Department of Computational Studies, Sri Manakula Vinayagar Engineering College , School of Arts and Science , E-mail: shamsathbegum.sas@smvec.ac.in Mobile: 9500399774	Internal member	

The meeting was concluded at 1:00 pm with vote of thanks by **Mr. M. Shanmugam**, Head of the Department, Department of Computational Studies.

Mr. M. Shanmugam,

HOD / Dept. of Computational Studies,
Chairman-BoS (B.Sc.CS)

Dean SAS
[Dr. S. Muthulakshmi]

SCHOOL OF ARTS AND SCIENCE

Department of Computational Studies
Bachelor of Computer Science

Minutes of 4th meeting of Board of Studies

ANNEXURE - I

Annexure I

SEMESTER – III										
S. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20CPT305	Problem Solving using Java	DSC	4	0	0	4	25	75	100
2	A20CPT306	Microprocessors and Assembly Language Programming	DSC	4	0	0	4	25	75	100
3	A20CPE3XX	Discipline Specific Elective – I	DSE	3	0	0	3	25	75	100
4	A20MAD307	Numerical Methods	IDC	3	1	0	4	25	75	100
5	A20XXO3XX	Open Elective – I	OE	2	0	0	2	25	75	100
Practical										
6	A20CPL305	Programming in Java Lab	DSC	0	0	4	2	50	50	100
7	A20CPL306	Microprocessors Lab	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
8	A20CPS303	Office Automation Tools	SEC	0	0	4	2	100	0	100
Employment Enhancement Course										
9	A20CPC303	Exploring Java	EEC	0	0	4	0	100	0	100
							23	**425**	**475**	**900**

SEMESTER – IV										
S. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20CPT407	Operating Systems	DSC	4	0	0	4	25	75	100
2	A20CPT408	Database Management Systems	DSC	4	0	0	4	25	75	100
3	A20CPD402	Distributed Computing	IDC	3	0	0	4	25	75	100
4	A20CPE4XX	Discipline Specific Elective- II	DSE	3	0	0	3	25	75	100
5	A20XXO4XX	Open Elective – II	OE	2	0	0	2	25	75	100
Practical										
6	A20CPL407	Operating Systems Lab	DSC	0	0	4	2	50	50	100
7	A20CPL408	DBMS Lab	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
8	A20CPS404	Android App Development	SEC	0	0	4	2	100	0	100
Employment Enhancement Course										
9	A20CPC404	Mobile Application Development	EEC	0	0	4	0	100	0	100
							23	425	475	**900**

SEMESTER – V										
S. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20CPT509	Python Programming	DSC	3	1	0	4	25	75	100
2	A20CPT510	Network Technologies	DSC	3	1	0	4	25	75	100
3	A20CPT511	Artificial Intelligence	DSC	3	1	0	4	25	75	100
4	A20CPE5XX	Discipline Specific Elective-III	DSE	3	0	0	3	25	75	100
Practical										
5	A20CPL509	Python and Network Lab	DSC	0	0	4	2	50	50	100
6	A20CPP501	Mini Project (C#/JAVA/PYTHON)	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
7	A20CMS314	Entrepreneurial Skills	SEC	0	0	4	2	100	0	100
Online Certification Course										
8	A20CPX501	NPTEL	OCC	0	0	0	0	0	0	0
Employment Enhancement Course										
9	A20CPC505	PYTHON	EEC	0	0	4	0	100	0	100
							21	400	400	**800**

SEMESTER – VI										
S. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20CPT612	.Net Technology	DSC	3	1	0	4	25	75	100
2	A20CPT613	Software Engineering	DSC	3	1	0	4	25	75	100
3	A20CPT614	Cloud Computing	DSC	3	1	0	4	25	75	100
4	A20CPE6XX	Discipline Specific Elective-IV	DSE	3	0	0	3	25	75	100
Practical										
5	A20CPP602	Project Work & Viva-voce	DSC	0	0	10	5	40	60	100
Skill Enhancement Course										
6	A20CPS606	Research Methodology	SEC	0	0	4	2	100	0	100
Employment Enhancement Course										
7	A20CPC606	Data Science	EEC	0	0	4	0	100	0	100
							22	**340**	**360**	**700**

SCHOOL OF ARTS AND SCIENCE

Department of Computational Studies
Bachelor of Computer Science

Minutes of 4th meeting of Board of Studies

ANNEXURE - II

Annexure II

A20CPT509	PYTHON PROGRAMMING	L	T	P	C	Hrs
		4	0	0	4	60

Course Objectives

- To acquire programming skill in core python.
- To learn the basic looping and functions.
- To learn how to design python program and applications.
- To acquire the basic packages.
- To develop the object oriented programming.

Course Outcomes

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

CO1 – Define the structure and components of a python program.
CO2 – Illustrate the concepts of Python decision statements.
CO3 – Use list, tuple, Set and dictionary in python program.
CO4 – Read / write data from/to files and structure a program using Exceptions and Modules.
CO5 – Knowing the basic oops concepts.

UNIT I INTRODUCTION TO PYTHON PROGRAMMING LANGUAGE (12 Hrs)

Introduction to Python Language –- Strengths and Weaknesses – IDLE – Operators – Data Types – Introduction List , Tuple, Set, Dictionary. String : Slicing ,Basic operations on strings- Built in methods -

UNIT II DECISION MAKING ,LOOPING & FUNCTIONS (12 Hrs)

Control Flow: Introduction – Control Flow and Syntax – Indenting – Relational Expressions – Logical Expressions – If Statement – If else – else if – Nested if. Loop: The while Loop– Nested while Loop – For Loop – Nested for Loop- – Break and continue Functions: parameters – Return values – Local and global scope – Function composition – Recursion and lambda functions.

UNIT III LIST, TUPLE, SET, DICTIONARY AND ARRAYS (12 Hrs)

Lists: List operations – List slices – List methods – List loop – Mutability – Aliasing – Cloning lists – List parameters – Tuples: Tuple assignment – Tuple as return value – Advanced list processing – List comprehension – Sets – Dictionaries: Operations and methods – Arrays.

UNIT IV FILES, EXCEPTIONS, MODULES AND PACKAGES (12 Hrs)

Built In Functions. Files and Exception: Text Files – Reading and writing files – Format operator – Command line arguments – Errors and exceptions – Handling exceptions – Modules – Standard modules – Packages.

UNIT V OBJECT ORIENTED PROGRAMMING IN PYTHON (12 Hrs)

Classes and Objects – Constructors – Inheritance – Abstraction – Polymorphism – Encapsulations – Dynamic Binding.

Text Books

1. Martin C Brown, “Python The Complete Reference”, McGraw-Hill Education, 4th Edition,2018
2. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, Shroff/O‘Reilly Publishers, 2nd edition, 2016(http://greenteapress.com/wp/thinkpython/).
3. ReemaThareja, “Python Programming Using Problem Solving Approach”, ISBN:9780199480173, Oxford University Press, First edition, 2017.

Reference Books

1. Robert Sedgewick, “Kevin Wayne, Robert Dondero – Introduction to Programming in Python: An Inter-disciplinary Approach”, Pearson India Education Services Pvt. 2016.
2. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd.,2015.
3. Ben Stephenson, “The Python Workbook A Brief Introduction with Exercises and Solutions”, Springer International Publishing, Switzerland2014.

Web References

1. https://www.learnpython.org/
2. https://pythonprogramming.net/introduction-learn-python-3-tutorials/
3. https://www.codecademy.com/learn/learn-python
4. https://nptel.ac.in/courses/106/106/106106182/

A20CPT511	ARTIFICIAL INTELLIGENCE	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To understand the basic concepts of applications of AI.
- To understand the functionalities of predicate calculus.
- To learn the basic concepts of natural language processing
- To understand various developments of Board system.
- To analyze and compare the case studies.

Course Outcomes

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

CO1- Know about the applications of artificial intelligence.
CO2 - Determine the predicate calculus and knowledge based systems.
CO3 - Very good knowledge in NLP process.
CO4- Describe the knowledge representation and Board systems.
CO5- Analysis the case studies..

UNIT I INTRODUCTION (12Hrs)

Artificial Intelligence - definition -Underlying Assumption - A.I. Technique space - search - Production systems-Control Strategies-Heuristic search - Problem characteristics -Production System characteristics.

UNIT II PREDICATE CALCULUS (12Hrs)

Predicate calculus & Knowledge Representation: Predicate calculus - Answer extraction - knowledge based systems - knowledge processing, inference technique.

UNIT III SOFTWARE AGENTS (12Hrs)

Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent system

UNIT IV APPLICATIONS (12Hrs)

AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing - Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving

UNIT V BOARD SYSTEMS (12Hrs)

Boards Systems Definition of Board Systems Characteristics of an Board Systems Architecture of Board Systems role of Board system knowledge acquisition - advantages and limitation of Board system-example Board System: MYCIN.

Text Book

1. N. J. Nilsson, Artificial Intelligence – A New Synthesis, Morgan Kaufmann, 1998.
2. Artificial Intelligence - Elaine Rich, Kevin Knight, ShivasankarB.Nair–Thirdedition- McGraw Hill- 2017
3. Stuart Russel, Peter Norvig “AI – A Modern Approach”, 2nd edition, PearsonEducation, 2007

Reference Books

1. E. Rich, K. Knight, S.B. Nair, Artificial Intelligence, 3/e, TMH, 2008.
2. S.J. Russel, P. Norvig Artificial Intelligence: A Modern Approach, 3 /e, PrenticeHall, 2009.
3. Ivan Bratka, “PROLOG Programming for Artificial Intelligence”, Addison Wesley, 1986.

Web References

1. https://www.sitesbay.com/ai/artificial-intelligence-types-of-artificial-intelligence
2. https://www.tutorialspoint.com/artificial_intelligence/index.htm
3. https://tutorialspoint.dev/computer-science/machine-learning/artificial-intelligence-an-introduction
4. https://www.javatpoint.com/artificial-intelligence-tutorial
5. https://www.tutorialandexample.com/artificial-intelligence-tutorial/

A20CPT612 **.NET TECHNOLOGY**

L	T	P	C	Hrs
3	0	0	4	60

Course Objectives

- To understand the fundamentals of developing modular application by using object oriented concepts.
- To utilize the C# and .NET framework to build distributed enterprise applications.
- To develop Console Application, Windows Application and Web Applications.
- To connect to multiple data sources and managing them effectively.
- To learn the product development.

Course Outcomes

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

CO1 -Learn about MS.NET framework developed by Microsoft.
CO2 - Develop and implement Applications with C#.
CO3 - Design the interface for application development.
CO4 - Understand the .NET framework and deployment in the .NET.
CO5 - Explore Assemblies and Deployment in .NET enterprise applications.

UNIT I INTRODUCTION (12 Hrs)

Common language Runtime (CLR) – Common Type System (CTS) – Common language Specification (CLS) – Compilation process – Assemblies – Namespaces – Command line compiler.

UNIT II C# FUNDAMENTALS (12 Hrs)

C# class - object - string formatting - Types - scope - Constants - C# iteration - Control flow - Operators - Array - String - Enumerations - Structures - Custom namespaces. Programming constructs – value types and reference types – object oriented concepts – Encapsulation – Inheritance – polymorphism – Interfaces – collections – Multithreading.

UNIT III GRAPHICS & WINDOW FORMS (12 Hrs)

Tool box controls – Container control – Menu – Tool bar – Tool tip Controls during design time – Run time – Graphics programming GDI+.

UNIT IV DATABASE PROGRAMMING (12 Hrs)

Data Access with ADO.NET – Architecture – Data reader – Data Adapter – Command – Connection – Data set – Data binding – Data Grid Control – XML based Data sets.

UNIT V J2EE (12 Hrs)

Enterprise Edition Overview – Multi-Tier Architecture – Best Practices – Comparison between J2EE and .NET.

Text Books

1. David Chappell, “Understanding .NET – A Tutorial and Analysis”, Addison Wesley, 2002.
2. Herbert Schildt, “C# 3.0 The Complete Reference”, McGraw-Hill Professional, Third Edition, 2009.
3. Keogh, “J2EE The Complete Reference”, Tata McGraw-Hill, 2015.

Reference Books

1. Andrew Troelsen, Pro C# 5.0 and the .NET 4.5 Framework, Sixth edition, A Press, 2012.
2. Joh Skeet, C# in depth, Manning publications, Third Edition, 2014. .
3. AdrewStellman and Jennifer Greene, Head First C#, Third Edition, O’Reilly, 2013.

Web Resources

1. https://www.c-sharpcorner.com/csharp-tutorials
2. https://www.guru99.com/c-sharp-tutorial.html
3. https://www.sitesbay.com/csharp/index
4. https://www.sitesbay.com/interview/dot-net

A20CPT613 **SOFTWARE ENGINEERING**

L	T	P	C	Hrs
3	1	0	4	60

Course Objectives

- To understand the various models and methods.
- To gain about software development life cycle models.
- To develop the software design.
- To connect the coding techniques.
- To learn the testing of software.

Course Outcomes

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

CO1 - Learn about the various models and methods.
CO2 - Develop and implement the software life cycle models.
CO3 - Design the software models.
CO4 - Analyze the coding techniques.
CO5 – Explore the testing of software.

UNIT I INTRODUCTION (12 Hrs)

Software-Software characteristics-software applications -Software Engineering - A Generic view - Software process - Software process model - The Linear sequential - Model- Prototyping Model - RAD Model - Fourth Generation Techniques.

UNIT II SOFTWARE MEASURES AND METRICS (12Hrs)

Measures, Metrics and Indicators-Software metrics -Process metrics-Project metrics - Software measurement- size oriented metrics -Function oriented metrics- Measure Quality Metrics for small organization - Establishing a software metrics program.

UNIT III SOFTWARE PROJECT PLANNING (12Hrs)

Software Project Planning-objectives-Feasibility-Software project - Estimation Empirical Estimation models - The structure of Estimation models - COCOMO model.-Software Risks-Software Quality Assurance.

UNIT III SOFTWARE DESIGN (12Hrs)

Software Design: Fundamental Design Concepts - Modules and Modularization Criteria –Design Notations –Design Techniques -Detailed Design Considerations -Real-Time and Distributed System-Design -Test Plans -Milestones, walkthroughs, and Inspections

UNIT IV SOFTWARE TESTING (12Hrs)

Software Testing Technique - Software Testing Fundamentals Testing objectives -Testing Principles - Testability - Test case Design-White Box Testing - Basic path testing-Control Structure Testing- Black Box Testing.

Text Books

1. R. Fairley, “Software Engineering Concepts”, Tata McGraw Hill Edition -2017.
2. Roger S. Pressman, “Software Engineering: A Practitioner’s Approach”, McGraw Hill, 7th edition, 2010. (Module 1 & Module 5)
3. Software Engineering , Tenth Edition , Pearson by Ian Sommerville

Reference Books

1. Software Engineering: A Practitioner’s Approach by Bruce R. Maxim
2. Pankaj Jalote's Software Engineering: A Precise Approach
3. Software Engineering 0th Edition, Kindle Edition by Suraiya Hussain

Web References

1. https://www.sitesbay.com/software-engineering/index
2. https://www.sitesbay.com/software-engineering/se-software-project-management-tools
3. https://www.sitesbay.com/software-engineering/se-risk-management-in-software-engineering
4. https://www.tutorialspoint.com/software_engineering/index.htm

A20CPT615	CLOUD COMPUTING	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To define the fundamental ideas behind Cloud Computing.
- To classify the basic ideas and principles in cloud information system.
- To relate cloud storage technologies and relevant distributed file systems
- To understand the Big Data Platform and its Use cases
- To provide an overview of Apache Hadoop, Provide HDFS Concepts and Interfacing with HDFS

Course Outcomes

After completion of the course, the students should be able to:

CO1 –Explain the core concepts of the cloud computing paradigm.
CO2 –Apply fundamental concepts in cloud infrastructures.
CO3 –Illustrate the fundamental concepts of cloud storage such as Amazon S3 and HDFS.
CO4 – Explain the Utility Computing concepts.
CO5 – Understand the Amazon Web Services concepts.

UNIT I INTRODUCTION (12Hrs)

Introduction to Cloud Computing- The Evolution of Cloud Computing – Hardware Evolution – Internet Software Evolution – Server Virtualization - Federation in the Cloud - Presence in the Cloud.

UNIT II SERVICES (12Hrs)

Web Services Deliver from the Cloud – Communication-as-a-Service – Infrastructure-as-a-Service – Monitoring-as-a-Service – Platform-as-a-Service – Software-as-a-Service – Building Cloud Network.

UNIT III CLOUD INFRASTRUCTURE (12Hrs)

Introduction - Advancing towards a Utility Model – Evolving IT infrastructure – Evolving Software Applications – Continuum of Utilities- Standards and Working Groups – Standards - Bodies and Working Groups – Service Oriented Architecture – Business Process Execution Language

UNIT IV UTILITY COMPUTING (12Hrs)

Utility Computing Technology – Virtualization – Hyper Threading – Blade Servers - Automated Provisioning - Policy Based Automation – Application Management – Evaluating Utility Management Technology

UNIT V AMAZON WEB SERVICES (12Hrs)

Identity and Access Management(IAM) – Elastic Compute Cloud(EC2) – EC2 Instance Storage – S3 – Database & Analytics.

Text Books

1. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
2. Ritting house, John W., and James F. Ransome, —Cloud Computing: Implementation, Management and Security, CRC Press, 2017.

Reference Books

1. 1. John W. Rittinghouse and james F. Ransome, “Cloud Computing Implementation, Management and Security”, 2010, CRC Press, Taylor & Francis Group, Boca Raton London New York. [Unit -11 and Unit II]
2. Alfredo Mendoza, “Utility Computing Technologies, Standards, and Strategies”, Artech House INC, 2007. [Unit - 11I to Unit V]
3. Bunker and Darren Thomson, “Delivering Utility Computing”, 2006, John Wiley & Sons Ltd.
4. Pete Warden, “Big Data Glossary”, O’Reily, 2011.

Web References

1. www.coltdatacentres.net/Cloud Technology.
2. https://www.zdnet.com/article/what-is-cloud-computing-everything-you-need-to-know-about-the-cloud/
3. www.digitalocean.com/community/tutorials/an-introduction-to-big-data-concepts-and-terminology

A20CPS606	RESEARCH METHODOLOGY	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To facilitate science and research
- To introduce research and methodology concepts
- To inculcate data collection
- To implement the scientific writing
- To construct the basic ethics

Course Outcomes

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

CO 1 - Identify various concepts science and research
CO 2 – Describing research and methodology concepts
CO 3 - Utilize the data collection
CO 4 – Managing the scientific writing
CO 5 – Deploy the basic ethics.

UNIT I SCIENCE AND RESEARCH (6 Hrs)

Definition – History – Evolution of Scientific Inquiry, Scientific Research: Definition, Characteristics, types, need of research. Identification of the problem, assessing the status of the problem, formulating the objectives

UNIT II INTRODUCTION TO RESEARCH METHODOLOGY (6 Hrs)

Meaning and importance of Research – Types of Research – Selection and formulation of Research Problem Research Design – Need – Features – Inductive, Deductive and Development of models Developing a Research Plan – Exploration, Description, Diagnosis, Experimentation, Determining Experimental and Sample Designs

UNIT III DATA COLLECTION AND ANALYSIS (6 Hrs)

Sources of Data – Primary, Secondary and Teritary – Types of Data – Categorical, nominal & Ordinal. Methods of Collecting Data : Observation, field investigations, Direct studies – Reports, Records or Experimental observations. Sampling methods – Data Processing and Analysis strategies- Graphical representation.

UNIT IV SCIENTIFIC WRITING (6 Hrs)

Structure and components of Scientific Reports – types of Report – Technical Reports and Thesis – Significance – Different steps in the preparation – Layout, structure and Language of typical reports - Illustrations and tables – Bibliography, Referencing and foot notes –Importance of Effective Communication.

UNIT V ETHICS (6 Hrs)

Ethical Issues – Ethical Committees – Commercialization – copy right – royalty – Intellectual Property rights and patent law – Track Related aspects of intellectual property Rights – Reproduction of published material – Plagiarism – Citation and Acknowledgement – Reproducibility and accountability.

Text Books

1. Garg.B.L., Karadia, R., Agarwal,F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
2. Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition. New Age International Publishers, New Delhi.
3. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.

Reference Books

1. Gupta S.P. (2008). Statistical Methods. 37 th ed. (Rev)Sultan Chand and Sons. New Delhi. 1470 p.
2. Leon & Leon (2202). Internet for everyone, Vikas Publishing House.
3. Wadehra, B.L.2000. Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
4. Research Methodology Dr P M Bulakh,Dr P. S. Patki and Dr A S Chodhary 2010 Published by Board Trading Corporation Dahisar West, Mumbai 400068

Web References

1. https://gradcoach.com/what-is-research-methodology/
2. https://www.guide2research.com/research/how-to-write-research-methodology
3. https://www.tutorialspoint.com/thematic_apperception_test/thematic_apperception_test_research_methods.htm
4. https://www.wisdomjobs.com/e-university/research-methodology-tutorial-355.html

A20CPE406	DATA MINING	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To understand the concepts of Data Mining.
- To learn about Data types.
- To learn about Preprocessing.
- To learn the basics of classification.
- To know about Cluster analysis.

Course Outcomes

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

CO 1 - Understand the basic concepts of Data Mining.
CO 2- Understand the basic data types and visualization.
CO 3- Usage of preprocessing techniques.
CO 4 - Basics of classification.
CO 5 - Basic concepts of cluster analysis.

UNIT I INTRODUCTION TO DATA MINING (9 Hrs)

Introduction to Data Mining: Definition of data mining - Stages of the Data Mining Process –Basic data types – Major building blocks –Scope of Data Mining – Data Mining working –Data Mining Architecture – Data Mining implementation process – Data Mining Techniques– Advantages & Disadvantages.

UNIT II WHY DATA MINING? (9 Hrs)

Data: Types of Data, Data quality, Data preprocessing- Measures of similarity and dissimilarity – Exploring data: summary statistics, visualization, OLAP and multidimensionaldata analysis.

UNIT III DATA PREPROCESSING (9 Hrs)

Data preprocessing: Data preprocessing introduction, Data cleaning - Data integration – Data reduction – Data transformation and data Discretization.

UNIT IV CLASSIFICATION – BASIC CONCEPTS (9 Hrs)

Classification: Problem definition - General approach - Decision tree induction - Rule based classifiers – nearest neighbor - Bayesian classifiers - Pattern Mining – Introduction- pattern mining in multilevel, multi-dimensional space - Frequent Pattern Mining Model.

UNIT V CLUSTER ANALYSIS (9 Hrs)

Cluster analysis basic concepts and methods: Introduction – requirements for cluster analysis– Over view of clustering methods. Data mining Applications – Data Mining Tools

Text Books

1. Data Mining: Concepts and Techniques by Jiawei Han and Micheline Kamber, Elsevier, 2010.
2. Introduction to Data Mining by Pang-Ning Tan, Michael Steinbach and Vipin Kumar,2005.
3. Data Mining: Practical Machine Learning Tools and Techniques, Fourth Edition, by Ian H. Witten , Eibe Frank , Mark A. Hall , Christopher Pal

Reference Books

1. Data Mining by Charu C Aggarwal, Springer.
2. Introduction to Data Mining by Pang-Nang Tan , Michael Steinbach , Vipin Kumar , Pearson.
3. Principles of Data Mining , by David Hand , HeikkiMannila , Padhraic Smyth , The MIT press , Cambridge
4. Data Mining: The Textbook 2015th Edition by Charu C. Aggarwal
5. Data Mining and Predictive Analytics (Wiley Series on Methods and Applications in Data Mining) 2nd Editionby Daniel T. Larose

Web References

1. https://www.sciencedirect.com/book/9780123814791/data-mining-concepts-and-techniques
2. https://www.tutorialspoint.com/data_mining/index.htm#:~:text=Data%20Mining%20is%20defined%20as,is%20mining%20knowledge%20from%20data.
3. https://www.tutorialspoint.com/dm/dm_quick_guide.htm
4. https://www.javatpoint.com/data-mining

A20CPE610	CLIENT / SERVER TECHNOLOGY	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To learn about objective evaluations and details of Client/Server development tools.
- To know about the network structures.
- Toused in operating system and database management system
- To learn the basics of applications in client server technology.
- To know about system development and web services

Course Outcomes

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

CO 1 - Understand the objective evaluations and details of Client/Server development tools.
CO 2 - Get andetailed networking concepts.
CO 3 - Used in operating system and database management system.
CO 4 - Basics of applications in client server technology.
CO 5 –Web services developments.

UNIT I INTRODUCTION TO CLIENT SERVER (9 Hrs)

Introduction – defining client/server computing – Classification of client/server systems – clients/server – advantages & disadvantages –driving forces behind client/server computing.

UNIT II TCP/IP (9 Hrs)

Introduction – two approaches of network communication – Ethernet technology – fiber distributed data interconnect(FDDI) – internet architecture – interconnection through IP routers – UDP. Related TCP – Segment format –TCP checksum computation – TCP connection reset – TCP state machine – TCP performance – TCP/IP over ATM network – VPN.

UNIT III CLIENT SERVER DATABASE (9 Hrs)

Client/Server databases – Introduction – client/server in respect of databases – client/server database architecture – database middleware component – access to multiple databases – distributed client/server database systems – distributed DBMS – web/database system for client/server applications.

UNIT IV CLIENT SERVER APPLICATION (9 Hrs)

Client/server application components – introduction – technologies for client/server application – services of a client/server application – categories of client/server applications – client services – server services – client/server application connectivity – client/server application: Layered Architecture.

UNIT V WEB SERVICES (9 Hrs)

System development – hardware & software requirements – communication interface technology – client/server technology & web services – what are web services – web services & client/server/browser – server technology – client/server technology & web applications.

Text Book

1. Subhash Chandra Yadav & Sanjay Kumar Singh,"An Introduction to Client/ServerComputing", New Age International Publishers, 2009.
2. Douglas E Comer, "Internetworking with TCP/IP-Principles, Protocols and Architecture", Pearson Education.
3. Dawana Travis Dewire, "Client/Server Computing", Tata McGraw -Hill Publishing Company Limited, New Delhi, 2003.

Reference Books

1. Patrick Smith,Client/server computing (Professional reference series), Paperback .
2. Robert Orfali, Dan Harkey and Jeri Edwards, "Essential Client/Server Survival Guide", Galgotia Publications, New Delhi, 2001.
3. Joel P Kaster, "Understanding Thin Client/Server Computing", Prentice Hall of India, New Delhi,2001.
4. Jein Edwards, "3 tier Client/server at Work", Wiley Computer Publishing, USA, 1999. 4. AshhofaiolTomy Martin, "Building N - tier Applications with COM and VB 6.0", Wiley Computer Publishing, Singapore, 1999.
5. Travis Derive D, "Second - generation Client/Server Computing" McGraw Hill, New Delhi, 1997.

Web References

1. https://www.tutorialspoint.com/Client-Server-Computing
2. https://www.eukhost.com/blog/webhosting/client-server-technology/
3. https://www.quora.com/What-are-client-server-technology

COMPLETE SYLLABUS FOR V AND VI SEMESTER

A20CPT509	PYTHON PROGRAMMING	L	T	P	C	Hrs
		4	0	0	4	60

Course Objectives

- To acquire programming skill in core python.
- To learn the basic looping and functions.
- To learn how to design python program and applications.
- To acquire the basic packages.
- To develop the object oriented programming.

Course Outcomes

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

CO1 – Define the structure and components of a python program.
CO2 – Illustrate the concepts of Python decision statements.
CO3 – Use list, tuple, Set and dictionary in python program.
CO4 – Read / write data from/to files and structure a program using Exceptions and Modules.
CO5 – Knowing the basic oops concepts.

UNIT I INTRODUCTION TO PYTHON PROGRAMMING LANGUAGE (12 Hrs)

Introduction to Python Language –- Strengths and Weaknesses – IDLE – Operators – Data Types – Introduction List , Tuple, Set, Dictionary. String : Slicing ,Basic operations on strings- Built in methods -

UNIT II DECISION MAKING ,LOOPING & FUNCTIONS (12 Hrs)

Control Flow: Introduction – Control Flow and Syntax – Indenting – Relational Expressions – Logical Expressions – If Statement – If else – else if – Nested if. Loop: The while Loop– Nested while Loop – For Loop – Nested for Loop- – Break and continue Functions: parameters – Return values – Local and global scope – Function composition – Recursion and lambda functions.

UNIT III LIST, TUPLE, SET, DICTIONARY AND ARRAYS (12 Hrs)

Lists: List operations – List slices – List methods – List loop – Mutability – Aliasing – Cloning lists – List parameters – Tuples: Tuple assignment – Tuple as return value – Advanced list processing – List comprehension – Sets – Dictionaries: Operations and methods – Arrays.

UNIT IV FILES, EXCEPTIONS, MODULES AND PACKAGES (12 Hrs)

Built In Functions. Files and Exception: Text Files – Reading and writing files – Format operator – Command line arguments – Errors and exceptions – Handling exceptions – Modules – Standard modules – Packages.

UNIT V OBJECT ORIENTED PROGRAMMING IN PYTHON (12 Hrs)

Classes and Objects – Constructors – Inheritance – Abstraction – Polymorphism – Encapsulations – Dynamic Binding.

Text Books

1. Martin C Brown, “Python The Complete Reference”, McGraw-Hill Education, 4th Edition,2018
2. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, Shroff/O‘Reilly Publishers, 2nd edition, 2016(http://greenteapress.com/wp/thinkpython/).
3. ReemaThareja, “Python Programming Using Problem Solving Approach”, ISBN:9780199480173, Oxford University Press, First edition, 2017.

Reference Books

1. Robert Sedgewick, “Kevin Wayne, Robert Dondero – Introduction to Programming in Python: An Inter-disciplinary Approach”, Pearson India Education Services Pvt. 2016.
2. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd.,2015.
3. Ben Stephenson, “The Python Workbook A Brief Introduction with Exercises and Solutions”, Springer International Publishing, Switzerland2014.

Web References

1. https://www.learnpython.org/
2. https://pythonprogramming.net/introduction-learn-python-3-tutorials/
3. https://www.codecademy.com/learn/learn-python
4. https://nptel.ac.in/courses/106/106/106106182/

A20CPT510	NETWORK TECHNOLOGIES	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To understand the basic concepts of Data Communications.
- To understand the functionalities and components involved in the physical layer.
- To learn the basic concepts of data link layer services and network layer communication protocols
- To understand various load characteristics and network traffic conditions, decide the transport protocols to be used.
- To analyze and compare the different protocols available in the application layer.

Course Outcomes

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

CO1 - Analyze the network components and network standards.
CO2 - Determine the Physical layer functionalities, Transmission modes and media.
CO3 - Analyze the Error correction and detection techniques and determine the proper usage of IP address, subnet mask and default gateway in a routed network.
CO4 - Describe, analyze and compare different protocols in transport layer.
CO5 - Analyze the functional working of different protocols of application layer**.**

UNIT I DATA COMMUNICATIONS (12Hrs)

Overview of Data Communications – Networks and its types – Network topologies. Transmission technologies: Signal Transmission – Digital signaling – Analog Signaling. Networks Models: Protocol Layering – OSI reference model – TCP/IP Protocol suite.

UNIT II PHYSICAL LAYER (12Hrs)

Physical layer functionalities – Analog to digital conversion using PCM, Transmission Modes: Parellel–Serial.Transmission Media: Guided and unguided media.Switching: Introduction. Circuit Switching and Packet switching Networks.

UNIT III DATA LINK LAYER AND NETWORK LAYER (12Hrs)

Data link layer services – Error Detection and Correction – Sliding window protocols – Network devices. Network layer functionality. Routing Algorithms: The Optimality Principle – Shortest path algorithm, Distance vector routing – Classful Addressing – Subnetting – Network layer protocols: IPV4, IPV6.

UNIT IV TRANSPORT LAYER (12Hrs)

The Transport Services - Connection management – Transport layer Congestion Control – Transport Layer Protocols: User Datagram Protocol (UDP) – Transmission Control Protocol (TCP).

UNIT V WIRELESS TECHNOLOGIES (12Hrs)

Wireless Technologies: Wi-fi, Bluetooth, Li-fi, Cellular Internet: 3G, 4G, 5G, Wireless Home Automation: ZigBee and Z-Wave.

Text Books

1. Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2013.
2. Tanenbaum,A.S. and David J. Wetherall “Computer Networks”, 5th ed., Prentice Hall, 2011
3. James F. Kurose and Keith W. Ross, “Computer Networking: A Top-Down Approach: International Edition”, Pearson Education, Sixth edition, 2013.

Reference Books

1. Larry L. Peterson and Bruce S. Davie, “Computer Networks- A system approach”, 5th edition, Elsevier, 2012.
2. Stallings, W., “Data and Computer Communications”, 10th Ed., Prentice Hall Int. Ed., 2013.
3. DayanandAmbawade, Deven Shah, "Advanced Compter Networks", Dreamtech Press, 1st edition, 2011.
4. PallapamanviV , "Data Communications and Computer Networks", PHI, 4th edition, 2014.
5. Andre S.Tanenbaum, "Computer Networks", Pearson Publication, 4th Edition, 2018.

Web References

1. https://www.geeksforgeeks.org/last-minute-notes-computer-network/
2. https://lecturenotes.in
3. https://www.cse.iitk.ac.in/users/dheeraj/cs425/
4. https://nptel.ac.in/courses/106/105/106105183/
5. https://nptel.ac.in/courses/106/105/106105081/

A20CPT511	ARTIFICIAL INTELLIGENCE	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To understand the basic concepts of applications of AI.
- To understand the functionalities of predicate calculus.
- To learn the basic concepts of natural language processing
- To understand various developments of expert system.
- To analyze and compare the case studies.

Course Outcomes

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

CO1 - Know about the applications of artificial intelligence.
CO2 - Determine the predicate calculus and knowledge based systems.
CO3 - Very good knowledge in NLP process.
CO4 - Describe the knowledge representation and expert systems.
CO5 - Analysis the case studies..

UNIT I INTRODUCTION (12Hrs)

Artificial Intelligence - definition-Underlying Assumption A.I. Technique space search Production systems-Control Strategies-Heuristic search Problem characteristics-Production system characteristics.

UNIT II PREDICATE CALCULUS (12Hrs)

Predicate calculus & Knowledge Representation: Predicate calculus - Answer extraction - knowledge based systems - knowledge processing, inference technique.

UNIT III SOFTWARE AGENTS (12Hrs)

Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent system

UNIT IV APPLICATIONS (12Hrs)

AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing - Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving

UNIT V EXPERT SYSTEMS (12Hrs)

Experts Systems Definition of Expert Systems Characteristics of an Expert Systems Architecture of Expert Systems role of expert system knowledge acquisition - advantages and limitation of expert system-example expert System: MYCIN.

Text Book

1. N. J. Nilsson, Artificial Intelligence – A New Synthesis, Morgan Kaufmann, 1998.
2. Artificial Intelligence - Elaine Rich, Kevin Knight, ShivasankarB.Nair–Thirdedition- McGraw Hill- 2017
3. Stuart Russel, Peter Norvig “AI – A Modern Approach”, 2nd edition, PearsonEducation, 2007

Reference Books

1. E. Rich, K. Knight, S.B. Nair, Artificial Intelligence, 3/e, TMH, 2008.
2. S.J. Russel, P. Norvig Artificial Intelligence: A Modern Approach, 3 /e, PrenticeHall, 2009.
3. Ivan Bratka, “PROLOG Programming for Artificial Intelligence”, Addison Wesley, 1986.

Web References

1. https://www.sitesbay.com/ai/artificial-intelligence-types-of-artificial-intelligence
2. https://www.tutorialspoint.com/artificial_intelligence/index.htm
3. https://tutorialspoint.dev/computer-science/machine-learning/artificial-intelligence-an-introduction
4. https://www.javatpoint.com/artificial-intelligence-tutorial
5. https://www.tutorialandexample.com/artificial-intelligence-tutorial/

A20CPL509	PYTHON AND NETWORK LAB	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To practice the fundamental programming methodologies in the Python programming language.
- Toapplylogicalskillsforproblemsolvingusingcontrolstructuresandarrays.
- Toimplement,testanddebugprogramsthatusedifferentdatatypes,variables,strings,arrays,pointersandstructures.
- To design basic networking styles and provides recursive solution to problems.
- To understand the miscellaneous aspects of networking.

Course Outcomes

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

CO1 – Apply and practice logical formulations to solve simple problems leading to specific applications.

CO2 – Develop python programs for simple applications making use of basic constructs, arrays and strings.

CO3 – Develop the networking programs using IP.

CO4 – Design the module for Client and Server.

CO5 – Construct the network specializations.

List of Exercises

1. Finding Area of a Triangle, Rectangle and Square.
2. Checking whether a given number is Prime or not.
3. Implementation of User defined functions.
4. Various operations on List and Tuples.
5. Various operations on string and dictionary.
6. Various types of inheritance using python..
7. Detect Network Changes Automatically.
8. Log Management with Python and Network Monitoring with Cacti.
9. NetFlow and sFlow Based Monitoring.
10. Alerting and Email Notification.
11. Testing DHCP Server and Client.
12. Test Network Speed with Python.

Reference Books

1. Stallings, W., “Data and Computer Communications”, 10th Ed., Prentice Hall Int. Ed., 2013.
2. John V Guttag, “Introduction to Computation and Programming Using Python’’, MIT Press, Revised and expanded Edition, 2013.

Web References

1. https://pythonprogramming.net/introduction-learn-python-3-tutorials/
2. ttps://www2.mvcc.edu/users/faculty/jfiore/CP/labs/LaboratoryManualForComputerProgramming.pdf
3. https://www.codecademy.com/learn/learn-python
4. https://www.geeksforgeeks.org/last-minute-notes-computer-network/
5. https://lecturenotes.in

A20CPP501	MINI PROJECT (C# / JAVA / PYTHON)	L	T	P	C	Hrs
		0	0	4	2	30

Table: 10 CAM & ESM break-up for Mini Project

Sl. No	Description			Weightage
1	**Continuous Assessment Marks**			
a	Review 1	Review Committee#	5	10
		Guide	5	
b	Review 2	Review Committee#	5	10
		Guide	5	
c	Review 3	Review Committee#	15	30
		Guide	15	
	Total CAM			50
2	**End Semester Marks**			
a	Evaluation of Mini Project report	Internal Examiner	20	40
		External Examiner	20	
b	Outcome*	Conference Presentations / Publication of papers /prototypes /patents etc	10	10
	Total ESM			**50**
	Total Marks			**100**

A20CPT612	.NET TECHNOLOGY	L	T	P	C	Hrs
		3	0	0	4	60

Course Objectives

- To understand the fundamentals of developing modular application by using object oriented concepts.
- To utilize the C# and .NET framework to build distributed enterprise applications.
- To develop Console Application, Windows Application and Web Applications.
- To connect to multiple data sources and managing them effectively.
- To learn the product development.

Course Outcomes

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

CO1 -Learn about MS.NET framework developed by Microsoft.
CO2 - Develop and implement Applications with C#.
CO3 - Design the interface for application development.
CO4 - Understand the .NET framework and deployment in the .NET.
CO5 - Explore Assemblies and Deployment in .NET enterprise applications.

UNIT I INTRODUCTION (12 Hrs)

Common language Runtime (CLR) – Common Type System (CTS) – Common language Specification (CLS) – Compilation process – Assemblies – Namespaces – Command line compiler.

UNIT II C# FUNDAMENTALS (12 Hrs)

C# class - object - string formatting - Types - scope - Constants - C# iteration - Control flow - Operators - Array - String - Enumerations - Structures - Custom namespaces. Programming constructs – value types and reference types – object oriented concepts – Encapsulation – Inheritance – polymorphism – Interfaces – collections – Multithreading.

UNIT III GRAPHICS & WINDOW FORMS (12 Hrs)

Tool box controls – Container control – Menu – Tool bar – Tool tip Controls during design time – Run time – Graphics programming GDI+.

UNIT IV DATABASE PROGRAMMING (12 Hrs)

Data Access with ADO.NET – Architecture – Data reader – Data Adapter – Command – Connection – Data set – Data binding – Data Grid Control – XML based Data sets.

UNIT V J2EE (12 Hrs)

Enterprise Edition Overview – Multi-Tier Architecture – Best Practices – Comparison between J2EE and .NET.

Text Books

1. David Chappell, “Understanding .NET – A Tutorial and Analysis”, Addison Wesley, 2002.
2. Herbert Schildt, “C# 3.0 The Complete Reference”, McGraw-Hill Professional, Third Edition, 2009.
3. Keogh, “J2EE The Complete Reference”, Tata McGraw-Hill, 2015.

Reference Books

1. Andrew Troelsen, Pro C# 5.0 and the .NET 4.5 Framework, Sixth edition, A Press, 2012.
2. Joh Skeet, C# in depth, Manning publications, Third Edition, 2014. .
3. AdrewStellman and Jennifer Greene, Head First C#, Third Edition, O’Reilly, 2013.

Web Resources

1. https://www.c-sharpcorner.com/csharp-tutorials
2. https://www.guru99.com/c-sharp-tutorial.html
3. https://www.sitesbay.com/csharp/index
4. https://www.sitesbay.com/interview/dot-net

		L	T	P	C	Hrs
A20CPT613	**SOFTWARE ENGINEERING**	**3**	**1**	**0**	**4**	**60**

Course Objectives

- To understand the various models and methods.
- To gain about software development life cycle models.
- To develop the software design.
- To connect the coding techniques.
- To learn the testing of software.

Course Outcomes

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

CO1 - Learn about the various models and methods.

CO2 - Develop and implement the software life cycle models.

CO3 - Design the software models.

CO4 - Analyze the coding techniques.

CO5 – Explore the testing of software.

UNIT INTRODUCTION (12Hrs)

Software-Software characteristics-software applications -Software Engineering a Generic view-Software process-Software process model-The Linear sequential - Model-Prototyping Model-RAD Model-Fourth Generation Techniques.

UNIT II SOFTWARE MEASURES AND METRICS (12Hrs)

Measures, Metrics and Indicators-Software metrics Process metrics Project metrics. Software measurement size oriented metrics Function oriented metrics Measurin Quality Metrics for small organization Establishing a software metrics program.

UNIT III SOFTWARE PROJECT PLANNING (12Hrs)

Software Project Planning-objectives-Feasibility-Software project Estimation Empirical Estimation models. The structure of Estimation models-COCOMO model.-Software Risks-Software Quality Assurance.

UNIT III SOFTWARE DESIGN (12Hrs)

Software Design: Fundamental Design Concepts - Modules and Modularization Criteria –Design Notations –Design Techniques -Detailed Design Considerations -Real-Time and Distributed System-Design -Test Plans -Milestones, walkthroughs, and Inspections.

UNIT IV SOFTWARE TESTING (12Hrs)

Software Testing Technique - Software Testing Fundamentals Testing objectives Testing Principles - Testability - Test case Design-White Box Testing - Basic path testing-Control Structure Testing-Black Box Testing.

Text Books

1. R. Fairley, “Software Engineering Concepts”, Tata McGraw Hill Edition -2017.
2. Roger S. Pressman, “Software Engineering: A Practitioner’s Approach”, McGraw Hill, 7th edition, 2010. (Module 1 & Module 5)
3. Software Engineering , Tenth Edition , Pearson by Ian Sommerville

Reference Books

1. Software Engineering: A Practitioner’s Approach by Bruce R. Maxim
2. Pankaj Jalote's Software Engineering: A Precise Approach
3. Software Engineering 0th Edition, Kindle Edition by Suraiya Hussain

Web References

1. https://www.sitesbay.com/software-engineering/index
2. https://www.sitesbay.com/software-engineering/se-software-project-management-tools
3. https://www.sitesbay.com/software-engineering/se-risk-management-in-software-engineering
4. https://www.tutorialspoint.com/software_engineering/index.htm

A20CPT614	CLOUD COMPUTING	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To define the fundamental ideas behind Cloud Computing.
- To classify the basic ideas and principles in cloud information system.
- To relate cloud storage technologies and relevant distributed file systems
- To understand the Big Data Platform and its Use cases
- To provide an overview of Apache Hadoop, Provide HDFS Concepts and Interfacing with HDFS

Course Outcomes

After completion of the course, the students should be able to:

CO1 –Explain the core concepts of the cloud computing paradigm.
CO2 –Apply fundamental concepts in cloud infrastructures.
CO3 –Illustrate the fundamental concepts of cloud storage such as Amazon S3 and HDFS.
CO4 – Explain the Utility Computing concepts.
CO5 – Understand the Amazon Web Services concepts.

UNIT I INTRODUCTION (12Hrs)

Introduction to Cloud Computing- The Evolution of Cloud Computing – Hardware Evolution – Internet Software Evolution – Server Virtualization - Federation in the Cloud - Presence in the Cloud.

UNIT II SERVICES (12Hrs)

Web Services Deliver from the Cloud – Communication-as-a-Service – Infrastructure-as-a-Service – Monitoring-as-a-Service – Platform-as-a-Service – Software-as-a-Service – Building Cloud Network.

UNIT III CLOUD INFRASTRUCTURE (12Hrs)

Introduction - Advancing towards a Utility Model – Evolving IT infrastructure – Evolving Software Applications – Continuum of Utilities- Standards and Working Groups – Standards - Bodies and Working Groups – Service Oriented Architecture – Business Process Execution Language

UNIT IV UTILITY COMPUTING (12Hrs)

Utility Computing Technology – Virtualization – Hyper Threading – Blade Servers - Automated Provisioning - Policy Based Automation – Application Management – Evaluating Utility Management Technology

UNIT V AMAZON WEB SERVICES (12Hrs)

Identity and Access Management (IAM) – Elastic Compute Cloud(EC2) – EC2 Instance Storage – S3 – Database & Analytics.

Text Books

1. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
2. Ritting house, John W., and James F. Ransome, —Cloud Computing: Implementation, Management and Security, CRC Press, 2017.

Reference Books

1. John W. Rittinghouse and james F. Ransome, “Cloud Computing Implementation, Management and Security”, 2010, CRC Press, Taylor & Francis Group, Boca Raton London New York. [Unit -11 and Unit II]
2. Alfredo Mendoza, “Utility Computing Technologies, Standards, and Strategies”, Artech House INC, 2007. [Unit -11I to Unit V]
3. Bunker and Darren Thomson, “Delivering Utility Computing”, 2006, John Wiley & Sons Ltd.
4. Pete Warden, “Big Data Glossary”, O’Reily, 2011.

Web References

1. www.coltdatacentres.net/Cloud Technology.
2. https://www.zdnet.com/article/what-is-cloud-computing-everything-you-need-to-know-about-the-cloud/
3. www.digitalocean.com/community/tutorials/an-introduction-to-big-data-concepts-and-terminology

A20CPP602	PROJECT WORK & VIVA VOCE	L	T	P	C	Hrs
		0	0	10	5	75

The Project work is to be evaluated as follows:

1. The internal assessment (40 marks) is awarded as follows:

15 marks is awarded based on two internal project reviews conducted in periodic intervals by a panel comprising of members of the Department during the tenure of the project.

The student's project guide awards 15 marks for the project work and 10 marks for attendance (attendance marks as specified in the Pondicherry University UG CBCS regulations).

2. The End Semester Examination assessment (60 marks) is evaluated under two aspects

i) Project Work – (40 marks)

ii)Project Report and Viva-Voce (20 marks)

Table: 10 CAM & ESM break-up for Project work

Sl. No	Description			Weightage
1	Continuous Assessment Marks			
a	Review 1	Review Committee#	5	10
		Guide	5	
b	Review 2	Review Committee#	5	10
		Guide	5	
c	Review 3	Review Committee#	10	20
		Guide	10	
			Total CAM	40
2	End Semester Marks			
a	Evaluation of final report and Viva-voce	Internal Examiner	25	50
		External Examiner	25	
b	Outcome*	Conference Presentations / Publication of papers /prototypes /patents etc	10	10
			Total ESM	60
			Total Marks	100

A20CPS606	RESEARCH METHODOLOGY	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To facilitate science and research
- To introduce research and methodology concepts
- To inculcate data collection
- To implement the scientific writing
- To construct the basic ethics

Course Outcomes

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

CO 1 - Identify various concepts science and research
CO 2 – Describing research and methodology concepts
CO 3 - Utilize the data collection
CO 4 – Managing the scientific writing
CO 5 – Deploy the basic ethics.

UNIT I SCIENCE AND RESEARCH (6 Hrs)

Definition – History – Evolution of Scientific Inquiry, Scientific Research: Definition, Characteristics, types, need of research. Identification of the problem, assessing the status of the problem, formulating the objectives

UNIT II INTRODUCTION TO RESEARCH METHODOLOGY (6 Hrs)

Meaning and importance of Research – Types of Research – Selection and formulation of Research Problem Research Design – Need – Features – Inductive, Deductive and Development of models Developing a Research Plan – Exploration, Description, Diagnosis, Experimentation, Determining Experimental and Sample Designs

UNIT III DATA COLLECTION AND ANALYSIS (6 Hrs)

Sources of Data – Primary, Secondary and Teritary – Types of Data – Categorical, nominal & Ordinal. Methods of Collecting Data : Observation, field investigations, Direct studies – Reports, Records or Experimental observations. Sampling methods – Data Processing and Analysis strategies- Graphical representation.

UNIT IV SCIENTIFIC WRITING (6 Hrs)

Structure and components of Scientific Reports – types of Report – Technical Reports and Thesis – Significance – Different steps in the preparation – Layout, structure and Language of typical reports - Illustrations and tables – Bibliography, Referencing and foot notes –Importance of Effective Communication.

UNIT V ETHICS (6 Hrs)

Ethical Issues – Ethical Committees – Commercialization – copy right – royalty – Intellectual Property rights and patent law – Track Related aspects of intellectual property Rights – Reproduction of published material – Plagiarism – Citation and Acknowledgement – Reproducibility and accountability.

Text Books

1. Garg.B.L., Karadia, R., Agarwal,F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
2. Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition. New Age International Publishers, New Delhi.
3. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.

Reference Books

1. Gupta S.P. (2008). Statistical Methods. 37 th ed. (Rev)Sultan Chand and Sons. New Delhi. 1470 p.
2. Leon & Leon (2202). Internet for everyone, Vikas Publishing House.
3. Wadehra, B.L.2000. Law relating to patents, trademarks, copyright designs and geographical indications. Universal Law Publishing.
4. Research Methodology Dr P M Bulakh,Dr P. S. Patki and Dr A S Chodhary 2010 Published by Expert Trading Corporation Dahisar West, Mumbai 400068

Web References

1. https://gradcoach.com/what-is-research-methodology/
2. https://www.guide2research.com/research/how-to-write-research-methodology
3. https://www.tutorialspoint.com/thematic_apperception_test/thematic_apperception_test_research_methods.htm
4. https://www.wisdomjobs.com/e-university/research-methodology-tutorial-355.html

SCHOOL OF ARTS AND SCIENCE

Department of Computational Studies
Bachelor of Computer Science

Minutes of 4th meeting of Board of Studies

ANNEXURE - III

DISCIPLINE SPECIFIC ELECTIVES										
S. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
ine Specific Electives (DSE - I) - offered in Third Semester										
1	A20CPE301	Introduction to Data Science using Hadoop	DSE	3	0	0	3	25	75	100
2	A20CPE302	Computer Graphics	DSE	3	0	0	3	25	75	100
3	A20CPE303	Information Security	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - II) - offered in Fourth Semester										
1	A20CPE404	Image Processing	DSE	3	0	0	3	25	75	100
2	A20CPE405	Computer hardware and Trouble Shooting	DSE	3	0	0	3	25	75	100
3	A20CPE406	Data Mining	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - III) - offered in Fifth Semester										
1	A20CPE507	Data Science using R	DSE	3	0	0	3	25	75	100
2	A20CPE508	Intrusion Detection System and Prevention	DSE	3	0	0	3	25	75	100
3	A20CPE509	System Software	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - IV) - offered in Sixth Semester										
1	A20CPE610	Client Server Technology	DSE	3	0	0	3	25	75	100
2	A20CPE611	Data Visualization using MATLAB	DSE	3	0	0	3	25	75	100
3	A20CPE612	Ethical Hacking	DSE	3	0	0	3	25	75	100