

PSGR KRISHNAMMAL COLLEGE FOR WOMEN

College of Excellence

(An Autonomous Institution, Affiliated to Bharathiar University)
(Reaccredited with 'A' Grade by NAAC, An ISO 9001:2015 Certified Institution)
Peelamedu, Coimbatore-641004



DEPARTMENT OF COMPUTER SCIENCE

**CHOICE BASED CREDIT SYSTEM &
OUTCOME BASED EDUCATION SYLLABUS**

BACHELOR OF COMPUTER SCIENCE (B.Sc Computer Science)

2018 - 2021



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PROGRAMME OUTCOME

After completion of the programme, the student will be able to

- PO1:** Provides a solid foundation in the discipline of Computer Science and enable students to formulate computational solutions to real life problems
- PO2 :** To possess knowledge to identify, analyze, design for an optimized solution using appropriate algorithms of varying complexity using cutting edge technologies.
- PO3 :** To develop skills in software and hardware maintenance so as to enable the students to establish a productive career in industry, research and academia.
- PO4 :** Equip the students to meet the industrial needs by utilizing tools and technologies with the skills to communicate effectively among peers.
- PO5 :** Foundation graduate programme which induces continuous improvement of knowledge and act as a platform for higher studies and engage in research.

PROGRAMME SPECIFIC OUTCOME

The students at the time of graduation will

- PSO1:** Graduates will apply domain knowledge and problem solving skills to solve real time problems
- PSO2:** Empowers graduates with good employability skills and ensures exceptional career opportunities in IT/ITeS/IT is companies



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DEPARTMENT OF COMPUTER SCIENCE

**CHOICE BASED CREDIT SYSTEM & OUTCOME BASED EDUCATION
 SYLLABUS & SCHEME OF EXAMINATION
 2018 - 2021**

Semester	Part	Subject Code	Title of paper	Instruction	Contact Hours	Tutorial Hours	Duration of Examination	Examination Marks			Credits
								CA	ESE	Total	
I	I	TAM1701/ HIN1701/ FRE1701	Language I	6	86	4	3	40	60	100	3
I	II	ENG1701 / ENG17F1	English Paper I / Functional English Paper I	6	86	4	3	40	60	100	3
I	III	PP18C01	Core 1 : Programming in C	6	86	4	3	40	60	100	4
I	III	CS18CP1	Programming Lab 1 : C programming Lab	4	60	-	3	40	60	50*	3
I	III	TH17A03B / TH17A03A	Allied A1 Paper I : Mathematics and Statistics-Level I Paper II: Mathematics and Statistics-Level II	6	86	4	3	40	60	100	5
I	IV	NME18ES/ NME16A1/ NME16B1	Introduction to Entrepreneurship/ Advance Tamil / Basic Tamil	2	28	2	2	50	50	100	2
II	I	TAM1702 / HIN1702 / FRE1702	Language II	6	86	4	3	40	60	100	3
II	II	ENG1702 / ENG17F2	English Paper II / Functional English Paper II	6	86	4	3	40	60	100	3
II	III	CS18C02	Core 2: Computer Organization and Architecture	3	41	4	3	40	60	100	4
II	III	PO18C03	Core 3: Object Oriented Programming with C++	4	56	4	3	40	60	100	4

II	III	CS18CP2	Programming Lab 2: C ++ Programming and Bio Informatics Lab	3	45	-	3	40	60	50*	2
II	III	TH17A06B / TH17A06A	Allied A2 Paper I : Discrete Mathematics-Level I Paper II: Discrete Mathematics - Level II	6	86	4	3	40	60	100	5
II	IV		Open Course (Self- Study- Online)	-	-	-	-	-	-	-	Grade
		NME16A2 / NME16B2	** Advanced Tamil / Basic Tamil	-	-	-	-	-	-	-	Grade
II	VI	REG16EE	Effective English Communication	2	-	-	2	50	50	100	2
II	VI	NM12GAW	General Awareness	Self- Study	-	-	Onli ne test	100	-	-	Grade
III	III	CS17C04	Core 4: Operating System	5	71	4	3	40	60	100	4
III	III	CS18C05	Core 5: Data Structures	5	71	4	3	40	60	100	4
III	III	PRD1803	Core 6:RelationalDatabase Management System	5	71	4	3	40	60	100	4
III	III	CS16CP3	ProgrammingLab3: RDBMS Lab	4	60	-	3	40	60	50*	2
III	III	TH16A13B / TH16A13A	Allied A3 Paper I: Optimization Techniques-I Paper II: Optimization Techniques-II	6	86	4	3	40	60	100	5
III	IV	NM14VHR	Foundation Course: Value Education and Human Rights	2	26	4	-	100	-	100	2
III & IV	IV	JOB1826	Job Oriented Course: Amazon Web Services	-	-	-	3	-	-	-	Grade
III & IV	IV	SB17DA01 SB17SE01	Skill Based Subject Data Analytics - Level I: R-Programming- OOSE-Level I: Software Design Tools	3	43	2	2	25	75	100	4
IV	III	CS18C07	Core 7 : Data Mining	5	71	4	3	40	60	100	4
IV	III	CS18C08	Core 8: Computer Networks	5	71	4	3	40	60	100	4
IV	III	CS18C09	Core 9: Python Programming	5	71	4	3	40	60	100	4
IV	III	CS18CP4	Programming Lab 4: Python Programming and Bioinformatics Lab	4	60	-	3	40	60	50*	3

IV	III	BP16A05 BP16A06 PM17A01	Allied A4 Paper I: Business Accounting Paper II: Principles of Marketing Paper III: Management Information Systems	6	86	4	3	40	60	100	5
III & IV	IV	SB17DAP1 SB17SEP1	Skill Based Subject Data Analytics: Practical I: R-Programming OOSE: Practical I : Software Design Tools	3	45	-	2	40	60	100	2
IV	IV	NM10EVS	Foundation Course: Environmental Studies	2	26	4	-	100	-	100	2
IV	V		NSS/NCC/YRC/Sports & Games	-	-	-	-	-	-	100	1
IV		COM15SER	Community Oriented Service	-	-	-	-	-	-	-	Grade
V	III	PJA1810	Core 10 : Java Programming	5	71	4	3	40	60	100	4
V	III	PCG1811	Core 11 : Computer Graphics	5	71	4	3	40	60	100	4
V	III	CS18C12	Core 12 : Software Engineering	5	71	4	3	40	60	100	4
V	III	CS18E01 CS18E02 CS18E03	Elective 1:Parallel Computing Elective 2 :Big Data Analytics Elective 3:Artificial Intelligence	5	71	4	3	40	60	100	5
V	III	CS17CP5	Programming Lab 5 : Java Programming and Bioinformatics Lab	5	75	-	3	40	60	50*	3
V	III	NM13IS2	Information Security-Level II	2	26	4	-	100	-	-	Grade
V	III	SB17DA02 SB17SE02	Skill Based Subject Data Analytics-Level II : Data Visualization Tools OOSE-Level II: Software Testing Tools	3	43	2	2	25	75	100	4
V	III	CS14AC1 CS16AC2	Advanced Level Course1 Paper1: Wireless Communications Paper 2: Cloud Computing	-	-	-	3	25	75	100*	5*
V	III		Comprehensive Exam	-	-	-	1	-	-	-	Grade
V	III	INST1	Internship Training	-	-	-	-	-	-	100	2
V			Personality Development	-	-	-	-	-	-	-	Grade
VI	III	CS18C13	Core 13 : .Net Programming	5	71	4	3	40	60	100	4
VI	III	CS18C14	Core 14 : Software Testing	5	71	4	3	40	60	100	4

VI	III	PWT1815	Core 15 : Web Technology	5	71	4	3	40	60	100	4
VI	III	CS17CP6	Programming Lab 6 : Web Technology and Bioinformatics Lab	5	75	-	3	40	60	50*	2
VI	III	PROJ	Project Viva – Voce	7	-	-	3	20	80	100	5
VI	III	CS14AC3 CS11AC4	Advanced Level Course 2 Paper 1: Image Processing Paper 2: Mobile Computing	-	-	-	3	25	75	100*	5*
V & VI	IV	SB17DAP2 SB17SEP2	Skill Based Subject Data Analytics: Practical II: Data Visualization Tool OOSE: Practical II: Software Testing Tools	3	45	-	2	40	60	100	2
TOTAL										3800	140

* 100 Marks Converted into 50 Marks

** Outside Regular Class Hours.

*The credits are applicable to candidates who take up the advanced level course exam.

QUESTION PAPER PATTERN

CORE & ALLIED PAPERS

Continuous Internal Assessment: 50 Marks

SECTION		MARKS	TOTAL
A	5 X 2 Marks	10	50
B	4 X 5 Marks	20	
C	2/3 X 10 Marks	20	

End Semester Examination: 100 Marks

SECTION	WORD LIMIT	MARKS	TOTAL
A-12/15 X 2 Marks (Open Choice)	One or two sentences	24	100
B – 6/8 X 6 Marks (Open Choice)	300 words	36	
C – 4/6 X 10 Marks (Open Choice)	600 – 800 words	40	

SKILL BASED SUBJECT

Continuous Internal Assessment: 25 Marks

SECTION		MARKS	TOTAL
A	4 / 6 X 4 Marks	16	25
B	1 / 2 X 9 Marks	9	

End Semester Examination: 50 Marks

SECTION		MARKS	TOTAL
A	4 / 6 X 5 Marks	20	50
B	2 / 3 X 15 Marks	30	

ADVANCED LEARNERS COURSE (ALC)

Continuous Internal Assessment: 25 Marks

SECTION		MARKS	TOTAL
A	4 / 6 X 4 Marks	16	25
B	1 / 2 X 9 Marks	9	

End Semester Examination: 75 Marks

SECTION		MARKS	TOTAL
A	5 / 8 X 5 Marks	25	75
B	5/8 X 10 Marks	50	

**VALUE EDUCATION AND HUMAN RIGHTS / WOMEN STUDIES / AMBEDKAR STUDIES /
GANDHIAN STUDIES / ENTREPRENEURSHIP / ENVIRONMENTAL STUDIES**

Continuous Internal Assessment: 50 Marks

SECTION		MARKS	TOTAL
A	4 / 6 X 5 Marks	20	50
B	2 / 3 X 15 Marks	30	

Value Education and Human Rights & Environmental Studies two internal tests will be conducted for 50 marks each and the total marks secured will be equated to a maximum of 75 marks and 25 marks is allotted for project / group discussion / presentation of a report.

INFORMATION SECURITY

Continuous Internal Assessment: 40 Marks

SECTION		MARKS	TOTAL
A	5 / 8 X 2 Marks	10	40
B	6 / 8 X 5 Marks	30	

FIELD TRAINING

The students have the option to carry out their field training work at any organizations such as Government / private organizations of different domains (Manufacturing, Textiles, Retails, Insurance & Banking, etc.,) and R&D institutes. Students will start the training work after getting approval from the respective faculty guide and HoD. The students will undergo training for a period of two weeks (15days) at the end of semester IV during vacation. The students must maintain a work diary and prepare report of the training undergone and submit the report. The field training will be assessed based on the components attendance, work diary, report and viva-voce with internal examiners at the beginning of the semester V.

MODE OF EVALUATION	MARKS	TOTAL
Attendance	10	100
Work Diary	15	
Report	50	
Viva-voce	25	

PROJECT

Individual Project and Viva Voce

Each student will be allotted with a faculty for project guidance. The topic/area of the project work and the organization will be finalized at the end of V semester and approved by the respective guide and HoD. The work will be carried out in the computer science lab as well as in the organization. Internal review will be conducted periodically to assess the progress of the project work. After completion of the work, a detailed project report will be prepared and submitted at the end of the semester VI. External examiner appointed by the Controller of Examination) will conduct the viva voce examination along with respective guide.

Area of Work

Mobile app development, website development, IoT, Dataset preparation, Biological sequence analysis etc.

Methodology

- Each project should contain the following details
- Brief introduction on the topic
- System Analysis
- System Design
- Testing and Implementation

- Conclusion
- Scope for Future Enhancement
- Bibliography

The above contents should not exceed 50 pages

Internal Assessment: 20 Marks

Review	Mode of Evaluation	Marks	Total
I	Synopsis, Organization profile, System Specification, Existing system, Proposed system	5	20
II	DFD,ERD, Table Design	10	
III	Input forms, Output forms and Preparation of rough draft	5	

External Assessment: 80 Marks

Mode of Evaluation	Marks	Total
Project Report		
Relevance of the topic	10	60
Technology	10	
Designing and development	20	
Report	20	
Viva Voce		
Presentation	10	20
Performance	10	

WEIGHTAGE ASSIGNED TO VARIOUS COMPONENTS OF CONTINUOUS INTERNAL ASSESSMENT

Theory

	CIA I	CIA II	Model Exam	Assignment/ Class Notes	Seminar	Quiz	Class Participation	Library Usage	Attendance	Max. Marks
Core / Allied	5	5	6	4	5	4	5	3	3	40
SBS	5	5	15	-	-	-	-	-	-	25
ALC		10	15	-	-	-	-	-	-	25
Information Security	40	40		10		10				100

Practical

	Model Exam	Lab Performance	Regularity in Record Submission	Attendance	Maximum Marks
Core / Allied / SBS	12	20	5	3	40

RUBRICS

Assignment/ Seminar

Maximum - 20 Marks (converted to 4 marks)

Criteria	4 Marks	3 Marks	2 Marks	1 Mark
Focus Purpose	Clear	Shows awareness	Shows little awareness	No awareness
Main idea	Clearly presents a main idea.	Main idea supported throughout	Vague sense	No main idea
Organization Overall	Well planned	Good overall organization	There is a sense of organization	No sense of organization
Content	Exceptionally well presented	Well presented	Content is sound	Not good

Style: Details and Examples	Large amounts of specific examples and detailed description	Some use of examples and detailed descriptions	Little use of specific examples and details	No use of examples
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CLASS PARTICIPATION

Maximum - 20 Marks (converted to 5 marks)

Criteria	5 Marks	4 Marks	3 Marks	2 Marks	1 Mark
Level of Engagement in Class	Student proactively contributes to class by offering ideas and asks questions more than once per class.	Student proactively contributes to class by offering ideas and asks questions once per class	Student contributes to class and asks questions occasionally	Student rarely contributes to class by offering ideas and asking no questions	Student never contributes to class by offering ideas
Listening Skills	Student listens when others talk, both in groups and in class. Student incorporates or builds off of the ideas of others.	Student listens when others talk, both in groups and in class.	Student listens when others talk in groups and in class occasionally	Student does not listen when others talk, both in groups and in class.	Student does not listen when others talk, both in groups and in class. Student often interrupts when others speak.
Behavior	Student almost never displays disruptive behavior during class	Student rarely displays disruptive behavior during class	Student occasionally displays disruptive behavior during class	Student often displays disruptive behavior during class	Student almost always displays disruptive behavior during class

Preparation	Student is almost always prepared for class with required class materials	Student is usually prepared for class with required class materials	Student is occasionally prepared for class with required class materials	Student is rarely prepared for class with required class materials	Student is almost never prepared for class.
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MAPPING OF POs WITH COs

COURSE	PROGRAMME OUTCOMES				
	PO1	PO2	PO3	PO4	PO5
COURSE 1 - PP18C01					
CO1	S	S	S	M	S
CO2	S	S	S	S	M
CO3	S	M	S	M	S
CO4	S	S	M	S	S
CO5	S	M	S	S	S
COURSE2- CS18CP1					
CO1	S	M	S	M	M
CO2	S	S	M	M	S
CO3	S	M	M	S	S
CO4	S	S	M	M	M
CO5	S	S	S	M	S
COURSE 3 - CS18C02					
CO1	S	S	M	S	S
CO2	S	S	S	S	M
CO3	S	M	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	S	S
COURSE 4 - PO18C03					
CO1	S	S	M	S	S
CO2	M	S	S	M	S
CO3	S	M	S	M	S
CO4	S	S	M	S	S

CO5	M	S	S	M	M
COURSE 5 - CS18CP2					
CO1	S	S	M	M	M
CO2	S	M	S	M	M
CO3	S	M	M	S	S
CO4	M	S	M	S	S
CO5	S	S	S	S	S
COURSE 6 - CS17C04					
CO1	S	M	M	M	S
CO2	S	S	M	M	S
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	M	S	M
COURSE 7 - CS18C05					
CO1	M	S	S	S	S
CO2	S	S	S	M	S
CO3	M	S	S	M	S
CO4	S	M	S	M	M
CO5	M	M	S	S	S
COURSE 8 - PRD1803					
CO1	M	S	M	S	M
CO2	S	M	S	S	M
CO3	M	S	S	M	S
CO4	S	M	M	S	M

CO5	M	S	S	M	S
COURSE 9- CS16CP3					
CO1	M	M	S	S	S
CO2	S	M	S	M	S
CO3	S	M	M	S	S
CO4	M	M	S	S	M
CO5	S	M	S	S	S
COURSE 10- CS18C07					
CO1	S	M	S	S	M
CO2	S	M	S	S	M
CO3	M	M	S	M	M
CO4	S	S	M	S	S
CO5	S	S	S	S	S
COURSE 11- CS18C08					
CO1	S	M	M	M	M
CO2	S	S	M	M	S
CO3	S	S	M	M	S
CO4	S	S	M	M	S
CO5	S	S	S	S	S
COURSE 12- CS18C09					
CO1	S	M	M	S	S
CO2	S	S	S	S	M
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S
COURSE 13- CS18CP4					
CO1	S	S	S	S	S
CO2	S	S	S	S	M
CO3	S	S	M	S	S
CO4	S	S	M	S	S
CO5	S	M	S	S	S
COURSE 14- PM17A01					
CO1	M	S	S	S	M
CO2	M	S	S	S	S
CO3	S	S	S	M	S
CO4	M	S	M	S	S
CO5	S	M	S	S	S

COURSE 15- PJA1810					
CO1	S	M	S	S	S
CO2	S	S	S	M	S
CO3	M	M	S	M	S
CO4	S	S	S	M	S
CO5	S	S	S	S	M
COURSE 16- CS18C12					
CO1	S	S	S	S	S
CO2	S	S	M	S	S
CO3	S	S	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	S	S
COURSE 17- CS18E01					
CO1	S	M	S	S	M
CO2	S	M	S	S	M
CO3	M	M	S	M	M
CO4	S	S	M	S	S
CO5	S	S	S	S	S
COURSE 18- CS18E02					
CO1	S	M	S	S	S
CO2	S	S	S	M	S
CO3	M	M	S	M	M
CO4	S	S	S	M	M
CO5	S	S	S	M	M
COURSE 19- CS18E03					
CO1	S	S	M	S	S
CO2	S	S	S	S	M
CO3	S	M	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	S	M
COURSE 20- CS17CP5					
CO1	S	M	S	S	S
CO2	S	S	S	M	S
CO3	M	M	S	M	S
CO4	S	S	S	M	S
CO5	S	S	S	S	M
COURSE 21- CS18C13					
CO1	M	S	M	M	M
CO2	S	M	S	S	S
CO3	S	S	S	S	M

CO4	S	M	S	M	S
CO5	M	M	M	S	S
COURSE 22- CS18C14					
CO1	S	S	S	S	S
CO2	M	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	M	S	S
CO5	M	S	S	S	S
COURSE 23- PWT1815					
CO1	S	S	S	M	S
CO2	S	S	M	S	M
CO3	M	S	M	M	S
CO4	S	M	S	M	S
CO5	M	M	S	S	M
COURSE 24- CS17CP6					
CO1	M	M	S	M	M
CO2	M	S	M	S	S
CO3	S	M	S	M	S
CO4	S	M	S	M	M
CO5	S	M	M	S	S

H- High; M-Medium; L-Low

Course Number	Course Name	Category	L	T	P	Credit
PP18C01	PROGRAMMING IN C	Core	86	4	-	4

Preamble

This course introduces fundamental concepts such as arrays, structures. It covers concepts such as arrays, pointers and file handling methods. It provides technical skills to design and develop various applications.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Identify the logic behind the execution of various applications	K1
CO2	Understand the concepts of C programming	K2
CO3	Analyze and discover bugs in the program	K3
CO4	Develop an application using memory management functions.	K3
CO5	Apply the concepts to solve a real-time problem	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1.	S	S	M	M	S
CO2.	S	S	M	M	M
CO3.	S	S	M	M	M
CO4.	S	S	M	S	S
CO5.	S	S	M	S	M

S- Strong; M-Medium; L-Low.

Syllabus

Unit - I

17 Hrs

Overview of C:– Introduction - character set - C tokens - keyword & identifiers – constants – variables - data types – Declarations of variables – Arithmetic, Relational, Logical, Assignment, conditional, Bit wise, special, increment and decrement operators - Arithmetic expressions - Evaluation of expression - Operator precedence & associativity - Mathematical functions - Reading & writing a character - Formatted input and output.

Unit - II**17 Hrs**

Decision Statements: If, if else, switch, break, continue - the? Operator - The GOTO statement. -
 Loop Control Statements: Introduction – for, nested for loops – while, do-while statements -
 Arrays: One-dimensional - Two dimensional - Multidimensional arrays.

Unit - III**17 Hrs**

Character string handling - Declaring and initializing string variables - Reading strings from terminal - Writing strings to screen - String handling functions - User-defined functions: Need for user defined functions – Types of functions - calling a function category of functions - no arguments and no return values - Arguments but no return values - Arguments with return values - Recursion - functions with arrays - functions with arrays - The scope and lifetime of variables in functions.

Unit - IV**17 Hrs**

Structure: Definition- Structure initialization - Comparison of structure variables - Arrays of structures - Arrays within structures - Structures within structures – unions. Pointers: understanding pointers - accessing the address of a variable - declaring and initializing pointers - accessing a variable through its pointers - pointer expressions - pointers and arrays - pointers and character strings - pointers and functions - pointers and structures.

Unit - V**18 Hrs**

File Management in C: defining and opening a file - closing file - I/O operations on files - error handling during I/O operations - Random access to files - command line arguments. Dynamic memory allocation: Introduction- dynamic memory allocation – MALLOC – CALLOC – REALLOC – The pre-processor.

Text Book

S.No	Author	Title of Book	Publisher	Year of Publication
1	E. Balagurusamy	Programming In ANSI C	Tata McGraw Hill	7 th Edition, 2017

Reference Book

S.No	Author	Title of Book	Publisher	Year of Publication
1	Byron Gottfried	Programming with C	Tata McGraw Hill,	3 rd Edition, 2013
2	V. Rajaraman	Computer Programming in C	Prentice Hall of India Pvt Ltd,	1 st Edition, 2004
3	Smarajit Ghosh	Programming in C	Prentice Hall of India Pvt Ltd,	1 st Edition, 2004

4	Yashwvant Kanetkar	Let us C	BPB Publications,.	13 th Edition, 2014
5	Martin J. Gentile	An Easy Guide to Programming in C	Create Space Independent Publishing Platform,	2 nd Edition, 2012

Pedagogy

Lectures, Group discussions, Demonstrations, Case studies.

Course Designers

- Mrs. N. Deepa.

Course Number	Course Name	Category	L	T	P	Credit
CS18CP1	C PROGRAMMING LAB	Core	-	-	60	3

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

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

CO Number	CO Statement	Knowledge Level
CO1	Recall the mathematical functions while creating a program	K1
CO2	Understand the fundamental programming concepts	K2
CO3	Illustrate the programming technique to analyze software problems	K2
CO4	Apply the concepts to find solution for the problems	K3
CO5	Design and develop the simple application.	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	M
CO2	S	S	M	M	S
CO3	S	M	M	S	S
CO4	S	S	M	M	M
CO5	S	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

- Exercise using different data types.
- Exercise using different operators.
- Exercise to implement control structures.
- Exercise using arrays.
- Exercise to implement functions.
- Exercise to create user defined function.
- Exercise using pointers.
- Exercise to work with files.

Pedagogy

- Demonstration, Lecture.

Course Designers

- Mrs. N. Deepa.

Course Number	Course Name	Category	L	T	P	Credit
CS18C02	Computer Organization and Architecture	Core	41	4	-	4

Preamble

This course provides the principles and practices of digital electronics and computer system and also covers the concepts of computer Arithmetic operations, cache mapping techniques and I/O organization. It also provides the various data transfer techniques in digital computer.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Define the functions to simplify the Boolean equations using logic gates.	K1
CO2	Discuss the system architecture based on microprocessor.	K2
CO3	Understand the functions of the registers and different types of micro operations.	K3
CO4	Illustrate the classification of pipelining and vector processing.	K3
CO5	Show the operation of ALU along with the algorithm and implementation of integer and floating point arithmetic operators.	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	S	S	S	M
CO3	S	M	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit - I

9 Hrs

Data Representation: Data types-Number systems: Octal & Hexadecimal numbers, Decimal Representation, Alphanumeric representation. Logic Circuits: Gates –AND, OR, NOT, NAND, NOR Gates & Truth tables-Boolean Algebra

Unit - II

8 Hrs

Flip flops: SR, JK, D, T. Karnaugh maps- Product of Sums method- Sum of product method, Don't Care condition -Decoders.Multiplexer-Demultiplexer.

Unit - III

8Hrs

Register Transfer and Micro Operations: Register transfer language - Register Transfer-Bus and memory transfers - Arithmetic Micro operations-Logic micro operations - Shift micro operations-Arithmetic logic shift unit-Instruction format: Three address instruction-Two address instruction-One address instruction-Zero address instruction.

Unit – IV

8 Hrs

Instruction Format-Addressing modes-Computer Arithmetic: Addition and Subtraction – Multiplication algorithm -Division algorithm - Floating point arithmetic operations.

Unit - V

8 Hrs

Input /output organization: Input output interface- Asynchronous data transfer- DMA. Memory organization: Cache memory-Virtual memory.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION
1	M Morris Mano	Computer System Architecture.	Pearson Education	3 rd Edition 2007

Reference Books

S.N O	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION
1.	Donald P.Leach, Albert Paul Malvino	Digital Principles And Applications	Tata McGraw-Hill	5 th Edition 2003
2.	John .L.Hennessy	Computer Architecture- A Quantitative approach	Elsevier	2 nd Edition, 2011
3.	William Stallings	Computer Organization and Architecture: Designing for Performance	Technical Publications	2010.

Pedagogy

- Lecture, Demonstration.

Course Designers

- Mrs. N. Deepa.

Course Number	Course Name	Category	L	T	P	Credit
PO18C03	Object Oriented Programming with C++	core	56	4	-	4

Preamble

The course provides an introduction to object-oriented programming using C++ language. It provides the concepts such as data abstractions, classes, inheritance, method overloading and overriding, generic programming and standard template library. It enables the students to apply these features in program design and implementation

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Define structure and object oriented problem solving approaches	K1
CO2	Infer classes and objects for a given problem	K2
CO3	Describe the constructors, destructors and type conversions for the problems	K2
CO4	Illustrate the code reusability and extensibility by means of Inheritance and Polymorphism	K3
CO5	Apply the concepts in file operations	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	M	S	S	M	S
CO3	S	M	S	M	S
CO4	S	S	M	S	S
CO5	M	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

Unit - I

(11 Hrs)

Principles of Object Oriented Programming: Basic concepts of object oriented programming – Benefits of OOPs – Applications of OOPs – Beginning with C++: What is C++ – Applications of C++ – C++ statements – Structure of C++ program. Tokens, Expressions and Control structures: Tokens – Keywords – Identifiers – Constants – Expressions and their types – Basic and user defined data types – operators in C++ – Operator overloading – Operator precedence – Control structures.

Unit - II

(12 Hrs)

Functions in C++: The main functions – Function prototyping – Call by reference – Return by reference – Inline functions – Function overloading – Friend & Virtual Functions. Classes and Objects: Specifying a class – Defining member function – Nesting of member functions – Private member functions – Arrays within a class – Static data members – Static member functions – Array of objects – Objects as function arguments – Friendly functions – Pointers to members.

Unit - III

(11 Hrs)

Constructors and Destructors: Constructors – Parameterized constructors – Multiple constructors in a class – Constructors with default arguments – Copy constructors – Dynamic constructors – Destructors – Operator overloading – type conversions.

Unit - IV

(11 Hrs)

Inheritance: Defining derived classes – Single Inheritance – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes – Abstract classes – Constructors in Derived Classes. Pointers, Virtual functions and Polymorphism: Pointers – Pointers to Objects, this Pointer, Pointers to Derived classes.

Unit - V

(11 Hrs)

Managing Console I/O Operations: C++ streams – C++ stream classes – Unformatted I/O operations – Formatted console I/O operations – Managing output with manipulators. Working with files: classes for file stream operations – opening and closing a file – Detecting End – of – File – sequential I/O operations – Error handling during file operations.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION
1	E. Balagurusamy	Object Oriented Programming with C++	Tata Mc Graw Hill Publications.	6 th Edition, 2013

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION
1	Bjarne Stroustrup	The C++ Programming Language	Pearson Education.	4 th Edition, 2014
2	Rajesh K. Shukla	Object Oriented Programming in C++	Wilsey India Pvt.Ltd.,	1 st Edition, 2008

3	Robert Lafore	Object Oriented Programming in C++	Galgotia Publications, Pvt Ltd.,	4 th Edition, 2001
4	Tony Gaddis, Judy Walfers, GodferyMuganda	Starting Out with C++: Early Objects	Addison-Wesley publication.	8th Edition, 2013

Pedagogy

- Lectures, Group Discussion, Demonstrations.

Course Designers

- Dr. J. Viji Gripsy

Course Number	Course Name	Category	L	T	P	Credit
CS18CP2	C ++ PROGRAMMING AND BIO INFORMATICS LAB	Core	-	-	45	2

Preamble

This course focuses on object oriented concepts and to develop an application. It implements the concepts such as inheritance, polymorphism, dynamic binding and generic structures to build reusable code. It enables the students to write programs using C++ features such as composition of objects, operator overloads, dynamic memory allocation, file I/O and exception handling. In addition, it also covers the methods to process the biological database.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Define the object oriented concepts for building object based applications	K1
CO2	Illustrate the different logic with suitable validation using control structures, classes and objects	K2
CO3	Demonstrate the Constructor, Destructor and Inheritance	K3
CO4	Implement method overloading and method overriding for different user specification	K3
CO5	Apply programming skills to experiment Protein sequence	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	S	M	S	M	M
CO3	S	M	M	S	S
CO4	M	S	M	S	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low.

Syllabus

- Exercises to implement various control structures.
- Exercises using Class and objects.
- Exercises using Constructors & Destructors.
- Exercises to implement Inheritance.
- Exercises using Operator Overloading.
- Exercises using Files.
- Exercises to explore the sitemap of NCBI and PUBMED and study the resources available on NCBI and PUBMED.
- Exercises to retrieve the Gen bank entry with specific accession number.
- Exercises to analyze and retrieve and save only the coding sequence of the entry AF375082 in FASTA format.
- Exercises to analyze the NCBI website and find the official gene symbol, its alias name, chromosome number and its ID.

Pedagogy

- Demonstrations, Lectures

Course Designers

- Dr. J. VijiGripsy.

Course Number	Course Name	Category	L	T	P	Credit
CS17C04	Operating System	Core	71	4	-	4

Preamble

This course provides the basic operating system structure, process management, synchronization and CPU scheduling. The course is designed to cover deadlock, storage management file system, interface, I/O systems, virtual machines and distributed systems.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recognize the basic concepts of operating system.	K1
CO2	Understand the process and thread concepts.	K2
CO3	Distinguish the concepts of deadlocks and storage management in operating system concepts..	K3
CO4	Apply various file system implementation and optimization techniques using files	K3
CO5	Illustrate the virtual machine and distributed system in various fields.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	S	M	M	S
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	M	S	M

S- Strong; M-Medium; L-Low.

Syllabus

Unit - I

14 Hrs

Introduction: What Operating Systems Do - Operating-System Structure - Operating System operations. Operating System Structures: Operating System Services - User and Operating System Interface - System Calls - System Programs - Operating System Design and Implementation - Operating System Debugging - Operating System Generation - Types of System Calls.

Unit-II**15 Hrs**

Process Management: Process Concept - Process Scheduling - Operations on Processes. Threads: Overview - Multicore Programming - Multithreading Models. Process Synchronization: Synchronization Hardware - Mutex Locks - Semaphores. CPU Scheduling: Basic Concepts - Scheduling Criteria - Scheduling Algorithms - Thread Scheduling.

Unit-III**14 Hrs**

Deadlock: System Model - Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention- Deadlock Avoidance- Deadlock Detection- Recovery from Deadlock. Storage Management: Overview of Mass Storage Structure - Disk Structure - Disk Attachment - Disk Scheduling - Disk Management- Swap Space Management -RAID Structure.

Unit-IV**14 Hrs**

File System Interface: File Concept- Access Methods -Directory and Disk Structure- File-System Mounting - File Sharing – Protection. I/O Systems: Overview- I/O Hardware - Application I/O Interface - Kernel I/O Subsystem.

Unit-V**14 Hrs**

Virtual Machines: Overview - Benefits and Features- Building Blocks -Types of Virtual Machines and their implementations - Virtualization and Operating System Components - Examples Distributed Systems: Advantages of Distributed Systems - Types of Network based Operating Systems.CaseStudies:XDS-940896-THE897-RC4000897- CTSS898- MULTICS899- IBMOS/360-TOPS-20- CP/MandMS/DOS901-MacintoshOperatingSystemandWindowsMach.

Text Book

S.No	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION
1	Abraham G Silberschatz	Operating System	Wiley Publisher.	10 th Edition 2017

Reference Books

S.No	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION
1	Andrew.S. Tannenbaum	Modern operatingSystem	Pearson Education	2014
2	Abraham Silberschatz, Peter B.Galvin, GregGane	OperatingSystem Concepts	Wiley Global Education	9 th Edition,2012

Pedagogy

- Lectures, Demonstration, Case studies.

Course Designer

- Mrs. J. Shalini

Course Number	Course Name	Category	L	T	P	Credit
CS18C05	Data structures	Core	71	4	-	4

Preamble

This course covers the basic concepts, terminologies in data structure. It provides the data representation, storage and retrieval also gives the sorting and searching techniques and implementation of the algorithm.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recognize the problems where stacks, queues and dequeue are used in data structures.	K1
CO2	Explain and implement Insertion Sort, Selection sort, Radix sort, Merge sort, Quick sort, Binary Search and Linear Search.	K2
CO3	Describe the abstract data type list as a linked list using node and reference pattern	K2
CO4	Illustrate the performance of basic linear data structures.	K3
CO5	Interpret the concept of files, queries and sequential organization.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	S	S
CO2	S	S	S	M	S
CO3	M	S	S	M	S
CO4	S	M	S	M	M
CO5	M	M	S	S	S

S- Strong; M-Medium; L-Low.

Syllabus

Unit-I

14 Hrs

Introduction and Overview: Introduction - Basic Terminology; Elementary Data Organization - Data structures - Data structure operations - Algorithms: Complexity, Time-Space Trade-off. Preliminaries: Algorithmic Notation - Control Structures- Variables, Data Types. Arrays, Records and Pointers: Introduction - Linear Arrays - Representation of Linear Arrays in Memory - Traversing Linear array - Inserting and Deleting - Multidimensional Array

Unit-II **14 Hrs**
 Stack, Queues, Recursion: Introduction – Stacks - Array Representation of Stacks -Linked Representation of Stacks - Arithmetic Expressions - Polish Notation - Recursion-Towers of Hanoi - Implementation of Recursive Procedures by Stacks – Queues - Linked Representation of Queues – Dequeue - Priority Queues

Unit-III **15 Hrs**
 Linked Lists: Introduction - Linked Lists - Representation of Linked Lists in Memory-Traversing a Linked List - Memory Allocation-Garbage Collection - Deletion from a Linked List - Header Linked Lists

Unit-IV **14 Hrs**
 Trees: Introduction - Binary Trees - Representing Binary Trees in Memory-traversing binary trees-Graphs: Terminology and Representations –Sequential Representation of Graphs-Adjacency Matrix, Path Matrix

Unit-V **14 Hrs**
 Sorting and Searching: Introduction – Sorting - Insertion Sort - Selection Sort - Merging - Merge Sort - Radix Sort -Bubble Sort-Quick Sort. Searching and Data Modification – Hashing-Linear Search - Binary Search

TextBooks

S.No	Author	Title of the book	Publisher	Year of Publication
1	Seymour Lipschutz	Data Structures	TataMcGraw Hill Company	5 th Edition 2009, Reprinted2014

Reference Books

S. No	Author	Title of Book	Publisher	Year of Publication
1	Ellis Horowitz SartajSahni	Fundamentals of Data Structures	Galgotia Book Source	2003, Reprinted 2014
2	HarryHariomChoudhary	Data Structures	Create Space Independent Publishing Platform	2014
3	A.K.Sharma	Data Structures using C	Pearson education	2014
4	Rajdew Tiwari and Nagesh Sharma	Design and Analysis of Algorithms	Pearson education	2014

Pedagogy

- Lectures, Demonstration, Case studies.

Course Designer

- *Mrs. R. Kavitha*

Course Number	Course Name	Category	L	T	P	Credit
PRD1803	RELATIONAL DATABASE MANAGEMENT SYSTEM	Core	71	4	-	4

Preamble

This course covers the basic concepts of database systems, relational database, queries, object modeling and database design. The course is designed to provide solutions related to the strategies for storing objects, transaction management, and security.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Define the fundamental elements of database management system.	K1
CO2	Understanding of normalization theory and extends such knowledge to the normalization of a database.	K2
CO3	Explain the basic concepts of relational data model, ERD, relational database design and algebra and query a database using SQL, DML/DDDL commands.	K2
CO4	Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS.	K3
CO5	Demonstrate programming PL/SQL including procedures, stored functions, cursors, packages.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	S	M
CO2	S	M	S	S	M
CO3	M	S	S	M	S
CO4	S	M	M	S	M
CO5	M	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

Unit-I

14 Hrs

Database Concepts-A Relational approach: Database -Relationships - DBMS -Relational data model - Integrity rules - Theoretical relational languages. Database Design: Data modeling -Dependency - Database design - Normal forms - Dependency diagrams - **Denormalization**

Unit-II**14 Hrs**

Structured Query Language (SQL): Introduction – DDL - Naming rules and conventions- D a t a t types- Constraints-C reading a table- Displaying t able information - Altering an existing table – **Dropping, renaming, and truncating table** - Table types

Unit-III**15 Hrs**

Working with tables: DML - Adding a new Row/Record - Customized prompts - Updating and deleting an existing rows/records - Retrieving data from table - Arithmetic operations - Restricting data with WHERE clause -Sorting -Substitution variables - DEFINE command – CASE structure.Functions and Grouping: **Built-in functions** - Grouping data. Joins and Views: Join -join types-**Views: Views** - Creating a view - Removing a view - Altering a view

Unit-IV**14 Hrs**

‘PL/SQL: Fundamentals - Block structure - comments - **Data types – Other data types - Variable declaration - Assignment operation** - Bind variables - Substitution variables - Printing. Control Structures and Embedded SQL: Control structures - Nested blocks - SQL in PL/SQL - Data manipulation - Transaction control statements

Unit-V**14 Hrs**

PL/SQL Cursors and Exceptions: Cursors - Implicit & explicit cursors and attributes - cursor FOR loops - SELECT...FOR UPDATE - WHERE CURRENT OF Clause - cursor with parameters - Cursor variables - Exceptions - Types of exceptions - Records - Tables - Procedures - **Functions-Triggers**

Text Book

S.No.	Authors	Title of the Book	Publisher	Year of Publication
1	Nilesh Shah	Database Systems Using Oracle	PHI	2 nd Edition, 2012

Reference Books

S.No	Author	Title of the Book	Publishers	Year of Publication
1	Rajesh Narang	Database Management Systems	Prentice Hall of India,	2 nd Edition 2011
2	Rakesh Saini, M.M.S.Rauthan, Abhay Saxena, Bindu Sharma	Database Management System	Vayu Education of India	2010
3	Satish Asnani	Oracle Database 11g	PHI	2010

Pedagogy

- Lecture, Demonstration

Note: Flipped mode learning topics are highlighted.

Course activity

Unit	Topic	Activity	Web Resources
Unit I	Demoralization	Group Discussion	<ul style="list-style-type: none">• https://www.w3schools.com/sql• https://www.tutorialspoint.com/sql/• https://livesql.oracle.com• https://www.w3schools.com/sql/trysql.asp?filename=trysql_asc
Unit II	Dropping, renaming, and truncating table	Case Study	
Unit III	Built-in functions	Quiz	
Unit IV	Data types – Other data types - Variable declaration - Assignment operation	Seminar	
Unit V	Functions	Case Study	

Course Designer

Mrs. R. Kavitha

Course Number	Course Name	Category	L	T	P	Credit
CS16CP3	RDBMS LAB	Core	-	-	60	2

Preamble

The course objective of this lab is to provide a strong foundation in database concepts, technology and practice SQL queries for application development.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Describe the concepts of database technologies	K1
CO2	Discuss PL/SQL including stored procedures, stored functions, cursors, packages	K2
CO3	Apply constraints on a database using RDBMS	K2
CO4	Illustrate the need, role, importance and uses of databases in applications development	K3
CO5	Demonstrate the concept of Triggers and Subroutines	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	S	M	S	M	S
CO3	S	M	M	S	S
CO4	M	M	S	S	M
CO5	S	M	S	S	S

S- Strong; M-Medium; L-Low.

Syllabus

- Exercise using Different operators.
- Exercise using Control Structures.
- Exercise to implement Built-in functions.
- Exercise to implement update and Alter table
- Exercise to implementing PL/SQL Block
- Exercise to implement splitting the table
- Exercise to implement joining the table
- Exercise using Functions
- Exercise using PL/SQL Cursors
- Exercise using Triggers
- Exercise using Packages.

Pedagogy

Lecture, Demonstration

Course Designers

Mrs. A.S. Kavitha

JOB ORIENTED COURSE

Title : Amazon Web Services
Subject code : JOB1826

Objective

This course focuses on basic concepts, key technologies, and strengths of amazon web services.

Unit-I **12 Hrs**
Amazon Web Services Overview-History and Evolution of AWS-Overview of AWS products

Unit-II **12 Hrs**
Identity and access management-Overview-Policies-Users groups and roles-Best Practices- Amazon Virtual Private Cloud-subnets-Networking-Security groups-Best practices

Unit- III **12 Hrs**
Elastic compute cloud-Overview-Machine Images-Launch and connect to an instance-Create an AMI demo-EC2 instance-EBS-EC2 Pricing-Load balancing-Auto scaling-AWS services- EC2 best practices.

Unit – IV **12 Hrs**
Amazon Simple Storage Server (S3)-Overview-Buckets-Version control and life cycle.

Unit- V **12 Hrs**
Amazon Relational Databases-AMI databases-Amazon Dynamo DB-Amazon redshift – Amazon elastic ache.

Text Book: Course materials will be provided

Semester : **III &IV**
Title : **Data Analytics-Level I: R Programming**
Subject code : **SB17DA01**
Credits : **4**
Lecture Hours : **43**

Objective

To provide a conceptual understanding of the basics of R programming and depth of exploratory data analysis.

Unit – I **9 Hrs**

Overview of the R Language: Defining the R project, Obtaining R, Generating R codes, Scripts, Comments, Text editors for R, Graphical User Interfaces (GUIs) for R, Packages.

Unit –II **9 Hrs**

R Objects and Data Structures: Variable classes, Vectors and matrices, Data frames and lists, Array and Factors.

Unit – III **9 Hrs**

Manipulating Objects in R: Mathematical operations, Decision making, loops, functions and Strings.

Unit – IV **8 Hrs**

Exploratory Data Analysis: Reading, creating and storing R –CSV file, Excel File, Binary file, XML File – R –Mean, Median, Mode- Regression.

Unit – V **8 Hrs**

Graphical Representation: R-PIE chart – Bar chart – Box plots-Histograms – line graphs – Scatter plots.

Text Book: Course materials will be provided.

Reference Books:

S.No	Authors	Title of Book	Publisher	Year of Publication
1	JaredLander	R for everyone	Pearson Education	2015
2	Norman Matloff	The Art of R Programming	No Starch Press	2011

Note:

*During Semester III, Unit – I and Unit – II till Vectors and Matrices

**During Semester IV in Unit – II from Data Frames, Unit – III, IV and V

Semester : III & IV
Title : OOSE-Level –I: Software Design Tools
Subject code : SB17SE01
Credits : 4
Lecture Hours : 43

Objective

To explore the basic building blocks of UML and to design various modeling diagrams using UML.

Unit – I

9 Hrs

Introduction to UML: Overview of the UML- Importance of modeling- principles of modeling- object oriented modeling- conceptual model of the UML- Architecture- Software Development Life Cycle.

Unit – II

9 Hrs

Structural Modeling Basic Structural Modeling: Classes- Relationships- common Mechanisms- and diagrams. Advanced Structural Modeling: Advanced classes- advanced relationships- Interfaces- Types and Roles- Packages.

Unit – III

9 Hrs

Class & Object Diagrams: Terms and concepts- construction of a class diagram- common modeling techniques for Class & Object Diagrams-Interactions- Interaction diagrams.

Unit – IV

8 Hrs

Behavioral Modeling : Use Cases – Use case Diagrams – Activity Diagrams – Advanced Behavioral Modeling – State Machines – Processes and Threads – Time and Space – State Chart Diagrams

Unit – V

8 Hrs

Architectural Modeling: Components- Modeling Techniques – Modeling a physical database- Model an adaptable system- Deployment – Component diagrams and Deployment diagrams.

Text Book: Course materials will be provided

Reference Books

S.No	Authors	Title of Book	Publisher	Year of Publication
1	Martina Seidl, Marion Scholz, Christian Huemer, GertiKappel	UML @ Classroom: An Introduction to Object-Oriented Modeling	Springer	2015
2	Martina Seidl, Marion Scholz, Christian Huemer, GertiKappel	An Introduction to Object-Oriented Modeling	Easy Reader	2011
3	Gandharba Swain	Object-Oriented Analysis and Design through Unified Modeling Language	Laxmi Publications	2010

Note

* During Semester III UNIT I, UNIT II, till advanced classes.

** During Semester IV from Advanced relationships, Unit III, Unit IV & Unit V

Course Number	Course Name	Category	L	T	P	Credit
CS18C07	Data Mining	III	71	4	-	4

Preamble

This course covers the basic concepts of data mining principles and methods. It provides insight on classification, and clustering techniques and focuses on applications like web mining, text mining and biological data mining.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recognize the basic concepts of data mining.	K1
CO2	Understand the techniques of data classification using various algorithms.	K2
CO3	Describe the concepts of classifier and prediction for simple data classification task and mining strategies in web.	K2
CO4	Apply various clustering methods for analysis.	K3
CO5	Illustrate the role of data mining techniques in various fields.	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	S	M	S	S	M
CO3	M	M	S	M	M
CO4	S	S	M	S	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit-I

14 Hrs

Introduction: Data Mining –KDD vs Data mining-DBMS vs Data mining-Other areas-Data mining techniques-Issues and challenges-Application areas.

Unit-II

15 Hrs

Association Rule: Introduction-Methods in association rule-Apriori algorithm. Clustering: Introduction- Clustering paradigms-Partition algorithm-K-medoid algorithms-CLARA-CLARANS –Hierarchical clustering-DBSCAN-BRICH-CURE.

Unit-III**14Hrs**

Decision Tree: Introduction-Tree construction principles-Best split-splitting indices-splitting criteria- Tree construction algorithms: CART-ID3-C4.5-CHAID.

Unit-IV**14 Hrs**

Other Techniques: Introduction-Neural Networks-Learning in NN-Unsupervised Learning-Genetic algorithm-Support Vector Machine

Unit-V**14Hrs**

Data Mining for Bioinformatics: Introduction-Bio medical data analysis-DNA data analysis- Protein data analysis. Web Mining: Introduction-Web mining-content mining-structure mining-usage mining-Text mining- unstructured text-Episode rule discovery for texts- hierarchy of categories-Text clustering.

Text Book

S.No	Author	Title of book	Publisher	Year of publication
1	Arun K Pujari	Data Mining Techniques	University press	3 rd Edition 2013.

Reference Books

S.No	Author	Title of book	Publisher	Year of Publication
1	Yi Ping Phoebe Chen.	Bio Informatics Technologies.	Springer	2 nd reprint 2014.
2	Pang-NingTan,Michael Steinbach and Vipin Kumar.	Introduction to Data Mining.	Pearson Education	2016
3	Max Barmer.	Principles of Data Mining.	Springer	3 rd Edition,2016

Pedagogy

- Lectures, Demonstration, Case studies

Course Designer

Mrs. A S. Kavitha

Course Number	Course Name	Category	L	T	P	Credit
CS18C08	Computer Networks	III	71	4	-	4

Preamble

The course is designed to provide in depth knowledge of the various network layers network security and client server computing.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Provide an overview of the concepts and fundamentals of data communication and computer networks	K1
CO2	Understand the terminology and concepts of the OSI reference model and the TCP-IP reference model	K2
CO3	Describe the significance of protocols used in data communications and networking	K3
CO4	Illustrate the importance of network security and application of cryptographic methods in establishing security	K3
CO5	Interpret the data flow in each layer and services of each layer	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	S	S	M	M	S
CO3	S	S	M	M	S
CO4	S	S	M	M	S
CO5	S	S	S	S	S

S - Strong; M-Medium; L-Low

Syllabus

Unit-I

14 Hrs

Data Communications: Components- data representation- Dataflow Networks: Distributed processing-network criteria -physical structures -network models-categories of networks- Interconnection of Networks: Internetwork- Protocols and Standards: protocols-standards-standards organizations-internet standards the OSI model- layers in the OSI model-TCP/IP protocol suite.

Unit-II**14 Hrs**

Guided Media: Twisted-pair cable-coaxial cable-fiber-optic cable- unguided media: - wireless: radio waves-microwaves-infrared. Telephone Network: Major components -Latas –signaling services provided by telephone networks dial-up modems: Modem standards digital subscriber line- cable TV networks. Wireless LANS: Bluetooth- connecting devices.

Unit-III**15 Hrs**

Data Link Layer: Introduction- block coding-framing- flow and error control- protocols-noiseless channels- noisy channels. Network Layer: IPV4 addresses- IPV6 addresses-delivery- forwarding- unicast routing protocols- multicast routing protocols.

Unit-IV**14 Hrs**

Transport layer: Process-to-Process delivery- user datagram protocol- TCP-congestion control and quality a TCP connection- congestion control- two examples- quality of service

Unit-V**14 Hrs**

Application Layer: Name space- domain name space- distribution of name space- DNS in the internet- resolution- remote logging- telnet- electronic mail- file transfer-cryptography: Introduction- symmetric-key cryptography- asymmetric-key cryptography.

Text Books

S.No	Author	Title of book	Publisher	Year of Publication
1	Behrouz A Forouzan	Data communications and networking	Tata McGraw Hill	5 th Edition, 2012

Reference Books

S.No	Author	Title of book	Publisher	Year of Publication
1	Robert Orfali, Dan Harkey, Jerry Edwards	Client/Server Survival Guide	John Wiley & sons	3 rd Edition, 2008
2	Larry L Peterson, Bruce S Davie	Computer Networks - A systems approach	Elsevier Press	5 th Edition, 2012
3	Andrew S Tanenbaum	Computer Networks	Pearson education	5 th Edition, 2011
4	William Stallings	Data and Computer Communications	Prentice Hall of India Private Limited, New Delhi	8 th Edition, 2011

Pedagogy

Lecture, Demonstration, Case Study

Course Designer

Dr. S. Karpagavalli

Course Number	Course Name	Category	L	T	P	Credit
CS18C09	Python Programming	Core	71	4	-	4

Preamble

This course provides basic idea on functions and concepts of Python programming. This course enables the students to understand the Python programming techniques.

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	Describe the basic built-in functions and syntax of Python programming.	K1
CO2	Explain the mapping and file concept.	K2
CO3	Explain the object oriented programming concept.	K2
CO4	Illustrate the concepts of decision making and construct statements.	K3
CO5	Illustrate the usage of database and regular expression	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	S
CO2	S	S	S	S	M
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit – I

15 Hrs

Python – origins – features – variable and assignment - Python basics – statement and syntax Identifiers – Basic style guidelines – Python objects – Standard types and other built in types - Internal types – Standard type operators – Standard type built-in functions.

Unit – II

14 Hrs

Numbers – Introduction to Numbers – Integers – Double precision floating point numbers Complex numbers – Operators – Numeric type functions – Sequences: Strings, Lists and Tuples – Sequences – Strings and strings operators – String built-in methods – Lists– List type Built in Methods – Tuples.

Unit – III

14 Hrs

Mapping type: Dictionaries – Mapping type operators – Mapping type Built-in and Factory Functions - Mapping type built in methods – Conditionals and loops – if statement – else Statement – elif statement – conditional expression – while statement – for statement – break statement – continue statement – pass statement – Iterators and the

iter() function - Files and Input/output – File objects – File built-in functions – File built-in methods – File built-in attributes – Standard files – command line arguments.

Unit – IV

14 Hrs

Functions and Functional Programming – Functions – calling functions – creating functions – passing functions – Built-in Functions: apply(), filter(), map() and reduce() - Modules – Modules and Files – Modules built-in functions - classes – class attributes – Instances. Database Programming – Introduction - Basic Database Operations and SQL - Example of using Database Adapters, MySQL.

Unit – V

14 Hrs

Bioinformatics Programming - Pattern Matching: fundamental syntax – fixed length matching – variable length matching – the action of the re modules – functions – flags – methods – match object fields – match object methods - Extracting Descriptions from Sequence Files - Extracting Entries From Sequence Files

Text Book

S.No	Author	Title of the Book	Publisher	Year of Publication
1	Wesley J. Chun	Core Python Programming	Pearson Education Publication	2012
2	Mitchell L Model	Bioinformatics Programming using Python	O ‘ Reilly Media	2009

Reference Books

S.No	Author	Title of the Book	Publisher	Year of Publication
1	Wesley J. Chun	Core Python Application Programming	Pearson Education Publication	2015
2	Eric Matthes	Python crash course	William pollock	2016
3	Zed Shaw	Learn Python the hard way	Addition Wesley	2017
4	Mark Lutz	Python pocket reference	O’Reilly Media	2014

Pedagogy

- Lectures, Group Discussions, Demonstrations, Case studies

Course Designer

- Dr. R.Vishnupriya

Course Number	Course Name	Category	L	T	P	Credit
CS18CP4	Python Programming and Bio Informatics Lab	core	-	-	60	3

Preamble

This course includes a practice in the use of basic techniques of Python programming and to implement in real time environment. It enriches the knowledge in programming techniques using pattern matching concepts. It enables to understand object oriented programming concepts.

Course Outcome

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

Co Number	CO Statement	Knowledge Level
CO1	Define the basic syntax and statements of Python programming.	K1
CO2	Discuss the various decision making and construct statement of Python programming.	K2
CO3	Apply object oriented programming concept in real time problems.	K3
CO4	Illustrate pattern matching and extraction using regular expression.	K3
CO5	Demonstrate mapping using file concept.	K3

Mapping with Programme Outcome

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	M
CO3	S	S	M	S	S
CO4	S	S	M	S	S
CO5	S	M	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

- Exercises using conditionals and loops.
- Exercises for implementing functions.
- Exercises using list and their built-in functions.
- Exercises by implementing tuples.
- Exercises using apply (), filter (), map () and reduce () functions.
- Exercises by implementing Modules
- Exercises by implementing classes and instances

- Exercises by illustrating regular expression
- Exercises for implementing files concept.
- Exercises using strings and their built-in functions.
- Retrieve Protein sequences from Protein Data Bank (PDB) and analyse the primary, secondary and tertiary protein structure using tools
- Retrieve nucleotide sequences and perform local alignment and global alignment using EMBOSS
- Retrieve nucleotide sequences and perform pair wise and multiple sequence alignment using BLAST tool and analyze the output.
- 'Retrieve nucleotide sequences and perform multiple sequence alignment using CLUSTALW tool and generate phylogenetic tree.

Pedagogy

System, White board, Demonstration through PPT

Course Designers

- Dr. R. Vishnupriya

Course Number	Course Name	Category	L	T	P	Credit
PM17A01	MANAGEMENT INFORMATION SYSTEMS	III	86	4	-	5

Preamble

This course covers impacts and uses of information systems and business tools for web enabled environment. It also covers the decision making concept, enterprise management system for data processing.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Tell about the basic concepts and Roles of Management Information system.	K1
CO2	Describe the development of Business strategies, E-Business Models	K2
CO3	Discussing the decision making concepts and knowledge management in MIS.	K2
CO4	Examine the applications in Manufacturing Sector and Service sector in Industry	K3
CO5	Illustrate the Enterprise Management System and Information Systems processing.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	S	M
CO2	M	S	S	S	S
CO3	S	S	S	M	S
CO4	M	S	M	S	S
CO5	S	M	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit - I

18Hrs

Introduction to MIS: MIS concept – Definition – Role of MIS – Impact of MIS – MIS and the User – Management as a Control system – MIS: a support to Management – Management Effectiveness and MIS – Organization as a system – Organizational Behaviours. Process Management: Planning – Organizing – Staffing – Coordinating – Directing and –Controlling.

Unit – II**17 Hrs**

Strategic Management of Business Performance: Essentiality of Strategic Planning – Tools of Planning – Strategic Management of Business Performance – What is Strategy? – Class and Types of Strategies. Electronic Business Technology: Introduction to E-Business – Models of E-Business-Electronic Payment System – Security in E-Business – MIS and E-Business. A tool for business management: Internet and Web Process Management – strategic Management under Web – Web Enabled Business Management – Application system Architecture in Web – MIS in Web Environment.

Unit – III**17 Hrs**

Decision Making: Decision-making concepts – Decision-making process– Behavioural Concepts in Decision-making – Organizational Decision-making – MIS and Decision-making – Decision Methods Tools and Procedures. Information and Knowledge: Information Concepts – Information: a quality product – Classification of Information – Methods of data and Information Collection – Value of Information – General Model of a Human as an Information Processor. Choice of Information Technology: Nature of IT decision – Strategic Decision – Configuration Design – Evaluation.

Unit – IV**17 Hrs**

Applications in Manufacturing Sector: Personnel, financial, production, raw material and Marketing Managements. Applications in Service Sector: Introduction to Service Sector – Creating a distinctive service – MIS Application in Service Industry – MIS: Service Industry.

Unit – V**17 Hrs**

Management of Global Enterprise: Enterprise Management Systems – ERP system – ERP Model and Modules –Benefits of ERP –ERP Product Evolution - ERP Implementation – EMS and MIS. Technology of Information Systems: Introduction – Data Processing – Transaction Processing – Application Processing – Information System processing – Human Factors and User Interface -Real Time Systems and Good Design.

Text Book

S.No	Author	Title of the Book	Publisher	Year of Publication
1	Waman S Jawadekar	Management Information Systems Text and cases	Tata McGraw Hill Publications	5 th Edition,2013

Reference Books

S.No	Author	Title of the Book	Publisher	Year of Publication
1	James A O'Brien & George MMarakas	Management Information Systems	Tata McGraw Hill Publications	7 th Edition, 2007
2	Kenneth C Laudon & Jane P Laudon	Management Information Systems managing the digital firm	PHI Publications	12 th Edition, 2011
3	MahadeoJaiswal & Monika Mital	Management Information Systems	Oxford Publications	2004

Pedagogy

- Lecture, Case study.

Course Designer

- Dr. C. ArunPriya

Semester	: III &IV
Title	: Data Analytics - Practicals I: R – Programming
Subject code	: SB17DAP1
Credits	: 2
Practical Hours	: 45

List of Exercises

- R Program for Vector operations.
- Create a R-list.
- Implement matrices addition, subtraction and Multiplication.
- Create a Data frame.
- Create a factor object.
- Import data, copy data from CSV file to R.
- Create a R program for Mean median and mode.
- Draw Bar charts and Pie charts in R.
- Make visual representations of data for plotting functions in R.
- Create a R program for Regression Model.

Note:

*During Semester III Program 1 to program 6

**During Semester IV Program 7 to program 10

Semester	: III &IV
Title	: OOSE – Practicals I: Software Design Tools
Subject code	: SB17SEP1
Credits	: 2
Practical Hours	: 45

Objective

To apply and develop the UML diagrams for applications.

Choose any one of the projects given below and do the exercises program for the project. [Student Marks Management System, Library Management System, Employee Management System, Hostel Management System].

- Write the complete problem statement
- Write the software requirement specification document
- Draw the entity relationship diagram
- Draw the data flow diagrams at level 0 and level1
- Draw use case diagram
- Draw activity diagram of all use cases
- Draw state chart diagram of all use cases
- Draw sequence diagram of all use cases
- Draw collaboration diagram of all use cases
- Assign objects in sequence diagram to classes and make class diagram

Note

* During Semester III, Program 1 to Program 6

** During Semester IV, Program 7 to Program 10

Course Number	Course Name	Category	L	T	P	Credit
PJA1810	Java Programming	Core	71	4	-	4

Preamble

The course is an expository of the object-oriented programming methodology with emphasis on software design and code reuse as its core objectives. Language elements include loops, arrays, input/output structures, events, exceptions, and threads. It aims to develop the student's logical, critical thinking and problem solving skills on programming basics

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Define the basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods	K1
CO2	Describe the fundamentals of object-oriented programming including defining classes, objects, invoking methods	K2
CO3	Apply the principles of inheritance, packages and interfaces	K3
CO4	Use exceptions, applets, graphics programming for real world problems	K3
CO5	Demonstrate the working features of files	K3

Mapping with Programme Outcomes

COs	PO 1	PO 2	PO3	PO 4	PO 5
CO 1	S	M	S	S	S
CO 2	S	S	S	M	S
CO 3	M	M	S	M	S
CO 4	S	S	S	M	S
CO 5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

Unit-I

14 Hrs

JAVA Evolution: History - Features - Java differs from C and C++ -Java and Internet - Java and WWW - Web Browsers. Overview of Java Language: Introduction - Simple Java program - Structure - **Java tokens**- Statements - Java virtual Machine

Unit-II

15 Hrs

Constants -**Variables**- Data types - Operators and expressions -**Decision making and Branching: Simple If Statement, the IF...Else statement, The Else... If ladder**, The Switch Statement, The?: Operator, Decision making and looping: The While statement, the do Statement - The for Statement - Jumps in loops - labeled loops - Classes, Objects and Methods

Unit-III

14 Hrs

Arrays, Strings and Vectors – Interfaces- Multiple Inheritance – Packages: Putting classes together Multi-Threaded Programming

Unit-IV

14 Hrs

Managing Errors and Exceptions – Applet Programming – Graphics programming: The Graphics class-Lines and rectangles-Circles and ellipses-Drawing arcs-Drawing polygons-Line graphs-Using Control loops in applets-**Drawing Bar charts**

Unit-V

14 Hrs

Files: Introduction – concept of streams – Stream classes – Using stream – I/O classes – File class – I/O Exceptions – creation of files – **Reading / Writing characters/ Bytes** – Handling primitive data types – Random Access Files

Text Book

S.No	Author	Title of Book	Publisher	Year of Publication
1	E. Balaguruswamy	Programming with JAVA - A Primer	McGraw Hill Professional	2015

Reference Book

S.No	Author	Title of Book	Publisher	Year of Publication
1	Herbert Schildt	Java: The Complete Reference	McGraw Hill Professional	2017
2	Robert Sedgewick & Kevin Wayne	Introduction to Programming in Java	Addison Wesley	2017
3	Y. Daniel Liang	Introduction to Java Programming, Brief Version	Pearson Education	2017

Pedagogy

Lectures, Group discussions, Demonstrations

Note: Flipped mode learning topics are highlighted.

Course Activity

Unit	Topic	Activity	Web Resources
Unit I	Java tokens	Assignment	<ul style="list-style-type: none">• www.javapoint.com• www.tutorialspoint.com• www.tutorialdost.com
Unit II	Variables- Decision making and Branching: Simple If Statement, the IF...Else statement, The Else... If ladder,	Debugging	
Unit III	Arrays	Seminar	
Unit IV	Drawing Bar charts	Demonstration	
Unit V	Reading / Writing characters/ Bytes	Debugging	

Course Designer

Dr. J. VijiGripsy

Course Number	Course Name	Category	L	T	P	Credit
PCG1811	COMPUTER GRAPHICS	Core	71	4	-	4

Preamble

This course covers the computer graphics display devices. It covers the drawing, clipping algorithms, 2D and 3D transformations. It focuses on interactive input methods and functions in computer graphics.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Describe the graphics techniques used in various applications and display devices.	K1
CO2	Differentiate the concept of drawing algorithms, rotation and transformation.	K2
CO3	Demonstrate the concepts of various clippings and transformations.	K3
CO4	Illustrate the various input devices used in graphics.	K3
CO5	Apply the three dimensional concepts using algorithm and display methods.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	S	S	S	M
CO3	S	M	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit - I

14 Hrs

Basic Concepts: Uses of computer graphics – Display devices - Color CRT monitors – Direct view storage tube – Flat panel displays – Raster scan systems - Random scan system, Input and Hard copy device.

Unit – II

14 Hrs

Line drawing algorithms: DDA algorithm, Bresenham's line drawing algorithm, Parallel line algorithms – Circle generating algorithms: Properties of circles, Midpoint circle algorithm.

Unit – III**14 Hrs**

Two dimensional transformations: Basic transformations - Composite transformation of translation, Rotation, Scaling – General Pivot point rotation – General fixed point scaling - Other transformations: Reflection, Shear. Two dimensional viewing: Clipping Operations – Point clipping – Line clipping: Cohen Sutherland line clipping - Curve clipping – Text clipping – Exterior clipping.

Unit - IV**14 Hrs**

Graphical User Interface and Interactive Input methods: Input of graphical Data: Logical input devices, locator devices, stroke devices, string devices, valuator devices, choice devices, pick devices – Input Functions: Input modes, request modes, locator and stroke input request modes, string modes, valuator modes, choice modes, pick modes, sample modes, event modes.

Unit – V**15 Hrs**

Three dimensional concepts: Three dimensional display methods – Three dimensional geometric and modeling transformations: Translation, Rotation and Scaling – Three dimensional viewing: Viewing pipeline – Viewing coordinates – Projections. Visible Surface Detection Methods: Back face detection method, Depth Buffer method, Octree method. Surface Rendering Methods: Polygon rendering methods.

Text Book

S.No	Author	Title of Book	Publisher	Year of Publication
1	Donald Hearn M.Pauline&Baker.	Computer Graphics –C Version	Pearson Education Publication	2 nd Edition, 2008.

Reference Book

S.No	Author	Title of Book	Publisher	Year of Publication
1	UditAgarwal	Computer Graphics	S K Kataria& Sons	2013.
2	Pradeep K. Bhatia	Computer Graphics	IK International Publishing House	3 rd Edition 2013.
3	John F Hugheset.al.,	Computer Graphics:Principles and Practice	Addison Wesley	3 rd Edition 2013.

Pedagogy

- Lectures, Group Discussions

Course Designers

- Dr. R. Kavitha

Course Number	Course Name	Category	L	T	P	Credit
CS18C12	SOFTWARE ENGINEERING	Core	71	4	-	4

Preamble

This course provides the basic concepts of software engineering to design a new software project and develops skills to construct software of high quality. This Course also covers the fundamental techniques for modeling software requirements, analysis and design.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recognize, define, and make correct use of generally accepted software engineering techniques and terminology	K1
CO2	Understand common lifecycle processes to plan and deliver an effective Software engineering Process	K2
CO3	Describe broad range of concepts from software engineering, spanning all aspects of activities in software engineering process	K2
CO4	Apply written, graphical communication in both technical and an ability to identify and use appropriate Software techniques to develop software system.	K3
CO5	Apply a systematic, disciplined, cost-effective development, operation and maintenance of software systems to the satisfaction of their beneficiaries.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	M	S	S
CO3	S	S	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit - I

14 Hrs

Software and Software Engineering: The Nature of Software – The Unique Nature of Web Apps- Software Engineering-The Software Process- Software Engineering Practice-Software Myths- How it All Starts. Process Models: A Generic Process Model-Process Assessment and Improvement-Prescriptive Process Models.

Unit - II

15 Hrs

Understanding Requirements: Requirements Engineering-Establishing the Groundwork-Eliciting Requirements-Developing Use Cases-Building the Requirements Model-Negotiating Requirements-Validating Requirements. Requirements Modeling: Scenarios, Information and Analysis Classes: Data Modeling Concepts-Class-Based Modeling.

Unit – III

14 Hrs

Design Concepts: The Design Process – Design Concepts - The Design Model. Architectural Design: Software Architecture-What is Architecture?- Why is Architecture Important?- Architectural Descriptions-Architectural Decisions Component-Level Design: What Is a Component?-Designing Class Based Components-Designing Traditional Components.

Unit – IV

14 Hrs

Quality Concepts: What is Quality? - The Software Quality Dilemma-Achieving Software Quality. Software Quality Assurance: Elements of Software Quality Assurance-SQA Tasks, Goals and Metrics-Formal Approaches to SQA-Statistical Software Quality Assurance-Software Reliability. Software Testing Strategies: A Strategic Approach to Software Testing-Strategic Issues. Product Metrics: A Framework for Product Metrics-Metrics for the Requirements Model- Metrics for Source Code-Metrics for Testing-Metrics for Maintenance.

Unit – V

14 Hrs

Risk Management: Reactive versus Proactive Risk Strategies - Software Risks- Risk Identification- Risk Projection- Risk Refinement-Risk Mitigation, Monitoring and Management- The RMMM Plan Maintenance and Reengineering: Software Maintenance – Software Supportability-Reengineering-Business Process Reengineering-Software Reengineering- Reverse Engineering-Restructuring-Forward Engineering-The Economics of Reengineering. Software Process Improvement: What is SPI? - The SPI Process -SPI Trends.

Text Books

S.No	Author	Title of Book	Publisher	Year of Publication
1	Roger S.Pressman	Software Engineering –A Practitioners Approach	MC –Graw Hill Higher Education	7 th Edition, 2017

Reference Books

S.No	Author	Title of Book	Publisher	Year of Publication
1	Ian Sommerville	Software Engineering	Pearson Education	10 th Edition, 2017
2	Richard Fairley	Software Engineering Concepts	McGraw Hill Education	2017
3	Rajib Mall	Fundamentals of Software Engineering	Prentice Hall India Learning Private Limited	4 th Edition, 2014

Pedagogy

- Lecture, Group Discussion, Demonstration, Case Study

Course Designer

- Dr.C.Arunpriya

Course Number	Course Name	Category	L	T	P	Credit
CS18E01	Parallel Computing	Elective	71	4	-	5

Preamble

To develop structural intuition of how the hardware and the software work, starting from simple systems to complex shared resource architectures and shared memory programming paradigm. This development is accompanied by progress in the design, analysis and application aspects of parallel algorithms and awareness of the parallel computing technologies using multi core system.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To gain the knowledge about basic models of parallel machines and tools to program them.	K1
CO2	To recognize how to use parallel computing and enable to write parallel code for high performance computing.	K2
CO3	Demonstrate the architecture of future multi- and many-core processor systems.	K3
CO4	Apply knowledge for a good understanding of optimizing serial programs and algorithms within computational science.	K3
CO5	Illustrate the pragmatic approach to parallel programming of message-passing algorithms through C language.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	S	M	S	S	M
CO3	M	M	S	M	M
CO4	S	S	M	S	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low.

Syllabus

Unit – I

15Hrs

Introduction: Why do we need High speed computing? – How do we increase the speed of computers? – History of parallel computers – Some interesting features of parallel computers. Instruction Level parallel processing: some example commercial processors – multithreaded processors – Proposed future processor architectures

Unit – II**14 Hrs**

Structure of parallel computers: A generalized structure of a parallel computer – Shared memory parallel computers – interconnection networks – Distributed shared memory parallel computers

Unit – III**14 Hrs**

Introduction: Computational demands of modern science – Advent of practical parallel processing – Parallel processing terminology – The sieve of Eratosthenes. PRAM Algorithms: A model of serial computation – The PRAM model of parallel computation. PRAM algorithms: Parallel reduction – merging two sorted lists

Unit – IV**14 Hrs**

Processor Arrays, Multiprocessors and Multicomputer: Processor organizations – Processor arrays – Multiprocessors – multicomputer – Flynn’s taxonomy-speedup, scaled speedup and parallelizability

Unit – V**14 Hrs**

Parallel programming languages & algorithms: Parallel language & algorithm design for the array processor – other von Neumann-type languages – C, C++ & parallel C++ - Non-von Neumann-type languages

Text Book

S.No	Author	Title of Book	Publisher	Year of Publication
1	Michael J Quinn	Parallel Computing	Tata Mc-Graw Hill	2nd Edition 2008
2	V.Rajaraman, C.Siva Ram Murthy	Parallel Computers Architecture and Programming	Prentice Hall of India pvt Ltd	2008

Reference Books

S.No	Author	Title of Book	Publisher	Year of Publication
1	Micheal McCool, Arch D.Robinson,JamesReindres	Structured Parallel Programming	Morgan Kaufmann publishers	2012
2	Wilkinson Barry, Michael Allen	Parallel and Concurrent Programming	Pearson Education	2012
3	Peter Pacheco	Introduction to Parallel Programming	Morgan Kaufmann publishers	2011

Pedagogy

- Lecture, Group Discussion, case Studies

Course Designers

- Mrs. S. Ponmalar

Course Number	Course Name	Category	L	T	P	Credit
CS18E02	Big Data Analytics	Elective	71	4	-	5

Preamble

The course provides an introduction to big data analytics and Hadoop architecture. It introduces the Map Reduce programming model. It provides insight on NoSQL databases and querying model used in Big Data.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Define the big data, types of data and understand the need of big data analytics	K1
CO2	Describe the Hadoop architecture and File system	K2
CO3	Apply the Map Reduce Programming model for real-world problems	K3
CO4	Distinguish NoSQL databases from RDBMS	K3
CO5	Demonstrate the working of row and column oriented data stores	K3

Mapping with Programme Outcomes

COs	PO1	PO2	P03	P04	PO5
CO1	S	M	S	S	S
CO2	S	S	S	M	S
CO3	M	M	S	M	M
CO4	S	S	S	M	M
CO5	S	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

Unit- I

14 Hrs

Overview of Big Data: Defining Big Data - Big Data Types – Big Data Analytics – Industry Examples of Big Data - Big Data and Data Risk – Big Data Technologies – Benefits of Big Data

Unit-II

15 Hrs

Basics of Hadoop: Big Data and Hadoop – Hadoop Architecture – Main Components of Hadoop Framework – Analyzing Big Data with Hadoop – Benefits of Distributed

Unit-III

14 Hrs

Map Reduce: Introduction to Map Reduce –Working of Map Reduce – Map operations – Map Reduce User Interfaces

Unit-IV

14 Hrs

NoSQL Databases: NoSQL Data Management – Types of NoSQL Databases – Query Model for Big Data – Benefits of NoSQL – Mongo DB – Advantages of Mongo DB over RDBMS – Replication in Mongo DB.

Unit-V

14 Hrs

HBase, CASSANDRA and JAQL: Introduction to HBase – Row-oriented and Column-oriented Data Stores – HDFS Vs. HBase – Hbase Architecture – HBase Data Model – Introduction to Cassandra –Features of Cassandra . Introduction to JAQL – JSON – Components of JAQL.

Text Book

S.No	Author	Title of Book	Publisher	Year of Publication
1	V.K. Jain	Big Data and Hadoop	Khanna Book Publishing	2017

Reference Books

S.No	Author	Title of Book	Publisher	Year of Publication
1	Frank J Ohlhorst	Big Data Analytics: Turning Big Data into Big Money	Wiley and SAS Business Series	2012
2	AnandRajaraman, Jeffrey David Ullman	Mining of Massive Datasets	Cambridge University Press	2012
3	Paul Zikopoulos, Chris Eaton, Paul Zikopoulos	Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data	Tata McGraw Hill	2011

Pedagogy

- Lecture, Demonstration, Group Discussion

Course Designer

- Dr . S. Karpagavalli

Course Number	Course Name	Category	L	T	P	Credit
CS18E03	Artificial Intelligence	Elective	71	4	-	5

Preamble

This course introduces the basic principle concepts in artificial intelligence like simple representation schemes, problem solving paradigms, constraint propagation, and search strategies. It also covers the areas of application such as knowledge representation, natural language processing and expert systems.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Learn about the artificial intelligence problem and the characteristics of the problem space.	K1
CO2	Demonstrate the fundamentals of heuristic search techniques and reasoning for problem solving.	K2
CO3	Understand the problem solving using predicates.	K2
CO4	Describe the concepts of expert systems with case studies for various applications	K2
CO5	Apply the concepts of game playing techniques.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	S	S	S	M
CO3	S	M	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

Unit - I

15Hrs

Artificial intelligence meaning- The AI problems – The underlying assumption – What is an AI Techniques? – The level of the model. Problems, problem spaces, and search: Defining the system – problem characteristics – production system characteristics.

Unit - II

14Hrs

Heuristic search techniques: Generate and Test – Hill climbing – Best –first search – Problem

reduction – Constraint satisfaction – Means –ends analysis. Knowledge representation issues: Representations and mappings – Approaches to knowledge representation.

Unit - III

14Hrs

Using predicate logic: Representing simple facts in logic – Representing instance and ISA relationships – computable functions and predicates resolution – natural deduction. Representing Knowledge using rules: Procedural versus declarative knowledge – Logic programming – Forward versus Backward reasoning – Matching – Control Knowledge.

Unit - IV

14Hrs

Game playing: Overview – The minimax search procedure – Adding alpha – beta cut-offs – Additional refinements – Iterative Deepening – References on specific games. Understanding: What understands? What makes understanding hard? Planning- The blocks world-components of a planning system –Good stack planning-Coral Stack planning-Nom linear planning using constraint posting.

Unit – V

14 Hrs

Expert systems: Representing & using domain knowledge – Expert system shells – Knowledge acquisition. Perception and Action: Real-time search – perception- Action – Robot Architectures. Prolog- the Natural languages of Artificial intelligence- introduction-converting English to prolog facts and rules-Goals-prolog terminology-Variables-Control structure-Arithmetic Operators-Matching in prolog-Backtracking

Text Books

S.No	Author	Title of Book	Publisher	Year of Publication
1	Elaine rich, Kevin Knight, Shiva shankar B Nair	Artificial Intelligence	Tata McGraw Hill	3 rd Edition, 2011

Reference Books

S.No	Author	Title of Book	Publisher	Year of Publication
1	Stuart Russell	Artificial Intelligence: A Modern Approach	Pearson	3 rd Edition, 2013
2	Deepak Khemani	A First Course in Artificial Intelligence	McGraw Hill	2013
3	Mishra R. B.	Artificial Intelligence	Prentice Hall of India	2010

Pedagogy

- Lectures, Group discussions, Demonstrations, Case studies

Course Designer

- Mrs. N. Deepa

Course Number	Course Name	Category	L	T	P	Credit
CS17CP5	JAVA PROGRAMMING AND BIO INFORMATICS LAB	Core	-	-	75	3

Preamble

This course focuses to equip students with adequate high-level object-oriented programming techniques required for successful design, development, and deployment of today's complex software systems. Implement object oriented programming concepts. Create package and interfaces in a Java program. Use graphical user interface in Java programs and create applets. To align the sequence data using various tools in Bioinformatics

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the enabling technologies for building internet applications	K1
CO2	Illustrate the object-oriented technique to analyze software problems	K2
CO3	Apply the principles of inheritance, packages and interfaces	K3
CO4	Implement the multithreading, exception handling concepts	K3
CO5	Apply programming skills to experiment protein sequence	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	S	S	S	M	S
CO3	M	M	S	M	S
CO4	S	S	S	M	S
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

- Exercises using classes and objects
- Exercises using Control Statements

- Exercises using different Inheritance
- Exercises using Mouse Events
- Exercises for implementing the font class method
- Exercises to implement Exception Handling
- Exercises using Interfaces
- Exercises to illustrate the Thread Priority
- Retrieve nucleotide sequences and perform pair wise and multiple sequence alignment using BLAST tool and analyze the output.
- Retrieve nucleotide sequences and perform multiple sequence alignment using CLUSTALW tool and generate phylogenetic tree.
- Retrieve two nucleotide sequences to align and generate PAM & BLOSUM scoring matrix.
- Convert gene sequence into its corresponding amino acid sequence using Translate Tool
- Convert RNA gene sequence into its corresponding amino acid sequence using RNA prediction Tool

Pedagogy

- Lectures, Demonstrations

Course Designer

- Dr. J.VijiGripsy

Semester : V
Title : **Information Security – Level II**
Subject code : NM13IS2
Credits : **Grade**
Lecture Hours : **26**

Objective

This course aims on introducing the theory and practice of designing and building secure computer systems that protect information and resist attacks. It covers all aspects of cyber security including network security, computer security and information security.

Unit - I **5Hrs**
 Information security: History of IS-What is security?-characteristic of IS-components of System –security system life cycle model.

Unit - II **6 Hrs**
 Cryptography: Concepts and techniques- plain text and cipher text- Encryption principles- Cryptanalysis-cryptograph algorithm- Cryptograph tools. Authentication methods-passwords- keys versus passwords-Attacking Systems via passwords-Password verification

Unit - III **5Hrs**
 Fire walls: Viruses and worms- Digital rights management- What is firewalls- Types of Fire wall- Design Principles of Firewall

Unit - IV **5Hrs**
 Hacking: Hacker hierarchy-password cracking-Phishing- Network Hacking- Wireless hacking.- Windows hacking- Web hacking- Ethical hacking

Unit - V **5Hrs**
 Case studies: DNS, IP SEC- Social media

Reference Book

S. No	Author	Title of Book	Publisher	Year of Publication
1	Dr.Michael E. Whitman, Herbert J. Mattord	Principles and Practices of Information Security	Course Technology Cengage Learning	4th Edition, 2012
2	AtulKahato	Cryptography and Network Security	McGraw Hill Education	3rd Edition, 2012
3	William Stallings	Network Security Essential Applications and standard	Prentice Hall	2nd Edition, 2009

Semester : V & VI
Title : **Data Analytics-Level II: Data Visualization Tools**
Subject code : **SB17DA02**
Credits : **4**
Lecture Hours : **43**

Objective

The course is aimed at providing exposure on data visualization tools. It will provide skills to present data effectively through chart, map and dashboard.

Unit - I **9 Hrs**

Data Visualization: Introduction – Benefits of Data Visualization - Data Visualization Tools – Features – Data access from data sources.

Unit - II **9 Hrs**

Data Transformation - Bar Chart - Pie Chart – Data Tables - Scatter Chart.

Unit - III **9 Hrs**

Time series Chart – Scorecard - Scatter Chart - Bullet Chart - Area Chart.

Unit - IV **8 Hrs**

Heat Map - Geo Map - Symbol Map - Filled Map - Editing Location in Map.

Unit - V **8 Hrs**

Dashboards: Creating Dashboard - Formatting a Dashboard - Actions in Dashboard - Sharing reports.

Text book: Course material will be provided

Reference Books

S.No	Author	Title of Book	Publisher	Year of Publication
1	Nathan Yau	Visualize This: The Flowing Data Guide to Design, Visualization, and Statistics	Wiley, 1 st Edition	2011
2	Cole NussbaumerKnafl	Storytelling with Data: A Data Visualization Guide for Business Professionals	John Wiley & Sons	2015

Note

* During Semester V – Unit I, Unit II till Data Tables

** During Semester VI - Scatter Chart in Unit II, Unit III, Unit IV and Unit V

Semester : V & VI
Title : OOSE-Level II: Software Testing Tools
Subject code : SB17SE02
Credits : 4
Lecture Hours : 43

Objective

The course covers the testing process, planning strategies to test the script using testing tools.

Unit – I **9 Hrs**

System Testing Process: Generic challenges in software development-Identify the process elements- Test strategy, Master test plan, Preparing detailed test plan, Develop and review test cases, Identify test execution cycles. System Test Commencement-Components in test strategy.

Unit - II **9 Hrs**

System Test Planning and Design: Objective- Test plan Development Process- Test Design- Test Case definition- Necessity of test case documentation- Rules to be followed- Test Case Design methods- Functional Specification based Test Case design- Functional Specification.

Unit – III **9 Hrs**

System Test Execution- Level of test execution, text reporting and defect tracking- Defect report format- Defect submission- Life cycle- Types of defects- Defect tracking system.

Unit – IV **8 Hrs**

Performance Testing: Introduction to Performance Testing- Need of Performance Testing- Methods for Load Testing- Performance Test approach. Vuser Script creation– Components – Virtual User Generator- Action Files – Output Window – Transactions.

Unit –V **8Hrs**

Software Testing Tools: Need for tools – Classification of Tools – Benefits of Tools – Risk associated with the tools – Selecting tools – Introducing the tools in the testing process - Testing an application using any software testing tools.

Text book

S.No	Author	Title of book	Publisher	Year of Publication
1	NageswaraRaoPusuluri	Software Testing Concepts and Tools	Dream Tech Press	2012

Reference Books

S.No	Author	Title of book	Publisher	Year of Publication
1	Dr. K.V.K.K.Prasad	Software Testing Tools	Dreamtech press, Reprint	2012

Note

*During Semester V - Unit I, Unit II till Test design

** During Semester VI – From test case in Unit II, Unit III, Unit IV & Unit V

Semester : V
Advance Level Course : 1
Paper : 1
Title : **Wireless Communications**
Subject code : **CS14AC1**
Credits : **5***

Objective:

This subject aims in providing a strong foundation in Technology and Architecture, Design approaches, Applications.

Unit - I

Introduction: Wireless comes of age, The cellular Revolution, The global cellular Network, Broad band, Future trends, The trouble with wireless. Transmission Fundamentals: signals for conveying Information, Analog and Digital Data Transmission, Channel Capacity, Transmission Media, Multiplexing.

Unit - II

Antennas and propagation: Antennas, propagation modes, Line-of-sight Transmission, Fading in the Mobile Environment. Signal Encoding Technique: Criteria, Digital data, Analog signals, Analog data, Analog signals, Analog data, and digital signals.

Unit - III

Spread Spectrum: The concept of spread spectrum, frequency hopping spread spectrum, direct sequence spread spectrum, code division multiple access, generation of spreading sequences. Coding and Error control: Error Detection, Block Error correction codes, Convolutional codes, convolution codes, automatic repeat request.

Unit - IV

Cellular Wireless Network: Principles, First generation analog, Second generation TDMA. Cordless systems and wireless local loop: cordless systems, wireless local loop. Mobile IP and wireless Access protocol: Mobile IP, Wireless Application Protocol.

Unit - V

Bluetooth and IEEE 802.15: Overview, Radio specification, Baseband specification, Link Manager Protocol, Logical link control and adaptation protocol.

Text Book

S. No	Author	Title of the Book	Publisher	Year of Publication
1	William Stallings	Wireless Communication and networks	Pearson Education	2 nd Edition, 2012

Reference Books

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Andreas F.Molisch	Wireless Communication	Wiley India Edition	2 nd Edition, 2012
2	Ali Eksim	Wireless Communication networks	Intech Publishing	2012
3	Ke-Lin Du, M.N.S Swamy	Wireless Communication system	Cambridge University Press	2011

Semester : V
Advance Level Course : 1
Paper : 2
Title : **Cloud Computing**
Subject code : **CS16AC2**
Credits : **5***

Objective:

The main purpose of this subject is to provide the basic framework for estimating value and to determine benefits from cloud computing as an alternative to conventional IT infrastructure.

Unit - I

Introduction cloud computing: grasping the fundamentals-discovering the value of the cloud for business getting inside the cloud-developing your cloud strategy.

Unit - II

Understanding the nature of the cloud-seeing the advantages of highly scaled data center- Exploring the technical foundation for scaling computer systems-checking the cloud workload strategy – managing data

Unit - III

Examining the cloud elements: Seeing infrastructure as a service-Exploring platform as service.

Unit - IV

Managing the cloud: Managing and securing cloud service – Governing the cloud - Virtualization and the cloud.

Unit - V

Managing the cloud: Managing desktops and devices in the cloud- Service-oriented architecture and the cloud – Managing the cloud environment.

Text Book

S.No	Author	Title of Book	Publisher	Year of Publication
1	Judith Hurwitz, Robin Bloor, Marcia Kaufman and Dr. Fernhalper	Cloud Computing For Dummies	Willey India Publication Edition	2012

Reference Books

S.No	Author	Title of Book	Publisher	Year of Publication
1	Prasant Kumar Pattnaik	Fundamentals of Cloud Computing	Vikas Publishing House	2014
2	RajkumarBuyya.,et.al	Cloud Computing: Principles and Paradigms	Wiley publications	2013
3	Barrie Sosinsky	Cloud Computing Bible	John Wiley and Sons	2011

Course Number	Course Name	Category	L	T	P	Credit
CS18C13	.NET PROGRAMMING	Core	71	4	-	4

Preamble

This course provides the students with an overview of .NET framework, Programming structure of C# in developing applications. This course covers the technologies like Common Language Runtime, C# and ADO.NET data access.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Define the basic concepts of .NET framework.	K1
CO2	Understand the general programming structure of C# in developing software solutions based on user requirements.	K2
CO3	Apply console based applications using C#.	K3
CO4	Examine the background process with the help of windows application.	K3
CO5	Illustrate the concepts of database access.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	M	M
CO2	S	M	S	S	S
CO3	S	S	S	S	M
CO4	S	M	S	M	S
CO5	M	M	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit - I

14 Hrs

Understanding .NET: The C# Environment: -.Net Strategy- Origins of .Net technology- .NET frame work- common language runtime- framework base classes- user and program interfaces- visual studio .NET- .NET languages- benefits of .NET Approach - C# and .NET. - First C# program - Data types and Expressions

Unit - II

14 Hrs

Methods and behaviours- Making Decisions - Repeating Instructions - Arrays and Collections: array basics-array declaration- array class- string class

Unit - III

14 Hrs

Advanced Object Oriented Programming: Object Oriented Language features - Component based Development,- Inheritance- abstract classes- partial classes- interfaces- polymorphism. Debugging and Handling Exceptions: Errors-Exceptions- Exception handling Techniques- Exception Classes

Unit - IV

15 Hrs

Introduction to Windows Programming: Constrating windows and console applications- Graphical User Interface- Elements of good design - Using C# and visual studio to create windows based applications- windows forms - controls. Programming based on Events: Event handling in C# -List box control objects- Combo box control objects- Menu strip control objects- checkbox and Radio button objects

Unit - V

14Hrs

Database Access Using ADO.NET: Database Access- ADO.Net- Data source configuration Tools

Text Books

S.No.	Authors	Title	Publishers	Year of Publication
1	Barbara Doyle	Programming in C#	Cengage Learning India private Limited	5 th Edition, 2015

Reference Books

S.No.	Authors	Title	Publishers	Year of Publication
1	Andrew Troelsen	C# and the .Net platform	The authors press	2 nd Edition, 2010
2	Mark J. Price	C#7 and .NET core	Packt Publisher	2 nd Edition, 2017
3	E.Balagurusamy	Programming in C#	Tata McGraw Hill	3 rd Edition, 2010

Pedagogy

- Lecture, Demonstration.

Course Designer

- Mrs. A.S. Kavitha

Course Number	Course Name	Category	L	T	P	Credit
CS18C14	SOFTWARE TESTING	III	71	4	-	4

Preamble

This course provides the foundation techniques, and tools in the area of software testing. This course also includes various methodologies of different software testing techniques and their challenges for a real time project.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Define the characteristics of testing and software development life cycle models	K1
CO2	Recognize the facts of software development models to adopt with product characteristics	K1
CO3	Understand different types of testing, their objectives and challenges	K2
CO4	Interpret the software products to execute and report test cases	K3
CO5	Apply software testing methods and to perform various types of testing in a software project	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	M	S	S
CO5	M	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit - I

15Hrs

Software Development Life Cycle Models: Phases of Software project –Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing – Structural Testing – Challenges in White-Box Testing

Unit - II**14Hrs**

Black-Box Testing: What is Black-Box Testing? - Why Black-Box Testing? – When to do Black-Box Testing? – How to do Black-Box Testing? Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing - Defect Bash

Unit – III**14Hrs**

System and Acceptance Testing: System Testing Overview – Why is System testing done? – Functional versus Non-functional Testing - Functional System Testing - Non-Functional Testing – Acceptance Testing - Summary of Testing Phases

Unit - IV**14Hrs**

Performance Testing: Factors Governing Performance Testing – Methodology for Performance Testing - Tools for Performance Testing - Process for Performance Testing - Challenges. Regression Testing: What is Regression Testing? – Types of Regression Testing – When to do Regression Testing? – How to do Regression Testing? – Best Practices in Regression Testing

Unit - V**14Hrs**

Test Planning, Management, Execution and Reporting: Test Planning – Test Management -Test Process – Test Reporting. Quick Test Professional (QTP): Overview of QTP – Testing an Application using QTP – Creating Check Points – Testing Database Application – Testing a Web Application

Text Books

S.No	Author	Title of Book	Publisher	Year of Publication
1	Srinivasan Desikan, Gopaldaswamy Ramesh	Software Testing Principles and Practices	Pearson Education	2012

Reference Books

S.No	Author	Title of Book	Publisher	Year of Publication
1	Dr.K.V.K.K.Prasad	Software Testing Tools	Dreamtech Press	2012
2	RenuRajani	Testing Practitioner Handbook	Packt Publishing Limited	2017
3	NareshChauhan	Software Testing	Oxford University Press	2 nd edition, 2016

Pedagogy

- Lectures, Group Discussion, Demonstration, Case Study

Course Designer

- Dr.C.Arunpriya

Course Number	Course Name	Category	L	T	P	Credit
PWT1815	WEB TECHNOLOGY	III	71	4	-	4

Preamble

This course gives the basic principle, strategies and methodologies of web application development. The Course is designed to develop dynamic web page using scripting languages and various styles with CSS andHTML5.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Define the knowledge about HTML document with element types, hyperlinks, images, list, tables and forms	K1
CO2	Understand the concept of CSS for dynamic presentation effect in HTML and XML documents.	K2
CO3	Describe the mark-up languages for processing, identifying and presenting information in web pages.	K2
CO4	Apply scripting languages in HTML document to add interactive components to web pages.	K3
CO5	Illustrate the web technology concept to create schemas and dynamic web pages.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	M	S	M
CO3	M	S	M	M	S
CO4	S	M	S	M	S
CO5	M	M	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

Unit - I

14 Hrs

Fundamentals of HTML: Understanding Elements: Root Elements-Metadata Elements-Section Elements-Heading Elements-Describing data types.

Unit - II

15Hrs

HTML 5: HTML5 and its essentials-Exploring New Features of HTML5-Next Generation of Web Development-Structuring an HTML Document-Exploring Editors and Browsers Supported by HTML5-Creating and Saving an HTML Document-Validating an HTML Document-Viewing an HTML Document-Hosting Web Pages.

Unit - III

14Hrs

DHTML: Introduction - Cascading Style sheets - DHTML Document Object Model and collections – Event Handling - Filters and Transitions - Data Binding.

Unit - IV

14Hrs

Scripting Languages: JavaScript: Introduction- Language Elements - Objects of JavaScript- Other Objects. VB Script: Introduction- Embedding VBScript Code in an HTML Document- Comments-Variables- Operators-Procedures- Conditional Statements- Looping Constructs - Objects and VBScript - Cookies.

Unit - V

14 Hrs

Extensible Mark-Up Language (XML): Introduction- HTML vs. XML- Syntax of the XML Document- XML Attributes- XML Validation- XML DTD- The Building Blocks of XML Documents-DTD Elements - DTD Attributes- DTD Entities- DTD Validation –XSL - XSL Transformation- XML Namespaces- XML Schema.

Text Book

S.No	Author	Title of book	Publisher	Year of Publication
1	N.P.Gopalan, J.Akilandeswari	Web Technology A Developer's- Perspective	PHI Learning Pvt.,Ltd	4 th Edition2011

Reference Books

S.No	Author	Title of book	Publisher	Year of Publication
1	Kogent Learning Solutions Inc	HTML5 BlackBook	Dreamtech Press	2011
2	AkankshaRastogi	Web Technology	K.Nath& Co Educational Publishers	1 st Edition 2012

3	AnuranjanMisra, Arjun Kumar Singh	Intoduction to Web Technology	Laxmi Publication	2011
4	C.Xavier	World Wide Web Design with HTML	TMH Publishers	2008

Pedagogy

- Lectures, Group Discussions

Course Designer

- Dr. R. Kavitha

Course Number	Course Name	Category	L	T	P	Credit
CS17CP6	WEB TECHNOLOGY AND BIO INFORMATICS LAB	Core	-	-	75	2

Preamble

This course covers the basic structure of an HTML element for creating dynamic web pages. To impart practical knowledge in web design and database connectivity to create more sophisticated HTML documents with scripting languages. To align the sequence data using various tools in Bioinformatics

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Identify the basic tags used in HTML document	K1
CO2	Understand the implementation of various style tags.	K2
CO3	Use database connectivity for practical experience in developing solutions.	K3
CO4	Demonstrate the use of various controls and connectivity in windows application.	K3
CO5	Apply programming skills to experiment Various tools in bioinformatics.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	M	M
CO2	M	S	M	S	S
CO3	S	M	S	M	S
CO4	S	M	S	M	M
CO5	S	M	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

- Exercises using Formatting Tags.
- Exercises to implement table tags.
- Exercises using List Tags.
- Exercises to implement Frames and Framesets
- Exercises using Cascading Style Sheets.
- Exercises to implement image, background color and text.
- Exercises using Radio buttons, Check boxes and List boxes
- Exercises to implement ADD, DELETE and UPDATE records in the table using ADO.NET.
- Retrieve the structures of the compounds from PubChem: Xylitol, Saccharine, Aspartame
- Perform the PHI-BLAST and PSI-BLAST for the protein sequence Q1A232. Write the top 4 E scores values and the Sequence ID until convergence.
- Perform Pair wise alignments for the proteins Insulin from the organism's homo sapiens and Musmusculus. Calculate the Percent Similarity and Identity using BLOSUM 62 and PAM 250 Compare the results.
- Perform the protein –ligand docking using ARGUSLAB for the given receptor and ligand (select the compounds from the databases) and compare the dock score.
- Find the super secondary structure for any protein database.

Pedagogy

- System, Demonstration.

Course Designers

- Dr. R. Kavitha

Semester : VI
Advance Level Course : 2
Paper : 1
Title : **Image Processing**
Subject code : CS14AC3
Credits : 5*

Objective

Presents the basic concepts and methodologies in a student-friendly manner. Provides learning principles and how they are applied in real applications.

Unit - I

Introduction to Image Processing System: Introduction-Image sampling-Quantization-Resolution- Human Visual system- Classification of digital images. Elements of image processing system.

Unit - II

Image Transforms: Introduction- Need for transform- Image transforms. Image Enhancement: Introduction – spatial domain methods- frequency domain methods – point operations - Histogram modeling.

Unit - III

Image restoration and Denoising: Introduction – Image degradation- Types of image blur- classification of image restoration techniques- image restoration model. Image segmentation: Introduction – Classification – Region approach to image segmentation – clustering techniques - Edge based segmentation – classification of edges- Edge detection.

Unit - IV

Object recognition: Introduction – Need for object recognition system – Patterns and pattern classes – Selection of measurement parameters- Relationship between image processing and object recognition
 Image compression: Introduction – Need for image compression – Redundancy in images – Image compression scheme –Classification.

Unit - V

Binary image processing – Introduction – Binarisation – Mathematical morphology- logical operations- Structure elements – Morphological image processing – Standard binary morphological – operations-dilation and erosion based operations properties of morphological based operations.

Text Books

S.No	Author	Title of Book	Publisher	Year of Publication
1	S.Jayaraman, S.Esakkirajan , T.Veerakumar	Digital Image Processing	Tata McGraw Hill Publication,	2009
2	MadhuriA.Joshi	Digital Image Processing - An algorithmic approach	PHI Learning Pvt Ltd	4 th Edition, 2009

Reference Books

S.No	Author	Title of Book	Publisher	Year of Publication
1	IRMA International	Image Processing: Concepts, Methodologies, Tools, and Applications	Idea Group,U.S	2013
2	Sachin Sharma Dr.D.J.Shah	Fundamentals of Image Processing	Mahajan Publishing House	2013
3	Rafael C. Gonzalez, Richard E.Woods, Steven L. Eddins	Digital Image Processing using MATLAB	Pearson Education , Inc. and Dorling Kindersley Publication, Fifth Impression	2011

Semester : VI
Advance Level Course : 2
Paper : 2
Title : **Mobile Computing**
Subject code : CS11AC4
Credits : 5*

Objective:

Learn the basics of networking theory- networking concepts relevant to modern wireless systems- emerging mobile computing ideas and best practices- get hands on knowledge practice with mobile computing and cloud services.

Unit - I

Wireless Communication – Introduction – History – Types of wireless networks – Application of wireless technology.

Unit - II

Telecommunication Systems: Introduction to GSM –Technical details – Mobile services – System architecture – Radio channel structure in GSM – Protocols.

Unit - III

GPRS: Introduction – GPRS system architecture – Services – Technology – GPRS physical and logical channels – Bluetooth: Working principle – Modes of operation – Applications- Bluetooth vs Wi-Fi in networking.

Unit - IV

Satellite Communications: Introduction – Satellite Basics – Satellite parameters and configuration – IEEE 802.11 architecture – Services.

Unit - V

Wireless Lan: Overview – History – Benefits – Disadvantage – Design Goals – Architecture – Types of wireless LANs – Transmission Technologies used for WLANs – Mode of operation – Competing wireless technologies.

Text Book

S.No	Author	Title of Book	Publisher	Year of Publication
1	SundaraRajan, Ramesh, Raja Sekaran	Mobile Computing	Sams Publishers	2008

Reference Books

S.No	Author	Title of book	Publisher	Year of Publication
1	Martin S. Nicklous, Thomas Stober	Mobile Computing: Theory and Practice	Pearson Education and Dorling Kindersley Publication	2012
2	Fundamentals of Mobile Computing	PattnaikPrasant Kumar and Mall Rajib	Prentice Hall of India	2012
3	RajKamal	Mobile Computing	Oxford University Press	2 nd Edition, 2011

Semester : V &VI
Title : Data Analytics-Practical II: Data Visualization tools
Subject code : SB17DAP2
Credits : 2
Practical Hours : 45

Exercises to be performed using data visualization tool.

- Create a bar chart for the given data
- Create a pie chart for the given data
- Create a scatter chart for the given data
- Create a time series chart for the given data
- Create a bullet chart for the given data
- Create a area chart for the given data
- Create a heat map for the given data
- Create a geo map for the given data
- Create a filled map for the given data
- Create a dashboard and format it

Note

* During Semester V - Exercises 1 to 6

** During Semester VI - Exercises 7 to 10

Semester : V &VI
Title : OOSE-Practical II: Software Testing Tools
Subject code : SB17SEP2
Credits : 2
Practical Hours : 45

Software Testing Lab

- Write a test case based on controls.
- Test data in a flat file.
- Manual test case to verify student grade
- Write and test a program to select the number of students who have scored more than 60 in any one subject (or all Subjects)
- Write and test a program to login a specific webpage.
- Write and test a program to get the number of list items in a list / combo box.
- Test a HTMLfile.
- Test a program in MS Excel for Data Driven Wizard.
- Test the addition of two values in C++Program.
- Write a test suite containing minimum 4 test cases.

Note:

- * During Semester V – Exercises 1 to 6
- ** During Semester VI - Exercises 7 to 10