



St. JOHN'S COLLEGE OF ARTS & SCIENCE

(Accredited with B++ by NAAC & Approved by UGC under section 2(f) & 12(B) status)

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

(A Christian Minority Institution)

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ELECTIVE COURSE – BSC COMPUTER SCIENCE

B.Sc., COMPUTERSCIENCE

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

SYLLABUS

ACADEMIC YEAR 2024-2025 ONWARDS

**TAMILNADU STATE COUNCIL FOR HIGHER
EDUCATION, CHENNAI-600005**

B.Sc. Computer Science Curriculum Design

(From the academic year 2024-2025 to 2026-2027)

Semester-I

Part	List of Courses	Credit	Hours per week (L/T/P)
Part-I	Language–Tamil	3	6
Part-II	English	3	6
Part-III	CC 1-PythonProgramming	5	5
	CC2-Practical- Python Programming	3	5
	Elective Course(EC-1) (Generic /Discipline Specific) – Digital Logic Fundamental	3	4
Part-IV	Skill EnhancementCourse-SEC-1 Practical-Office Automation	2	2
	Foundation Course FC – Problem Solving Techniques	2	2
		21	30

Semester-II

Part	List of Courses	Credit	Hours per week(L/T/P)
Part-I	Language-Tamil	3	6
Part-II	English	3	4
Part-III	CC3-Data Structure and Algorithms	5	5
	CC4-Practical - Data Structure and Algorithms	3	5
	Elective Course(EC2) (Generic /Discipline Specific) – Discrete Mathematics	3	4
Part-IV	SkillEnhancementCourse-SEC-2 Practical -HTML	2	2
	Skill EnhancementCourse–SEC-3 (Discipline Specific / Generic) Computer Architecture	2	2
	Naan Muthalvan Course –English/Soft skills for Employability	2	2
		23	30

Subject code	Subject Name	Category	L	T	P	S		I n s t. H o u r s	M a r k s		
									CI A	Ext ern al	Tota l
EC-1	Digital Logic Fundamentals	Elective course-2	4	-	-	-	3	4	25	75	100
Learning Objectives											
LO1	To understand the concepts of number systems										
LO2	To learn conversions										
LO3	To construct truth tables										
LO4	To learn SOP and POS										
LO5	To understand various simplifications										
UNIT	Contents									No. of Hours	
I	Number Systems :Codes and Digital Logic Binary Number System – Binary to Decimal Conversion – Decimal to Binary Conversion –Octal Numbers –Hexadecimal Numbers –The ASCII Code –The Excess- 3 Code –The Gray Code. Digital Logic: The Basic gates NOT,OR,AND– Universal Logic Gates NOR,NAND– AND-OR Invert Gates.									15	
II	Combinational Logic : Circuits Boolean Laws and Theorems – Sum of Products Method–Truth Table to Karnaugh Map –Pairs, Quads and Octets –Karnaugh Simplifications –Don't Care Conditions –Product of Sums Method –Product of Sums Simplification.									15	

III	Data Processing and Arithmetic circuits :Multiplexers –De-multiplexers –1-of-16-Decoders –BCD- to-Decimal Decoders – Seven-Segment decoders –Encoders –Exclusive-OR gates. Arithmetic Circuits: Binary Addition –Binary Subtraction –Unsigned BinaryNumbers–Sign-MagnitudeNumbers–2’sComplement Representation–2’s Complement Arithmetic.	15
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IV	Flip-Flops: RS Flip Flops–Edge Triggered RS Flip Flops–Edge Triggered D Flip Flops–Edge Triggered JK Flip Flops –JK Master Slave Flip Flops	15
V	Registers : Types of Registers –Serial in serial out –serial in parallel out –parallel in serial out –parallel in parallel out–Universal Shift Register.	15
Total		75

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
CO1	Understand the concept of various number systems	PO1,PO6
CO2	Understand basic concepts of digital systems	PO2
CO3	Describe the storage structures	PO2,PO4
CO4	Solve problems using SOP and PoS	PO4,PO6
CO5	Apply concepts for simplifications	PO5,PO6

Text Book

TextBook:

Digital Principles and Applications, by Albert Paul Malvino & Donald P. Leach, Seventh Edition, McGraw Hill Education Private Limited

Reference Books:

1. Fundamentals of Digital Circuits, A. Anand Kumar, Second Edition, PHI Learning Private Limited
2. Digital design, M. Morris Mano, Third Edition, Pearson Education

Course code and title: Digital Logic Fundamentals Mapping with Programme Outcomes:

CO/PO	PSO					
	1	2	3	4	5	%of co's
CO1	3	3	2	2	2	2.5
CO2	3	3	3	3	2	2.7
CO3	2	3	3	3	2	2.5
CO4	2	2	3	3	3	2.6
CO5	2	2	3	3	3	2.7
Average of CO's=2.6(high)						

Course Code-Elective Course EC2	Discrete Mathematics		Credits 3
Lecture Hours:(L) perweek-4	TutorialHours:75 (T)per week	Hours: (P)per week	Total:(L+T+P) perweek:4
Course Category: Elective	Year &Semester: I Year II Semester	Admission Year:	
Pre-requisite	Basic Knowledge of Programming concept		
Course Outcomes: (for students: To know what they are going to learn) CO1: Know how to solve various problems on discrete mathematics CO2: Use approximation to solve problems CO3: Differentiationandintegrationconceptare applied CO4: Apply, direct methods for solving linear systems CO5: Discretresolution of ordinary problems			
Units	Contents		Required Hours
I	Set theory-Sets and elements-Specifications of sets-Identity and Cardinality-Set inclusion-Equality of sets-proper sets-Power sets-Universal set-Operations on sets-ordered pairs-Cartesian product of sets		15
II	Relations and functions-Definition-example-Relations on sets- Equivalence relations-Equivalence Class - Functions		15
III	MATHEMATICAL LOGIC Introduction – Statement (Propositions) – Laws of Formal Logic – Basic Set of Logical operators/operations - Propositions and Truth Tables – Algebra Propositions - Tautologies and Contradictions – Logical Equivalence –Logical Implication – Normal Forms		15

IV	MATRIX ALGEBRA Introduction–Definition of a Matrix-Types of Matrices–Operations on Matrices–Related Matrices– Transpose of a Matrix –Symmetric and Skew-symmetric Matrices –Complex Matrix–Conjugate of a Matrix–Determinant of a Matrix– Typical Square Matrices	15
V	Adjoint and Inverse of a Matrix –Singular and Non-singular Matrices–Adjoint of a Square Matrix –Properties of Adjoin to a Matrix–Properties of Inverse of a Matrix.	15

Textbook:

Discrete Mathematics, Swapan Kumar, Chakraborty and Bikash Kanti Sarkar, OXFORD University Press.

Referencebooks:

1. Discrete Mathematics, Third Edition, Seymour Lipschutz And Marc Lars Lipson, Tata Mcgraw Hill Education Private Limited.
2. Discrete Mathematical Structures With Applications To Computer Science By J.P.Tremblay, R.Manohar TMH Edition

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc . COMPUTER SCIENCE

(Choice Based Credit System)

(with effect from the academic year 2020-2021 onwards)

Se m	Par t I/ II/ III/ IV/ V	Subject No.	Subject Status	Subject Title	Contac t Hrs/ Week	L	T	P	Credits
III	III	15	Core	Java Programming	5	4	1	0	4
	III	16	Core	Digital Design	4	4	0	0	4
	III	17	Major Practical - III	Java Programming Lab	6	0	0	6	2
	III	18	Allied -III	Scripting Languages	4	4	0	0	3
	III	19	Allied Practical - II	Scripting Languages Lab	4	0	0	4	2
	III	20	Skill Based Core-I	Introduction to Big Data analytics	5	5	0	0	4
	IV	21	Non-Major Elective	1. Fundamentals of Internet and Emerging Technologies 2. Basic Programming Design	2	2	0	0	2
			Common	Yoga*	2	2	0	0	2
	Subtotal (excluding Yoga)				30	19	1	10	21
IV	III	22	Core	Data Structures	5	4	1	0	4
	III	23	Core	Computer Architecture	5	5	0	0	4
	III	24	Major Practical - IV	Data Structure lab	5	0	0	5	2
	III	25	Allied -IV	Machine Learning	4	4	0	0	3
	IV	26	Allied Practicals	PYTHON	4	4	0	0	2

	III	27	Skill Based – Core II	Multimedia Applications	5	5	0	0	4
	IV	28	Non-Major Elective	1. HTML 2. Programming in C	2	2	0	0	2
			Common	Computers for Digital Era *	2	2	0	0	2
	V		Extension Activity	NCC, NSS, YRC, YWF	0	0	0	0	1
	Subtotal (Excluding Computer for Digital Era)				30	24	1	5	23
V	III	29	Core	Relational Database Management System	4	4	0	0	4
	III	30	Core	Data Communication and Computer Networks	5	5	0	0	4
	III	31	Core	PHP and mySQL	5	4	1	0	4
	III	32	Major Practical - V	PHP and mySQL Lab	4	0	0	4	2
	III	33	Major Practical - VI	Machine learning practicals	5	0	0	5	2
	III	34	Major Elective – I (Anyone)	1. Mobile application Development 2. Introduction to Security in Computing 3. Cloud Computing	5	5	0	0	4
	III	35	Skill Based Common	Personality Development/ Effective Communication/ Youth Development	2	2	0	*	2
	Subtotal				30	20	1	9	22
VI	III	36	Core	Operating System	5	5	0	0	4
	III	37	Core	Software Engineering and Testing	4	4	0	0	4
	III	38	Core	Computer Graphics and Visualization	5	4	1	0	4
	III	39	Core	Introduction to Digital Image Processing	4	4	0	0	4

	III	40	Major Practical - VII	Computer Graphics Lab	4	0	0	4	2
	III	42	Major Elective - II	1. Internet of Things(IoT) 2. Information Technology Service Management (ITSM) 3. Neural Networks	4	4	0	0	4
	III	41	Project	Digital Image Processing using SciLab/MathLab	4	0	0	4	4
	Subtotal				30	21	1	8	26
	Total credits(including Yoga & Computers for Digital Era)								141

➤ L-Lecture T-Tutorial P-Practical

Distribution of marks between External and Internal Assessment is

For Theory 75 : 25

For Practical 50 : 50

Internal Marks for Practical shall be allotted in the following manner

Continuous Assessment: 25 marks “N” number of practical’s being conducted based on the practical prescribed in the syllabus and the marks should be distributed equally for each practical.

Test: 25 marks Two tests should be conducted and average of tests be taken.

Calculation of marks: Sum of marks awarded to number of practicals + the average marks of two tests

Total-50 marks

1. MOBILE APPLICATION DEVELOPMENT

Objective:

To make the students understand the basics of Mobile Applications

Unit-I:

Getting Started: Diving in - Welcome to Androidville - The Android platform - Install Android Studio - How to build the app - Activities and layouts - first Android app - a complete folder structure - Useful files in your project - Edit code with the Android Studio editors - Run the app in the Android emulator - Creating an Android Virtual Device - Run the app in the emulator - watch progress in the console - What's in the layout? - activity_main.xml has two elements - Update the text displayed in the layout.

Building Interactive Apps: Apps that do something: building a Beer Adviser app - Create the project - a default activity and layout - A closer look at the design editor - Add a button using the design editor - activity_find_beer.xml has a new button - A closer look at the layout code - the app, test drive - Hardcoding text makes localization hard - Create the String resource - Use the String resource in your layout - The code for activity_find_beer.xml - Add values to the spinner - Add the string-array to strings.xml - Test drive the spinner - We need to make the button do something - Make the button call a method - The activity code - Add an onClickFindBeer() method to the activity - onClickFindBeer() needs to do something - Once you have a View, you can access its methods - Update the activity code - The first version of the activity - What the code does - Build the custom Java class.(12L)

Unit-II:

Multiple Activities and Intents: State your intent - More than one activity in an app - the app structure - create the project - Update the layout - Create the second activity and layout - Android manifest file - An intent - What happens when you run the app - Pass text to a second activity - Update the text view properties - putExtra() method - Update the CreateMessageActivity code - Get ReceiveMessageActivity

to use the information in the intent - What happens when the user clicks the Send Message button - send messages to other people

How Android apps work - Create an intent that specifies an action - Change the intent to use an action - the intent filter - if users ALWAYS want to choose an activity - when `createChooser()` method is called - Change the code to create a chooser.

The Activity Lifecycle: Being an activity - How do activities really work? - The Stopwatch app - Add String resources - How the activity code will work - Add code for the buttons - The `runTimer()` method - The full `runTimer()` code - The full `StopwatchActivity` code -

Rotating the screen changes the device configuration - The states of an activity - The activity lifecycle: from create to destroy - The updated `StopwatchActivity` code - What happens when you run the app - There's more to an activity's life than create and destroy -

The updated `StopwatchActivity` code - when the app is run - when an app is only partially visible - The activity lifecycle: the foreground lifetime - Stop the stopwatch if the activity's paused - Implement the `onPause()` and `onResume()` methods - The complete `StopwatchActivity` code - Your handy guide to the lifecycle methods.(12L)

Unit-III:

Views and View Groups: Enjoy the view - Your user interface is made up of layouts and GUI components - `LinearLayout` displays - Add a dimension resource file - Using margins - change a basic linear layout - adding weight to a view - Values you can use with the `android:gravity` attribute - The full linear layout code - Frame layouts stack their views - Add an image to your project - The full code to nest a layout - `FrameLayout`: a summary - Playing with views - Editable text view - Toggle button - Switch - Checkboxes - Radio buttons - Spinner - Image view - Adding images to buttons - Scroll views - Toasts.

Constraint Layouts: Put things in their place - Nested layouts can be inefficient - the Constraint Layout - the Constraint Layout Library - Add the String resources to `strings.xml` - Use the blueprint tool - Position views using constraints - Add a vertical constraint - Changes to the blueprint are reflected in the XML - center views - Adjust a view's position by updating its bias - change a view's size - align views - build a real layout.(12L)

Unit-IV:

List views and Adapters: Getting organized - Every app starts with ideas - Use list views to navigate to data - The drink detail activity - The Starbuzz app structure - The `Drink` class - The top-level layout contains an image and a list - The full top-level layout code - Get list views to respond to clicks with a

listener - Set the listener to the list view - A category activity displays the data for a single category - Update activity_drink_category.xml - For nonstatic data, use an adapter - Connect list views to arrays with an array adapter - Add the array adapter to DrinkCategoryActivity - App review - How clicks are handled in TopLevelActivity - The full DrinkCategoryActivity code - Update the views with the data - The DrinkActivity code - when the app is run.

Fragments: Make it modular - Your app needs to look great on ALL devices - Your app may need to behave differently too - Fragments allow you to reuse code - The phone version of the app - Create the project and activities - Add a button to MainActivity's layout - How to add a fragment to your project - The fragment's onCreateView() method - Add a fragment to an activity's layout - Get the fragment and activity to interact - The Workout class - Pass the workout ID to the fragment - Get the activity to set the workout ID - The fragment lifecycle - Set the view's values in the fragment's onStart() method - How to create a list fragment - The updated WorkoutListFragment code - The code for activity_main.xml - Connect the list to the detail - The code for WorkoutListFragment.java - MainActivity needs to implement the interface - DetailActivity needs to pass the ID to WorkoutDetailFragment.(12L)

Unit-V:

SQLite Databases: Fire up the database - Back to Starbuzz - Android uses SQLite databases to persist data - SQLite classes - The current Starbuzz app structure - change the app to use a database - The SQLite helper manages database - Create the SQLite helper - Inside a SQLite database - create tables using Structured Query Language (SQL) - Insert data using the insert() method - Insert multiple records - The StarbuzzDatabaseHelper code - What the SQLite helper code does - What if changes to the database is needed? - SQLite databases have a version number - when the version number is changed - Upgrade your database with onUpgrade() - Downgrade your database with onDowngrade() - upgrade the database - Upgrade an existing database - Update records with the update() method - Apply conditions to multiple columns - Change the database structure - Delete tables by dropping them - The full SQLite helper code.

Basic cursors: Getting data out - The new Starbuzz app structure - change DrinkActivity to use the Starbuzz database - The current DrinkActivity code - Get a reference to the database - Get data from the database with a cursor - Return all the records from a table - Return records in a particular order - Return selected records - The DrinkActivity code so far - To read a record from a cursor, you first need to navigate to it - Navigate cursors - Get cursor values - The DrinkActivity code - The current

DrinkCategoryActivity code - Get a reference to the Starbuzz database - replace the array data in the list view - A simple cursor adapter maps cursor data to views - use a simple cursor adapter - Close the cursor and database - The DrinkCategoryActivity code.(12L)

Text Book:

1. Head First Android Development (Nov 2019) - Dawn Griffiths & David Griffiths, O'Reilly Media/Shroff Publishers & Distributors Pvt. Ltd.- ISBN: 9789352136063 (Chapters 1-7, 9, 15, 16)

Reference Books:

1. Beginning Android Programming with Android Studio (Wrox Beginning Guides) 4e, 2016 - J. F. DiMarzio - Wiley
2. Android Developer Fundamentals Course: 2017
<https://google-developer-training.github.io/android-developer-fundamentals-course-concepts/en/android-developer-fundamentals-course-concepts-en.pdf>
3. Android Programming Unleashed, 1e, 2013 - B.W.Harwani – Pearson

2.INTRODUCTION TO SECURITY IN COMPUTING

Objectives

- To understand the concepts of basic concepts in security in computing
- To know about the various security algorithms

Unit-I

Model of network security – Security attacks, services and attacks – OSI security architecture – Classical encryption techniques – SDES – Block cipher PrinciplesDES – Strength of DES – Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – RC4 - Differential and linear cryptanalysis – Placement of encryption function – traffic confidentiality.(12L)

Unit-II

Number Theory – Prime number – Modular arithmetic – Euclid's algorithm - Fermet's and Euler's theorem – Primality – Chinese remainder theorem – Discrete logarithm –

DIGITAL IMAGE PROCESSING USING SCILAB / MatLab

L T P C

4 0 0 4

Objective:

- To get knowledge about the basic programs on Digital Image Processing
- 1) Perform 2D Linear Convolution, Circular Convolution between two 2D matrices.
- 2) Perform Discrete Fourier Transform(DFT), Discrete Cosine Transform(DCT) of 4x4 gray scale image.
- 3) Perform Brightness enhancement, Contrast Manipulation, Image negative of an image.
- 4) Perform threshold operation on an image.
- 5) Perform Edge detection using different edge detectors.
- 6) Perform Dilation and Erosion operation.
- 7) Perform Opening and closing operations
- 8) Read a colour image and separate the image into red, blue and green planes.

Reference:

- 1) Scilab Textbook Companion for Digital Image Processing, S. Jayaraman, S. Esakkirajan And T. Veerakumar, 2016 (https://scilab.in/textbook_companion/generate_book/125)

MSU/ 2020-21 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – VI /Major Elective - II

1. INTERNET OF THINGS

L T P C

4 0 0 4

Objective:

- To give a brief idea about IOT working
- To make the students understand the Architecture of IOT

UNIT I:

Fundamentals of Internet of Things: Introduction – Characteristics of IoT – The Physical Design of IoT – IoT Architecture and Components – Logical design of IoT – Communication Models – IoT Communication API – IoT Architecture and Protocols – Introduction – Fog based Architecture of IoT – Near Field Communication – Wireless Sensor Networks – IoT Network protocol stack – IoT technology stack – Blue tooth – Zig Bee – and 6LowPAN.(12L)

UNIT II:

Programming Framework for IoT: Interoperability – Programming Paradigm – Assembly – Introduction to Arduino Programming – Introduction to Python Programming – Introduction to Raspberry Pi . Virtualization: Introduction – Types – Virtualization and IoT – Embedded Virtualization.(12L)

UNIT III:

IoT Application Area: Introduction – Homes – Health care – Agriculture – Military applications – Politics – Constructions – Other application areas . Cloud and IoT : Introduction – Cloud – IoT – Difference between cloud and IoT – Cloud IoT architecture – challenges.(12L)

UNIT IV:

Smart City using IoT: Introduction – Concept – The emergence – Dimensions and Components – Design strategies – Factors affecting automation – IoT applications in smart cities – Education – E-governance – Industry . IoT Use Cases: Industrial IoT Use Case – IoT and smart energy – Smart transportation – Smart health – Smart home – Smart Education system – Governance use case – Smart cities.(12L)

UNIT V:

Network Security for IoT and M2M communications: Introduction – Network Technologies for IoT and M2M – Security for IoT and M2M Technologies – Security in IETF M2M network Technologies – Security in ETSI M2M Network Technologies – Other M2M standard Efforts.(12L)

Text Books:

1. Internet of Things – Principles, Paradigms and Applications of IoT by Dr.Kamlesh Lakhwani, Dr.Hemant Kumar Gianey, Joseph Kofi Wireko, Kamal Kant Hiran (BPB publication First Edition 2020)
2. Internet of Things(IoT) Systems and Applications By Jamil Y . Khan & Mehmet R.Yuce Jenny

Stanford Publishing.

Reference Book

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014



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Declaration

I hereby declare that the details and information given above are complete and true to the best of my knowledge and belief.

Dr. V.Y. DASAPPAN M.A., M.Phil., Ph.D.
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Principal
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