DEPARTMENT OF COMPUTER SCIENCE(U.G.)

About the Department

The Department of Computer Science which started in 2005 aims at imparting quality education in Computer Science through various undergraduate programmes. It offers an environment for the students to nurture their creativity and develop real time applications in various advanced areas of Computer Science. The Department mainly focuses on the wholesome development of the graduate i.e. their intellectual, moral and spiritual wellbeing to excel in education, research and service. It also strives to inculcate innovative skills and technology for the benefit of learners through continuous up gradation of curriculum on par with international standards.

This degree can lead you to profiles like computer scientist or an information systems manager or a networking specialist whose job is to draw the technological roadmap for the organization, ensure efficient management of the available computer facilities, handle smooth functioning of the local area and wide area networking, implement cyber security systems, look after software and hardware system upgrading, and manage system designing and technical analysis for the organization.

PRINCIPAL

Dr. P. Balagurusamy, M.A., M.Phil, M.Ed., P.G.D.C.A., Ph.D.,

STAFF MEMBERS

1. Dr. P. Alagambigai., MCA., M.Phil., Ph.D - Assistant Professor & Head

2. Mrs K.Priyadharsini., MCA., MPhil, SET., (Ph.D)   - Assistant Professor

3. Mrs S.Gowthami, MCA., M. Phil,   - Assistant Professor

4. Mrs.R.Bindhu, MCA,M.Phil, M.E   - Assistant Professor

5. Mr A.Kumaravadivelan., MCA., M.Phil., (Ph.D)   - Assistant Professor

6. Miss B.Shaheen Nihar., M.Sc(CS) .,   - Assistant Professor

7. Mrs.K.Sankari, M.Sc(IT) .,   - Assistant Professor

8. Mr. S.Sundaresh M.C.A., M.E.   - Assistant Professor

Programme Outcomes (Pos)

On successful completion of the B.Sc. programme, the graduates will be able to,

1. Apply the knowledge acquired in the respective disciplines and also have a multidisciplinary perspective towards the study of sciences.

2. Attain skills like analytical reasoning, critical thinking and problem solving to evince interest in higher education and research for offering solutions to societal and environmental problems.

3. Communicate articulately and effectively and interpret the results obtained from scientific studies and put forth innovative ideas to carve a niche in their domain.

4. Instil the principles and ethics learnt from the field of study and exhibit the qualities like leadership, entrepreneurship and teamwork for discharging their duties as responsible citizens.

5. Utilize the growing advancements in Information and Communication Technology and embrace digital learning to become life-long learners.

Programme Specific Outcomes (PSOs)

On successful completion of the B.Sc. Computer Science programme, the student will be able to

PSO1: Define the basic principles and concepts of Computer Science through effective teaching and learning method.

PSO2: Describe the necessary skills of algorithmic, mathematical and scientific reasoning and analytical abilities for developing computer-based solutions for real life problems.

PSO3: Apply the concepts of computer theory and practices using emerging technologies and tools for developing software.

PSO4: Analyze and explore the field of computer science at multiple levels for implementing innovative solutions that cater to the dynamic nature of IT industries.

PSO5: Execute effectively on teams to accomplish shared computing design, evaluation, or implementation goals.

PSO6: Analyze impacts of computing on individuals, organizations, and society.

PSO7: Implement necessary knowledge base and create new ideas for research and development in Computer Science.

PSO8: Develop and implement solution based systems and/or processes that address issues and/or improve existing systems within in a computing based industry.

PSO9: Gaining knowledge of grammatical conversation, verities, Formulation, course and culture. Becoming competent to face competitive examination through development of language skills.

PSO10: Summarize the importance of value based living and make as responsible citizens with clear conviction to practice values and ethics in life.

PSO11: Implement the transnational character of environmental problems and ways of Addressing them, including interactions across local to global scales.

PSO12: Execute a technical training through a range of educational activities, to develop a range of transferable skills applicable to employment and lifelong learning.

Under Choice Based Credit System (CBCS)

Under Graduate Courses

G.T.N. Arts College (Autonomous), a pioneer in higher education institution in India, strives to work towards the academic excellence. The new Outcome Based Education (OBE) system allows enhanced academic mobility and enriched employability for the students. At the same time this system preserves the identity, autonomy and uniqueness of every department and reinforces their efforts to be student centric curriculum designing and skill imparting. This new system will work concertedly to achieve and accomplish the following objectives:

1. Optimal utilization of resources both human and material for the academic flexibility leading to exemplary outcome.

2. Students experience or enjoy their choice of courses and credits for their horizontal mobility.

3. The existing curricular structure as specified by TANSCHE and other higher educational institutions facilitate the Credit- Transfer across the Disciplines (CTAD) – a uniqueness of the Choice Based Credit System.

Course Pattern for B.Sc., (Computer Science)

The Undergraduate degree course consists of five vital components. They are as follows:

Part I Language (Tamil / French)
Part II English
Part III Core Course (Theory, Practical, Electives, Allied, Project and Internship).
Part IV Skill Based, Non Major Electives, Environmental Studies, Value Education and Self Study
Part V Physical Education (Non Semester) and Extension Activities.

Objectives
The Syllabus for B.Sc., (Computer Science) Programme under semester system has been designed on the basis of Choice Based Credit System (CBCS), which would focus on job oriented programmes and value added education. It will come into effect from June 2020 onwards.

Eligibility
Candidates should have passed the Higher Secondary Examination, Government of Tamil Nadu or any other examination accepted by the syndicate of Madurai Kamaraj University as equivalent there to.

Duration of the Course
The students who join the B.Sc., (Computer Science) Programme shall undergo a study period of three academic years – Six semesters.

B.Sc Computer Science
Course Pattern – from 2020-2021 Batch
Department of Computer Science
Course Pattern – from 2020-2021 – B. Sc Computer Science

Sem.	Part	Study Component	Course Code	Course Title	Hrs	Credit
I	I	Tamil	20UTAL11	□□□□□□□□□□□□□□□ □□□□□□□□	6	3
	II	English	20UENL11	English Language Through Literature I	6	3
	III	Core Course I	20UCSC11	Programming for Problem Solving	4	3
		Core Practical I	20UCSC1P	Programming for Problem Solving Lab	3	3
		Core Practical II	20UCSC1Q	Linux and Shell Programming Lab	3	3
		Allied Course I	20UMAA11	Discrete Mathematics	4	4
	IV	Non-Major Elective I	20UCSN11	Introduction to Computer Science	2	2
		VE	20UVEV11	Value Education	2	2
				Total	**30**	**23**
II	I	Tamil	20UTAL21	□□□□□□□□□□□□□□□ □□□□□□□□	6	3
	II	English	20UENL21	English Language Through Literature II	6	3
	III	Core Course II	20UCSC21	C++ and Data Structures	4	4
		Core Practical III	20UCSC2P	C++ and Data Structures Lab	3	3
		Core Practical IV	20UCSC2Q	Visual Basic Lab	3	3
		Allied Course II	20UMAA21	Operation Research	4	4
	IV	Non-Major Elective II	20UCSN21	Introduction to Computer Networks	2	2
		EGS	20UEGS21	Environment and Gender Studies	2	2
	V	PE	20UPEV2P	Physical Education (Non Semester Course)		2
				Total	**30**	**26**
III	I	Tamil	20UTAL31	□□□□□□□□□□□□□□□ □□□□□□□□□□	6	3
	II	English	20UENL31	English Language Through Literature III	6	3
	III	Core Course III	20UCSC31	Java Programming	4	4
		Core Practical V	20UCSC3P	Java Programming Lab	4	3
		Core Course IV	20UCSC32	Markup and Scripting Languages	4	3
		Allied Course III	20UMAA33	Numerical Methods	4	4
		Value Added Course I	20CCSC31	Office Automation	-	-

	IV	Skill Based Course I	20UCSS3P	Markup and Scripting Languages Lab	2	2
		Self Study Course I Course I	20USSS31	Soft Skills I		2
				Total	**30**	**24**
IV	I	Tamil	20UTAL41	தமிழிலக்கிய வரலாறும் மொழித்திறனும்	6	3
	II	English	20UENL41	English Language Through Literature IV	6	3
	III	Core Course V	20UCSC41	Python Programming	4	4
		Core Practical	20UCSC4P	Python Programming Lab	4	3
		Core Course VI	20UCSC42	Digital Principles	4	4
		Allied Course IV	20UMAA43	Quantitative Aptitude	4	4
		Value Added Course II	20CCSC41	ASP.Net	-	-
	IV	Skill Based Course II	20UCSS4P	Advanced Java Programming Lab	2	2
		Self Study Course II	20USSS41	Soft Skills II		2
	V	EA	Common	Extension Activities		2
				Total	**30**	**27**
V	III	Core Course VII	20UCSC51	RDBMS	4	3
		Core Practical VII	20UCSC5P	RDBMS Lab	4	3
		Core Course VIII	20UCSC52	Programming in C# .NET	4	3
		Core Practical VIII	20UCSC5Q	C# .NET Lab	4	3
		Core Course IX	20UCSC53	Operating System	4	3
		Core Course X	20UCSC54	Software Engineering	4	3
		Elective Course I	20UCSE51 20UCSE52 20UCSE53	1. Cryptography with Network security 2. Big Data Analytics 3. Mobile Application Development	4	4
	IV	Skill Based Course III	20UCSS5P	Desktop Publishing Lab	2	2
				Total	**30**	**24**
VI	III	Core Course XI	20UCSC61	Web Technology	4	3
		Core Practical XII	20UCSC6Q	Web Technology- Lab	4	3

		Core Course XIII	20UCSC62	Data communication Network	4	3
		Core Course XIV	20UCSC63	Cloud Computing	3	3
		Core Course XV	20UCSC64	Artificial Intelligence and Machine Learning	3	3
		Core Practical XVI	20UCSC6P	Project Work/ Viva-Voce	6	5
		Elective Course II	20UCSE61 20UCSE62 20UCSE63	1. Digital Image Processing 2. Internet of Things 3. Software Project Management	4	4
	IV	Skill Based Course IV	20UCSS6P	CGI Technology Lab	2	2
				Total	**30**	**26**

Value Added Courses

      The Computer Science Department has offered the following Value Added Courses for UG students.

      (i) Web Designing

      (ii) Network Terminology

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSC11	Number of Hours/Cycle	4
Semester	I	Max. Marks	100
Part	III	Credit	3
CORE COURSE I			
Course Title	Programming for Problem Solving		
Cognitive Level	Upto K4		

Preamble

To provide a comprehensive study of the procedure oriented concept using C programming language and to facilitates the students to elaborately study about C programming techniques. Implement these techniques to solve the variety of real-time problems.

Unit I – C Fundamentals   **12 Hours**

Overview of C: History of C – Importance of C – Basic structure of C Programs – Programming style –Character Set- C Tokens- Keywords & Identifiers- Constants, variables and Data types – declaration of variables – defining symbolic constants – declaring a variable as constant – overflow and underflow of data. Operators and expressions- precedence of arithmetic operators – mathematical functions.

Unit II – Control Statements   **12 Hours**

Managing I/O operations:reading and writing a character – formatted input, output. Decision making and branching: if statement, if….else statement, Nesting of if ….else statement – Else if Ladder – Switch statement – the?: operator – go to statement- the While statement – do statement – The for statement – jumps in loops.

Unit III – Array and String   **14**

One dimensional array – declaration, initialization – two dimensional array – multi dimensional arrays – dynamic arrays – initialization. Strings: declaration, initialization of string variables – reading and writing string–string handling function.

Unit IV- Functions and Structure   **12 Hours**

User defined functions – Structures and unions: defining a structure – declaring structure variables – accessing structure members – initialization – copying and comparing – operations on individual members – arrays of structures – arrays within structures – structures within structures – structures and functions– Unions – size of structures – bit fields.

Unit V – Pointers and Files   **10 Hours**

Pointers:accessing the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointer – chain of pointers– pointer increment and scale factors – pointers and character strings– pointers as function arguments – pointers and structures. Files: defining, opening, closing a file. I/O operations on files**.**

Pedagogy

Class Room Lectures, Power point presentation, Group Discussion, Seminar, Quiz, Assignments.

Text Book

1. Balagurusamy.E. (2005), " *Programming In Ansi C*", Tata McGraw Hill Publications, New Delhi, Second Edition.

Reference Books

1. Ashok.N. Kamthane, (2006), "*Programming in C"*, Pearson, New Delhi, Second Edition.
2. Herbert Scheldt, (2008), *"C: The Complete Reference*", Tata McGraw-Hill, New Delhi, Fourth Edition.

3. Shubhnandan. S., Jamual, (2014), "*Programming in C*", Pearson Education, New Delhi, First Edition.
4. Subburaj.R., (2012),"*Programming in C"*, Vikas Publishing, Chennai, First Edition.

E- Resources

- http://www.pdfdrive.com/Computer-Fundamentals
- http://www.programiz.com/C-programming
- http://www.tutorispoint.com/Cprogramming/index.html
- http://www.beginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/
- https://developerinsider.co/best-c-programming-book-for-beginners/

Course Outcomes

At the end of the course, students would be able to:

CO1	Identify the basic data types, operators and expressions
CO2	Describe the conditional statements and loops in programs
CO3	Illustrate the concepts of arrays and string handling functions.
CO4	Categorize the user defined functions, Structures and Unions.
CO5	Analyze the pointers and File concepts.

Mapping of Course Outcomes (Cos) with Programme Specific Outcomes (PSOs)

	PSO1	PSO2	PSO 3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	3	1	1	1	1	1	1	1	0	0	0	1
CO2	2	2	2	2	2	1	2	2	0	0	0	2
CO3	1	2	2	2	1	1	3	2	0	0	0	2
CO4	1	2	2	2	2	1	2	1	0	0	0	1
CO5	1	3	3	3	2	2	3	3	0	0	0	3

1. LOW   2.MEDIUM   3.HIGH

Articulation Mapping – K Levels with Course Outcomes (Cos)

Units	Cos	K – Level	Section A		Section B	Section C
			MCQs		Either/or Choice	Either/or Choice
			No. Of Questions	K-Level	No. Of Questions	No. Of Questions
1	CO1	Up to K2	2	K1 & K2	2(K1&K1)	1(K1)
2	CO2	Up to K2	2	K1 & K2	2(K2&K2)	1(K2)
3	CO3	Up to K3	2	K1 & K2	2(K2&K3)	1(K3)
4	CO4	Up to K3	2	K1 & K2	2(K2&K3)	1(K3)
5	CO5	Up to K4	2	K1 & K2	2(K2&K4)	1(K4)
No of Questions to be asked			10		10	5
No of Questions to be answered			10		5	3
Marks for each Question			10		4	10
Total Marks for each Section			10		20	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving problems

K4 – Analyzing the problem

Distribution of Section –wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Either/or)	Total Marks	% of Marks without choice	Consolidated (Rounded off)
K1	5	8	10	23	23.00	23%
K2	5	20	10	35	35.00	35%
K3		8	20	28	28.00	28%
K4		4	10	14	14.00	14%
Total Marks	10	40	50	100		100%

LESSON PLAN

UNIT	DESCRIPTION	HOURS	MODE
I – C Fundamentals	a) History of C, Importance of C, Basic structure of C Programs	2	PPT Presentation Descriptive Method
	b) Programming style, Character Set, C Tokens, Keywords &Identifiers, Constants, variables	3	
	c) Data Types, Declaration of Variables, Defining symbolic constants, declaring a variable as constant	4	
	d) Overflow and underflow of data, Operators and Expressions, Precedence of Arithmetic operators, Mathematical Functions	3	
II - Control Statements	a) Managing I/O operations: reading and writing a character, formatted input, output	3	PPT Presentation Descriptive Method Assignment
	b) Decision making and branching: if statement, if….else statement, Nesting of if ….else statement, Else if Ladder	3	
	c) Switch statement ,the?: operator, go to statement- the While statement	3	
	d) do statement, The for statement, jumps in loops	3	
III-Array & Strings	a) Arrays: one dimensional array, Programming Examples, Declaration, Initialization	4	PPT Presentation Descriptive Method
	b) Two dimensional array , Programming Examples, Multi Dimensional arrays, Dynamic arrays	4	
	c) Initialization. Strings: declaration, initialization of string variables, reading and writing string	4	
	d) String handling functions	2	
IV- Functions & Structure	a) User defined functions, Structures and unions: defining a structure, declaring structure variables, accessing structure members	4	PPT Presentation Descriptive Method Assignment
	b) Initialization, copying and comparing, operations on individual members, arrays of structures, arrays within structures	3	
	c) structures within structures, structures and functions	3	
	d) Unions, size of structures, bit fields	2	
V- Pointers & Files	a) Pointers: accessing the address of a variable, declaring, initialization of pointer variables, accessing a variable through its pointer	4	PPT Presentation Descriptive Method
	b) Chain of pointers, pointer increment and scale factors , pointers and character strings	2	
	c) Pointers as function arguments, pointers and structures.	2	
	d) Files: defining, opening, closing a file. I/O operations on files	2	

Course Designed By: Mrs.V.Rajarajeswari.

Program	B.Sc	Programme Code	UCS
Course Code	20UCSC1P	Number of Hours/Cycle	3
Semester	I	Max. Marks	100
Part	III	Credit	3
CORE PRACTICAL I			
Course Title	Programming for Problem Solving Lab		

Preamble

To provide a comprehensive study of the procedure oriented concept using C programming Language and to facilitates the students to elaborately study about C programming techniques. Implement these techniques to solve the variety of real-time problems.

LIST OF PROGRAMS
1. Find the Sum of Digits of a given number.
2. Generate Fibonacci Series.
3. Check whether a given number is Prime or Not
4. Find the grade of a Student using else if Ladder.
5. Check whether a given number is Armstrong or Not.
6. Check the given number is Adam number or not.
7. Calculate Quadratic Equation using Switch Case.
8. Perform various String handling Functions.
9. Reverse a given number.
10. Find Minimum and maximum of N numbers using Arrays.
11. Arrange the given numbers in Ascending Order.
12. Add the two matrices.
13. Calculate NCR and NPR using Function.
14. Generate Student Mark list using Array of Structure.
15. Swap two numbers using Pointers.

Course Designed By: Mrs.V.Rajarajeswari.

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSC1Q	Number of Hours/Cycle	3
Semester	I	Max. Marks	100
Part	III	Credit	3
Core Practical II			
Course	Linux and Shell Programming Lab		

Preamble

To provide a comprehensive study of the Linux commands, basic programming logics, file attributes and to facilitate the execution of some c programs using Linux platform.

LIST OF PROGRAMS

Linux and Shell Programming

1. Perform some of the basic Linux commands
2. Find odd or even in given number
3. Perform basic arithmetic operations of the given numbers.
4. Display multiplication table
5. Find the user who logged in.
6. To get the attributes of the given file.
7. Read names and sort ascending or descending order wise.
8. To check given file is directory or not.
9. To perform string manipulation.
10. To create and append data to the file.
11. Perform pattern matching using grep.

C programs Using Linux Platform

1. Find the factorial value of the given number.
2. Find the biggest of given three numbers.
3. Check the given string is palindrome or not.
4. To prepare an electricity bill.
5. To Prepare student mark list.
6. To process nested for loop.

Course Designed By: Mr.P.Sivarajan.

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSN11	Number of Hours/Cycle	2
Semester	I	Max. Marks	100
Part	IV	Credit	2
NON MAJOR ELECTIVE I			
Course Title		Introduction to Computer Science	
Cognitive Level		Upto K3	

Preamble

Be familiar with the Computer program basics, testing and debugging, computer language, software categories and basis of Internet.

Unit I - Computer Fundamentals 6 Hours

Introduction – Evolution of computers- Generation of computers – classification of computers – computing concept – Applications of computers.

Unit II - Computer Organization and Architecture 6 Hours

Introduction- Central Processing Unit – Internal Communications – Machine cycle – The Bus – Instruction set.

Unit III – Computer Software 7 Hours

Introduction- Types of Computer Software - System Management Programs – System Development Programs – Standard Application Programs – Unique Application Programs – Problem Solving – Structure Logic – Using the Computer.

Unit IV - Computer Languages 6 Hours

Introduction – History of Programming Languages – Generation of Programming Languages – Characteristics of a good Programming Language – Categorization of High Level Language – Popular High Level Languages.

Unit V - Internet Basics 5 Hours

Introduction -History of Internet- Internet Applications – Understanding the World Wide Web – Web Browsers – Browsing the Internet – Using a Search Engine – Email services – Protocols used for the Internet.

Pedagogy

Class Room Lectures, Power point presentation, Group Discussion, Seminar, Quiz, Assignments.

Text Book

1. E.Balagurusamy, (2017), ”*Fundamentals of Computers*”, Mc Graw Hill Education Ltd., New Delhi.

Reference Books
1. Pradeep K.Sinha and Priti Sinha, (2003), ”*Computer Fundamentals*”, BPB publications, Sixth Edition.
2. Poonam Yadav and Praveen kumar,(2013), ” *Computer Fundamentals*”, Vayu Education of India, First Edition.
3. M.S.Rozera and Deepak Rohilla, (2013), “*Computer Fundamentals*”, Vayu Education of India, First Edition.

E-References
1. https://learnengineering.in/Computer-Fundamentals
2. http://www.pdfdrive.com/Computer-Fundamentals
3. http://www.tutorialspoint.com/Computer_Fundamentals/
4. http://www.tutorialsandexample.com/Computer-Fundamentals-tutorial/
5. http://www.researchgate.net/publication/258339295_Fundamentals_of_Computer_Studies

Course Outcomes (CO)

At the end of the course, students would be able to

CO1	Describe the basics of Computer and its classification.
CO2	Explain the Computer Organization and Architecture
CO3	Summarize the Software categories
CO4	Express the various Computer Languages
CO5	Establish of Internet concepts

On successful completion of the course the students will be able to acquire the knowledge of Computer Basics, Architecture of Computer, Software Categories, Types of Computer Languages, and Basis of Internet.

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K – Level	Section A MCQs		Section B Either/or Choice	Section C Either/or Choice
			No. Of Questions	K-Level	No. Of Questions	No. Of Questions
1	CO1	Up to K2	2	K1 & K2	1(K1&K1)	1(K1)
2	CO2	Up to K2	2	K1 & K2	1(K1&K2)	1(K2)
3	CO3	Up to K2	2	K1 & K2	1(K2&K2)	1(K2)
4	CO4	Up to K2	2	K1 & K2	1(K2&K2)	1(K3)
5	CO5	Up to K3	2	K1 & K2	1(K3&K3)	1(K3)
No of Questions to be asked			10		10	5
No of Questions to be answered			10		5	3
Marks for each Question			10		4	10
Total Marks for each Section			10		20	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented- solving problems.

Distribution of Section –wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Either/or)	Total Marks	% of Marks without choice	Consolidated (Rounded off)
K1	5	12	10	27	27.00	27%
K2	5	20	20	45	45.00	45%
K3		8	20	28	28.00	28%
K4						
Total Marks	10	40	50	100		100%

LESSON PLAN

Unit	Description	Hours	Mode
I- Computer Fundamentals	a) Introduction-Evolution of Computers	1	PPT Presentation Descriptive Method
	b) Generation of Computers	2	
	c) Classification of Computers and Computing Concepts	2	
	d) Application of computers.	1	
II- Computer Organization and Architecture	a) Introduction-Central Processing Unit	2	PPT Presentation Descriptive Method
	b) Internal Communication	1	
	c) Machine Cycle	1	
	d)The Bus and Instruction set	2	
III- Computer Software	a) Introduction- Types of Computer Software	2	PPT Presentation Textual Method
	b) System Management Process	1	
	c) System Development Programs and Standard Application Programs	2	
	d) Unique Application Programs	1	
	e) Problem Solving-Structure Login and Using the computers	1	
IV- Computer Language	a) Introduction-History of Programming Language	2	PPT Presentation Descriptive Method
	b) Generation of Programming Language	1	
	c) Characteristics of a good programming Language and High level language	2	
	d) Popular High level language	1	
V- Internet Basics	a) Introduction-History of internet and Applications	1	Visual Aids Descriptive Method
	b) Understanding the WWW and web browser	1	
	c) Browsing the Internet and Using Search Engine	1	
	d) E-Mail Service and Protocol used for the Internet	2	

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSC21	Number of Hours/Cycle	4
Semester	II	Max. Marks	100
Part	III	Credit	4
CORE COURSE II			
Course Title		C++ and Data Structures	
Cognitive Level		Upto K3	

Preamble

To provide a comprehensive study of the object oriented concept using C++ programming language and to facilitates the students to elaborately study about C++ programming techniques. Implement these techniques to solve the variety of Data Structure real-time problems.

Unit I – Introduction to C++   12 Hours

Basic Concepts of Object-Oriented Programming-Benefits of OOP-Object-Oriented Languages-Applications of OOP- Structure of a C++ Program – Functions in C++ - Specifying a class-Defining Member Functions - Making an outside Function inline-Nesting of Member Functions - Private Member Functions - Array within a class -Memory Allocation for Objects - Static Data Members and Functions - Array of Objects - Objects as Function Arguments-Friendly Function-Returning Objects - Constant Member Functions.

Unit II –Constructors,Inheritance and Pointers   13 Hours

Constructors - Destructors - Inheritance-Defining Derived Classes-Single Inheritance-Making a Private Member Inheritable-Multilevel Inheritance-Multiple Inheritance-Hierarchical Inheritance-Hybrid Inheritance-Virtual Base Classes-Constructors in Derived class-Member-Nesting classes. Pointer to Objects - this Pointer- Pointer to Derived Classes-Virtual Functions-Pure Virtual Functions.

Unit III – Data Structures- Arrays & Linked Lists   14 Hours

Introduction- concept of Data Structures – Overview of Data Structures – Implementation of Data Structures- Arrays: One Dimensional Array – Multi Dimensional Array – Linked List: Single Linked List – Double Linked List - Circular Linked List.

Unit IV - Stacks and Queues   11 Hours

Stacks: Definition – Representation of Stack – Operations of Stack – Applications of Stack – Queues: Definition – Representation of Queues – various Queue structures – Application of Queues.

Unit V – Trees   10 Hours

Definition and concepts – Representation of Binary Trees – operations of Binary Tree – B and B+ Tree.

Pedagogy

Class Room Lectures, Power point presentation, Group Discussion, Seminar, Quiz, Assignments.

Text Book

1. Balagurusamy.E., (2008), " *Object Oriented Programming with C++* ", Tata McGraw Hill Publications, New Delhi, Fourth Edition.
2. D.Samanta, (2006), *"Classic Data Structures",* Prentice Hall of India, New Delhi.

Reference Books

1. Ellis Horrowitz and Sarataj Sahni, (2009),*" Fundamentals of Computer Algorithms",* New Delhi,
2. Herbert Schildt, (1998), "*C++-The Complete Reference*" , New Delhi,TMH.
3. Paul Deitel and Harvey Deitel, (2014), " *C++ How to Program*", Ninth edition, PHI.

E- Resources

- https://www.worldcat.org/title/fundamentals-of-data-structures-in-c/oclc/243506509

- https://www.researchgate.net/publication/220693653_Fundamentals_of_Data_Structure_in_C
- https://www.cplusplus.com/
- https://www.tutorialspoint.com/cplusplus/cpp_useful_resources.htm
- http://www.cppreference.com/

Course Outcomes

At the end of the course, students would be able to:

CO1	Observe the basics of OOPs Concepts.
CO2	Illustrate the types of Inheritance and Pointers
CO3	Develop the basic terminologies of Data Structures, Arrays and Linked Lists.
CO4	Construct the stack and queue applications.
CO5	Estimate the various tree concepts.

Mapping of Course Outcomes (COs) with Programme Specific Outcomes (PSOs)

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12
CO1	3	1	1	1	1	0	1	1	0	0	0	1
CO2	2	2	2	1	1	0	1	0	0	0	0	1
CO3	1	3	3	2	2	0	2	1	0	0	0	2
CO4	1	3	3	2	2	1	2	1	0	0	0	2
CO5	1	2	2	2	1	1	1	1	0	0	0	1

1. LOW   2.MEDIUM   3.HIGH

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K – Level	Section A MCQs		Section B Either/or Choice	Section C Either/or Choice
			No. Of Questions	K-Level	No. Of Questions	No. Of Questions
1	CO1	Up to K2	2	K1&K2	1(K1&K1)	1(K1)
2	CO2	Up to K2	2	K1&K2	1(K2&K2)	1(K2)
3	CO3	Up to K3	2	K1&K2	1(K2&K3)	1(K2)
4	CO4	Up to K3	2	K1&K2	1(K2&K3)	1(K3)
5	CO5	Up to K4	2	K1&K2	1(K3&K3)	1(K4)
No of Questions to be asked			10		10	5
No of Questions to be answered			10		5	3
Marks for each Question			10		4	10
Total Marks for each Section			10		20	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving problems

Distribution of Section –wise Marks with K Levels

K Levels	Section A (NoChoice)	Section B (Either/or)	Section C (Either/or)	Total Marks	% of Marks without choice	Consolidated (Rounded off)
K1	5	8	10	23	23.00	23%
K2	5	16	20	41	41.00	41%
K3		16	10	26	26.00	26%
K4			10	10	10.00	10%
Total Marks	10	40	50	100		100%

LESSON PLAN

UNIT	DESCRIPTION	HOURS	MODE
I-Introduction to C++	a)Basic Concepts, Benefits of Object Oriented Programming Language ,Application of OOPs and Structure of C++ program	2	Descriptive Method PPT Presentation
	b) Functions in C++	2	
	c) Specifying a class, Defining member Functions, Making an outside function inline	2	
	d) Nesting of member functions, Private member functions, Array with in a class	2	
	e) Memory Allocation of Objects, Static Data Members and Functions, Array of Objects, Objects as function arguments ,Friendly Function, Returning Objects, Constant Member Functions	4	
II - Constructors, Inheritance and Pointers	a) Constructors and Destructors	3	PPT Presentation Quiz
	b)Inheritance, Defining Derived Classes, Single Inheritance and Making a Private Member Inheritable	2	
	c)Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance and Hybrid Inheritance	3	
	d) Virtual Base Classes, Constructors in Derived class , Member Nesting Classes	2	
	e) Pointer to Objects, this Pointer ,and Pointer to derived Classes	2	
	f) Virtual Functions and Pure Virtual Functions	1	
III – Data Structures – Arrays &Linked List	a) Introduction and Concept of Data Structures	2	PPT Presentation Assignments
	b) Overview of Data Structures and Implementation of Data Structures	3	
	c)Arrays – One Dimensional Arrays , Multidimensional Arrays	4	
	d) Linked List – Single, Double and Circular Linked List	5	
IV- Stacks and Queues	a) Definition	1	Descriptive Method Assignments
	b)Representation of Stack ,Operations of Stack and Applications of Stack	5	
	c) Representation of queues Various Queue Structures and Application of Queue	5	
V-Trees	a) Definition and concepts b)Representation of Binary Trees c)Operations of Binary Tree	2 2 3	Descriptive Method PPT Presentation Seminar
	d) B Tree and B+ Tree	3	

Course Designed By: Mrs.P.Murugeswari.

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSC2P	Number of Hours/Cycle	3
Semester	II	Max. Marks	100
Part	III	Credit	3
CORE PRACTICAL III			
Course Title	C++ and Data Structures Lab		

Preamble

      To provide a comprehensive study of the object oriented concept using C++ programming Language and to facilitates the students to elaborately study about C++ programming techniques. Implement these techniques to solve the variety of Data Structures real-time problems.

LIST OF PROGRAMS

C++ Programming
1. Finding area of geometric shape using function Overloading.
2. Simple arithmetic Operations using Inline Functions.
3. Demonstrating the use of Pre-defined Manipulators.
4. Demonstrating the use of Friend Function.
5. Creating Students Mark list using array and objects.
6. Demonstrating Multiple Inheritances.
9. Demonstrating Multilevel Inheritances.
10. Demonstrating the use of "this" pointer.

Data Structures using C++ Programming
11. Program using Stack.
12. Program using binary search using Arrays.
13. Program using Queue.
14. Program using Linked List.
15. Program using merge sort.
16. Program using Binary Tree Traversal.

Course Designed By: Mr.P.Sivarajan.

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSC2Q	Number of Hours/Cycle	3
Semester	II	Max. Marks	100
Part	III	Credit	3
Core Practical IV			
Course Title	Visual Basic Lab		

Preamble

To facilitate the student learns to work in visual basic windows based application, conditional statements, event driven, and timer control and menu creation.

LIST OF PROGRAMS

1. To check whether a given number is Prime or not.
2. To perform Reverse the String and find the length of the String.
3. To find current date, time and day of the given date.
4. To print multiplication table.
5. To Create Arithmetic calculator
6. Using list and combo boxes.
7. To Prepare the questionnaire
8. To process a mouse events
9. To draw geometric shapes.
10. To create color mixture using scroll bar controls.
11. To change text attributes.
12. Using timer control to animate an object.
13. To load a picture using file system controls.
14. Using textbox to validate its content.
15. To create a menu with simple file and edit options using common Dialog control

Course Designed By: Mrs.P.Murugeswari.

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSN21	Number of Hours/Cycle	2
Semester	II	Max. Marks	100
Part	IV	Credit	2
NON MAJOR ELECTIVE II			
Course Title		Introduction to Computer Networks	
Cognitive Level		Upto K3	

Preamble

To understand the basic concepts of data communication, classify the network types and media types.

Unit I - Introduction to Data Communication and Networks   6 Hours

Characteristics and components- Distributed processing- Network criteria- applications - Protocols and standards and standard organizations.

Unit II – Basic Concepts of Networks   6 Hours

Line configurations - Topologies - Transmission mode- categories of Networks - Internetworking.

Unit III – The OSI Model   7 Hours

The Model- Functions of the Layers - TCP/IP protocol suite.

Unit IV - Transmission Media   5 Hours

Guided media – Twisted pair, Coaxial cable, optical fibers.

Unit V- Transmission Media   6 Hours

Unguided media - Microwave, Satellite, Cellular telephony - Transmission impairments - Performance – wave length.

Pedagogy

Class Room Lectures, Power point presentation, Group Discussion, Seminar, Quiz, Assignments.

Text Book

1. Behrous A. Forouzan, (2007), "*Data Communications and Networking*", Tata McGraw-Hill Edition.

Reference Books

1. Brijendra Singh, (2007), "*Data Communications and Computer Networks*", (2nd Edition), New Delhi, Prentice-Hall of India Pvt Ltd.
2. Tananbaum.A, 2007, Computer Networks,Pearson Education Asia, Prentice Hall of India.
3. William Stallings, 2007, Data and Computer communications, Pearson Education, Asia.

E- Resources

- http://intronetworks.cs.luc.edu/current/ComputerNetworks.pdf
- http://www.ddegjust.ac.in/studymaterial/mca-5/mca-301.pdf
- http://www.svecw.edu.in/Docs%5CCCSECNLNotes2013.pdf
- https://www.ece.uvic.ca/~itraore/elec567-13/notes/dist-03-4.pdf
- https://www.tutorialspoint.com/data_communication_computer_network/data_communication_computer_network_tutorial.pdf

Course Outcomes (CO)

At the end of the course, students would be able to

CO1	Represent the data communication and Computer Networks
CO2	Employ the line configuration and network types.
CO3	Describe the OSI model and it layers.
CO4	Explain the types of guided media
CO5	Illustrate the unguided media types

On successful completion of the course the students will be able to acquire the knowledge of basic concepts of Computer Networks, Line Configuration of Networks, OSI model layers and transmission medium types.

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K – Level	Section A MCQs No. Of Questions	Section A MCQs K-Level	Section B Either/or Choice No. Of Questions	Section C Either/or Choice No. Of Questions
1	CO1	Up to K2	2	K1&K2	1(K1&K1)	1(K1)
2	CO2	Up to K3	2	K1&K2	1(K2&K3)	1(K3)
3	CO3	Up to K2	2	K1&K2	1(K2&K2)	1(K2)
4	CO4	Up to K2	2	K1&K2	1(K1&K2)	1(K2)
5	CO5	Up to K2	2	K1&K2	1(K1&K2)	1(K2)
No of Questions to be asked			10		10	5
No of Questions to be answered			10		5	3
Marks for each Question			10		4	10
Total Marks for each Section			10		20	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving problems.

Distribution of Section –wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Either/or)	Total Marks	% of Marks without choice	Consolidated (Rounded off)
K1	5	16	10	31	31.00	31%
K2	5	20	30	55	55.00	55%
K3		4	10	14	14.00	14%
Total Marks	10	40	50	100		100%

LESSON PLAN

UNIT	DESCRIPTION	HOURS	MODE
I-Introduction to Data Communication and Networks	a)Characteristics and Components ,Distributed Processing b) Network criteria, Applications c)Protocols and standards and Standard organizations	2 2 2	PPT Presentation
II – Basic Concepts of Networks	a) Line Configurations b) Topologies c) Transmission mode d) Categories of Network e) Internetworking	1 2 1 1 1	PPT Presentation Quiz
III – The OSI Model	a) The Model b) Functions of the Layers c) TCP Protocol suite	2 3 2	Descriptive Method
IV- Transmission Media	a) Guided Media – Twisted Pair b) Coaxial Cable c) Optical fibers	1 2 2	Descriptive Method Assignments
V-Transmission Media	a) Unguided Media –Microwave, Satellite, Cellular telephony b) Transmission impairments, Performance, wavelength	3 3	Descriptive Method PPT Presentation Seminar

Programme	B.Sc. CS	Programme Code		UCS	
Course Code	**20UCSC31**	Number of Hours/Cycle		**4**	
Semester	**III**	Max. Marks		**100**	
Part	**III**	Credit		**4**	
Core Course III					
Course Title		**Java Programming**	**L**	**T**	**P**
Cognitive Level		**Up to K3**	**55**	**5**	**-**

Preamble

To understand the basic concepts of OOP and the basic elements need for developing java applications and gain knowledge about Interface, Multithread, Applet programming, Graphics and File system in java.

Unit I	Evolution, Overview and Data Types	9 Hours
	Java evolution: java Features- how java differs from C and C++ - java and Internet – Java and World Wide Web –Web Browsers – Hardware and Software Requirements –Java Environment. Overview of Java Language: Simple Java Program- java program structure- java tokens-java statement- implementing java program-java virtual machine-command line arguments. Constants – variables-data types- declaration of variables-giving values to variables- scope of variables-symbolic constants- type casting.	
Unit II	**Operators, Branching & Looping, Classes & Objects**	**12 Hours**
	Operators and Expressions: Arithmetic Operators – relational operators-logical operators-Assignment operators-Increment and Decrement Operators –Conditional Operators – Bitwise Operators-Special operators-Arithmetic Expression-Evaluation of Expression-Precedence of Arithmetic Operators-Operator precedence and associatively-Mathematical Functions. Decision Making and Branching: Decision making with if statement- Simple if statement- if else statement –Nesting 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. Class, Objects and Methods: Defining a class- fields declaration- methods declaration-creating object-accessing class members- constructors –Methods overloading- static members-nesting of methods-Inheritance-Overriding Methods-Final Variable and Methods-Final Classes-Finalizer Methods-Abstract Methods and classes-Visibility Control.	
Unit III	**Arrays, Interfaces and Packages, Multithread**	**14 Hours**
	Arrays, strings and vectors: one dimensional Arrays-creating an Array- Two dimensional Array –Strings –Vectors-Wrapper classes-Enumerated types. Intefaces :Multiple Inheritance: Defining Interfaces-extending Interfaces-Implementing Interfaces-Accessing Interface variables. Package: Java API Packages-Using system package-adding a class t a package- hiding classes- static import. Multithreaded	

	programming: creating threads- extending the thread class- stopping and blocking a thread- life cycle of a thread – using thread methods- thread exceptions-thread priority-synchronization-implementing the runnable interface	
Unit IV	**Errors and Exceptions, Applet Programming**	**10 Hours**
	Managing errors and exceptions: types of errors-exceptions- syntax of exception handling code-multiple catch statement-using finally statement- throwing our own exceptions-using exception for debugging. Applet Programming: how applets differ from applications-preparing to write Applets-Building Applet Code-Applet Life cycle-creating an executable applet-designing a webpage-applet tag-adding applet to html file-running the applet	
Unit V	**Graphics Programming, Managing I/O on Files**	**10 Hours**
	Graphics Programming: the graphics class-Lines and rectangles-circles and ellipses, drawing polygons-line graphs-using control in applets-drawing bar charts. Managing Input/output Files in Java: concept of streams – stream classes-byte stream classes- character stream classes- using streams-other useful I/O Classes-un\sing the file class- I/O exceptions-creation of files-reading/writing character and buffering files-random access files-interactive input and output.	

Pedagogy

Class Room Lectures, Power point presentation, Group Discussion, Seminar, Quiz and Assignments

Text Book
1. Balagurusamy, E. (2019), "*Programming with Java*", TATA McGraw-Hill Company, Sixth Edition.

Reference Books
1. Debasish Jana, (2008), "*Java and object oriented programming paradigm*" , New Delhi Prentice-Hall in India Private Limited.
2. Herbert Schildt , (2002), "*Java 2 – Complete Reference*" , Mcgraw Hill Edition (India) Private Limited, New Delhi, Fifth Edition.
3. John.R.Hubbard ,(2004) , " *Programming with Java (Schaum's Outline Series)*", McGraw Hill International Editions, New Delhi, Second Edition.
4. Somasundaram .K., (2008) , " *Programming in Java2*", JAICO Publishing House, First Edition.

E-Resources
- www.codecademy.com
- www.computerscience.org
- www.learnjavaonline.org
- www.programiz.com
- www.w3schools.com

Course Outcomes
After completion of this course, the students will be able to:

CO1	Understand the fundamentals of object-oriented programming in Java, variables and data types
CO2	Describe the conditional statements and loops, implement class and objects in programs,
CO3	Illustrate the concepts of Arrays, Interface ,Packages and Multithread
CO4	Develop java programs to implement exception handling and applet
CO5	Write Java programs to implement graphics programs and Files.

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	2	1	1	1	-	-	2	-	-	-	-	1
CO2	1	1	2	1	-	-	2	-	-	-	-	1
CO3	1	1	3	1	-	-	3	-	-	-	-	1
CO4	-	3	3	1	-	-	3	1	-	-	--	1
C05	-	3	3	1	-	-	3	1	-	-	-	1

3. High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A		Section B	Section C
			MCQs		Either/ or Choice	Open Choice
			No. Of Questions	K-Level	No. Of Questions	No. Of Questions
1	CO1	Up to K2	2	K1&K2	2(K1 & K1)	1(K1)
2	CO2	Up to K2	2	K1&K2	2(K2 & K2)	1(K1)
3	CO3	Up to K3	2	K1&K2	2(K2 & K2)	1(K2)
4	CO4	Up to K3	2	K1&K2	2(K2 & K2)	1(K2)
5	CO5	Up to K3	2	K1&K2	2(K3 & K3)	1(K3)
No of Questions to be asked			10		10	5
No of Questions to be answered			10		5	3
Marks for each Question			1		4	10
Total marks for each Section			10		20	30

K1 – Remembering and recalling facts with specific answers
K2 – Basic understanding of facts and stating main ideas with general answers
K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	5	8	20	33	33.00	33
K2	5	24	20	49	49.00	49
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit	Evolution, Overview and Data Types	9 Hours	Mode
I	**a.** java Features, how java differs from C and C++, java and Internet, Java and World Wide Web, Web Browsers	2	**Descriptive Method**
	b. Hardware and Software Requirements, Java Environment, Simple Java Program, java program structure	2	
	c. java tokens, java statement, implementing java program, java virtual machine, command line arguments	2	
	d. Constants , variables, data types	2	
	e. Declaration of variables, giving values to variables, scope of variables, symbolic constants, type casting	1	

Unit	Operators, Branching & Looping, Classes & Objects	12 Hours	Mode
II	**a.** Arithmetic Operators, relational operators, logical operators, Assignment operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special operators	2	**PPT Presentation**
	b. Arithmetic Expression, Evaluation of Expression, Precedence of Arithmetic Operators, Operator precedence and associativity, Mathematical Functions	2	
	c. Decision making with if statement- Simple if statement, if else statement, Nesting if else statement, the else if ladder, the switch statement, the? : Operator	1	
	d. The while statement, the do statement, the for statement, jumps in Loops	2	
	e. Defining a class, fields declaration, methods declaration, creating object, accessing class members, constructors, Methods overloading, static members, nesting of methods	3	
	f. Overriding Methods, Final Variable and Methods, Final Classes, Finalizer Methods, Abstract Methods and classes, Visibility Control	2	

Unit	Arrays, Interfaces and Packages, Multithread	14 Hours	Mode
III	**a.** one dimensional Arrays, creating an Array, Two dimensional Array ,Strings, Vectors, Wrapper classes, Enumerated types	2	**Descriptive Method**
	b. Intefaces :Multiple Inheritance, Defining Interfaces, extending Interfaces, Implementing Interfaces, Accessing Interface variables	3	
	c. Package: Java API Packages, Using system package, adding a class t a package, hiding classes, static import	3	
	d. Multithreaded programming: creating threads, extending the thread class, stopping and blocking a thread, life cycle of a thread, using thread methods	3	

	e. Thread exception, thread priority, synchronization, implementing the runnable interface	**3**	
Unit IV	**Errors and Exceptions, Applet Programming**	**10 Hours**	**Mode**
	a. Types of errors, exceptions, syntax of exception handling code, multiple catch statement	**2**	**Descriptive Method**
	b. Using finally statement, throwing our own exceptions, using exception for debugging	**2**	
	c. How applets differ from applications, preparing to write Applets, Building Applet Code, Applet Life cycle	**3**	
	d. Creating an executable applet, designing a webpage, applet tag, adding applet to html file, running the applet	**3**	
Unit V	**Graphics Programming, Managing I/O on Files**	**10 Hours**	**Mode**
	a. The graphics class, Lines and rectangles, circles and ellipses,	**2**	**Descriptive Method**
	b. Drawing polygons, line graphs, using control in applets, drawing bar charts.	**2**	
	c. Managing Input/output Files in Java: concept of streams, stream classes, byte stream classes, character stream classes, using streams, other useful I/O Classes, using the file class	**3**	
	d. I/O exceptions, creation of files, reading/writing character and buffering files random access files, interactive input and output.	**3**	

Course designed by Mrs. V. Raja Rajeswari

Programme	B.Sc. CS	Programme Code		UCS		
Course Code	20UCSC3P	Number of Hours/Cycle		4		
Semester	III	Max. Marks		100		
Part	III	Credit		3		
Core Practical V				L	T	P
Course Title	Java Programming Lab			-	-	60

Preamble

To understand the basic concepts of OOP and the basic elements need for developing java applications and gain knowledge about Interface, Multithread, Applet programming, Graphics and File system in java.

List of Programs

1. Generate a simple temperature conversion program.
2. Perform Volume calculation using method overloading.
3. Using Command line Arguments, test if the given string is palindrome or not.
4. String Manipulation using string (Use of any five string methods are preferred)
5. Write a program to store names into a Vector list. Also, copy them into another Array List and then print it using Vector Class methods.
6. Perform Multiplication of Matrices using class and object
7. Using multilevel inheritance process student mark list.
8. Implement multiple inheritances for payroll processing.
9. Create a package called "Arithmetic "the contains method to deal with all arithmetic operators. Also write a Program to use the package.
10. Create two threads such that one of the threads prints even numbers and another print odd numbers using thread priorities.
11. Program to demonstrate the use built-in exception in Java.
12. Define an exception called "Marks Out of bound "Exception that is the entered marks are greater than 100.
13. File processing using byte stream.
14. Draw a color balls using applet.
15. Draw a polygon using applets.

Course designed by Mrs. V. Raja Rajeswari

Programme	B.Sc. CS	Programme Code		UCS		
Course Code	20UCSC32	Number of Hours/Cycle		4		
Semester	III	Max. Marks		100		
Part	III	Credit		3		
		Core Course IV				
Course Title	Markup and Scripting Languages			L	T	P
Cognitive Level		Up to K3		56	4	-

Preamble

To understand the basic concepts of internet and web page creation using JavaScript and VBScript and gain knowledge about JSP , ASP.

Unit I	Internet Basic Concepts	11 Hours
	Introduction to Internet: – History of Internet – Internet services and accessibility – uses of Internet- Internet protocols. HTML – Head and Body Section – format tags – paragraph tag – list tags – anchor tag – image tag - table tags – html forms.	
Unit II	JAVA Script	10 Hours
	Introduction – language elements – objects of java script – other objects	
Unit III	VB Script	13 Hours
	Introduction – Embedding VB script – comments – variables – operators – procedures – conditional statements – looping constructs – object and VBScript – cookies.	
Unit IV	Java Server Pages	10 Hours
	Introduction – advantages of JSP – developing first JSP – components of JSP – reading requests – retrieving the data posted from a HTML file to a JSP file- JSP Session – cookies.	
Unit V	Active Server Pages	12 Hours
	Introduction – Advantages of ASP – First ASP script – Processing of ASP scripts with forms – variables and constructs – subroutines – ASP Cookies – ASP objects – connecting data with ASP.	

Pedagogy

Class Room Lectures, Power point presentation, Group Discussion, Seminar, Quiz and Assignments

Text Book
1. Gopalan, N.P., Akilandeswari, J.(2014), "*Web Technology A Developer's Perspective*", Prentice Hall of India, Second Edition.

Reference Books
1. Akshi Kumar, (2018), "Web Technology: Theory and Practice" , Chapman and Hall/CRC; First Edition
2. Srinivasan,M., (2012), "Web Technology: Theory and Practice" , Pearson Education; First Edition.
3. Uttam K. Roy., (2010), "Web Technology" , Oxford University Press ; First Edition

E-Resources
- www.computerscience.org
- www.geeksforgeeks.com
- www.halvorsen.blog

Course Outcomes

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

CO1	Understand the Internet concepts and protocols
CO2	Describe the concept of java script
CO3	Illustrate the role of VB script in web page creation
CO4	Develop web page using Java Server Pages
CO5	Write ASP Script to create dynamic web page

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	2	2	1	1	1	1	1	1	-	-	-	1
CO2	2	2	2	2	2	1	2	1	-	-	-	1
CO3	2	3	2	2	2	1	3	1	-	-	-	1
CO4	2	3	2	2	2	1	3	1	-	-	-	1
CO5	2	3	2	2	2	1	3	1	-	-	-	2

3. High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A		Section B	Section C
			MCQs		Either/ or Choice	Open Choice
			No. Of Questions	K-Level	No. Of Questions	No. Of Questions
1	CO1	Up to K2	2	K1&K2	2(K1 & K1)	1(K1)
2	CO2	Up to K2	2	K1&K2	2(K1 & K1)	1(K2)
3	CO3	Up to K3	2	K1&K2	2(K2 & K2)	1(K2)
4	CO4	Up to K3	2	K1&K2	2(K2 & K2)	1(K2)
5	CO5	Up to K3	2	K1&K2	2(K3 & K3)	1(K3)
No of Questions to be asked			10		10	5
No of Questions to be answered			10		5	3
Marks for each Question			1		4	10
Total marks for each Section			10		20	30

K1 – Remembering and recalling facts with specific answers
K2 – Basic understanding of facts and stating main ideas with general answers
K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	5	16	10	31	31.00	31
K2	5	16	30	51	51.00	51
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit		Hours	Mode
Unit I	**Internet Basic Concepts**	**11 Hours**	**Mode**
	a. Introduction to Internet: History of Internet, Internet services and accessibility, uses of Internet, Internet protocols	3	**Descriptive Method**
	b. HTML, Head and Body Section, format tags	3	
	c. paragraph tag, list tags, anchor tag	3	
	d. image tag, table tags, html forms	2	
Unit II	**JAVA Script**	**10 Hours**	**Mode**
	a. Introduction, language elements	3	**PPT Presentation**
	b. objects of java script	4	
	c. other objects	3	
Unit III	**VB Script**	**13 Hours**	**Mode**
	a. Introduction, Embedding VB script	3	**Descriptive Method**
	b. comments, variables, operators, procedures	3	
	c. conditional statements, looping constructs	3	
	d. object and VBScript, cookies	4	
Unit IV	**Java Server Pages**	**10 Hours**	**Mode**
	a. Introduction, advantages of JSP, developing first JSP	2	**Descriptive Method**
	b. components of JSP, reading requests	3	
	c. retrieving the data posted from a HTML file to a JSP file	3	
	d. JSP Session, cookies	2	
Unit V	**Active Server Pages**	**12 Hours**	**Mode**
	a. Introduction, Advantages of ASP	2	**Descriptive Method**
	b. First ASP script, Processing of ASP scripts with forms.	3	
	c. variables and constructs, subroutines	3	
	d. ASP Cookies, ASP objects, connecting data with ASP.	4	

Course designed by Mrs. S. Jeyanthi

Programme	B.Sc. CS	Programme Code		UCS		
Course Code	**20UCSS3P**	Number of Hours/Cycle		**2**		
Semester	**III**	Max. Marks		**50**		
Part	**IV**	**Credit**		**2**		
Skill Based Course I				**L**	**T**	**P**
Course Title	**Markup and Scripting Language Lab**			**-**	**-**	**30**

Preamble

       To understand the basic concepts of internet and web page creation using JavaScript and VBScript and gain knowledge about JSP , ASP.

List of Programs

1. Creation of a simple college web site using hyperlinks, tables and images.
2. Creation of different text styles using style sheets
3. Simple VB Scripts to handle mouse events (mousein , mouseover etc.)
4. Simple Java Script for Email ID Validation
5. Java Script to Great the user as good morning / good afternoon depending on the time of day.
6. Creation of cookies using java script
7. Java Script using Timers
8. HTML Forms using VB Script
9. Display the day of week using VB script
10. Create two JSP file and Print "Hello Welcome" in Bold Text.
11. Create two JSP files called "a.jsp" and "b.jsp" then forward b.jsp file form a.jsp.
12. Create a Servlet file and call a JSP file from that created servelet.
13. Program using HTTP Get Request / Post Request etc.

Course designed by Mrs. S. Jeyanthi

Programme	B.Sc. CS	Programme Code		UCS	
Course Code	**20UCSC41**	Number of Hours/Cycle		**4**	
Semester	**IV**	Max. Marks		**100**	
Part	**III**	Credit		**4**	
Core Course V					
Course Title		**Python Programming**	**L**	**T**	**P**
Cognitive Level		**Up to K3**	**55**	**5**	**-**

Preamble

To enable the students to familiar with python programming basics, Functions, Strings, Lists Classes and Objects.

Unit I	**Introduction to digital computer**	**9 Hours**
	Introduction-Von Neumann Concept- Storage-Programming languages-Translators-Hardware and Software-Operating system. **Problem solving strategies:** Problem analysis-Algorithms-Flow charts-Examples of algorithms and flow charts.	
Unit II	**Introduction to Python and Data, Expressions, Statements**	**11 Hours**
	Introduction-Python overview-Getting started with python-Comments-Python identifiers-Reserved Keywords-Variables-Standard data types-Operators-Statement and expressions-String operations-Boolean expressions-Control Statements-Iteration-while statement-Input from keyboard.	
Unit III	**Functions**	**13 Hours**
	Introduction-Built-in functions-Composition of functions-User defined functions-Parameters and arguments-Function calls-The return statement-Python recursive function-The Anonymous functions-Writing python scripts.	
Unit IV	**String and Lists**	**12 Hours**
	Strings-Lists. Tuples and Dictionaries: Tuples-Dictionaries. **Files and Exceptions:** Text files-Directories-Exceptions - Exception with arguments - User-defined Exception.	
Unit V	**Classes and Objects**	**10 Hours**
	Overview of OOP(object-oriented programming)-Class definitions-Creating objects-Objects as Arguments-Object as Return Values-Built-in Class Attributes-Inheritance-Method Overriding-Data Encapsulation-Data hiding.	

Pedagogy

Class Room Lectures, Power point presentation, Group Discussion, Seminar, Quiz and Assignments

Text Book

1. Balagurusamy,E. (2018), "*Problem Solving and Python Programming*", McGraw-Hill Education, First Edition.

Reference Books

1. Leonard Eddison, (2018), "*Python Programming, A step by step Guide for Beginners*", Atlantic Publishers, Second Edition.
2. Martin C. Brown , (2018), "*Python The Complete Reference*" , McGraw Hill Edition (India) Private Limited, New Delhi, Second Edition.
3. Dr. Nageswara Rao, R.(2018), "*Core Python Programming*", DreamTech Press, Second Edition

E-Resources

- **www.python.org**
- **www.w3schools.com**
- **www.programiz.com**

Course Outcomes

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

CO1	Enumerate basic concepts of digital computer and algorithms
CO2	Illustrate the basic elements of python programming language
CO3	Describe the built-in functions in python and python scripts
CO4	Develop python programs using strings, list and files
CO5	Illustrate the concept of Object Oriented Programming

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	3	3	1	2	1	1	1	1	-	-	-	1
CO2	2	2	2	2	1	1	1	1	-	-	-	1
CO3	2	2	2	3	2	1	2	2	-	-	-	2
CO4	2	2	2	3	2	1	2	2	-	-	-	2
C05	2	2	1	3	2	1	2	1	-	-	-	2

4. High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A		Section B	Section C
			MCQs		Either/ or Choice	Open Choice
			No. Of Questions	K-Level	No. Of Questions	No. Of Questions
1	CO1	Up to K2	2	K1&K2	2(K1 & K1)	1(K1)
2	CO2	Up to K2	2	K1&K2	2(K1 & K1)	1(K2)
3	CO3	Up to K3	2	K1&K2	2(K2 & K2)	1(K2)
4	CO4	Up to K3	2	K1&K2	2(K2 & K2)	1(K3)
5	CO5	Up to K3	2	K1&K2	2(K2 & K2)	1(K3)
No of Questions to be asked			10		10	5
No of Questions to be answered			10		5	3
Marks for each Question			1		4	10
Total marks for each Section			10		20	30

K1 – Remembering and recalling facts with specific answers
K2 – Basic understanding of facts and stating main ideas with general answers
K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	5	16	10	31	31.00	31
K2	5	24	20	49	49.00	49
K3			20	20	20.00	20
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit I	Introduction to digital computer	9 Hours	Mode
	a. Introduction, Von Neumann Concept, Storage, Programming languages	2	**Descriptive Method**
	b. Translators, Hardware and Software, Operating system.	2	
	c.Problem solving strategies: Problem analysis, Algorithms.	2	
	d. Flow charts, Examples of algorithms and flow charts	3	
Unit II	**Introduction to Python and Data, Expressions, Statements**	11 Hours	Mode
	a.Introduction, Python overview, Getting started with python	2	**PPT Presentation**
	b.Comments, Python identifiers, Reserved Keywords, Variables, Standard data types	3	
	c. Operators ,Statement and expressions, String operations, Boolean expressions	3	
	d. Control Statements, Iteration, while statement, Input from keyboard.	3	
Unit III	**Functions**	13 Hours	Mode
	a. Introduction, Built-in functions	2	**Descriptive Method**
	b. Composition of functions, User defined functions.	3	
	c.Parameters and arguments, Function calls, The return statement.	3	
	d.Python recursive function, The Anonymous functions	3	
	e.Writing python scripts	2	
Unit IV	**String and Lists**	12 Hours	Mode
	a.Strings, Lists.	2	**Descriptive Method**
	b. Tuples and Dictionaries: Tuples, Dictionaries.	3	
	c.Files and Exceptions: Text files, Directories.	3	
	d.Exceptions, Exception with arguments, User-defined Exception	4	
Unit V	**Classes and Objects**	10 Hours	Mode
	a.Overview of OOP(object-oriented programming)	2	**Descriptive Method**
	b. Class definitions, Creating objects	2	
	c.Objects as Arguments, Object as Return Values, Built-in Class Attributes	3	
	d.Inheritance, Method Overriding, Data Encapsulation Data hiding.	3	

Course designed by Mr .B.Albert

Programme	B.Sc. CS	Programme Code		UCS	
Course Code	**20UCSC4P**	Number of Hours/Cycle		**4**	
Semester	**IV**	Max. Marks		**100**	
Part	**III**	Credit		**3**	
Core Practical VI			**L**	**T**	**P**
Course Title	**Python Programming Lab**		**-**	**-**	**60**

Preamble

To enable the students to familiar with python programming basics, Functions, Strings, Lists, Classes and Objects.

List of Practical:

1. Convert Fahrenheit to Celsius
2. Calculate simple interest
3. Swap two numbers.
4. Find odd or even from given number.
5. Find biggest among 3 numbers.
6. Print Fibonacci series.
7. Find prime or not in given number.
8. Demonstrate built in functions (Math and String functions)
9. Find factorial using recursion.
10. Demonstrate convert number systems.
11. Process employee payroll using user defined functions.
12. Find a string is a palindrome or not.
13. Remove punctuation marks of a given string.
14. Add and multiply the matrices.
15. Define functions and print tuple values are cube of number between 1and 15
16. Demonstrate file process.
17. Print calendar as per need.

Course designed by Mr .B.Albert

Programme	B.Sc. CS	Programme Code		UCS	
Course Code	**20UCSC42**	Number of Hours/Cycle		4	
Semester	**IV**	Max. Marks		100	
Part	**III**	Credit		4	
Core Course VI					
Course Title		**Digital Principles**	**L**	**T**	**P**
Cognitive Level		**Up to K3**	**57**	**3**	**-**

Preamble

      To be Familiar with the basic principles of Number System ,Gates ,the Boolean Laws, K – Map, Concept of Multiplexers, Binary Addition, Subtraction, Flip Flops, Registers and its Types.

Unit I	**Number System and Digital Logic**	**10 Hours**
	Binary number system-Binary to Decimal conversions-Decimal to Binary-Octal-Hexadecimal numbers-ASCII code-Excess-3 code-Gray code-The basic gates- Inverter-OR Gates-AND Gates-Universal logic gates-NOR Gates-NAND Gates	
Unit II	**Combinational Logic Circuits**	**12 Hours**
	Boolean laws and theorems-Sum of Products Method-K map-Truth Tables-Pairs, Quads, Octets-K map simplifications-Don't care conditions-Product of sum methods-Product of sum simplifications.	
Unit III	**Data Processing Circuits**	**13 Hours**
	Multiplexers-De-Multiplexers-1-of-16-Decoders-BCD-to-Decimal Decoders- 7-segment decoders-Encoders-Exclusive-OR Gates-Parity Generators-Checkers	
Unit IV	**Arithmetic Circuits and Flip Flops**	**12 Hours**
	Binary Addition-Binary Subtraction-2's & 1's complement representation-2'sComplement Arithmetic-Arithmetic building blocks-RS-flip flop-D-Flip Flop-JK Flip Flop- JK Master Slave Flip Flop.	
Unit V	**Registers and Counters**	**10 Hours**
	Types of Registers-Serial in Serial out-Serial in Parallel out-Parallel in Serial out-Parallel in parallel out-Ripple Counter-Synchronous Counter.	

Pedagogy

      Class Room Lectures, Power point presentation, Group Discussion, Seminar, Quiz and Assignments

Text Book
1. Donald, P. Leach , Albert Paul Malvino. (2015), "*Digital Principles and Applications*", McGraw-Hill Education, Eighth Edition.

Reference Books
1. Ananda Natarajan,R. , (2015), "*Digital Design*", PHI Learning Private Limited, Fifth Edition.
2. Meena, K. , (2013), "*Principles of Digital Electronics*" , PHI Learning Private Limited, Fifth Edition
3. Salivahanan, S., Arivazhagan, S.,(2012), "*Digital Circuits and Design*", Vikas Publishing House , Fourth Edition

E-Resources
- www.digitalprinciples.org
- www.w3schools.com
- www.toladata.com

Course Outcomes

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

CO1	Describe the basic concepts of number system and digital logic
CO2	Develop the various combinational logic circuits and K map
CO3	Illustrate the circuits of multiplexers and decoders
CO4	Develop arithmetic circuits and functions of various flip flop
CO5	Discuss the types of registers and counters

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	2	2	1	1	1	1	1	1	-	-	-	1
CO2	1	1	3	1	2	1	2	2	-	-	-	1
CO3	1	1	2	1	1	1	2	1	-	-	-	1
CO4	1	1	3	1	2	1	2	2	-	-	-	1
C05	1	1	2	1	1	1	2	1	-	-	-	1

3. High; 2. Moderate; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A		Section B	Section C
			MCQs		Either/ or Choice	Open Choice
			No. Of Questions	K-Level	No. Of Questions	No. Of Questions
1	CO1	Up to K2	2	K1&K2	2(K1 & K1)	1(K3)
2	CO2	Up to K2	2	K1&K2	2(K1 & K1)	1(K3)
3	CO3	Up to K3	2	K1&K2	2(K2 & K2)	1(K2)
4	CO4	Up to K3	2	K1&K2	2(K2 & K2)	1(K1)
5	CO5	Up to K3	4	K1&K2	2(K2 & K2)	1(K1)
No of Questions to be asked			10		10	5
No of Questions to be answered			10		5	3
Marks for each Question			1		4	10
Total marks for each Section			10		20	30

K1 – Remembering and recalling facts with specific answers
K2 – Basic understanding of facts and stating main ideas with general answers
K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	5	16	20	41	41.00	41
K2	5	24	10	39	39.00	39
K3			20	20	20.00	20
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit I	**Number System and Digital Logic**	**10 Hours**	**Mode**
	a. Binary number system, Binary to Decimal conversions, Decimal to Binary, Octal, Hexadecimal numbers	**3**	**Descriptive Method**
	b. ASCII code, Excess-3 code, Gray code	**2**	
	c.The basic gates, Inverter, OR Gates, AND Gates	**2**	
	d. Universal logic gates, NOR Gates, NAND Gates.	**3**	
Unit II	**Combinational Logic Circuits**	**12 Hours**	**Mode**
	a.Boolean laws and theorems, Sum of Products Method	**3**	**PPT Presentation**
	b.K map, Truth Tables, Pairs, Quads, Octets.	**3**	
	c. K map simplifications, Don't care conditions	**3**	
	d. Product of sum methods, Product of sum simplifications.	**3**	
Unit III	**Data Processing Circuits**	**13 Hours**	**Mode**
	a. Multiplexers, De-Multiplexers	**3**	
	b.1-of-16-Decoders, BCD-to-Decimal Decoders	**3**	**Descriptive Method**
	c.7-segment decoders, Encoders, Exclusive-OR Gates	**4**	
	d.Parity Generators, Checkers	**3**	
Unit IV	**Arithmetic Circuits and Flip Flops**	**12 Hours**	**Mode**
	a.Binary Addition, Binary Subtraction	**3**	**Descriptive Method**
	b. 2's & 1's complement representation, 2'sComplement Arithmetic.	**3**	
	c.Arithmetic building blocks, RS-flip flop, D-Flip Flop	**3**	
	d.JK Flip Flop, JK Master Slave Flip Flop	**3**	
Unit V	**Registers and Counters**	**10 Hours**	**Mode**
	a.Types of Registers, Serial in Serial out, Serial in Parallel out.	**4**	**Descriptive Method**
	b. Parallel in Serial out, Parallel in parallel out.	**3**	
	c.Ripple Counter, Synchronous Counter	**3**	

Lesson Plan

Course designed by Mr. P.Sivarajan

Programme	B.Sc. CS	Programme Code		UCS		
Course Code	**20UCSS4P**	Number of Hours/Cycle		**2**		
Semester	**IV**	Max. Marks		**50**		
Part	**IV**	**Credit**		**2**		
Skill Based Course II				**L**	**T**	**P**
Course Title	**Advanced Java Programming Lab**			**-**	**-**	**30**

Preamble

Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing, Event Handling and servlet program.

List of Programs

1. Program to create a frame using AWT and implement mouse event.
2. Program to display a string in frame window with pink color as background using AWT.
3. Program to create Buttons and implement Button click event using AWT.
4. Program which response to Key typed events and updates the status window message using AWT.
5. Program to execute select query using JDBC.
6. Program to update customer information using JDBC.
7. Simple servlet that generate plain text.
8. Simple servlet which display cookie id.
9. Implement RMI concept in stock market.
10. Implement a Java socket programming where client sends a text and server receives and prints it.

Course designed by Mr .B.Albert

Extra Credit Value Added Courses

Programme	B.Sc. CS	Programme Code		UCS	
Course Code	**20CCSC31**	Number of Hours per Semester		30	
Semester	**III**	Max. Marks		50	
Part	**III**	Credit			
Value Added Course I			L	T	P
Course Title	Office Automation		30	-	-

Unit I	Introduction to Computer and Information Technology- Computer Organization and working-ALU- Memory – Read Only Memory (ROM).	**6 Hours**
Unit II	Input Devices- Output Devices- Storage Devices	**6 Hours**
Unit III	Microsoft Office 2007 - Word Processing.	**6 Hours**
Unit IV	Microsoft Office Excel 2007	**6 Hours**
Unit V	Creating charts in Excel 2007 –Formatting numbers and labels –Protect a sheet – Applying themes.	**6 Hours**

Text Book
1. Computer Fundamentals and Office Automation, Course Designer and Acquisition Editor, Centre for Information Technology and Engineering, Manonmaniam Sundaranar University, Tirunelveli.

Reference Book

1.Habib Zeb, Office Automation, Khyber Pakhtunkhwa Board of Technical Education, 1st Edition August 2014.

E- Resources
1.https://www.tutorialspoint.com/computer_fundamentals/computer_fundamentals_tutorial.pdf
2. https://khpditweebly.weebly.com/office-automation-notes.html

Programme	B.Sc. CS	Programme Code		UCS	
Course Code	**20CCSC41**	Number of Hours		**30**	
Semester	**IV**	Max. Marks		**50**	
Part	**III**	**Credit**			
Value Added Course II			**L**	**T**	**P**
Course Title	**ASP.NET**		**30**	**-**	**-**

Unit I	Introduction - Visual Studio 2005- Changes to ASP.NET 1.0 controls.	**6 Hours**
Unit II	Changes to ASP.NET 1.0 controls- Application and Page frameworks	**6 Hours**
Unit III	New Ways to Handle Data- The sql Data source and Grid view control –Visual Studio 2005 – Connection Strings.	**6 Hours**
Unit IV	Site Navigation-Tree view Server Control – Menu Server Control – Site map Data Provider – Site Map API.	**6 Hours**
Unit V	Working With Master Pages-Event Ordering – Caching with Master Pages.	**6 Hours**

Text Book

1**.** Dino Esposito, Programming Microsoft ASP.NET 4, Published by Microsoft Press, 2011.

Reference Books

1. Beginning ASP.NET 4.5.1 in C# and VB, ImarSpaanjaars, Published by John Wiley & Sons, Inc, 2014.

E- Resources
1. https://www.tutorialspoint.com/asp.net/asp.net_tutorial.pdf
2. https://www.halvorsen.blog/
3. http://www.csc.villanova.edu/~mdamian/ASPNET/1-startTutorial.pdf
4.https://www.halvorsen.blog/documents/tutorials/resources/ASP.NET%20and%20Web%20Programming.pdf.

Programme	B.Sc. CS	Programme Code			UCS
Course Code	20UCSC51	Number of Hours/Cycle			4
Semester	V	Max. Marks			100
Part	III	Credit			3
Core Course VII					
Course Title	RDBMS		L	T	P
Cognitive Level		Up to K3	60	--	--

Preamble:

To enable the students to be familiar of Database System, relational model and SQL queries, Normal Forms and Transaction Management.

Unit I	Introduction to Database and Database Architecture	12 Hours
	Introduction: Managing data-File system vs DBMS-Advantages of DBMS-Describing and Storing Data in a DBMS-Structure of a DBMS-Database Design and ER Diagrams-Entities, Attributes, and Entity Sets-Relationships and Relationship Sets-Additional Features of the ER Model.	
Unit II	THE RELATIONAL MODEL	11 Hours
	Introduction to the Relational Model-Integrity Constraints over Relations-Logical Database Design: ER to Relational-Introduction to Views-Destroying/Altering Tables and Views-Relational Algebra-Relational Calculus	
Unit III	SQL: QUERIES, CONSTRAINTS, TRIGGERS	12 Hours
	The Form of a Basic SQL Query-UNION, INTERSECT, and EXCEPT-Nested Queries-Aggregate Operators-Null Values-Complex Integrity Constraints in SQL-Triggers and Active Databases-Designing Active Databases.	
Unit IV	APPLICATION DEVELOPEMENT	12 Hours
	Accessing database from applications-Introduction to JDBC- JDBC classes and interfaces- SQLJ-Stored Procedures- Internet Concepts- Three-Tier Application Architecture- Presentation Layer- Middle Tier. Storage and Indexing: File Organizations and Indexing-Index Data Structures.	
Unit V	TRANSACTION MANAGEMENT	13 Hours
	The ACID Properties-Transactions and Schedules-Concurrent Execution of Transactions-Lock-Based Concurrency Control- Performance of Locking-Transaction Support in SQL - Introduction to Crash Recovery- Serializability, and Recoverability-Introduction to Lock Management-Specialized Locking Techniques-TOOLS: MangoDB	

Pedagogy

Class Room Lectures, chalkboards, Power point presentation, You Tube, Group Discussion, Seminar, Quiz, Assignments, Brain storming, Activity

Text Book

1. Raghu Ramakrishnan & Johannes Gehrke, (2014), "*Database Management Systems*", McGraw Hill International Edition, 3rdEdition.

Reference Books

1. Ramez Elmasri,Shamkant B.Navathe., (2017), *"Fundamentals of Database Systems*", Pearson Education, 7th Edition.
2. Raghu Ramakrishnan & Johannes Gehrke., (2000), "*Database Management Systems*", McGraw Hill International Edition, 2nd Edition.
3. Gupta.G.K., (2011), *"Database Management Systems"*, McGraw Hill Publication, New Delhi, 4th Edition.

E-Resources

- https://www.javatpoint.com/dbms-tutorial
- https://www.tutorialspoint.com/dbms/dbms_overview.htm
- https://www.geeksforgeeks.org/dbms/
- https://www.guru99.com/dbms-tutorial.html
- https://www.mygreatlearning.com/blog/dbms-tutorial/

Course Outcomes

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

CO1	Identify the basic concepts of Database Architecture and ER model
CO2	Describe the concept of Relational model.
CO3	Illustrate the SQL queries and triggers.
CO4	Illustrate the application development and architecture
CO5	Describe the transaction management and tools.

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12
CO1	3	2	2	3	2	1	2	2	1	2	1	3
CO2	3	2	3	2	2	2	2	2	1	1	1	3
CO3	3	2	3	3	2	1	2	2	2	1	1	3
CO4	3	2	3	3	2	1	2	2	1	2	1	3
CO5	3	2	2	3	2	1	2	2	1	1	1	3

3. High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A MCQs No. Of Questions	Section B Either/ or Choice No. Of Questions	Section C Open Choice No. Of Questions
1	CO1	Up to K1	2(K1)	2(K1 & K1)	1(K1)
2	CO2	Up to K2	2(K1)	2(K2 & K2)	1(K1)
3	CO3	Up to K3	2(K1)	2(K2 & K2)	1(K2)
4	CO4	Up to K3	2(K1)	2(K2 & K2)	1(K2)
5	CO5	Up to K3	2(K1)	2(K3 & K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers
K2 – Basic understanding of facts and stating main ideas with general answers
K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	8	20	38	38.00	38
K2		24	20	44	44.00	44
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit		Hours	Mode
Unit I	**Introduction to Database and Database Architecture**	**12 Hours**	**Mode**
	a. Introduction: Managing data-File system Vs DBMS-Advantages of DBMS	**2**	Descriptive method, PPT Presentation
	b. Describing and Storing Data in a DBMS	**2**	
	c. Structure of a DBMS-Database Design and ER Diagrams-Entities	**3**	
	d. Attributes, and Entity Sets-Relationships and Relationship Sets	**2**	
	e. Additional Features of the ER Model.	**3**	
Unit II	**THE RELATIONAL MODEL**	**11 Hours**	**Mode**
	a. Introduction to the Relational Model-Integrity Constraints over Relations	**3**	Descriptive method, PPT Presentation
	b. Logical Database Design: ER to Relational	**3**	
	c. Destroying/Altering Tables and Views	**2**	
	d. Relational Algebra-Relational Calculus	**3**	
Unit III	**SQL: QUERIES, CONSTRAINTS, TRIGGERS**	**12 Hours**	**Mode**
	a. The Form of a Basic SQL Query-UNION, INTERSECT	**3**	Descriptive method, PPT Presentation
	b. EXCEPT-Nested Queries-Aggregate Operators	**2**	
	c. Triggers and Active Databases	**4**	
	d. Designing Active Databases.	**3**	
Unit IV	**APPLICATION DEVELOPEMENT**	**12 Hours**	**Mode**
	a. Accessing database from applications-Introduction to JDBC	**2**	Descriptive method, PPT Presentation
	b. JDBC classes and interfaces- SQLJ	**3**	
	c. Stored Procedures- Internet Concepts	**2**	
	d. Three-Tier Application Architecture-Presentation Layer- Middle Tier.	**3**	
	e. Storage and Indexing: File Organizations and Indexing- Index Data Structures.	**2**	
Unit V	**TRANSACTION MANAGEMENT**	**13 Hours**	**Mode**
	a. The ACID Properties-Transactions and Schedules-Concurrent	**2**	Descriptive method, Assignment, PPT Presentation
	b. Execution of Transactions-Lock-Based Concurrency Control-Performance of Locking	**3**	
	c. Transaction Support in SQL-Introduction to Crash Recovery	**3**	
	d. Serializability, and Recoverability-Introduction to Lock Management	**2**	
	e. Specialized Locking Techniques-TOOLS: MangoDB	3	

Course designed by Mrs. S. Gowthami

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSC5P	Number of Hours/Cycle	4
Semester	V	Max. Marks	100
Part	III	Credit	3
CORE PRACTICAL VII			
Course Title	**RDBMS LAB**		

Preamble

This course aims to prepare the students to create and manipulate relations using SQL and helps to write basic queries, views and triggers using SQL.

List of Practical
Write a program

1. To execute the Basic SQL queries. (create table, Insert, delete and select)

2. To execute SQL queries for alter and update existing table. (alter, update and rename)

3. To execute SQL queries for constraints. (Primary key and integrity constraints).

4. To execute SQL queries for built in functions.(String, math and Date)

5. To execute SQL queries for aggregate functions.

6. To execute SQL queries for DCL. (Create user, Grant and Revoke)

7. To execute PL/SQL program for Conditional statements.

8. To execute PL/SQL program for Loops.

9. To execute PL/SQL program for Table handling queries.

10. To execute PL/SQL program for Implicit Cursor.

11. To execute PL/SQL program for Explicit Cursor.

12. To execute PL/SQL program for Exception Handling.

13. To execute PL/SQL program for Trigger.

14. To execute PL/SQL program for Functions.

15. To execute PL/SQL program for Package.

Course designed by Mrs. S. Gowthami

Programme	B.Sc	Programme Code			UCS	
Course Code	20UCSC52	Number of Hours/Cycle			4	
Semester	V	Max. Marks			100	
Part	III	Credit			3	
Core Course VIII						
Course Title		Programming with C#.NET	L	T		P
Cognitive Level		Up to K3	60	--		--

Preamble

The course helps the students to master all procedure of software development in C# Programming Language and to demonstrate these techniques by implementing the solution for variety of problems.

Unit I	Overview of .Net Framework	12 Hours
	.NET Features –The Common Language Runtime (CLR) –The .NET Framework class Library –The Common Type System – Visual Studio .NET IDE 2005.Windows Forms: Window Forms Fundamentals –Windows MDI Forms –Creating Dialog boxes – Adding Controls to Forms –Handling Events.	
Unit II	Windows Controls	13 Hours
	Windows Controls: The control class –Text boxes –Rich Text Boxes –Labels –Link labels - Buttons- Checkboxes –Radio Button – List Boxes – Checked list Boxes- Combo boxes - Picture Boxes – Scroll Bars – Timers.	
Unit III	File Handling and User Controls	11 Hours
	File Handling: The File stream Class –Using stream Writer class, Binary Writer class, Binary Reader class. User Controls: Creating User Controls, Adding properties, methods, events, using the Scrollable Control Class, Container Control class, Using System, Windows, Forms, User Control class.	
Unit IV	Data Access with ADO.Net	13 Hrs
	Data Access With ADO.Net: ADO.Net Architecture-objects. Handling Database in Code: Connection class-Command Class-Data Adapter-Dataset Class- Data Reader Class -Data Table Class Handling Data manipulation in Code: Record Navigation- updating –Inserting – Deleting records.	
Unit V	Object Oriented Programming Concepts in C#	11 Hours
	Objects- Inheritance and Polymorphism- Interfaces-Operator Overloading. Decision Making and Branching –Decision making and Looping, Methods in C#, Handling array, Structures and Enumerations.	

Pedagogy

Class Room Lectures, Power point presentation, Experience Sharing, Brain storming, Activity

Text Books

1. J.G.R. Sathiaseelan, N. Sasikaladevi, (2009), *"Programming with C#.NET"*, PHI Learning Private Limited, New Delhi.
2. E. Balagurusamy, Reprint (2010), *"Programming in C# a primer"*, Tata Mc-Graw Hill Publications.

Reference Books

1. Herbert Schildt (2004), *"The Complete Reference: C#"*, Tata McGraw Hill Publications.
2. Andrew Troelsen Philip Japikse (2017), *"Pro C# 7 With .NET and .NET Core"*, Apress Publications.
3. E. Balagurusamy(2009), *"Programming in C#"*, Tata Mc-Graw Hill Publications, 2nd Edition.

E-Resources:
- https://www.tutorialspoint.com/csharp/index.htm
- https://www.w3schools.com/cs/index.php
- https://www.javatpoint.com/c-sharp-tutorial
- https://www.tutorialsteacher.com/csharp
- https://www.guru99.com/c-sharp-tutorial.html

Course Outcomes

At the end of the course, students would be able to:

	Course Outcome
CO1	Outline the basic concepts of .Net Frame Work and specify the CLR and windows forms.
CO2	Depicts the various tools of Windows Controls of the forms.
CO3	Illustrate the operations for File Handling and its specific User Controls.
CO4	Categorize the Data Access with ADO.Net classes.
CO5	Describes the C#.Net with Object Oriented concepts , decision making and loops, Interpret Inheritance and Polymorphism, Interfaces and Operator overloading

Mapping Course Outcomes with Program Outcomes:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	3	2	3	3	2	2	2	2	1	1	1	2
CO2	3	2	2	2	2	3	1	2	1	2	1	3
CO3	3	2	2	2	2	3	3	2	1	2	1	3
CO4	3	2	3	2	1	3	3	3	3	1	1	3
CO5	3	3	3	3	2	3	3	3	3	1	1	3

3. High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A	Section B	Section C
			MCQs	Either/ or Choice	Open Choice
			No. Of Questions	No. Of Questions	No. Of Questions
1	CO1	Up to K2	2(K1)	2(K1 & K1)	1(K1)
2	CO2	Up to K2	2(K1)	2(K2 & K2)	1(K2)
3	CO3	Up to K3	2(K1)	2(K2 & K2)	1(K2)
4	CO4	Up to K3	2(K1)	2(K3 & K3)	1(K3)
5	CO5	Up to K3	2(K1)	2(K3 & K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers
K2 – Basic understanding of facts and stating main ideas with general answers
K3 – Application oriented – Solving problems
K4 – Examining, analyzing, presentation and make inferences with evidences

Distribution of Section –wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	8	10	28	28	28%
K2		16	20	36	36	36%
K3		16	20	36	36	36%
Total Marks	10	40	50	100	100	100%

LESSON PLAN

UNIT I		Overview of .Net Framework	11 Hours	Mode
	a.	.NET Features-The Common Language Runtime (CLR)	2	Descriptive Method
	b.	The .NET Framework class Library-The Common Type System – Visual Studio .NETIDE2005.	3	
	c.	Window Forms Fundamentals-Windows MDI Forms – Creating Dialog boxes	3	PPT Presentation Assignment
	d.	Adding Controls to Forms – Handling Events.	3	
UNIT II		Windows controls	13 Hours	Mode
	a.	The control class –Text boxes –Rich Text Boxes	3	Descriptive Method
	b.	Labels –Link labels - Buttons- Checkboxes	3	PPT Presentation Assignment
	c.	Radio Button - List Boxes – Checked list Boxes	3	
	d.	Combo boxes - Picture Boxes	2	
	e.	Scroll Bars – Timers.	2	
UNIT III		File Handling and User Controls	11 Hours	Mode
	a.	The File stream Class – Using stream Writer class.	3	Descriptive Method
	b.	Binary Writer class, Binary Reader class – Creating User Controls, Adding properties, methods, events	4	PPT Presentation
	c.	Using the Scrollable Control Class, Container Control class, Using System, Windows, Forms, User Control class.	4	Assignment
Unit IV		Data Access with ADO.Net	13 Hours	Mode
	a.	Data Access With ADO.Net: ADO.Net Architecture-objects.	2	Descriptive Method
	b.	Handling Database in Code: Connection class- Command Class	2	PPT Presentation Quiz Assignment
	c.	Data Adapter-Dataset Class- Data Reader Class	2	
	d.	Data Table Class	2	
	e. f.	Handling Data manipulation in Code: Record Navigation- updating	3	
	g.	Inserting – Deleting records.	2	
Unit V		Object Oriented Programming Concepts in C#	11 Hours	Mode
	a.	Objects-Inheritance and Polymorphism	2	Descriptive Method
	b.	Interfaces-Operator Overloading.	3	PPT Presentation Quiz Assignment
	c.	Decision Making and Branching and Looping	3	
	d.	Methods in C#, Handling array, Structures and Enumerations.	3	

Course designed by: Mr A.Kumaravadivelan

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSC5Q	Number of Hours/Cycle	4
Semester	V	Max. Marks	100
Part	III	Credit	3
CORE PRACTICAL VIII			
Course Title	C# .NET LAB		

Preamble

This course helps students to understand and create software development in C# Programming language.

List of Practical

Write a C# program

1. To create an Animation in Windows Console Application using ASP.Net C#.

2. To change the background design using Web Application in ASP.Net C#.

3. To use data rotation by degree of angle.

4. To create web application page with automatic image change using AD Rotator.

5. To design a number of web pages with animation effects using CSS

6. To design Stylish attractive Menus.

7. To create Front Page Designs using ASP.Net C#.

8. To create database

      1. Using Grid View.

      2. Using Data List

      3. Using Details View

      4. Using Form View

      5. Using List View

      6. Using Repeater & Data Pager.

9. To insert, delete a record from database via coding in ASP.Net C#.

      Note: Example → Student, Pay Roll, Employee, Customer, Product Database

10. To display Data base records

      i. Using Crystal Display Viewer

11. To design the Websites using all concepts of ASP C# .Net.

      Note : Example → Online Shopping, College Web Site, Online Booking and etc.

Course designed by: Mr A.Kumaravadivelan

Programme	B.Sc	Programme Code		UCS	
Course Code	20UCSC53	Number of Hours/Cycle		4	
Semester	V	Max. Marks		100	
Part	III	Credit		3	
Core Course IX					
Course Title		Operating System	L	T	P
Cognitive Level		Up to K3	60		

Preamble

     To enable the students to understand the concepts of operating systems, analyze the memory organization and management techniques.

Unit I	**OPERATING SYSTEM OVERVIEW**	12 Hours
	Operating system overview-Introduction-What operating system do? Computer system organization- Operating System Structure and Operations-operating system services- System Calls, types of system calls-operating system structure- OS Generation and System Boot.	
Unit II	**PROCESS MANAGEMENT**	14 Hours
	Processes : Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication; CPU Scheduling - Scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real time scheduling; Threads: Overview, Multithreading models, Threading issues; Process Synchronization: The critical-section problem, Synchronization hardware, Mutex locks, Semaphores, Critical regions, Monitors-Synchronization example.	
Unit III	**MEMORY MANAGEMENT**	12 Hours
	Deadlock - System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock. **Main Memory**: Background, Swapping, Contiguous Memory Allocation, Paging- Segmentation with paging. **Virtual Memory** – Page Replacement, Allocation, Thrashing.	
Unit IV	**STORAGE MANAGEMENT**	12 Hours
	Mass Storage system – Overview of Mass Storage Structure-Disk Structure- Disk Scheduling and Management- RAID structure. **File-System Interface** - File concept-Access methods- Directory Structure-Directory organization-**File System Implementation-** File System Structure, Directory implementation, Allocation Methods, Free Space Management-**I/O Systems** – I/O Hardware, Application I/O interface, Kernel I/O subsystem.	
Unit V	**VIRTUAL MACHINES AND DISTRIBUTED SYSTEMS**	10 Hours
	Virtual Machines: Benefits and features Types of VM and implementation- Virtualization and OS Components. **Distributed Systems:** Real time OS- Advantages of real time OS and distributed OS- Types of network-based Operating Systems- Network structure- Communication structure- Communication protocols.	

Pedagogy

Class Room Lectures, chalkboards, Power point presentation, You Tube, Group Discussion, Seminar, Quiz, Assignments, Brain storming, Activity

TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne., (2012),*"Operating System Concepts "*, John Wiley and Sons Inc., 9th Edition.

REFERENCES:

1. Ramaz Elmasri, A. Gil Carrick, David Levine.,(2010),*"Operating Systems – A Spiral Approach*", Tata McGraw Hill Edition.
2. Achyut S. Godbole, Atul Kahate.,(2016), "*Operating Systems*", McGraw Hill Education.
3. Andrew S. Tanenbaum.,(2004),*"Modern Operating Systems*", Pearson Education, 2nd Edition.

E-Resources

- https://www.javatpoint.com/os-tutorial
- https://www.tutorialspoint.com/operating_system/index.htm
- https://www.geeksforgeeks.org/real-time-operating-system-rtos/
- https://www.guru99.com/os-tutorial.html
- https://www.studytonight.com/operating-system/

Course Outcomes

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

CO1	Understand the Basic concepts of Operating System
CO2	Interpret the process of Scheduling algorithms
CO3	Illustrate the concept of deadlock and memory management.
CO4	Implement the storage organization in different OS Architectures.
CO5	Articulate the concept of Virtual and Distributed Systems

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	3	2	3	3	1	2	1	1	1	1	1	3
CO2	2	2	2	2	2	1	2	1	1	1	1	1
CO3	2	3	2	2	2	2	3	1	1	1	1	3
CO4	3	3	2	2	2	1	3	1	1	1	1	1
C05	2	3	2	3	2	2	3	1	1	1	1	2

3. High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A MCQs No. Of Questions	Section B Either/ or Choice No. Of Questions	Section C Open Choice No. Of Questions
1	CO1	Up to K1	2(K1)	2(K1)	1(K1)
2	CO2	Up to K2	2 (K1)	2(K1)	1(K2)
3	CO3	Up to K3	2(K1)	2(K2)	1(K2)
4	CO4	Up to K3	2(K1)	2(K2)	1(K2)
5	CO5	Up to K3	2(K1)	2(K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	16	10	36	36.00	36
K2		16	30	46	46.00	46
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit		Hours	Mode
Unit I	**OPERATING SYSTEM OVERVIEW**	**12 Hours**	**Mode**
	a. Operating system overview-Introduction	4	Descriptive method
	b. Operating System Structure and Operations-operating system services	4	
	c. OS Generation and System Boot.	4	
Unit II	**PROCESS MANAGEMENT**	**14 Hours**	**Mode**
	a. Processes : Process Concept, Process Scheduling, Operations on Processes	3	Descriptive method
	b. Threads: Overview, Multithreading models	4	
	c. Process Synchronization : The critical-section problem	4	
	d. Synchronization hardware, Mutex	3	
Unit III	**MEMORY MANAGEMENT**	**12 Hours**	**Mode**
	a. Deadlock - System model, Deadlock characterization	4	Descriptive method, Assignments
	b. Methods for handling deadlocks, Deadlock prevention	4	
	c. Page Replacement, Allocation, Thrashing.	4	
Unit IV	**STORAGE MANAGEMENT**	**12 Hours**	**Mode**
	a. Overview of Mass Storage Structure- Disk Structure	3	Descriptive method PPT Presentation
	b. Disk Scheduling and Management- RAID structure	3	
	c. File concept-Access methods- Directory Structure-Directory organization	2	
	d. File System Structure, Directory implementation, Allocation Methods	2	
	e. I/O Hardware, Application I/O interface, Kernel I/O subsystem.	2	
Unit V	**VIRTUAL MACHINES AND DISTRIBUTED SYSTEMS**	**10 Hour**	**Mode**
	a. Benefits and features Types of VM and implementation	2	Descriptive method, Assignment, PPT Presentation
	b. Communication structure- Communication protocols.	2	
	c. Real time OS- Advantages of real time OS and distributed OS	3	
	d. Communication structure- Communication protocols.	3	

Course designed by: Mrs. K. Sankari

Programme	B.Sc	Programme Code		UCS		
Course Code	20UCSC54	Number of Hours/Cycle		4		
Semester	V	Max. Marks		100		
Part	III	Credit		3		
Core Course X						
Course Title		Software Engineering	L	T	P	
Cognitive Level		Up to K3	60			

Preamble

To enable the students to understand the concepts of Software Engineering techniques

Unit I	Software Process And Agile Development	10 Hours
	Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models – Introduction to Agility-Agile process-Extreme programming-XP Process.	
Unit II	Requirements Analysis And Specification	12 Hours
	Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management Classical analysis: Structured system Analysis, Petri Nets- Data Dictionary.	
Unit III	Software Design	12 Hours
	Design process – Design Concepts-Design Model– Design Heuristic – Architectural Design - Architectural styles, Architectural Design, Architectural Mapping using Data Flow-User Interface Design: Interface analysis, Interface Design – Component level Design: Designing Class based components, traditional Components.	
Unit IV	Testing And Maintenance	12 Hours
	Software testing fundamentals-Internal and external views of Testing-white box testing -black box testing-Regression Testing – Types of Testing–Software Implementation Techniques: Reverse and Forward Engineering- Case Study: Cases and units of analysis-Methods of data collection	
Unit V	Project Management	14 Hours
	Software Project Management: Estimation – LOC, FP Based Estimation – Project Scheduling – Project Plan, Planning Process, RFP Risk Management – Identification, Projection -**Testing Tools:** Selenium, QTP, Load Runner and Ranorex.	

Pedagogy

Class Room Lectures, chalkboards, Power point presentation, You Tube, Group Discussion, Seminar, Quiz, Assignments, Brain storming, Activity

TEXT BOOKS:

1. Roger S. Pressman.,(2010),*"Software Engineering – A Practitioner's Approach"*, Mc Graw-Hill International., 7th Edition.
2. Ian Sommerville.,(2011)"*Software Engineering*", Pearson Education Asia, 9th Edition.

REFERENCES:

1. Rajib Mall.,(2009), " Fundamentals of Software Engineering", PHI Learning Private Limited., 3rd Edition.
2. Pankaj Jalote,(2010), "*Software Engineering, A Precise Approach*", Wiley India.
3. Kelkar S.A.(2007), "*Software Engineering*", Prentice Hall of India Pvt Ltd.

E-Resources

- https://www.tutorialspoint.com/software_engineering/
- https://www.guru99.com/integration-testing.html
- https:/www.geeksforgeeks.org/software-engineering/
- https://www.javatpoint.com/software-engineering-tutorial/
- https://www.studytonight.com/software_engineering/

Course Outcomes
After completion of this course, the students will be able to:

CO1	Understand the main concepts, key technologies, strengths and limitations of software Engineering.
CO2	Illustrate the software requirements and Analysis Modeling.
CO3	Develop the systematic procedure for software design and deployment.
CO4	Describe the various testing, maintenance and case study.
CO5	Illustrate the project management and testing tools.

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	3	3	3	3	2	2	2	3	1	2	2	3
CO2	3	3	3	2	3	3	2	3	1	1	2	3
CO3	3	3	3	3	3	2	2	3	1	1	2	3
CO4	3	3	2	3	3	3	2	3	1	1	2	3
C05	3	3	2	3	3	3	2	3	1	2	2	3

3. High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A MCQs No. Of Questions	Section B Either/ or Choice No. Of Questions	Section C Open Choice No. Of Questions
1	CO1	Up to K1	2(K1)	2(K1)	1(K1)
2	CO2	Up to K2	2(K1)	2(K1)	1(K2)
3	CO3	Up to K2	2(K1)	2(K2)	1(K2)
4	CO4	Up to K3	2(K1)	2(K2)	1(K2)
5	CO5	Up to K3	2(K1)	2(K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers
K2 – Basic understanding of facts and stating main ideas with general answers
K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	16	10	36	36.00	36
K2		16	30	46	46.00	46
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit	Software Process And Agile Development	10 Hours	Mode
I	a. Introduction to Software Engineering	3	Descriptive method, PPT Presentation
	b. Software Process, Perspective	2	
	c. Specialized Process Models	2	
	d. Introduction to Agility-Agile process-Extreme programming - XP Process.	3	
Unit	Requirements Analysis And Specification	12 Hours	Mode
II	a. Software Requirements: Functional and Non-Functional	3	Descriptive method, PPT Presentation
	b. User requirements, System requirements, Software Requirements Document	2	
	c. Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis,	3	
	d. requirements validation, requirements management Classical analysis:	2	
	e. Structured system Analysis, Petri Nets-Data Dictionary.	2	
Unit	Software Design	12 Hours	Mode
III	a. Design process – Design Concepts-Design Model–	2	Descriptive method, Assignments
	b. Design Heuristic – Architectural Design - Architectural styles	2	
	c. Architectural Design, Architectural Mapping using Data Flow	2	
	d. User Interface Design: Interface analysis	2	
	e. Interface Design –Component level Design	2	
	f. Designing Class based components, traditional Components.	2	
Unit	Testing And Maintenance	12 Hours	Mode
IV	a. Software testing fundamentals-Internal and external views of Testing-white box testing	2	Descriptive method PPT Presentation
	b. -black box testing- Regression Testing – Types of Testing	3	
	c. Software Implementation Techniques: Reverse and Forward Engineering	2	
	d. Case Study: Cases and units of analysis-Methods of data collection	3	
Unit	Project Management	10 Hour	Mode
V	a. Software Project Management: Estimation – LOC, FP Based Estimation	2	Descriptive method, Assignment, PPT Presentation
	b. Project Scheduling – Project Plan, Planning Process, RFP Risk Management – Identification, Projection	3	
	c. Testing Tools: Selenium,	3	
	d. QTP, Load Runner and Ranorex.	2	

Course designed by Mrs. K.Sankari

Programme	B.Sc	Programme Code		UCS		
Course Code	20UCSE51	Number of Hours/Cycle		4		
Semester	V	Max. Marks		100		
Part	III	Credit		4		
Elective Course I						
Course Title	Cryptography with Network Security		L	T	P	
Cognitive Level		Up to K3	60			

Preamble

      To enable the students to understand the concepts of encryption and decryption algorithms for security over a network

Unit I	**Overview and Encryption Techniques**	**12 Hours**
	Computer Security Concepts– OSI security architecture– Security Attacks- Security Services- Security Mechanisms- Classical encryption techniques: Symmetric cipher model- Rotor Mechanics- substitution techniques- transposition techniques- steganography	
Unit II	**Symmetric Key Cryptography**	**12 Hours**
	Mathematics of Symmetric Key Cryptography: The Euclidean Algorithm- Polynomial Arithmetic- Block Cipher Operation: Cipher block chaining mode- cipher feedback mode- Output feedback mode- Counter mode-Pseudorandom number generation and Stream ciphers.	
Unit III	**Asymmetric Key Cryptography**	**14 Hours**
	Mathematics of Asymmetric Key Cryptography: Primes – Primality Testing – Factorization – Euler's totient function, Fermat's and Euler's Theorem - Chinese Remainder Theorem – Exponentiation and logarithm - ASYMMETRIC KEY CIPHERS: RSA cryptosystem – Key distribution – Key management –Elliptic curve arithmetic-Elliptic curve cryptography.	
Unit IV	**Authentication Requirements**	**12 Hours**
	Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA –Digital signature and authentication protocols – DSS- Entity Authentication: Biometrics, Passwords, Challenge Response protocols- Authentication applications - Kerberos, X.509	
Unit V	**E- Mail Security**	**10 Hours**
	Electronic Mail security – PGP, S/MIME – IP security – Web Security - SYSTEM SECURITY: Intruders – Malicious software – viruses – Firewalls.	

Pedagogy

Class Room Lectures, chalkboards, Power point presentation, You Tube, Group Discussion, Seminar, Quiz, Assignments, Brain storming, Activity

TEXT BOOK:

1. William Stallings, (2009),"*Cryptography and Network Security: Principles and Practice*", PHI ,5th Edition.

REFERENCES:

1. Bruce Schneier,(2008),"*Applied Cryptography*", Aggarwal Printing press, Delhi,2nd Edition.
2. BehrouzA.Foruzan(2007), "*Cryptography and Network Security*", Tata McGraw Hill.
3. Charlie Kaufman, Radia Perlman, and Mike Speciner,(2002), "*Network Security: Private communication and public world"*, 2nd Edition, Pearson.

E-Resources

- www.geeksforgeeks.org/cryptography
- https://www.tutorialsduniya.com/notes/cryptography-network-security-notes/
- www.geeksforgeeks.org/cryptography/
- https://www.ecpi.edu/blog/crypotgraphy-and-network-security/
- https://www.coursera.org/lecture/managing-network-cybersecurity/

Course Outcomes

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

CO1	Understand the basic concepts of Security trends and encryption techniques
CO2	Describe the concept of Symmetric Key Cryptography
CO3	Illustrate the Asymmetric Key Cryptography
CO4	Describe the Authentication requirement
CO5	Illustrate the concepts of E-Mail and system security

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	3	2	2	3	2	2	2	2	2	2	2	3
CO2	3	2	3	2	2	3	2	2	1	1	2	3
CO3	3	3	2	3	2	3	3	2	1	1	2	3
CO4	3	3	3	2	2	3	3	2	1	1	2	3
C05	3	3	3	3	2	3	3	2	1	1	2	3

3. High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A MCQs No. Of Questions	Section B Either/ or Choice No. Of Question	Section C Open Choice No. Of Question
1	CO1	Up to K1	2(K1)	2 (K1 & K1)	1(K1)
2	CO2	Up to K2	2(K1)	2 (K2 & K2)	1(K2)
3	CO3	Up to K3	2(K1)	2 (K2 & K2)	1(K2)
4	CO4	Up to K3	2(K1)	2 (K2& K2)	1(K2)
5	CO5	Up to K3	2(K1)	2 (K3 & K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers
K2 – Basic understanding of facts and stating main ideas with general answers
K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	16	10	36	36.00	36
K2		16	30	46	46.00	46
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit		Hours	Mode
Unit I	**Overview and Encryption Techniques**	**12 Hours**	**Mode**
	a. Computer Security Concepts–	3	Descriptive method, PPT Presentation
	b. OSI security architecture- Security Attacks	3	
	c. Security Mechanisms	3	
	d. Classical encryption techniques: Symmetric cipher model	3	
Unit II	**Symmetric Key Cryptography**	**12 Hours**	**Mode**
	a. Mathematics of Symmetric Key Cryptography: The Euclidean Algorithm	4	Descriptive method, PPT Presentation
	b. Cipher block chaining mode- cipher feedback mode	4	
	c. Pseudorandom number generation and Stream ciphers.	4	
Unit III	**Asymmetric Key Cryptography**	**14 Hours**	**Mode**
	a. Mathematics of Asymmetric Key Cryptography: Primes	5	Descriptive method, Assignments
	b. Primality Testing – Factorization – Euler's totient function	4	
	c. Key management –Elliptic curve arithmetic- Elliptic curve cryptography.	5	
Unit IV	**Authentication Requirements**	**12 Hours**	**Mode**
	a. Authentication requirement – Authentication function	4	Descriptive method, PPT Presentation
	b. MAC – Hash function – Security of hash function and MAC	4	
	c. Authentication applications - Kerberos, X.509	4	
Unit V	**Introduction to Data Analytics with R**	**10 Hours**	**Mode**
	a. Electronic Mail security – PGP, S/MIME	2	Descriptive method, Assignment, PPT Presentation
	b. IP security – Web Security- SYSTEM SECURITY: Intruders	4	
	c. Malicious software – viruses – Firewalls.	4	

Course designed by Mrs. K.Sankari

Programme	B.Sc	Programme Code		UCS		
Course Code	20UCSE52	Number of Hours/Cycle		4		
Semester	V	Max. Marks		100		
Part	III	Credit		4		
		Elective Course I				
Course Title		BigData Analytics	L	T	P	
Cognitive Level		Up to K3	60			

Preamble

      This course focuses on big data technologies used for storage, analysis, classification, manipulation and visualization of data.

Unit I	**Introduction to Big Data**	12 Hours
	Evolution of Big data - Best Practices for Big data Analytics - Big data characteristics – Validating - The Promotion of the Value of Big Data - Big Data Use Cases- Characteristics of Big Data Applications - Perception and Quantification of Value - Understanding Big Data Storage - A General Overview of High-Performance Architecture - HDFS – Map Reduce and YARN - Map Reduce Programming Model	
Unit II	**Clustering And Classification**	12 Hours
	Overview of Clustering - K-means - Use Cases - Overview of the Method - Determining the Number of Clusters - Diagnostics - Reasons to Choose and Cautions .- Classification: Decision Trees - Overview of a Decision Tree - The General Algorithm - Decision Tree Algorithms - Evaluating a Decision Tree - Decision Trees in R - Naïve Bayes - Bayes' Theorem - Naïve Bayes Classifier.	
Unit III	**Association And Recommendation System**	12 Hours
	Advanced Analytical Theory and Methods: Association Rules - Overview - Apriori Algorithm - Evaluation of Candidate Rules - Applications of Association Rules - Finding Association& finding similarity - Recommendation System: Collaborative Recommendation- Content Based Recommendation - Knowledge Based Recommendation- Hybrid Recommendation Approaches	
Unit IV	**Stream Memory**	14 Hours
	Introduction to Streams Concepts – Stream Data Model and Architecture - Stream Computing, Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating moments – Counting oneness in a Window – Decaying Window – Real time Analytics Platform(RTAP) applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions. Using Graph Analytics for Big Data: Graph Analytics	

Unit V	Nosql Data Management For Big Data And Visualization	10 Hours
	NoSQL Databases : Schema-less Models : Increasing Flexibility for Data Manipulation- Key Value Stores- Document Stores - Tabular Stores - Object Data Stores - Graph Databases Hive - Sharding – Hbase – Analyzing big data with twitter - Big data for E-Commerce Big data for blogs - Review of Basic Data Analytic Methods using R.	

Pedagogy

Class Room Lectures, chalkboards, Power point presentation, You Tube, Group Discussion, Seminar, Quiz, Assignments, Brain storming, Activity

TEXT BOOK

1. Anand Rajaraman and Jeffrey David Ullman,(2020), "*Mining of Massive Datasets*", Cambridge University Press,3rd edition.
2. David Loshin,(2013),"*Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph*", Morgan Kaufmann / Elsevier Publishers,1st edition.

REFERENCES

1. EMC Education Services,(2015),"*Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*", Wiley publishers.
2. Bart Baesens,(2015),"*Analytics in a Big Data World: The Essential Guide to Data Science and its Applications*", Wiley Publishers.
3. Dietmar Jannach and Markus Zanker,(2010),"*Recommender Systems: An Introduction*", Cambridge University Press.

E-Resources

*   www.lecturenotes.in/subject/884/big-data-analysis
*   https://www.tutorialspoint.com/big_data_analytics
*   https://www.javatpoint.com/what-is-big-data
*   https://www.guru99.com/bigdata-tutorials.html
*   https://data-flair.training/blogs/big-data-tutorials-home/

Course Outcomes

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

CO1	Understand the Basic concepts of big data tools and its analysis techniques
CO2	Describe the concept of Analyze data by utilizing clustering and classification algorithms
CO3	Illustrate the Association And Recommendation System
CO4	Describe the Stream Memory
CO5	Illustrate the Nosql Data Management For Big Data And Visualization

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PS01	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	3	2	3	3	1	2	1	1	1	1	1	3
CO2	2	2	2	2	2	1	2	1	1	1	1	1
CO3	2	3	2	2	2	2	3	1	1	1	1	3
CO4	3	3	2	2	2	1	3	1	1	1	1	1
C05	2	3	2	3	2	2	3	1	1	1	1	2

4. High; 2. Moderate ; 1. Low
5.

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A	Section B	Section C
			MCQs	Either/ or Choice	Open Choice
			No. Of Questions	No. Of Question	No. Of Question
1	CO1	Up to K1	2(K1)	2 (K1 & K1)	1(K1)
2	CO2	Up to K2	2(K1)	2 (K1 & K1)	1(K2)
3	CO3	Up to K3	2(K1)	2 (K2 & K2)	1(K2)
4	CO4	Up to K3	2(K1)	2 (K2& K2)	1(K2)
5	CO5	Up to K3	2(K1)	2 (K3 & K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	16	10	36	36.00	36
K2		16	30	46	46.00	46
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit I	**Introduction to Big Data**	**12 Hours**	**Mode**
	a. Evolution of Big data - Best Practices for Big data Analytics	3	Descriptive method, PPT Presentation
	b. Big data characteristics – Validating - The Promotion of the Value of Big Data	2	
	c. Big Data Use Cases- Characteristics of Big Data Applications - Perception and Quantification of Value	3	
	d. Understanding Big Data Storage - A General Overview of High-Performance Architecture	2	
	e. HDFS – Map Reduce and YARN - Map Reduce Programming Model	2	
Unit II	**Clustering And Classification**	**12 Hours**	**Mode**
	a. Overview of Clustering - K-means - Use Cases - Overview of the Method	2	Descriptive method, PPT Presentation
	b. Determining the Number of Clusters - Diagnostics - Reasons to Choose and Cautions	3	
	c. Classification: Decision Trees - Overview of a Decision Tree - The General Algorithm	2	
	d. Decision Tree Algorithms - Evaluating a Decision Tree	3	
	e. Decision Trees in R - Naïve Bayes - Bayes'Theorem - Naïve Bayes Classifier.	2	
Unit III	**Association And Recommendation System**	**12 hours**	**Mode**
	a. Advanced Analytical Theory and Methods: Association Rules - Overview	2	Descriptive method, PPT Presentation
	b. Apriori Algorithm - Evaluation of Candidate Rules - Applications of Association Rules	3	
	c. Finding Association& finding similarity	3	
	d. Recommendation System: Collaborative Recommendation- Content Based Recommendation	2	
	e. Knowledge Based Recommendation- Hybrid Recommendation Approaches	2	
Unit IV	**Stream Memory**	**14 Hours**	**Mode**
	a. Introduction to Streams Concepts – Stream Data Model and Architecture	3	Descriptive method, PPT Presentation
	b. Stream Computing, Sampling Data in a Stream – Filtering Streams	2	
	c. Counting Distinct Elements in a Stream – Estimating moments	2	
	d. Counting oneness in a Window – Decaying Window – Real time Analytics Platform(RTAP) applications	3	

	e.	Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.	2	
	f.	Using Graph Analytics for Big Data: Graph Analytics	2	
Unit V	**Nosql Data Management For Big Data And Visualization**		**10 Hours**	**Mode**
	a.	NoSQL Databases : Schema-less Models : Increasing Flexibility for Data Manipulation-	3	Descriptive method, PPT Presentation
	b.	Key Value Stores- Document Stores - Tabular Stores - Object Data Stores	2	
	c.	Graph Databases Hive - Sharding – Hbase – Analyzing big data with twitter	3	
	d.	Big data for E-Commerce Big data for blogs - Review of Basic Data Analytic Methods using R.	2	

Course Designed by: Dr. P. Alagambigai

Programme	B.Sc	Programme Code		UCS		
Course Code	20UCSE53	Number of Hours/Cycle		4		
Semester	V	Max. Marks		100		
Part	III	Credit		4		
Elective Course I						
Course Title		Mobile Application Development	L	T	P	
Cognitive Level		Up to K3	60			

Preamble

      This course helps to learn about different types of mobile devices, modern mobile operating systems and able to design the various kinds of mobile applications.

Unit I	Introduction	12 Hours
	Getting Started - Overview of Android and Android SDK - Getting to know your Android development environment - Writing your first Android application - Running and debugging your application - Test your application on device	
Unit II	Android Applications - The Big Picture	13 Hours
	Android Applications - The Big Picture: Android architecture - Android application model - Overview of Android application building blocks - Application design guidelines - Application lifecycle	
Unit III	Building User Interface	13 Hours
	Building User Interface: Overview of Android's view structure - Android built-in layouts - Defining a layout in XML - Android built-in Views - Event handling - Building custom views and layouts	
Unit IV	Building Android Applications	11 Hours
	Building Android Applications: Android Manifest.xml file - the control file - Building activities - Building intents - Building and using services – Notifications - Building and using content providers	
Unit V	Location and mapping , Drawing 2D and 3D Graphics	11 Hours
	Location and mapping: Location based services-Mapping- working with Map views-Location without maps. **Drawing 2D and 3D Graphics:** Rolling your own widgets-Blings.	

Pedagogy

Class Room Lectures, chalkboards, Power point presentation, You Tube, Group Discussion, Seminar, Quiz, Assignments, Brain storming, Activity

Text Book

1. John Lombardo, Blake Meike, Rick Rogers, Zigurd Mednieks,(2009) "*Android Application Development*" , O'Reilly Media, Inc,1st Edition.

Reference Books

1. Barry Burd ,(2015), "*Android Application Development All in one for Dummies*", 1st Edition
2. Charlie Collins, Michale Galpin, Matthias Kaeppler (2012), *"Android in Practice"*, Manning Publications .
3. John Horton,(2019), *"Android Programming with Kotlin for Beginners"*, Packt

publishing,1st edition.

E-Resources

- https://www.tutorialspoint.com/mobile_development_tutorials.htm
- https://developer.android.com/training/basics/firstapp
- https://www.ibm.com/cloud/learn/mobile-application-development-explained
- https://www.theserverside.com/tutorial/Mobile-application-development-tutorial
- https://www.toptal.com/android/developing-mobile-web-apps-when-why-and-how

Course Outcomes
After completion of this course, the students will be able to:

CO1	Describe the Android development environment
CO2	Illustrate the architecture of Android application & its lifecycle
CO3	Setup programming to build user interfaces
CO4	Design various Android applications
CO5	Recognize location and mapping

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PS0 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO1 0	PSO1 1	PSO1 2
CO 1	2	3	2	1	1	3	1	3	1	1	1	3
CO 2	2	3	2	1	1	3	1	3	1	1	1	3
CO 3	2	3	2	1	1	3	1	3	1	1	1	3
CO 4	3	2	3	2	1	3	1	3	1	1	1	3
C0 5	3	2	3	2	1	3	1	3	1	1	1	3

3.High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A	Section B	Section C
			MCQs	Either/ or Choice	Open Choice
			No. Of Questions	No. Of Question	No. Of Question
1	CO1	Up to K1	2(K1)	2 (K1 & K1)	1(K1)
2	CO2	Up to K2	2(K1)	2 (K1 & K1)	1(K2)
3	CO3	Up to K3	2(K1)	2 (K2 & K2)	1(K2)
4	CO4	Up to K3	2(K1)	2 (K2& K2)	1(K2)
5	CO5	Up to K3	2(K1)	2 (K3 & K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers
K2 – Basic understanding of facts and stating main ideas with general answers
K3 – Application oriented – Solving problems
K4 – Examining, analyzing, presentation and make inferences with evidences

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/ or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	16	10	36	36.00	36
K2		16	30	46	46.00	46
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit I	Introduction	12 Hours	Mode
	a. Overview of Android and Android SDK - Getting to know your Android development environment	4	Descriptive method, Demo
	b. Writing your first Android application	4	
	c. Running and debugging your application	2	
	d. Test your application on device	2	
Unit II	Android Applications - The Big Picture	13 Hours	Mode
	a. Android architecture	3	Descriptive method, Demo, PPT Presentation
	b. Android application model	2	
	c. Overview of Android application building blocks	3	
	d. Application design guidelines	2	
	e. Application lifecycle	3	
Unit III	Building User Interface	13 Hours	Mode
	a. Overview of Android's view structure	2	Descriptive method, Demo, Assignments
	b. Android built-in layouts	2	
	c. Defining a layout in XML	2	
	d. Android built-in Views	2	
	e. Event handling	3	
	f. Building custom views and layouts	2	
Unit IV	Building Android Applications	11 Hours	Mode
	a. AndroidManifest.xml file - the control file	3	Descriptive method, Demo, PPT Presentation
	b. Building activities - Building intents -	3	
	c. Building and using services – Notifications -	3	
	d. Building and using content providers	2	
Unit V	Location and mapping , Drawing 2D and 3D Graphics	11 Hours	Mode
	a. Location based services-Mapping	3	Descriptive method, Demo Assignment, PPT Presentation
	b. working with Map views	3	
	c. Location without maps.	3	
	d. **Drawing 2D and 3D Graphics:** Rolling your own widgets-Blings.	2	

Course Designed by: Mrs. K. Priyadharsini

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSS5P	Number of Hours/Cycle	2
Semester	V	Max. Marks	100
Part	IV	Credit	2
Skill Based Course III			
Course Title	Desktop Publishing Lab		

Preamble

      To enable the Students to be Familiar with the basic principles of Photoshop and PageMaker and their operations

List of Practical:

1. Getting Acquainted with Photoshop Basic Image Manipulation
2. Color Basics and Painting Tools Brush Settings
3. Making Selections and Filling and stroking
4. Layers and Advanced Layers
5. Text and Drawing
6. Basic Photo Corrections Retouching and Repairing
7. Working with selections
8. Masks and channels
9. Digital photographs Topographic design
10. Vector drawing

Page Maker:

11. Getting Started with PageMaker
12. PageMaker Interface
13. Creating a New Document
14. Managing Document Layer
15. Creating & Editing Text

Course Designed by: Dr. P. Alagambigai

Programme	B.Sc	Programme Code		UCS		
Course Code	20UCSC61	Number of Hours/Cycle		4		
Semester	VI	Max. Marks		100		
Part	III	Credit		3		
		Core Course XI				
Course Title		Web Technology	L	T	P	
Cognitive Level		Up to K3	60			

Preamble

This course enables the student to learn to create and design dynamic web pages.

Unit I	**Introduction to Internet**	9 Hrs
	Internet- Intranet- WWW- Static and Dynamic Web Page- Web Clients- Web Servers-Client Server Architecture- Single Tier- Two-Tier- Multi-Tier-HTTP Request and Response- URL- Client Side Scripting- Server Side Scripting-Web 1.0-2.0	
Unit II	**Introduction to HTML**	12 Hrs
	Introduction to HTML- HTML Document- HTML Elements - Attributes-Headers- Formatting Text -Phrases- Images- Lists-Tables- Frames- Forms- Class Attributes of HTML Elements-Meta Tags- Audio- Video- Canvas- Header-Footer-Navigation- HTML Events	
Unit III	**Introduction to CSS**	13 Hrs
	Introduction to Cascading style sheet- CSS Syntax- Inserting CSS- Inline- Internal- External-ID and Class Selectors-Colors- Backgrounds-CSS Box Model- Box Layout- Display Property- Padding- Margin- Positioning- CSS3 Borders- Box Shadows- Text Effects and shadow- Introduction to Bootstrap	
Unit IV	**Client Side Scripting with JavaScript**	13 Hrs
	Introduction to JavaScript - Variables and DataTypes-Statements- Expression- Keyword-Block- Operators- Flow Controls- Looping- Functions- Popup Boxes- Objects and properties- Arrays- User Defined Objects-DOM-Event Handling and Form Validation-Error Handling- Handling Cookies-JQuery Syntax-JQuery Selectors- Events and Effects	
Unit V	**Server Side Scripting using PHP**	13 Hrs
	Introduction to PHP-PHP Syntax- Variables-Data Types -Strings- Constants- Operators- Control structure- Functions-Array- Creating Class and Objects- PHP Forms- Form Validation-Events- Cookies and Sessions- Connecting to Database-Creating-Selecting- Deleting- Updating Records in a table	

Text book:

1. Jeffrey C. Jackson ,(2007),"*Web technologies – A Computer Science Perspective* ", Prentice Hall;

Reference book:

2. Thomas A. Powell ,(2010),*"HTML & CSS"*, Complete Reference-McGraw-Hill Professional.
3. Don Gosselin ,(2010), *"The Web Technologies Series*" ,Cengage Learning.
4. Jon Duckett , (2011), *"HTML & CSS",* Design and Build Websites-Wiley.

E-Resources

- https://www.javatpoint.com/internet/intranet
- https://www.tutorialspoint.com/HTML
- https://www.w3schools.com/ai/CSS templates
- https://www.simplilearn.com/javascript
- https://www.edureka.co/phpvariables

Course Outcomes

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

CO1	Inferthefundamentals of Internet.
CO2	Inferthefundamentals of HTML and Develop web pages.
CO3	Brief knowledge about Cascading Style Sheets
CO4	Understand Java Script and its classifications
CO5	Inferthefundamentals of Server Side Scripting using PHP

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PS01	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	2	1	1	1	1	2	2	2	3	1	1	1
CO2	1	1	2	1	1	1	2	2	1	1	2	1
CO3	1	1	3	1	1	2	3	3	3	2	1	2
CO4	2	3	3	1	1	1	3	1	2	3	3	1
C05	1	3	3	1	1	2	3	1	1	1	2	1

3- High; 2 - Moderate ; 1 - Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A MCQs No. Of Questions	Section B Either/ or Choice No. Of Question	Section C Open Choice No. Of Question
1	CO1	Up to K1	2(K1)	2 (K1 & K1)	1(K1)
2	CO2	Up to K2	2(K1)	2 (K2 & K2)	1(K2)
3	CO3	Up to K3	2(K1)	2 (K2 & K2)	1(K2)
4	CO4	Up to K3	2(K1)	2 (K2& K2)	1(K2)
5	CO5	Up to K3	2(K1)	2 (K3 & K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	8	10	28	28.00	28
K2		24	30	54	54.00	54
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit	Introduction to Internet	9 Hours	Mode
I	a. Internet, Intranet, WWW, Static and Dynamic Web Page	3	Descriptive method, PPT Presentation
	b. Web Clients; Web Servers	3	
	c. Client Server Architecture: Single Tier, Two-Tier, Multi-Tier;	3	
Unit II	**Introduction to HTML**	**12Hours**	**Mode**
	a. Text Markup Language Introduction to HTML; Elements of HTML Document;	3	Descriptive method, PPT Presentation
	b. HTML Elements and HTML Attributes,Headings,Paragraph,Division, Formatting-Meta Tags-HTML events	4	
	c. Lists: Ordered and Unordered and Definition;Tables; Frames; Forms: Form Elements, ID attributes-header-footer-video and audio tag	3	
	d. d. HTML Events: Window Events, Form Element Events, Keyboard Events, Mouse Events	2	
Unit III	**Introduction to CSS**	**13 Hours**	**Mode**
	a. Cascading Style Sheets Introduction; Cascading Style Sheets (CSS)	4	Descriptive method, PPT Presentation
	b. CSS Syntax; Inserting CSS: Inline, Internal, External, ID and Class Selectors; Colors; Backgrounds; Borders; Text; Font; List; Table	2	
	c. CSS Box Model;Normal Flow Box Layout: Basic Box Layout, Display Property, Padding, Margin; Positioning:Relative, Float, Absolute;	3	
	d. CSS3 Borders, Box Shadows, Text Effects and shadow; Basics of Responsive Web Designs; Media Queries, Introduction to Bootstrap	4	
Unit IV	**Client Side Scripting with JavaScript**	**13 Hours**	**Mode**
	a. Client Side Scripting with JavaScript Structure of JavaScript Program	2	Descriptive method, PPT Presentation
	b. Variables and Data Types; Statements: Expression, Keyword,Block; Operators; Flow Controls, Looping, Functions	4	
	c. Objects and properties; Arrays; , String, Form, User Defined Objects; Event Handling and Form Validation	5	
	d. Error Handling, Handling Cookies, jQuery Syntax; jQuery Selectors, Events and Effects	2	
Unit V	**Server Side Scripting using PHP**	**13 Hours**	**Mode**
	a. Server Side Scripting using PHP HP Syntax	2	Descriptive method, PPT Presentation
	b. Variables, Data Types , Strings, Constants, Operators, Control structure,	4	

	Functions,Array, Creating Class and Objects, PHP Forms	
c.	Accessing Form Elements, Form Validation, Events, Cookies and Sessions, Working with PHP and MySQL, Connecting to Database,	5
d.	Creating, Selecting, Deleting, Updating Records in a table.	2

Course Designed by: S.Sundaresh

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSC6Q	Number of Hours/Cycle	4
Semester	VI	Max. Marks	100
Part	III	Credit	3
Core Practical XII			
Course Title	**Web Technology Lab**		

Preamble

To enable students understand the basic techniques and methods in php

List of Practical

1. Home page Development static pages (using Only HTML) of an online Book store.

2. Validate the Registration, user login and payment by credit card pages using JavaScript.

3. Write simple JavaScript with HTML for arithmetic expression evaluation and message printing.

4. Introduction to basic HTML elements

5. Use table tag to format web page. Also create the Time Table of your class using table tag.

6. Create your profile page i.e. educational details, Hobbies, Achievement, My Ideals etc.

7. Create Style sheet to set formatting for text tags and embed that style sheet on web pages created for your site.

8. Design a web page and embed various multimedia features in the page.

9. Write a JavaScript program to determine whether a given year is a leap year in the Gregorian calendar.

10. Write a JavaScript program to convert temperatures to and from Celsius, Fahrenheit.

11. Write a simple PHP program using expressions and operators

12. Write a PHP program to-

    • Calculate length ofstring.

    • Count the number of words in string without using string functions.

13. Write a simple PHP program to demonstrate use of various built-in string functions.

14. Develop web page with data validation

15. Develop a simple application to Update, Delete table data from database.

16. Write a PHP program for sending and receiving plain text message (e -mail)

Course Designed by: S.Sundaresh

Programme	B.Sc	Programme Code		UCS		
Course Code	20UCSC62	Number of Hours/Cycle		4		
Semester	VI	Max. Marks		100		
Part	III	Credit		3		
Core Course XIII						
Course Title		Data Communication Network	L	T	P	
Cognitive Level		Up to K3	60			

Preamble

      To analyze the performance of a network and to learn the functions of network Layer and the various routing protocols.

Unit I	INTRODUCTION AND PHYSICAL LAYER	12 Hours
	Networks – Network Types – Protocol Layering – TCP/IP Protocol suite – OSI Model – Physical Layer: Performance – Transmission media – Switching – Circuit-switched Networks – Packet Switching.	
Unit II	DATA-LINK LAYER & MEDIA ACCESS	14 Hours
	Introduction – Link-Layer Addressing – DLC Services – Data-Link Layer Protocols – HDLC – PPP - Media Access Control - Wired LANs: Ethernet - Wireless LANs – Introduction – IEEE 802.11, Bluetooth – Connecting Devices.	
Unit III	NETWORK LAYER	12 Hours
	Network Layer Services – Packet switching – Performance – IPV4 Addresses – Forwarding of IP Packets - Network Layer Protocols: IP, ICMP v4 – Unicast Routing Algorithms – Protocols – Multicasting Basics – IPV6 Addressing – IPV6 Protocol.	
Unit IV	TRANSPORT LAYER	12 Hours
	Introduction – Transport Layer Protocols – Services – Port Numbers – User Datagram Protocol – Transmission Control Protocol – SCTP.,Network Sockets.	
Unit V	APPLICATION LAYER	10 Hours
	WWW and HTTP – FTP – Email –Telnet –SSH – DNS – SNMP-HTTPS.	

Text Book

    1. Behrouz A. Forouzan, (2017) *,"Data Communications and Networking,"*, Fifth Edition, McGraw Hill Education.

Reference Books

    1. Larry L. Peterson, Bruce S. Davie (2012), *"Computer Networks: A Systems Approach"*, Fifth Edition, Morgan Kaufmann Publishers Inc.

2. William Stallings (2013), *"Data and Computer Communications"*, Tenth Edition, Pearson Education.
3. Nader F. Mir (2014), *"Computer and Communication Networks"*, Second Edition, Prentice Hall.
4. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker (2011), *"Computer Networks: An Open Source Approach"*, McGraw Hill Publisher.
5. James F. Kurose, Keith W. Ross (2013), *"Computer Networking, A Top-Down Approach Featuring the Internet"*, Sixth Edition, Pearson Education.

E-Resources

- www.computerscience.org
- www.geeksforgeeks.com
- www.halvorsen.blog
- https://peda.net/kenya/ass/subjects2/computer-studies/form-4/itcn
- https://www.javatpoint.com/computer-network-tutorial

Course Outcomes

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

CO1	Understand the network types and its Performance.
CO2	Describe the role of datalink layer and medium access control.
CO3	Illustrate the working of network layer and various routing algorithms.
CO4	Identify the services of transport layer.
CO5	Interpret the various protocols of application layer.

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PS01	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	3	2	3	3	1	2	1	1	1	1	1	3
CO2	2	2	2	2	2	1	2	1	1	1	1	1
CO3	2	3	2	2	2	2	3	1	1	1	1	3
CO4	3	3	2	2	2	1	3	1	1	1	1	1
C05	2	3	2	3	2	2	3	1	1	1	1	2

3. High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A	Section B	Section C
			MCQs	Either/ or Choice	Open Choice
			No. Of Questions	No. Of Question	No. Of Question
1	CO1	Up to K2	2(K1)	2(K1 & K1)	1(K1)
2	CO2	Up to K2	2(K1)	2(K1 & K1)	1(K2)
3	CO3	Up to K3	2(K1)	2(K2 & K2)	1(K2)
4	CO4	Up to K3	2(K1)	2(K2 & K2)	1(K2)
5	CO5	Up to K3	2(K1)	2(K3 & K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	16	10	36	36.00	36
K2		16	30	46	46.00	46
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit		Hours	Mode
Unit I	**Introduction And Physical Layer**	**12 Hours**	**Mode**
	a. Networks – Network Types	2	Descriptive method, PPT Presentation
	b. Protocol Layering – TCP/IP Protocol suite	2	
	c. OSI Model – Physical Layer- Performance	3	
	d. Transmission media- Switching	2	
	e. Circuit-switched Networks – Packet Switching.	3	
Unit II	**DATA-LINK LAYER & MEDIA ACCESS**	**14 Hours**	**Mode**
	a. Introduction – Link-Layer Addressing	3	Descriptive method, PPT Presentation
	b. DLC Services – Data-Link Layer Protocols – HDLC – PPP.	3	
	c. Media Access Control	3	
	d. Wired LANs: Ethernet - Wireless LANs	2	
	e. Introduction – IEEE 802.11, Bluetooth – Connecting Devices.	3	
Unit III	**NETWORK LAYER**	**12 Hours**	**Mode**
	a. Network Layer Services — IPV4 Addresses	2	Descriptive method,Assignment
	b. Packet switching – Performance- Forwarding of IP Packets	2	
	c. Network Layer Protocols: IP, ICMP v4 – Unicast Routing Algorithms	2	
	d. Protocols – Multicasting Basics	2	
	e. IPV6 Addressing – IPV6 Protocol.	4	
Unit IV	**TRANSPORT LAYER**	**12 Hours**	**Mode**
	a. Introduction – Transport Layer Protocols	3	Descriptive method PPT Presentation
	b. Services – Port Numbers	3	
	c. User Datagram Protocol – Transmission Control Protocol	3	
	d. SCTP.,Network Sockets.	3	
Unit V	**APPLICATION LAYER**	**10 Hours**	**Mode**
	a. WWW and HTTP —Telnet –SSH –	3	Descriptive method,Assignment,PPT Presentation
	b. FTP – Email	2	
	c. Telnet –SSH	2	
	d. DNS – SNMP-HTTPS.	3	

Course Designed by : Mrs. K.Priyadharsini

Programme	B.Sc	Programme Code		UCS		
Course Code	20UCSC63	Number of Hours/Cycle		3		
Semester	VI	Max. Marks		100		
Part	III	Credit		3		
		Core Course XIV				
Course Title		Cloud Computing	L	T	P	
Cognitive Level		Up to K3	45			

Preamble

To enable the students to understand the concepts of Cloud computing technologies and cloud security

Unit I	UNDERSTANDING CLOUD COMPUTING	9 Hours
	History of Cloud computing - Cloud Computing Architectural Framework - Types of Clouds - pros and cons of cloud computing - difference between web 2.0 and cloud - key challenges in cloud computing - Major Cloud players - Cloud Deployment Models - Virtualization in Cloud Computing - types of virtualization - Parallelization in Cloud Computing - cloud resource management - dynamic resource allocation - Optimal allocation of cloud models	
Unit II	CLOUD SERVICE MODELS	9 Hours
	Software as a Service (SaaS) - Infrastructure as a Service (IaaS) - 13 Platform as a Service (PaaS) - Service Oriented Architecture (SoA) - Elastic Computing - On Demand Computing	
Unit III	CLOUD DEPLOYMENT MODELS	9 Hours
	Deployment of applications on the cloud - Hypervisor - Case studies 13 - Xen, VMware, Eucalyptus - Amazon EC2, KVM, Virtual Box, Hyper-V	
Unit IV	CLOUD COMPUTING FOR EVERYONE	9 Hours
	Cloud data centres - Energy efficiency in data centre - Mobile cloud computing service models - Collaboration with services and applications: CRM management - Project management - Email - on line database - calendar - schedules - Word Processing - Presentation - Spreadsheet - Databases - Desktop - Social Networks and Groupware	
Unit V	CLOUD SECURITY	9 Hours
	Cloud security - Security threats and solutions in clouds - Auditing protocols - dynamic auditing - storage security - Privacy preserving - Fully Homo-morphic Encryption - big data security - Cloud availability - DoS attacks - Fault tolerance management in cloud computing - Cloud computing in India	

Pedagogy

Class Room Lectures, chalkboards, Power point presentation, You Tube, Group Discussion, Seminar, Quiz, Assignments, Brain storming, Activity

TEXT BOOKS:

1. Anthony T.Velte, Toby J. Velte Robert Elsenpeter.,(2010),"*Cloud Computing a Practical Approach*", TATA Mc-Graw - Hill, New Delhi.

REFERENCES:

1. Judith Hurwitz, Bloor.R, Kanfman.M, Halper.F, (2010), *"Cloud Computing for Dummies"*, Wiley India Edition.
2. Gautam Shroff, (2010), *"Enterprise Cloud Computing"* ,Cambridge University press.
3. Ronald Krutz and Russell Dean Vines, (2010), *"Cloud Security"*, Wiley-India pvt. Ltd

E-Resources

- https://www.javatpoint.com/cloud-computing-tutorial
- https://www.tutorialspoint.com/cloud_computing/cloud_computing_overview.htm
- https://www.guru99.com/cloud-computing-for-beginners.html
- https://www.simplilearn.com/tutorials/cloud-computing-tutorial
- https://data-flair.training/blogs/cloud-computing-tutorial/

Course Outcomes
After completion of this course, the students will be able to:

CO1	Understand the Basics of Cloud computing.
CO2	Understand Cloud Computing architecture
CO3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
CO4	Illustrate the use of cloud services and applications
CO5	Describe the core issues of cloud computing such as resource management and security.

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	3	2	3	3	1	2	1	1	0	0	0	3
CO2	2	2	2	2	2	1	2	1	0	0	0	1
CO3	2	3	2	2	2	2	3	1	0	0	0	3
CO4	3	3	2	2	2	1	3	1	0	0	0	1
C05	2	3	2	3	2	2	3	1	0	0	0	2

3. High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A	Section B	Section C
			MCQs	Either/ or Choice	Open Choice
			No. Of Questions	No. Of Question	No. Of Question
1	CO1	Up to K2	2(K1)	2(K1 & K1)	1(K1)
2	CO2	Up to K2	2(K1)	2(K1 & K1)	1(K2)
3	CO3	Up to K3	2(K1)	2(K2 & K2)	1(K2)
4	CO4	Up to K3	2(K1)	2(K2 & K2)	1(K2)
5	CO5	Up to K3	2(K1)	2(K3 & K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	16	10	36	36.00	36
K2		16	30	46	46.00	46
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit I	UNDERSTANDING CLOUD COMPUTING	9 Hours	Mode
	a. History of Cloud computing - Cloud Computing Architectural Framework -	2	Descriptive method, PPT Presentation
	b. Types of Clouds - pros and cons of cloud computing - difference between web 2.0 and cloud	2	
	c. key challenges in cloud computing - Major Cloud players - Cloud Deployment Models	2	
	d. Virtualization in Cloud Computing - types of virtualization - Parallelization in Cloud Computing	2	
	e. Cloud resource management - dynamic resource allocation - Optimal allocation of cloud models	1	
Unit II	CLOUD SERVICE MODELS	9 Hours	Mode
	a. Software as a Service (SaaS) - Infrastructure as a Service (IaaS)	3	Descriptive method, PPT Presentation
	b. Platform as a Service (PaaS)	2	
	c. Service Oriented Architecture (SoA)	2	
	d. Elastic Computing - On Demand Computing	2	
Unit III	CLOUD DEPLOYMENT MODELS	9 Hours	Mode
	a. Deployment of applications on the cloud - Hypervisor	3	Descriptive method, PPT Presentation
	b. Case studies 13 - Xen, VMware, Eucalyptus	3	
	c. Amazon EC2, KVM, Virtual Box, Hyper-V	3	
Unit IV	CLOUD COMPUTING FOR EVERYONE	9 Hours	Mode
	a. Cloud data centres - Energy efficiency in data centre	2	Descriptive method, PPT Presentation
	b. Mobile cloud computing service models	2	
	c. Collaboration with services and applications: CRM management - Project management	2	
	d. Email - on line database - calendar - schedules - Word Processing	2	
	e. Presentation - Spreadsheet - Databases - Desktop - Social Networks and Groupware	1	
Unit V	CLOUD SECURITY	9 Hours	Mode
	a. Cloud security - Security threats and solutions in clouds	3	Descriptive method, PPT Presentation
	b. Auditing protocols - dynamic auditing - storage security Privacy preserving	2	
	c. Fully Homo-morphic Encryption - big data security Cloud availability - DoS attacks	2	
	d. Fault tolerance management in cloud computing - Cloud computing in India	2	

Course Designed by: Mrs. S.Gowthami

Programme	B.Sc	Programme Code		UCS		
Course Code	20UCSC64	Number of Hours/Cycle		3		
Semester	VI	Max. Marks		100		
Part	III	Credit		3		
Core Course XV						
Course Title	Artificial Intelligence and Machine Learning			L	T	P
Cognitive Level		Up to K3		45		

Preamble

To enable the students to understand the concepts of Artificial Intelligence techniques.

Unit I	INTRODUCTION	9 Hours
	Introduction–What is AI? – The History of Artificial Intelligence – The State of the Art–. Intelligent Agents: Agents and environment-The Nature of Environments-The structure of Agents – Problem Solving Approach to Typical AI problems.	
Unit II	PROBLEM SOLVING METHODS	9 Hours
	Problem solving Methods - Search Strategies-Uninformed - Informed - Heuristics - Local Search Algorithms and Optimization Problems - Searching with Partial Observations - Game Playing – Optimal Decisions in Games – Alpha - Beta Pruning - Stochastic Games. Constraint Satisfaction Problems: – Constraint Propagation - Backtracking Search	
Unit III	KNOWLEDGE REPRESENTATION	9 Hours
	First Order Logic: Syntax and semantics of First-order logic-using First-order Logic- Unification & lifting – Forward Chaining-Backward Chaining – Resolution.– Knowledge Representation - Ontological Engineering-Categories and Objects – Events - Mental Events and Mental Objects - Reasoning Systems for Categories - Reasoning with Default Information	
Unit IV	LEARNING	9 Hours
	Learning from examples: Forms of Learning-Supervised Learning-learning decision trees-The theory of Learning-Artificial neural network -Support vector machines- Ensemble Learning. Reinforcement Learning: passive and active reinforcement learning-applications of reinforcement learning.	
Unit V	COMMUNICATING, PERCEIVING AND ACTING	9 Hours
	Natural Language Processing -Language models- Machine Translation – Speech Recognition – Image formation-object recognition by appearance-reconstructing the 3D world-object reconstruction from structural information-using vision.	

Pedagogy

Class Room Lectures, chalkboards, Power point presentation, You Tube, Group Discussion, Seminar, Quiz, Assignments, Brain storming, Activity

TEXT BOOKS:

1. S. Russell and P. Norvig.,(2009) "A*rtificial Intelligence: A Modern Approach"*, Prentice Hall, 3rd Edition.

REFERENCES:

1. Tim Jones.,(2008),"*Artificial Intelligence: A Systems Approach(Computer Science)"*, Jones and Bartlett Publishers, 1st Edition.
2. Nils J. Nilsson.,(2009),"*The Quest for Artificial Intelligence*", Cambridge University Press.
3. William F. Clocksin and Christopher S. Mellish.,(2003), *"Programming in Prolog: Using the ISO Standard*", Springer,5th Edition.

E-Resources

- https://www.javatpoint.com/artificial-intelligence-tutorial
- https://www.tutorialspoint.com/artificial_intelligence/index.htm
- https://www.w3schools.com/ai/
- https://www.simplilearn.com/tutorials/artificial-intelligence-tutorial
- https://www.edureka.co/blog/artificial-intelligence-tutorial/

Course Outcomes

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

CO1	Understand the main concepts, key technologies, strengths and limitations of Artificial Intelligence.
CO2	Illustrate the apt agent strategy to solve a given problem.
CO3	Describe the knowledge representation in AI .
CO4	Describe the concept of learning in artificial neural network.
CO5	Develop applications for NLP that use Artificial Intelligence.

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PSO1	PSO2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO10	PSO 11	PSO 12
CO1	3	2	3	3	1	2	1	1	0	0	0	3
CO2	2	2	2	2	2	1	2	1	0	0	0	1
CO3	2	3	2	2	2	2	3	1	0	0	0	3
CO4	3	3	2	2	2	1	3	1	0	0	0	1
C05	2	3	2	3	2	2	3	1	0	0	0	2

1. High; 2. Moderate; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A	Section B	Section C
			MCQs	Either/ or Choice	Open Choice
			No. Of Questions	No. Of Question	No. Of Question
1	CO1	Up to K2	2(K1)	2(K1 & K1)	1(K1)
2	CO2	Up to K2	2(K1)	2(K1 & K1)	1(K2)
3	CO3	Up to K3	2(K1)	2(K2 & K2)	1(K2)
4	CO4	Up to K3	2(K1)	2(K2 & K2)	1(K2)
5	CO5	Up to K3	2(K1)	2(K3 & K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	16	10	36	36.00	36
K2		16	30	46	46.00	46
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit I	INTRODUCTION	9 Hours	Mode
	a. Introduction–What is AI?	2	Descriptive method, PPT Presentation
	b. The History of Artificial Intelligence	2	
	c. The State of the Art–. Intelligent Agents: Agents and environment	2	
	d. The Nature of Environments-The structure of Agents	2	
	e. Problem Solving Approach to Typical AI problems.	1	
Unit II	PROBLEM SOLVING METHODS	9 Hours	Mode
	f. Problem solving Methods - Search Strategies.	1	Descriptive method, PPT Presentation
	g. Local Search Algorithms and Optimization Problems	2	
	h. Uninformed - Informed - Heuristics - Searching with Partial Observations	2	
	i. Game Playing – Optimal Decisions in Games- Alpha - Beta Pruning - Stochastic Games	2	
	j. Constraint Satisfaction Problems: Constraint Propagation - Backtracking Search	2	
Unit III	KNOWLEDGE REPRESENTATION	9 Hours	Mode
	a. First Order Logic: Syntax and semantics of First-order logic-using First-order Logic.	2	Descriptive method, Assignments
	b. Unification & lifting – Forward Chaining-Backward Chaining – Resolution	2	
	c. Knowledge Representation - Ontological Engineering-Categories and Objects	2	
	d. Events - Mental Events and Mental Objects	2	
	e. Reasoning Systems for Categories - Reasoning with Default Information	1	
Unit IV	LEARNING	9 Hours	Mode
	a. Learning from examples: Forms of Learning- Supervised Learning.	2	Descriptive method PPT Presentation
	b. Learning decision trees-The theory of Learning-	2	
	c. Artificial neural network -Support vector machines- Ensemble Learning	2	
	d. Reinforcement Learning: passive and active reinforcement earning	2	
	e. Applications of reinforcement learning.	1	
Unit V	COMMUNICATING, PERCEIVING AND ACTING	9 Hours	Mode
	1. Natural Language Processing -Language models	3	Descriptive method, Assignment,
	2. Machine Translation – Speech Recognition	3	

	3. Image formation-object recognition by appearance-reconstructing the 3D world-	2	PPT Presentation
	4. Object reconstruction from structural information-using vision.	1	

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSC6P	Number of Hours/Cycle	5
Semester	VI	Max. Marks	100
Part	III	Credit	6
Core Practical XVI			
Course Title		**Project Work**	

Course Outcomes

Upon successful completion of this project work the student:

CO1	Will get a little exposure to the field of research in Computer Science.
CO2	Able to convert a real life problem into a systematic model and solve it using technical skills.
CO3	Able to develop, test and maintain an application.
CO4	Will familiarize about various frameworks, programming languages and database.

Project work:

- Each faculty will be allotted a group of **(2)** students for their research project in any one of the areas of Computer Science and interdisciplinary of any science subject in consultation with their guide and the Head of the Department.
- The topic/area of work will be finalized at the end of IV semester, allowing scope for the students to gather relevant literature during the vacation.
- The project report should be submitted to the Head of the Department of Computer Science through the Guide one week prior to the commencement of the summative examination.
- They shall submit **three** copies of their project report for valuation.
- The choice of the topic for the project can be from a wide range of subjects, but a text or topic prescribed in the syllabi should be strictly avoided.

Area of work:

Networking, Artificial Intelligence, Data Mining, Deep Learning, Machine Learning, Cloud computing.

Each project should contain the following details:

- Brief introduction on the topic
- Materials and Methods
- Results and Discussions
- Conclusion / Summary
- Bibliography
- The project should be at least 25 pages excluding bibliography and appendices.

- The maximum marks for the project work shall be 100.

Mode of Evaluation	Marks
Internal Assessment	40
External Project Viva Voce	60

Programme	B.Sc(CS)	Programme Code		UCS		
Course Code	20UCSE61	Number of Hours/Cycle		4		
Semester	VI	Max. Marks		100		
Part	III	Credit		4		
Elective Course II						
Course Title	Digital Image Processing		L	T	P	
Cognitive Level		Up to K3	60			

Preamble

This course helps students to understand the basics of digital image fundamentals, various image processing techniques and familiar with image compression and enhancement techniques.

Unit I	**DIGITAL IMAGE FUNDAMENTALS**	**14 Hours**
	Digital Image Processing - Origins - Example of fields that use Digital Image Processing - Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels.	
Unit II	**IMAGE ENHANCEMENT**	**12 Hours**
	Intensity Transformation and spatial filtering – Basics - Some basic intensity transformation functions - Fundamentals of Spatial Filtering– Smoothing and Sharpening Spatial Filtering	
Unit III	**IMAGE RESTORATION**	**12 Hours**
	A model of the Image degradation/restoration process - Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering	
Unit IV	**IMAGE COMPRESSION**	**12 Hours**
	Fundamentals - Basic compression methods -Huffman coding - Arithmetic coding - Run Length coding - JBIG2 compression - Bit Plane coding -Block Transform coding - Digital Image Watermarking	
Unit V	**COLOUR IMAGE PROCESSING**	**10 Hours**
	Color Image processing – color models – pseudo color Image processing – Smoothing – Sharpening – Color transformation - Color segmentation	

Pedagogy

Class Room Lectures, chalkboards, Power point presentation, You Tube, Group Discussion, Seminar, Quiz, Assignments, Brain storming, Activity

TEXT BOOKS:

1. Rafael C. Gonzalez, Richard E. Woods (2010), "Digital Image Processing", Pearson, Third Edition.

2. Anil K. Jain (2002), " Fundamentals of Digital Image Processing", Pearson.

REFERENCES:

1. Kenneth R. Castleman (2006), *"Digital Image Processing"*, Pearson.
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins (2011), *"Digital Image Processing using MATLAB"*, Pearson Education, Inc.,
3. D,E. Dudgeon and RM. Mersereau (1990), *"Multidimensional Digital Signal Processing"*, Prentice Hall Professional Technical Reference.
4. William K. Pratt(2002), *"Digital Image Processing"*, John Wiley, New York.
5. Milan Sonka et. al.(1999), *"Image Processing, Analysis and Machine vision"*, Brookes/Cole, Vikas Publishing House, 2nd edition.

Course Outcomes
After completion of this course, the students will be able to:

CO1	Understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.
CO2	Describe the techniques of smoothing, sharpening and enhancement using images.
CO3	Understand the restoration concepts and filtering techniques.
CO4	Understand he basics of image compression techniques and digital watermarking
CO5	Describe the concept of Colour image processing

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PS01	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	3	2	1	1	1	2	2	2	2	2	1	1
CO2	2	2	2	1	1	2	2	2	2	2	1	1
CO3	3	2	3	1	1	2	3	2	2	2	1	1
CO4	2	3	3	1	1	2	3	2	2	2	1	1
C05	3	3	3	1	1	2	3	2	2	2	1	1

3.High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A MCQs No. Of Questions	Section B Either/ or Choice No. Of Question	Section C Open Choice No. Of Question
1	CO1	Up to K2	2(K1)	2(K1 & K1)	1(K1)
2	CO2	Up to K2	2(K1)	2(K1 & K1)	1(K1)
3	CO3	Up to K3	2(K1)	2(K2 & K2)	1(K2)
4	CO4	Up to K3	2(K1)	2(K2 & K2)	1(K2)
5	CO5	Up to K3	2(K1)	2(K3 & K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	16	20	46	46.00	46
K2		16	20	36	36.00	36
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit I	**DIGITAL IMAGE FUNDAMENTALS**		**14 Hours**	**Mode**
	a. Digital Image Processing - Origins - Example of fields that use Digital Image Processing-	3		Descriptive method, PPT Presentation
	b. Steps in Digital Image Processing	3		
	c. Components – Elements of Visual Perception	3		
	d. Image Sensing and Acquisition – Image Sampling and Quantization	2		
	e. Relationships between pixels.	3		
Unit II	**IMAGE ENHANCEMENT**		**12 Hours**	**Mode**
	a. Intensity Transformation and spaitial filtering – Basics	3		Descriptive method, PPT Presentation
	b. Some basic intensity transformation functions	3		
	c. Fundamentals of Spatial Filtering	3		
	d. Smoothing and Sharpening Spatial Filtering	3		
Unit III	**IMAGE RESTORATION**		**12 Hours**	**Mode**
	a. A model of the Image degradation/restoration process	2		Descriptive method, PPT Presentation
	b. Noise models – Mean Filters	2		
	c. Order Statistics – Adaptive filters – Band reject Filters	3		
	d. Band pass Filters – Notch Filters – Optimum Notch Filtering	3		
	e. Inverse Filtering – Wiener filtering	2		
Unit IV	**IMAGE COMPRESSION**		**12 Hours**	**Mode**
	a. Fundamentals - Basic compression methods -Huffman coding - Arithmetic coding	4		Descriptive method, PPT Presentation
	b. Run Length coding - JBIG2 compression -	4		
	c. Bit Plane coding -Block Transform coding -	2		
	d. Digital Image Watermarking	2		
Unit V	**COLOUR IMAGE PROCESSING**		**10 Hours**	**Mode**
	a. Color Image processing – color models –	2		Descriptive method, PPT Presentation
	b. pseudo color Image processing	2		
	c. Smoothing – Sharpening	3		
	d. Color transformation - Color segmentation	3		

Course designed by Dr.P.Alagambigai

Programme	B.Sc	Programme Code		UCS		
Course Code	20UCSE62	Number of Hours/Cycle		4		
Semester	VI	Max. Marks		100		
Part	III	Credit		4		
		Elective Course II				
Course Title		**Internet of Things**		**L**	**T**	**P**
Cognitive Level		Up to K3		90		

L-Lecture Hours   T-Tutorial Hours   P-Practical Hours

Preamble

This course helps students to understand the basics of IoT, develop knowledge about difference between IoT and M2M , IoT devices and data analytics for IoT.

Unit I	**Introduction to IoT**	12 Hours
	Introduction – Physical design of IoT – Logical design of IoT – IoT enabling Technologies – IoT and deployment Templates	
Unit II	**Domain specific IoTs**	10 Hours
	Introduction – Home automation – Cities – Environment – Energy – Retail – Logistics- Agriculture – Industry – Health and Life style	
Unit III	**IoT and M2M, IoT System Management with NETCONFIG-YANG**	13 Hours
	Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT. Need for IoT system management – Simple Network Management Protocol – Network operator requirements- YANG - IoT system management with NETCONFIG-YANG	
Unit IV	**IoT physical devices and Endpoint**	13 Hours
	What is an IoT device-Basic Building blocks of an IoT device-Raspberry Pi-About the board –Linux on Raspberry Pi-Interfaces-Programming Raspberry Pi with Python – Other IoT devices	
Unit V	**Data Analytics for IoT**	12 Hours
	Overview of MapReduce parallel programming model – Overview of Hadoop – Case study on Batch data analysis using Hadoop – Case study on real-time data analysis using Hadoop – Overview of Apache Oozie– Overview of Apache Spark – Overview of Apache Storm –Case study on using Apache Storm for real-time data analysis	

Pedagogy

Class Room Lectures, chalkboards, Power point presentation, You Tube, Group Discussion, Seminar, Quiz, Assignments, Brain storming, Activity

Text Book

1. Arshdeep Bahga , Vijay Medisetti, (2015), "*Internet of Things Hands on Approach*" ,Universities Press (INDIA) Pvt Ltd., Mumbai.

Reference Books
1. Daniel Minoli,(2014), "*Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications*", Willy Publications
2. CunoPfister, ,(2011), "*Getting started with Internet of Things*", O'Relly
3. Adrian McEven, Hakim Cassimally,(2014),"*Designing the Internet of Things*",Wiley Publications
4. Marco Schwartz,(2014),"*Internet of Things with Arduino Yun*",Packt Publishing,Mumbai

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- http://alvarestech.com/temp/smar/Smar/Book2021/Industry4.0/2019
- https://www.tutorialspoint.com/internet_of_things/internet_of_things_tutorial.pdf
- https://www.leverege.com/iot-ebook/how-iot-systems-work
- https://freecomputerbooks.com/Internet-of-Things-in-5-days.html
- https://en.wikipedia.org/wiki/Internet_of_things

Course Outcomes
After completion of this course, the students will be able to:

CO1	Infer the fundamentals of Internet of Things
CO2	Develop domain specific IoT devices.
CO3	Classify differences between IoT and Machine to Machine
CO4	Build an IoT device using Raspberry Pi
CO5	Make use of Data analytics for IoT applications

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PS01	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	2	2	2	1	1	3	1	2	1	1	1	3
CO2	2	3	3	1	1	3	1	2	1	1	1	3
CO3	2	2	2	1	1	3	1	2	1	1	1	3
CO4	2	3	3	1	1	3	1	3	1	1	1	3
C05	2	3	3	1	1	3	1	3	1	1	1	3

3.High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A MCQs No. Of Questions	Section B Either/ or Choice No. Of Question	Section C Open Choice No. Of Question
1	CO1	Up to K2	2(K1)	2(K1 & K1)	1(K1)
2	CO2	Up to K2	2(K1)	2(K1& K1)	1(K1)
3	CO3	Up to K3	2(K1)	2(K2 & K2)	1(K2)
4	CO4	Up to K3	2(K1)	2(K2 & K2)	1(K2)
5	CO5	Up to K3	2(K1)	2(K3 & K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers
K2 – Basic understanding of facts and stating main ideas with general answers
K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consoli dated (Round ed off)
K1	10	16	20	46	46.00	46
K2		16	20	36	36.00	36
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit		Hours	Mode
Unit I	**Introduction to IoT**	**12 Hours**	**Mode**
	a. Introduction – Physical design of IoT	4	Descriptive method, PPT Presentation
	b. Logical design of IoT – IoT enabling Technologies,	4	
	c. IoT and deployment Templates	4	
Unit II	**Domain specific IoTs**	**10 Hours**	**Mode**
	a. Introduction – Home automation	2	Descriptive method, PPT Presentation
	b. Cities – Environment – Energy	3	
	c. Retail – Logistics – Agriculture –	3	
	d. Industry – Health and Life style	2	
Unit III	**IoT and M2M, IoT System Management with NETCONFIG-YANG**	**13 Hours**	**Mode**
	a. Introduction – M2M- Difference between IoT and M2M	4	Descriptive method, PPT Presentation
	b. SDN and NFV for IoT	2	
	c. Need for IoT system management – Simple Network Management Protocol	3	
	d. Network operator requirements- YANG - IoT system management with NETCONFIG-YANG	4	
Unit IV	**IoT physical devices and Endpoint**	**13 Hours**	**Mode**
	a. What is an IoT device-Basic Building blocks of an IoT device	4	Descriptive method, PPT Presentation
	b. Raspberry Pi-About the board –Linux on Raspberry Pi	4	
	c. Interfaces-Programming Raspberry Pi with Python – Other IoT devices	5	
Unit V	**Iot with Arduino Yun**	**12 Hours**	**Mode**
	a. Overview of MapReduce parallel programming model – Overview of Hadoop – Case study on Batch data analysis using Hadoop – Case study on real-time data analysis using Hadoop	5	Descriptive method, PPT Presentation
	b. Overview of Apache Oozie– Overview of Apache Spark	4	
	c. Overview of Apache Storm –Case study on using Apache Storm for real-time data analysis	3	

Course designed by Mrs.K.Priyadharsini

Programme	B.Sc	Programme Code		UCS	
Course Code	20UCSE63	Number of Hours/Cycle		4	
Semester	VI	Max. Marks		100	
Part	III	Credit		4	
Elective Course II					
Course Title	Software Project Management		L	T	P
Cognitive Level		Up to K3	60		

Preamble

To enable the students to understand the concepts of Software Project Management techniques.

Unit I	**Project Evaluation And Project Planning**	12 Hours
	Importance of Software Project Management – Activities - Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.	
Unit II	**Project Life Cycle And Effort Estimation**	12 Hours
	Software process and Process Models – Choice of Process models - Rapid Application development – Agile methods – Dynamic System Development Method – Extreme Programming– Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points - COCOMO II - a Parametric Productivity Model.	
Unit III	**Activity Planning And Risk Management**	12 Hours
	Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Formulating Network Model – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Risk Planning –Risk Management – – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical paths – Cost schedules.	
Unit IV	**Project Management And Control**	12 Hours
	Framework for Management and control – Collection of data – Visualizing progress – Cost monitoring – Earned Value Analysis – Prioritizing Monitoring – Project tracking – Change control – Software Configuration Management – Managing contracts – Contract Management.	
Unit V	**Staffing In Software Projects**	12 Hours
	Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham – Hackman job characteristic model – Stress – Health and Safety – Ethical and Professional concerns – Working in teams – Decision making – Organizational structures – Dispersed and Virtual teams – Communications genres – Communication plans – Leadership.	

TEXT BOOK:
1. Bob Hughes, Mike Cotterell and Rajib Mall (2012), *"Software Project Management"*, Fifth Edition, Tata McGraw Hill, New Delhi.

REFERENCES:
2. Robert K. Wysocki (2011), *"Effective Software Project Management"*, Wiley Publication, 2011.
3. Walker Royce (1998), *"Software Project Management"*, Addison Wesley.
4. Gopalaswamy Ramesh (2013), *"Managing Global Software Projects"*, McGraw Hill Education (India), Fourteenth Reprint.

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- https://www.javatpoint.com/software-project-management
- https://www.tutorialspoint.com/software_engineering/software_project_management.htm
- https://www.geeksforgeeks.org/software-engineering-software-project-management-spm/
- https://www.guru99.com/project-management-tutorial.html
- https://www.simplilearn.com/tutorials/project-management-tutorial

Course Outcomes

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

CO1	Understand Project Management principles while developing software.
CO2	Illustrate extensive knowledge about the basic project management concepts, framework and the process models.
CO3	Describe adequate knowledge about software process models and software effort estimation techniques.
CO4	Understand the risks involved in various project activities
CO5	Describe the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.

Mapping of Course Outcomes (COs) with Programme Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	3	2	3	3	1	2	1	1	0	0	0	3
CO2	2	2	2	2	2	1	2	1	0	0	0	1
CO3	2	3	2	2	2	2	3	1	0	0	0	3
CO4	3	3	2	2	2	1	3	1	0	0	0	1
C05	2	3	2	3	2	2	3	1	0	0	0	2

3. High; 2. Moderate ; 1. Low

Articulation Mapping - K Levels with Course Outcomes (COs)

Units	COs	K-Level	Section A MCQs	Section B Either/ or Choice	Section C Open Choice
			No. Of Questions	No. Of Question	No. Of Question
1	CO1	Up to K2	2(K1)	2(K1 & K1)	1(K1)
2	CO2	Up to K2	2(K1)	2(K1& K1)	1(K1)
3	CO3	Up to K3	2(K1)	2(K2 & K2)	1(K2)
4	CO4	Up to K3	2(K1)	2(K2 & K2)	1(K2)
5	CO5	Up to K3	2(K1)	2(K3 & K3)	1(K3)
No of Questions to be asked			10	10	5
No of Questions to be answered			10	5	3
Marks for each Question			1	4	10
Total marks for each Section			10	20	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving problems

Distribution of Section - wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open)	Total Marks	% of Marks without Choice	Consolidated (Rounded off)
K1	10	16	20	46	46.00	46
K2		16	20	36	36.00	36
K3		8	10	18	18.00	18
Total Marks	10	40	50	100	100	100%

Lesson Plan

Unit I	Project Evaluation And Project Planning	12 Hours	Mode
	a. Importance of Software Project Management – Activities - Methodologies	3	Descriptive method, PPT Presentation
	b. Categorization of Software Projects – Setting objectives – Management Principles – Management Control	3	
	c. Project portfolio Management – Cost-benefit evaluation technology	3	
	d. Risk evaluation – Strategic program Management – Stepwise Project Planning	3	
Unit II	**Project Life Cycle And Effort Estimation**	**12 Hours**	**Mode**
	a. Software process and Process Models – Choice of Process models	3	Descriptive method, PPT Presentation
	b. Rapid Application development – Agile methods – Dynamic System Development Method	3	
	c. Extreme Programming– Managing interactive processes – Basics of Software estimation	3	
	d. Effort and Cost estimation techniques – COSMIC Full function points - COCOMO II - a Parametric Productivity Model.	3	
Unit III	**Activity Planning And Risk Management**	**12 Hours**	**Mode**
	a. Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling	3	Descriptive method, PPT Presentation, Group Discussion
	b. Network Planning models – Formulating Network Model – Forward Pass & Backward Pass techniques	3	
	c. Critical path (CRM) method – Risk identification – Assessment – Risk Planning – Risk Management	3	
	d. PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical paths – Cost schedules.	3	
Unit IV	**Project Management And Control**	**12 Hours**	**Mode**
	a. Framework for Management and control – Collection of data – Visualizing progress – Cost monitoring	4	Descriptive method, PPT Presentation
	b. Earned Value Analysis – Prioritizing Monitoring – Project tracking – Change control	4	
	c. Software Configuration Management – Managing contracts – Contract Management.	4	
Unit V	**Staffing In Software Projects**	**12 Hours**	**Mode**
	a. Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham – Hackman job characteristic model	4	Descriptive method, PPT Presentation, Group Discussion, Seminar
	b. Stress – Health and Safety – Ethical and Professional concerns	3	

	c. Working in teams – Decision making	2	
	d. Organizational structures – Dispersed and Virtual teams – Communications genres – Communication plans – Leadership	3	

Course Designed by : Ms. B. Shaheen Nihar

Programme	B.Sc	Programme Code	UCS
Course Code	20UCSS6P	Number of Hours/Cycle	2
Semester	VI	Max. Marks	100
Part	IV	Credit	2
		Skill Based Course IV	
Course Title		**CGI Technology Lab**	

Preamble

Describe different realizations of multimedia tools and the way in which they are used. Compare various data compression schemes. Analyze user interface for a given application.

List of Programs:

PHOTOSHOP:

1. Design an Image by cutting the Objects from three Files and Organize them in a single file and apply feather effects

2. Design an Image by applying mirror effect

3. Design an Image by extracting flower only from given photographic image

4. Design an Image by applying text and transform tools

5. Design an Image by using patch or healing brush tool to remove damaged parts of an image

6. Design an Image by applying lighting effect filter

7. Design an Image by applying blending options to make a text effect

8. Design an Image by applying rainbow effect

9. Design an Image by applying text masking effect

10. Design an Image by ID card using any tools

FLASH :

11. Basic tools used in flash

12. Develop a Flash application using motion tween

13. Develop a Flash application using shape tween

14. Develop a Flash application for ball bouncing using motion guide path

15. Develop a Flash application for masking effect

16. Develop a Flash application using layer based animation

17. Develop a Flash application to represent the growing moon

18. Write action script to play and stop an animation

Course designed by Mr .S. Sundharesh

Programme	B.Sc	Programme Code	UCS
Course Code	20CCSC51	Total Number of Hours	2
Semester	V	Max. Marks	100
Part	V	Credit	2
		Value Added Course III	
Course Title		Web Designing	

Preamble

Students will understand the knowhow and can function either as an entrepreneur or can take up jobs in the multimedia and Web site development studio and other information technology sectors.

Unit I	Web Design Principles	6 Hours
	Basic principles involved in developing a web site 1.2 Planning process 1.3 Five Golden rules of web designing 1.4 Designing navigation bar 1.5 Page design 1.6 Home Page Layout 1.7 Design Concept	
Unit II	Basics in Web Design	6 Hours
	Brief History of Internet 2.2 What is World Wide Web 2.3 Why create a web site 2.4 Web Standards 2.5 Audience requirement.	
Unit III	Introduction to HTML	7 Hours
	What is HTML 3.2 HTML Documents 3.3 Basic structure of an HTML document 3.4 Creating an HTML document 3.5 Mark up Tags 3.6 Heading-Paragraphs 3.7 Line Breaks 3.8 HTML Tags.	
Unit IV	Elements of HTML	6 Hours
	Introduction to elements of HTML 4.2 Working with Text 4.3 Working with Lists, Tables and Frames 4.4 Working with Hyperlinks, Images and Multimedia 4.5 Working with Forms and controls.	
Unit V	Introduction to Web Publishing or Hosting	5 Hours
	Creating the Web Site 6.2 Saving the site 6.3 Working on the web site 6.4 Creating web site structure 6.5 Creating Titles for web pages 6.6 Themes-Publishing web sites.	

TextBook:

1. Jeremy Osborn, Jennifer Smith, and the AGI Training Team ,(2011),"*Web Design with HTML and CSS Digital Classroom*", Wiley Publishing, Inc.,

Programme	B.Sc	Programme Code	UCS
Course Code	20CCSC61	Total Number of Hours	2
Semester	VI	Max. Marks	100
Part	V	Credit	2
Value Added Course IV			
Course Title		Network Terminology	

Preamble

      Students will understand the knowhow and can function either as an entrepreneur or can take up jobs in the Networking and other information technology sectors.

Unit I	**INTRODUCTION**	**7 Hours**
	Introduction to networks: Why networks?, Basic network concepts, applications & uses of computer networks, different layers in networks, internet & web concepts, network security.	
Unit II	**TCP&UDP**	**9 Hours**
	Software & hardware issues in networking, reference models, OSI, TCP, IP, UDP	
Unit III	**TRANSMISSION MEDIUM**	**11 Hours**
	Transmission medium –wired communication, wireless communication, satellite communication, PSTN-first generation, second generation, third generation.	
Unit IV	**MODERN NETWORK TECHNIQUES**	**10 Hours**
	Modern Network Techniques: Basic modern network mediums, basic modern Modem, Ethernet, Switch, Hub, Routers	
Unit V	**INTERNET STANDARDIZATION**	**8 Hours**
	Internet Standardization, fine walls, proxy server, URI, URN, HTML, XML, MINE, HTTP Sockets.	

Textbook:
1.Brijendra Singh,(2011),"*Data Communications and Computer Networks*", PHI Learning Private Limited,3rd edition.