UNIVERSITY OF MADRAS

B.C.A. DEGREE COURSE

SYLLABUS WITH EFFECT FROM 2020-2021 TO 2022-2023

PROGRAM OUTCOME:

PO1. To **Identify, formulate, review** research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO2. To **Design** solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO3. To **Conduct** investigations of complex problems: To Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO4. To **Create, select, and apply** appropriate techniques, resources, and modern engineering and IT tools.

PO5. To **Apply** the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems

PO6.To Convert the real-world problems into computational problem to solve them by using various computational and problem-solving skills.

PROGRAM SPECIFIC OUTCOME:

PSO1: The three-year course of BCA course helps the students to **develop** programming skills, networking skills, learn applications, packages, programming languages and modern techniques of IT

PSO2: The program helps the students to **implement** the analytical skill, communication skill, decision making and problem-solving skill in the field of computational studies.

PSO3: The program helps the students to **fetch** employment in Information Technology Sector of National / International standards and to become a social responsible person.

PSO4: To **Pursue** higher studies in the area of Computer Science / Computer Applications / Information Technology.

UNIVERSITY OF MADRAS

B.Sc. DEGREE COURSE IN COMPUTER SCIENCE

SYLLABUS WITH EFFECT FROM 2020-2021

BCE-CSC01

CORE: PROBLEM SOLVING USING PYTHON

(Common paper to B.Sc.Software Applications, B.Sc. Computer Science with AI & B.C.A.)

I YEAR
I / II SEM

OBJECTIVES:

- Describe the core syntax and semantics of Python programming language.
- Discover the need for working with the strings and functions.
- Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
- Understand the usage of packages and Dictionaries.

OUTCOMES:

- To Understand the principles of Python and acquire skills in programming in python
- To develop the emerging applications of relevant field using Python
- Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
- Able to develop simple turtle graphics programs in Python

UNIT – I

Introduction: The essence of computational problem solving – Limits of computational problem solving-Computer algorithms-Computer Hardware-Computer Software-The process of computational problem solving-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types.

UNIT - II

Control Structures: Boolean Expressions - Selection Control - If Statement- Indentation inPython-Multi-Way Selection -- Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flags and Indefinite Loops. Lists: List Structures - Lists in Python - Iterating over lists in Python.

UNIT - III

Functions: Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope.

UNIT - V

Objects and their use: Software Objects - Turtle Graphics – Turtle attributes-Modular Design: Modules - Top-Down Design - Python Modules - Text Files: Opening, reading and writing text files - String Processing - Exception Handling.

UNIT - V

Dictionaries and Sets: Dictionary type in Python - Set Data type. Object Oriented Programming using Python: Encapsulation - Inheritance – Polymorphism. Recursion: Recursive Functions.

TEXT BOOK:

1. Charles Dierbach, "Introduction to Computer Science using Python - A computational Problemsolving Focus", Wiley India Edition, 2015.

REFERENCE BOOKS:

1. Mark Lutz, "*Learning Python Powerful Object Oriented Programming*", O'reilly Media2018, 5th Edition.
2. Timothy A. Budd, "*Exploring Python*", Tata MCGraw Hill Education Private Limited2011, 1st Edition.
3. Allen Downey, Jeffrey Elkner, Chris Meyers, "*How to think like a computer scientist: learningwith Python*", 2012.
4. Sheetal Taneja & Naveen kumar, "*Python Programming a Modular approach – A Modular approach with Graphics, Database, Mobile and Web applications*", Pearson,2017.
5. Ch Satyanarayana M Radhika Mani, B N Jagadesh, "*Python programming*", UniversitiesPress 2018.

WEB REFERENCES

- http://interactivepython.org/courselib/static/pythonds
- http://www.ibiblio.org/g2swap/byteofpython/read/
- http://www.diveintopython3.net/
- http://greenteapress.com/wp/think-python-2e/
- NPTEL & MOOC courses titled Python programming
- http://spoken-tutorial.org/tutorial-search/?search_foss=Python&search_language=English
- http://docs.python.org/3/tutorial/index.html

COURSE OUTCOMES:

CO 1: To **Understand** the principles of Python and acquire skills in programming in python

CO 2: To **develop** the emerging applications of relevant field using Python

CO 3: Interpret the fundamental Python syntax and semantics and be fluent in the use of Python controlflow statements.

CO 4: Able to **develo**p simple turtle graphics programs in Python

CO 5: To **Apply** the best features available in Python to solve the computational problems.

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	X	X		X		X
CO2	X	X			X	
CO3	X	X		X	X	
CO4	X			X	X	
CO5	X		X	X		X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE
APPLICATIONSYLLABUS WITH EFFECT FROM
2020-2021

BSA-CSC03

CORE-III: OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++

(Common paper to B.C.A.)

I YEAR / II SEMESTER

OBJECTIVES:

- To inculcate knowledge on Object-oriented programming concepts using C++.
- To gain Knowledge on programming with C++.

OUTCOMES:

- To write programs using OOP concepts like Abstraction, Encapsulation, Inheritance andPolymorphism

UNIT - I

Introduction to C++ - key concepts of Object-Oriented Programming –Advantages – Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures : - Decision Making and Statements : If ..else, jump, goto, break, continue, Switch case statements - Loops in C++ : for, while, do - functions in C++ - inline functions – Function Overloading.

UNIT - II

Classes and Objects: Declaring Objects – Defining Member Functions – Static Member variablesand functions – array of objects –friend functions – Overloading member functions – Bit fields and classes – Constructor and destructor with static members.

UNIT- III

Operator Overloading: Overloading unary, binary operators – Overloading Friend functions – type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes.

UNIT - IV

Pointers – Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding, Polymorphism and Virtual Functions.

UNIT - V

Files – File stream classes – file modes – Sequential Read / Write operations – Binary and ASCIIFiles – Random Access Operation – Templates – Exception Handling - String – Declaring and Initializing string objects – String Attributes – Miscellaneous functions .

TEXT BOOK:

1. E. Balagurusamy, "*Object-Oriented Programming with C++",* TMH 2013, 7th Edition.

REFERENCE BOOKS:

1. Ashok N Kamthane, "*Object-Oriented Programming with ANSI and Turbo C++",*

Pearson Education 2003.

2. Maria Litvin & Gray Litvin, "*C++ for you*", Vikas publication 2002.

WEB REFERENCES:

- NPTEL & MOOC courses titled Object oriented programming concepts using C++ https://alison.com/course/introduction-to-c-plus-plus-programming

COURSE OUTCOMES:

CO 1: To inculcate knowledge on Object-oriented programming concepts using C++.

CO 2: To gain Knowledge on programming with C++.

CO 3: To write programs using OOP concepts like Abstraction, Encapsulation, Inheritance and Polymorphism

CO 4: To understand the structure and model of the C++ programming language.

CO 5: To solve problems in C++ demonstrating Object Oriented Concepts

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	X		X	X	X	
CO2		X			X	X
CO3		X		X		X
CO4	X		X	X	X	
CO5	X	X	X			X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE APPLICATIONSYLLABUS WITH EFFECT FROM 2020-2021

BSA-DSC05

CORE V: DATASTRUCTURES

II YEAR / III SEMESTER

OBJECTIVES:

- To understand the concepts of ADTs
- To learn linear data structures-lists, stacks, queues
- To apply Tree and Graph structures
- To understand sorting, searching and hashing

OUTCOMES:

- Implement abstract data types for linear data structures.
- Apply the different linear and non linear data structures to problem solutions.
- Critically analyze the various sorting algorithms.

UNIT - I

Abstract Data Types (ADTs)- List ADT-array-based implementation-linked list implementation- singly linked lists-circular linked lists-doubly-linked lists-applications of lists-Polynomial Manipulation- All operations-Insertion-Deletion-Merge-Traversal.

UNIT - II

Stack ADT-Operations- Applications- Evaluating arithmetic expressions – Conversion of infix to postfix expression-Queue ADT-Operations-Circular Queue- Priority Queue-deQueue- applications of queues.

UNIT - III

Tree ADT-tree traversals-Binary Tree ADT-expression trees-applications of trees-binary search tree ADT- Threaded Binary Trees-AVL Trees- B-Tree- B+ Tree – Heap-Applications of heap.

UNIT - IV

Definition- Representation of Graph- Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits-Applications of graphs.

UNIT - V

Searching- Linear search-Binary search-Sorting-Bubble sort-Selection sort-Insertion sort-Shell sort-Radix sort-Hashing-Hash functions-Separate chaining- Open Addressing-Rehashing- Extendible Hashing.

TEXT BOOKS:

1. Mark Allen Weiss, "*Data Structures and Algorithm Analysis in C++",* Pearson Education 2014, 4th Edition.
2. Reema Thareja, "*Data Structures Using C",* Oxford Universities Press 2014, 2nd Edition.

REFERENCES:

1. Thomas H.Cormen,Chales E.Leiserson,Ronald L.Rivest, Clifford Stein, "*Introduction toAlgorithms*", McGraw Hill 2009, 3rd Edition.
2. Aho, Hopcroft and Ullman, "*Data Structures and Algorithms*", Pearson Education 2003.

WEB REFERENCES:

- NPTEL & MOOC courses titled Data Structures: https://nptel.ac.in/courses/106106127/

COURSE OUTCOMES:

CO 1: To **Implement** abstract data types for linear data structures.

CO 2: To **Apply** the different linear and nonlinear data structures to solve computational problems.

CO 3: To **Analyze** the various sorting algorithms.

CO 4: To **Solve** linear and non-linear data structure problems.

CO 5: To **Evaluate** various sorting methods and searching algorithms.

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	X	X	X		X	
CO2	X			X	X	
CO3		X		X		X
CO4		X	X	X	X	
CO5		X	X			X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE
APPLICATIONSYLLABUS WITH EFFECT FROM
2020-2021

BSA-DSC06

CORE VI: JAVA PROGRAMMING

II YEAR / III SEMESTER

OBJECTIVES:

- To understand the concepts of Object Oriented Programming.
- To learn about the control structures, class with attributes and methods used in Java.

OUTCOMES:

- Knowledge of the structure and model of the Java programming language.
- Understand the basic principles of creating Java applications with GUI.
- Demonstrate use of string and String Buffers, Develop multithreaded programs in Java.

UNIT - I

Introduction to OOPS: Paradigms of Programming Languages – Basic concepts of Object Oriented Programming – Differences between Procedure Oriented Programming and Object Oriented programming - Benefits of OOPs – Application of OOPs. Java: History – Java features. Java Environment – JDK – API. Introduction to Java: Types of java program – Creating and Executing a Java program – Java Tokens- Java Virtual Machine (JVM) – Command Line Arguments –Comments in Java program.

UNIT - II

Elements: Constants – Variables – Data types - Scope of variables – Type casting – Operators: Special operators – Expressions – Evaluation of Expressions. Decision making and branching statements- Decision making and Looping– break – labeled loop – continue Statement. Arrays: One Dimensional Array – Creating an array – Array processing – Multidimensional Array – Vectors – ArrayList – Advantages of Array List over Array Wrapper classes.

UNIT - III

Class and objects: Defining a class – Methods – Creating objects – Accessing class members – Constructors – Method overloading – Static members –Nesting of Methods – this keyword – Command line input. Inheritance: Defining inheritance –types of inheritance– Overriding methods – Final variables and methods – Final classes – Final methods - Abstract methods and classes – Visibility Control- Interfaces: Defining interface – Extending interface - Implementing Interface - Accessing interface variables. Strings: String Array – String Methods – String Buffer Class.

UNIT - IV

Packages: Java API Packages – System Packages – Naming Conventions –Creating & Accessinga Package – Adding Class to a Package – Hiding Classes. Exception Handling: Limitations of Error handling – Advantages of Exception Handling - Types of Errors – Basics of Exception Handling – try blocks – throwing an exception – catching an exception – finally statement. Multithreading: Creating Threads – Life of a Thread – Defining & Running Thread – Thread Methods – Thread Priority – Synchronization –Implementing Runnable interface – Thread Scheduling.

UNIT - V

I/O Streams: File – Streams – Advantages - The stream classes – Byte streams –Character streams. Applets: Introduction – Applet Life cycle – Creating & Executing an Applet – Applet tags in HTML – Parameter tag – Aligning the display - Graphics Class: Drawing and filling lines – Rectangles – Polygon – Circles – Arcs – Line Graphs – Drawing Bar charts AWT Componentsand Even Handlers: Abstract window tool kit – Event Handlers – Event Listeners – AWT Controls and Event Handling: Labels – Text Component – Action Event – Buttons – Check Boxes – Item Event – Choice– Scrollbars – Layout Managers- Input Events – Menus.

TEXT BOOKS:

1. E. Balagurusamy, "*Programming with Java*", TataMc-Graw Hill, 5th Edition.
2. Sagayaraj, Denis, Karthick and Gajalakshmi, "*Java Programming for Core and advancedlearners*", Universities Press (INDIA) Private Limited 2018.

REFERENCES:

1. Herbert Schildt, "*The complete reference Java*", TataMc-Graw Hill, 7th Edition.

WEB REFERENCES:

- NPTEL & MOOC courses titled Java: https://nptel.ac.in/courses/106105191/

COURSE OUTCOMES

CO 1: To **Learn** the structure and model of the Java programming language.

CO 2: To **Implement** the basic principles of Java to create Java applications with GUI.

CO 3: To **Demonstrate** the use of string and String Buffers.

CO 4: To **Develop** multithreaded programs in Java.

CO 5: To **Construct** Applet Programming.

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	X	X		X		X
CO2	X	X			X	
CO3		X		X	X	
CO4	X			X	X	
CO5	X		X	X		X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE
APPLICATIONSYLLABUS WITH EFFECT FROM
2020-2021

BCE-CSC03

CORE III: COMPUTER ORGANIZATION

(Common to BCA III SEM)

II YEAR / III SEMESTER

OBJECTIVES:

- To understand the basic organization of computers and the working of each componentand CPU
- To bring the programming features of 8085 Microprocessor and know the features oflatest microprocessors.
- To understand the principles of Interfacing I/O devices and Direct Memory accesses

OUTCOMES:

- Describe the major components of a computer system and state their function andpurpose
- Describe the microstructure of a processor
- Demonstrate the ability to program a microprocessor in assembly language.
- Classify and describe the operation DMA and peripheral Interfaces.

UNIT - I

Data representation: Data types – Complements- fixed point and floating point representation other binary codes. Register Transfer and Microoperations: Register transfer language- Register transfer- Bus and Memory transfers – Arithmetic, logic and shift micro operations.

UNIT - II

Central processing unit: General register and stack organizations- instruction formats - Addressing modes- Data transfer and manipulation - program control- RISC - Pipelining - Arithmetic and instruction- RISC pipeline - Vector processing and Array processors.

UNIT - III

Microprocessor Architecture and its Operations - 8085 MPU - 8085 Instruction Set and Classifications. Programming in 8085: Code conversion - BCD to Binary and Binary to BCD conversions - ASCII to BCD and BCD to ASCII conversions - Binary to ASCII and ASCII to Binary conversions.

UNIT - IV

Programming in 8085:BCD Arithmetic - BCD addition and Subtraction - Multibyte Addition andSubtraction - Multiplication and Division. Interrupts: The 8085 Interrupt – 8085 Vectored Interrupts –

UNIT - V

Direct Memory Access(DMA)and 8257 DMA controller - 8255A Programmable Peripheral Interface. Basic features of Advanced Microprocessors - Pentium - I3 , I5 and I7

TEXT BOOKS:

1. M.M. Mano, "Computer System architecture". Pearson, Third Edition, 2007
2. R. S. Gaonkar- "Microprocessor Architecture- Programming and Applications with8085"- 5th Edition- Penram- 2009.
3. Tripti Dodiya & Zakiya Malek, "Computer Organization and Advanced Microprocessors", CengageLearning, 2012.

REFERENCE BOOKS:

1. Mathur- "Introduction to Microprocessor"- 3rd Edition- Tata McGraw-Hill-1993.
2. P. K. Ghosh and P. R. Sridhar- "0000 to 8085: Introduction to Microprocessors for Engineers andScientists"- 2nd Edition- PHI- 1995.
3. NagoorKani- "Microprocessor (8085) and its Applications"- 2nd Edition- RBA Publications- 2006.
4. V. Vijayendran- "Fundamentals of Microprocessors – 8085"- S. Viswanathan Pvt. Ltd.- 2008.

WEB REFERENCES:

- NPTEL & MOOC courses titled Computer organization
- https://nptel.ac.in/courses/106105163/
- https://nptel.ac.in/courses/106103068/

COURSE OUTCOME

CO 1: To **Identify** the major components of a computer system and state their function and purpose

CO 2: To **Describe** the microstructure of a processor

CO 3: To **Demonstrate** the ability to program a microprocessor in assembly language.

CO 4: To **Classify** the operation DMA and peripheral interfaces.

CO 5: To **Learn** the principles of Interfacing I/O devices and Direct Memory accesses

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	X		X	X	X	
CO2		X			X	X
CO3		X		X		X
CO4	X		X	X	X	
CO5	X	X	X			X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE
APPLICATIONSYLLABUS WITH EFFECT FROM
2020-2021

BCE-CSC09

CORE: COMPUTER NETWORK

(Common paper to B.Sc.Software Applications-VI Sem., B.Sc.Computer Science withData Science, Computer Science with AI & B.C.A.)

II YEAR / IV SEMESTER

OBJECTIVES:

- To understand the concept of Computer network
- To impart knowledge about networking and inter networking devices

OUTCOMES:

- Analyze different network models
- Describe, analyze and compare a number of data link, network and transport layer
- Analysing key networking protocols and their hierarchical relationship in the conceptual modellike TCP/IP and OSI

UNIT - I

Introduction – Network Hardware - Software - Reference Models - OSI and TCP/IP Models - Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer - Theoretical Basis for Data Communication - Guided Transmission Media.

UNIT - II

Wireless Transmission - Communication Satellites - Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues - Error Detection and Correction.

UNIT - III

Elementary Data Link Protocols - Sliding Window Protocols - Data Link Layer in the Internet - Medium Access Layer - Channel Allocation Problem - Multiple Access Protocols - Bluetooth.

UNIT - IV

Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms - IP Protocol - IP Addresses - Internet Control Protocols.

UNIT - V

Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection - Simple Transport Protocol - Internet Transport Protocols (ITP) - Network Security: Cryptography.

TEXT BOOK :

1. A. S. Tanenbaum, "*Computer Networks*", Prentice-Hall of India 2008, 4th Edition.

REFERENCE BOOKS:

1. Stallings, "*Data and Computer Communications*", Pearson Education 2012, 7th Edition.
2. B. A. Forouzan, "*Data Communications and Networking*", Tata McGraw Hill 2007, 4th Edition.
3. F. Halsall, "*Data Communications, Computer Networks and Open Systems*", Pearson Education2008.
4. D. Bertsekas and R. Gallagher, "*Data Networks*", PHI 2008, 2nd Edition.
5. Lamarca, "*Communication Networks*", Tata McGraw Hill 2002.

WEB REFERENCES:

- **NPTEL & MOOC courses titled Computer Networks**
  https://nptel.ac.in/courses/106106091/

COURSE OUTCOME:

CO 1: To **Learn** various principles & concepts of Computer networks.

CO 2: To **Analyze** different network models.

CO 3: To **Evaluate** the data flow through TCP/IP & ISO Layers.

CO 4: To **Assess** key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI

CO 5: To **Identify** networking and inter-networking devices

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	X		X		X	
CO2	X			X	X	
CO3		X		X		X
CO4		X		X	X	
CO5		X	X			X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE APPLICATIONSYLLABUS WITH EFFECT FROM 2020-2021

BSA-CSC15

CORE XV: OPEN SOURCE TECHNOLOGIES

(Common paper to BCA-IV Sem.)

II YEAR / IV SEMESTER

OBJECTIVES:

- To provide a basic idea of Open source technology, their software development process to understand the role and future of open source software in the industry along with the impact of legal, economic and social issues for such software.

OUTCOMES:

- To recognize the benefits and features of Open Source Technology and to interpret, contrast and compare open source products among themselves

UNIT- I

Introduction – Why Open Source – Open Source –Principles, Standards Requirements, Successes – Free Software – FOSS – Internet Application Projects

UNIT- II

Open source – Initiatives, Principles, Methodologies, Philosophy, Platform, Freedom, OSSD, Licenses – Copy right, Copy left, Patent, Zero Marginal Technologies, Income generation opportunities, Internalization

UNIT- III

Case Studies – Apache, BSD, Linux, Mozilla (Firefox), Wikipedia, Joomla, GCC, Open Office.

UNIT- IV

Open Source Project –Starting, Maintaining –Open Source – Hardware, Design, Teaching & Media

UNIT- V

Open Source Ethics – Open Vs Closed Source – Government – Ethics – Impact of Open source Technology – Shared Software – Shared Source

TEXT BOOK:

1. Kailash Vadera, Bhavyesh Gandhi, "*Open Source Technology*", Laxmi Publications Pvt Ltd2012, 1st Edition.

REFERENCE BOOK:

1. Fadi P. Deek and James A. M. McHugh, "*Open Source: Technology and Policy*", CambridgeUniversities Press 2007.

WEB REFERENCES:

Coursera online course – Open Source Software Development Methods - https://www.coursera.org/learn/open-source-software-development-methods

COURSE OUTCOMES:

- **CO 1:** To **Recognize** the benefits and features of Open Source Technology.
- **CO 2:** To **Compare and Contrast** different open source products.
- **CO 3:** To **Install** various packages in open source operating systems.
- **CO 4:** To **Learn** the open-source ethics.To **Use** appropriate open source tools based on the nature of the problem.
- **CO 5:** To **Implement and Compile** different open source software.

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1		X		X		X
CO2	X	X		X		
CO3	X			X		X
CO4		X	X		X	
CO5		X	X			X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE
APPLICATIONSYLLABUS WITH EFFECT FROM
2020-2021

BSA-DSC11

CORE XI: E-COMMERCE TECHNOLOGIES

II YEAR / IV SEMESTER

OBJECTIVES:

- To provide students with an overview and understanding of e-commerce with a specific emphasison Internet Marketing.
- To explore the major issues associated with e-commerce-security, privacy, intellectual propertyrights, authentication, encryption, acceptable use policies, and legal liabilities.

OUTCOMES:

- Obtain a general understanding of basic business management concepts.
- Have complete knowledge about basic technical concepts relating to E-Commerce.
- Obtain thorough understanding about the security issues, threats and challenges of E-Commerce.

UNIT - I

History of E-commerce and Indian Business Context: E-Commerce –Emergence of the Internet –Emergence of the WWW – Advantages of E-Commerce – Transition to E-Commerce in India – The Internet and India – E-transition Challenges for Indian Corporate. Business Models for E- commerce: Business Model – E-business Models Based on the Relationship of Transaction Parties - E-business Models Based on the Relationship of Transaction Types.

UNIT - II

Enabling Technologies of the World Wide Web: World Wide Web – Internet Client-Server Applications –Networks and Internets – Software Agents – Internet Standards and Specifications
– ISP. e-Marketing :Traditional Marketing – Identifying Web Presence Goals – Online Marketing – E-advertising – E-branding.

UNIT - III

E-Security: Information system Security – Security on the Internet – E-business Risk Management Issues – Information Security Environment in India. Legal and Ethical Issues : Cybers talking – Privacy is at Risk in the Internet Age – Phishing – Application Fraud – Skimming – Copyright – Internet Gambling – Threats to Children.

UNIT - IV

e-Payment Systems: Main Concerns in Internet Banking – Digital Payment Requirements – Digital Token-based e-payment Systems – Classification of New Payment Systems – Properties of Electronic Cash – Cheque Payment Systems on the Internet – Risk and e-Payment Systems – Designing e-payment Systems – Digital Signature – Online Financial Services in India - Online Stock Trading.

UNIT - V

Information systems for Mobile Commerce: What is Mobile Commerce? – Wireless Applications –Cellular Network – Wireless Spectrum – Technologies for Mobile Commerce

– Wireless Technologies –Different Generations in Wireless Communication – Security Issues Pertaining to Cellular Technology. Portals for E-Business: Portals – Human Resource Management – Various HRIS Modules.

TEXT BOOK:

1. P.T.Joseph, S.J., *"E-Commerce - An Indian Perspective"*, PHI 2012, 4th Edition.

REFERENCE BOOKS:

1. David Whiteley , "*E-Commerce Strategy, Technologies and Applications*", Tata McGrawHill, 2001.
2. Ravi Kalakota, Andrew B Whinston, "*Frontiers of Electronic Commerce*", Pearson 2006,12th Impression.

WEB REFERENCES:

- https://www.docsity.com/en/e-commerce-notes-pdf-lecture-notes-university- level/2484734/
- https://magnetoitsolutions.com/blog/advantages-and-disadvantages-of-ecommerce
- https://www.researchgate.net/publication/320547139ECommerce_Merits_and_Demerits_ A_Review_Paper

COURSE OUTCOMES:

CO 1: To **Obtain** a general understanding of basic business management concepts.

CO 2: To **Define** basic technical concepts relating toE-Commerce.

CO 3: To **Summarize** the security issues, threats and challenges of E-Commerce.

CO 4: To **Explore** the major issues associated with e-commerce-security, privacy, intellectual property rights, authentication, encryption, acceptable use policies, and legal liabilities.

CO 5: To **Choose** a specific emphasis of E-Commerce which is suited to specific internet Marketing

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	X	X		X		X
CO2		X	X		X	
CO3		X		X	X	
CO4	X			X	X	
CO5	X		X	X		X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE
APPLICATIONSYLLABUS WITH EFFECT FROM
2020-2021

BCE-CSC14

CORE XIV: SOFTWARE ENGINEERING

(Common paper to B.Sc.Software Applications-V Sem. & B.C.A.-V Sem.)

III YEAR / VI SEMESTER

OBJECTIVES:

- To introduce the software development life cycles
- To introduce concepts related to structured and objected oriented analysis & design co
- To provide an insight into UML and software testing techniques

OUTCOMES:

- The students should be able to specify software requirements, design the software using tools
- To write test cases using different testing techniques.

UNIT- I

Introduction – Evolution – Software Development projects – Emergence of Software Engineering. Software Life cycle models – Waterfall model – Rapid Application Development – Agile Model – SpiralModel

UNIT- II

Requirement Analysis and Specification – Gathering and Analysis – SRS – Formal System Specification

UNIT- III

Software Design – Overview – Characteristics – Cohesion & Coupling – Layered design – ApproachesFunction Oriented Design – Structured Analysis – DFD – Structured Design – Detailed design

UNIT- IV

Object Modeling using UML – OO concepts – UML – Diagrams – Use case, Class, Interaction, Activity,State Chart – Postscript

UNIT- V

Coding & Testing – coding – Review – Documentation – Testing – Black-box, White-box, Integration,OO Testing, Smoke testing.

TEXT BOOK:

1. Rajib Mall, "*Fundamentals of Software Engineering*", PHI 2018, 5th Edition.

REFERENCE BOOKS:

1. Roger S. Pressman, "*Software Engineering - A Practitioner's Approach*", McGraw Hill 2010, 7thEdition.
2. Pankaj Jalote, "*An Integrated Approach to Software Engineering*", Narosa Publishing House 2011,3rd Edition.

WEB REFERENCES:

- NPTEL online course – Software Engineering - https://nptel.ac.in/courses/106105182/

COURSE OUTCOMES:

CO 1: To **Specify** software requirements, design the software using tools

CO 2: To **Write** test cases using different testing techniques.

CO 3: To **Construct** of software requirements and the SRS documents.

CO 4: To **Describe** software testing approaches such as unit testing and integration testing.

CO 5: To **Choose** a specific software development life cycle model such as the waterfall model, agile model, spiral model and Rapid Application Development

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	X	X	X		X	
CO2	X			X	X	
CO3		X	X			X
CO4	X		X	X		
CO5		X	X			X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE APPLICATIONSYLLABUS WITH EFFECT FROM 2020-2021

BCE-CSC10

CORE X: OPERATING SYSTEM

(Common paper to B.Sc.Software Applications, B.Sc.Computer Science with Data Science, Computer Science with AI & B.C.A.)

III YEAR / V SEMESTER

OBJECTIVES:

- To understand the fundamental concepts and role of Operating System.
- To learn the Process Management and Scheduling Algorithms
- To understand the Memory Management policies
- To gain insight on I/O and File management techniques

OUTCOMES:

- Understand the structure and functions of Operating System
- Compare the performance of Scheduling Algorithms
- Analyze resource management techniques

UNIT - I

Introduction: Views - Types of System - OS Structure – Operations - Services – Interface- System Calls- System Structure - System Design and Implementation. Process Management: Process - Process Scheduling - Inter-process Communication. CPU Scheduling: CPU Schedulers - Scheduling Criteria - Scheduling Algorithms.

UNIT - II

Process Synchronization: Critical- Section Problem - Synchronization Hardware Semaphores - Classical Problems of Synchronization - Monitors. Deadlocks: Characterization - Methods for Handling Deadlocks

- Deadlock Prevention - Avoidance - Detection - Recovery.

UNIT - III

Memory Management: Hardware - Address Binding – Address Space - Dynamic Loading and Linking – Swapping – Contiguous Allocation - Segmentation - Paging – Structure of the Page Table.

UNIT - IV

Virtual Memory Management: Demand Paging - Page Replacement Algorithms - Thrashing. File System:File Concept -. Access Methods - Directory and Disk Structure - Protection - File System Structures - Allocation Methods - Free Space Management.

UNIT - V

I/O Systems: Overview - I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Transforming 1/0 Requests to Hardware Operations - Performance. System Protection: Goals - Domain - Access matrix. System Security: The Security Problem - Threats – Encryption- User Authentication.

TEXT BOOK:

1. Abraham Silberschatz, Peter B Galvin, Greg Gagne, "*Operating System Concepts*", Wiley IndiaPvt. Ltd 2018, 9th Edition,.

REFERENCES:

1. William Stallings, "*Operating Systems Internals and Design Principles*", Pearson, 2018, 9thEdition.
2. Andrew S. Tanenbaum, Herbert Bos, "*Modern Operating Systems*", Pearson 2014, 4th Edition.

WEB REFERENCES:

- **NPTEL & MOOC courses titled Operating Systems**
  - **https://nptel.ac.in/courses/106106144/**

COURSE OUTCOMES:

CO 1: To **Demonstrate** the structure and functions of Operating System

CO 2: To **Compare** the performance of Scheduling Algorithms

CO 3: To **Explain** the various issues in Inter Process Communication.

CO 4: To **Identify** the features of I/O and File handling methods

CO 5: To **Relate and differentiate** the Memory Management policies

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	X		X	X	X	
CO2		X			X	X
CO3		X		X		X
CO4	X		X	X	X	
CO5	X	X	X			X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE
APPLICATIONSYLLABUS WITH EFFECT FROM
2020-2021

BCE-CSC11

CORE XI: RELATIONAL DATABASE MANAGEMENT SYSTEMS

(Common paper to B.Sc.Software Applications, B.Sc.Computer Science with Data Science, Computer Science with AI & B.C.A.)

III YEAR / V SEMESTER

OBJECTIVES:

- Gain a good understanding of the architecture and functioning of Database Management Systems
- Understand the use of Structured Query Language (SQL) and its syntax.
- Apply Normalization techniques to normalize a database.
- Understand the need of transaction processing and learn techniques for controlling the consequences of concurrent data access.

OUTCOMES:

- Describe basic concepts of database system
- Design a Data model and Schemas in RDBMS
- Competent in use of SQL
- Analyze functional dependencies for designing robust Database

UNIT - I

Introduction to DBMS– Data and Information - Database – Database Management System – Objectives - Advantages – Components - Architecture. ER Model: Building blocks of ER Diagram – Relationship Degree – Classification – ER diagram to Tables – ISA relationship – Constraints – Aggregation and Composition – Advantages

UNIT - II

Relational Model: CODD's Rule- Relational Data Model - Key - Integrity – Relational Algebra Operations – Advantages and limitations – Relational Calculus Domain Relational Calculus -QBE.

UNIT - III

Structure of Relational Database. Introduction to Relational Database Design - Objectives – Tools –Redundancy and Data Anomaly – Functional Dependency - Normalization – 1NF – 2NF – 3NF – BCNF. Transaction Processing – Database Security.

UNIT - IV

SQL: Commands – Data types – DDL - Selection, Projection, Join and Set Operations – Aggregate Functions – DML – Modification - Truncation - Constraints – Subquery.

UNIT - V

PL/SQL: Structure - Elements – Operators Precedence – Control Structure – Iterative Control - Cursors - Procedure - Function - Packages – Exceptional Handling - Triggers.

TEXT BOOK:

1. S. Sumathi, S. Esakkirajan, "*Fundamentals of Relational Database Management System*", Springer International Edition 2007.

REFERENCE BOOKS:

1. Abraham Silberchatz, Henry F. Korth, S. Sudarshan, "*Database System Concepts*", McGrawHill2019, 7th Edition.
2. Alexis Leon & Mathews Leon, "*Fundamentals of DBMS*", Vijay Nicole Publications 2014, 2ndEdition.

WEB REFERENCES:

- NPTEL & MOOC courses titled Relational Database Management Systems
- https://nptel.ac.in/courses/106106093/
- https://nptel.ac.in/courses/106106095/

COURSE OUTCOMES:

CO 1: To **Describe** basic concepts of database system

CO 2: To **Design** a Data model and Schemas in RDBMS

CO 3: To **Write** the uses of SQL

CO 4: To **Analyze** functional dependencies for designing robust Database

CO 5: To **Evaluate** the need of transaction processing and learn techniques for controlling the consequences of concurrent data access.

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1		X		X		X
CO2	X	X			X	
CO3	X			X		X
CO4			X		X	X
CO5		X	X			X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE APPLICATION
SYLLABUS WITH EFFECT FROM 2020-2021

BSA-CSE1B

ELECTIVE-I(B): MULTIMEDIA AND ITS APPLICATIONS
(Common paper to B.C.A.)

III YEAR / V SEM

OBJECTIVES:

- To understand the basic concepts of Multimedia Systems
- To learn representations, perceptions and applications of Multimedia

OUTCOMES:

- To understand the technologies behind multimedia applications

UNIT- I

Definition - Classification - Multimedia application -Multimedia Hardware - Multimedia software -

CDROM - DVD.

UNIT-II

Multimedia Audio: Digital medium - Digital audio technology - sound cards - recording - editing - MP3 - MIDI fundamentals - Working with MIDI - audio file formats - adding sound to Multimedia project.

UNIT-III

Multimedia Text: Text in Multimedia -Multimedia graphics: coloring - digital imaging fundamentals - development and editing - file formats - scanning and digital photography

UNIT-IV

Multimedia Animation: Computer animation fundamentals - Kinematics - morphing - animation s/w tools and techniques. Multimedia Video : How video works - broadcast video standards - digital video fundamentals – digital video production and editing techniques - file formats.

UNIT-V

Multimedia Project : stages of project - Multimedia skills - design concept - authoring - planning and costing –Multimedia Team. Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing

TEXT BOOKS:

1. S.Gokul, “Multimedia Magic”, BPB Publications, 2nd Edition.
2. Tay Vaughen , “Multimedia Making it Work”, TMH, 6th Edition.

REFERENCE BOOKS:

1. Kiran Thakrar, Prabhat k.andleigh, “Multimedia System Design”, Prentice Hall India.
2. Malay k Pakhira, “Computer graphics, Multimedia and Animation”, Prentice Hall India, 2 nd Edition.

WEB REFERENCES:

- NPTEL & MOOC courses titled Multi media
- https://nptel.ac.in/courses/106105163/
- W3schools.com/html/html-media.asp

COURSE OUTCOMES:

CO 1: To **Describe** the basic concepts of Multimedia Systems
CO 2: To **Summarize** the technologies behind multimedia applications
CO 3: To **Learn** representations, perceptions and applications of Multimedia
CO 4: To **Compare** multimedia animation s/w tools and techniques
CO 5: To **Sketch** stages of Multimedia projects

CO – PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	X	X		X		X
CO2	X	X			X	
CO3	X	X		X	X	
CO4	X			X	X	
CO5	X		X	X		X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE APPLICATION
SYLLABUS WITH EFFECT FROM 2020-2021

BCA-DSC18

CORE XVIII: WEB DESIGN AND DEVELOPMENT

III YEAR / VI SEMESTER

OBJECTIVES:

- To understand Web based programming and scripting languages.
- To learn the basic web concepts and to create rich internet applications that use most recentclient-side programming technologies.
- To learn the basics of HTML, DHTML, XML, CSS, Java Script and AJAX.

OUTCOMES:

- Ability to Develop and publish Web pages using Hypertext Markup Language (HTML).
- Ability to optimize page styles and layout with Cascading Style Sheets (CSS).
- Ability to Understand, analyze and apply the role of languages to create a capstone
- Website using client-side web programming languages like HTML, DHTML, CSS, XML, JavaScript, and AJAX.

UNIT I:

HTML: HTML-Introduction-tag basics- page structure-adding comments working with texts, paragraphs and line break. Emphasizing test- heading and horizontal rules-list-font size, face and color-alignment- links-tables-frames

UNIT II:

Forms & Images Using Html: Graphics: Introduction-How to work efficiently with images in web pages, image maps, GIF animation, adding multimedia, data collection with html forms textbox, password, list box, combo box, text area, tools for building web page front page

UNIT III:

XML & DHTML: Cascading style sheet (CSS)-what is CSS-Why we use CSS-adding CSS to your web pages-Grouping styles-extensible markup language (XML). Dynamic HTML: Document object model (DCOM)-Accessing HTML & CSS through DCOM Dynamic content styles & positioning-Event bubbling-data binding.

UNIT IV:

JavaScript : Client side scripting, What is JavaScript, How to develop JavaScript, simple JavaScript, variables, functions, conditions, loops and repetition, Advance script, JavaScript and objects, JavaScript own objects, the DOM and web browser environments, forms and validations

UNIT V:

Ajax: Introduction, advantages &disadvantages, Purpose of it, ajax based web application, alternatives of ajax

Java Script & AJAX: Introduction to array-operators, making statements-date & time-mathematics- strings-Event handling-form properties. AJAX. Introduction to jQuery and AngularJS.

TEXT BOOKS:

1. Pankaj Sharma, "*Web Technology*", Sk Kataria & Sons Bangalore 2011.(UNIT I, II, III & IV).
2. Mike Mcgrath, "*Java Script*", Dream Tech Press 2006, 1st Edition. (UNIT V: JAVASCRIPT)
3. Achyut S Godbole & Atul Kahate, "*Web Technologies*", 2002, 2nd Edition. (UNIT V: AJAX)

REFERENCE BOOKS:

- Laura Lemay, Rafe Colburn , Jennifer Kyrnin, *"Mastering HTML, CSS & Javascript WebPublishing*", 2016.
- DT Editorial Services (Author), "*HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML,AJAX, PHP, jQuery)*", Paperback 2016, 2nd Edition.
- C. Xavier, "*World Wide Web Design with HTML*", TMH Publishers 2001.
- Wendy Willard, "*A Beginners Guide HTML",* Tata McGraw Hill 2009, 4th Edition.

WEB REFERENCES:

- NPTEL & MOOC courses titled Web Design and Development.
  - https://www.udemy.com/topic/web-design/

COURSE OUTCOMES:

CO 1: To **Develop** and publish Web pages using Hypertext Markup Language (HTML).

CO 2: To **Optimize** page styles a layout with Cascading Style Sheets (CSS).

CO 3: To **Analyze** and apply the role of languages to create a capstone

CO 4: To **Create** Website using client-side web programming languages like HTML, DHTML, CSS, XML, JavaScript, and AJAX

CO 5: To **Learn** jQuery and AngularJS.

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1		X		X		X
CO2	X	X		X		
CO3	X			X		X
CO4		X	X		X	X
CO5		X	X			X

UNIVERSITY OF MADRAS
BACHELOR OF COMPUTER APPLICATIONS
SYLLABUS WITH EFFECT FROM 2020-2021

BCA-DSC19

CORE XIX: DATA MINING

III YEAR / VI SEMESTER

OBJECTIVES:

- To learn about data mining Concepts
- To study the different data mining techniques

OUTCOMES

- To have knowledge in Data mining concepts
- To apply Data mining concepts in different fields

UNIT - I

Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery in Data Bases – Data Mining Issues – Data Mining Matrices – Social Implications of Data Mining – Data Mining fromData Base Perspective.

UNIT - II

Data Mining Techniques – a Statistical Perspective on data mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

UNIT - III

Classification: Introduction – Statistical – Based Algorithms – Distance Based Algorithms – Decision.

UNIT - IV

Clustering Tree – Based Algorithms – Neural Network Based Algorithms – Rule Based Algorithms – Combining Techniques: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms. Partitioned Algorithms.

UNIT - V

Association Rules: Introduction - Large Item Sets – Basic Algorithms – Parallel & Distributed Algorithms – Comparing Approaches – Incremental Rules – Advanced Association Rules Techniques – Measuring the Quality of Rules.

TEXT BOOK:

1. Jiawei Han & Micheline Kamber, "*Data Mining Concepts & Techniques*", 2011, 3rdEdition.

REFERENCE BOOK:

1. Margaret H.Dunbam, "*Data Mining Introductory and Advanced Topics*", Pearson Education 2003.

WEB REFERENCES:

- NPTEL & MOOC courses titled Data Mining
- https://nptel.ac.in/courses/106105174/

COURSE OUTCOMES:

CO 1: To **Secure** knowledge in Data mining concepts

CO 2: To **Apply** Data mining concepts in different fields

CO 3: To **Characterize** the kinds of patterns that can be discovered by association rule mining, classification and clustering.

CO 4: To **Demonstrate** neural network-based algorithms

CO 5: To **Differentiate** data mining versus knowledge discovery in databases

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	X		X		X	
CO2	X			X	X	
CO3		X		X		X
CO4		X	X	X		
CO5		X	X			X

UNIVERSITY OF MADRAS
BACHELOR OF COMPUTER APPLICATIONS
SYLLABUS WITH EFFECT FROM 2020-2021

BCA-DSC20

CORE XX: MOBILE APPLICATIONS DEVELOPMENT

III YEAR / VI SEMESTER

OBJECTIVES:

- To make the student understand the basic concepts of mobile application development, be aware of Characteristics of mobile applications, User-interface design, basics of graphics and multimedia.
- To gain knowledge about testing and publishing of Android application

OUTCOMES:

- To explain the basics of mobile application development
- Develop Android application with User interface, networking and animation.
- Use simulator tools to test and publish the application.

UNIT - I

Mobile Application Development - Mobile Applications and Device Platforms - Alternatives for Building Mobile Apps -Comparing Native vs. Hybrid Applications -The Mobile Application Development Lifecycle-The Mobile Application Front-End-The Mobile Application Back-End- Key Mobile Application Services-What is Android-Android version history-Obtaining the Required Tools- Launching Your First Android Application-Exploring the IDE-Debugging YourApplication-Publishing Your Application

UNIT - II

Understanding Activities-Linking Activities Using Intents-Fragments-Displaying Notifications- Understanding the Components of a Screen-Adapting to Display Orientation-Managing Changes to Screen Orientation- Utilizing the Action Bar-Creating the User Interface Programmatically Listening for UI Notifications

UNIT - III

Using Basic Views-Using Picker Views -Using List Views to Display Long Lists-Understanding Specialized Fragments - Using Image Views to Display Pictures -Using Menus with Views- Using WebView- Saving and Loading User Preferences-Persisting Data to Files-Creating and Using Databases.

UNIT - IV

Sharing Data in Android-Creating Your Own Content Providers -Using the Content Provider- SMS Messaging -Sending Email-Displaying Maps- Getting Location Data-Monitoring a Location.

UNIT - V

Consuming Web Services Using HTTP-Consuming JSON Services- Creating Your Own Services -Binding Activities to Services -Understanding Threading .

TEXT BOOK:

1. Jerome DiMarzio, "*Beginning Android Programming with Android Studio*", 4th Edition.

REFERENCE BOOKS:

1. Dawn Griffiths, David Griffiths, "*Head First Android Development: A Brain-FriendlyGuide",* 2017.
2. Neil Smyth , "*Android Studio 3.0 Development Essentials: Android",* 8th Edition.
3. Pradeep Kothari, "*Android Application Development (With Kitkat Support)",* Black Book2014.

WEB REFERENCES:

- https://developer.android.com/guide
- https://en.wikipedia.org/wiki/Android_10
- Develop App for Free
- https://flutter.dev/
- http://ai2.appinventor.mit.edu
- https://en.wikipedia.org/wiki/Android_version_history
- https://aws.amazon.com/mobile/mobile-application-development/ (Unit 1)
- https://en.wikipedia.org/wiki/Mobile_app_development

COURSE OUTCOMES:

CO 1: To **Explain** the basics of mobile application development

CO 2: To **Develop** Android application with User interface, networking and animation.

CO 3: To **Use** simulator tools to test and publish the application.

CO 4: To **Develop** and Publish Android application which can use Location and network services

CO 5: To **Develop** and Publish Android applications using Graphical user interface

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	X		X	X		
CO2		X			X	X
CO3		X		X		X
CO4	X		X	X	X	
CO5	X		X			X

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN COMPUTER SCIENCE
SYLLABUS WITH EFFECT FROM 2020-2021

BCE-CSC2B

ELECTIVE: IOT AND ITS APPLICATIONS

(Common paper to B.Sc.Computer Science with Data Science and
Computer Science with AI as Core, B.Sc.Software Applications & B.C.A. as Elective)

III YEAR / VI SEMESTER

OBJECTIVES:

- To understand the concepts of Internet of Things and the application of IoT.
- To Determine the Market perspective of IoT.
- To Understand the vision of IoT from a global context

OUTCOMES:

- Use of Devices, Gateways and Data Management in IoT.
- Design IoT applications in different domain and be able to analyze their performance
- Implement basic IoT applications on embedded platform.

UNIT – I

IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.

UNIT - II

M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

UNIT - III IoT Architecture -State of the Art – Introduction, State of the art, Architecture. Reference ModelIntroduction, Reference Model and architecture, IoT reference Model, IoT Reference ArchitectureIntroduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

UNIT - IV

IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and GasIndustry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.

UNIT - V Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security.

COURSE OUTCOMES:

CO 1: To describe the basic concepts of Internet of Things and the application of IoT.

CO 2: To use Devices, Gateways and Data Management in IoT.

CO 3: To design IoT applications in different domain and be able to analyze their performance

CO 4: To implement basic IoT applications on embedded platform

CO 5: To demonstrate IoT Architecture

CO-PO MAPPING

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1		X		X		X
CO2		X	X		X	
CO3	X	X		X	X	
CO4	X			X	X	
CO5	X		X			X