DEPARTMENT OF COMPUTER APPLICATIONS

PREAMBLE

UG : Programme profile and the syllabi of courses in the III & IV semesters along with evaluation components III & IV (with effect from 2018-2021 batch onwards)

PROGRAMME PROFILE: BCA

PSO1 : Understanding of the key concepts and principles of programming languages.

PSO2 : Capacity to analyze a problem, identify the computing requirements and using procedures find a solution.

PSO3 : Development of practical skills to solve problems and provide solutions using current trends in the discipline of Computer Applications.

PSO4 : Ability to apply the algorithmic principles, mathematical foundations and computer science theory for designing computer-based systems.

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit Min	Credit Max
I	I	Language	UTAL105/ UTAL106/ UHIL101/ UFRL101	Basic Tamil-I/ Advanced Tamil-I/ Hindi-I/ French-I	4	2	3
	II	English	UENL107/ UENL108	General English-I/ Advanced English-I	5	3	4
	III	Core I	UCAM107/ UCSM106	Programming in C	6	5	5
	III	Core II	UCAM108/ UCSM108 UCAM109/ UCSM109	Fundamental of Computer Science/ Advanced Computer Science	5	4	4
	III	Core Practical I	UCAR105/ UCSR108	Programming in C- Practical	3	2	2
	III	Allied I	UMAA110	Mathematical Methods-I	5	4	4
	IV	Value Education			2	1	1
Total					**30**	**21**	**23**
II	I	Language	UTAL205/ UTAL206/ UHIL201/ UFRL201	Basic Tamil-II/ Advanced Tamil-II/ Hindi-II/ French-II	4	2	3
	II	English	UENL207/ UENL208	General English-II/ Advanced English-II	5	3	4
	III	Core III	UCAM205/ UCSM206	Data Structures	6	6	6

	III	Core Practical II	UCAR204/ UCSR205	Data Structures - Practical	4	3	3
	III	Allied II	UMAA216	Mathematical Methods-II	5	4	4
	IV	Non - Major Elective			4	2	2
	IV	Soft Skill			2	1	1
	V	Extension Programme/ Physical Education/NCC			-	1	2
Total					**30**	**22**	**25**
III	III	Core IV	UCAM310/ UCSM305	Java Programming	5	5	5
	III	Core V	UCAM308	MIS and ERP	5	4	4
	III	Core VI	UCAM311	Data Communication Networks	6	5	5
	III	Core Practical III	UCAR304/ UCSR308	Java Programming - Practical	4	3	3
	III	Allied III	UCOA303	Financial Accounting	5	5	5
	IV	Online course		NPTEL/Spoken Tutorial/Swayam	3	1	2
	IV	Value Education			2	1	1
Total					**30**	**24**	**25**
IV	III	Core VII	UCAM404	Database Management System	6	5	5
	III	Core VIII	UCAM403	Object Oriented Analysis and Design	5	4	4
	III	Core IX	UCAM406	Python Programming	6	5	5
	III	Core Practical IV	UCAR402	Database Management System - Practical	3	2	2
	III	Core Practical V	UCAR404	Python Programming- Practical	3	2	2
	III	Allied IV	UCOA403/ UCOR403	Accounting Package	5	5	5
	IV	Soft skill			2	1	1
	V	Extension Programme/ Physical Education			-	-	2
Total					**30**	**24**	**26**
V	III	Core X	UCAM507	Operating System	5	5	5
	III	Core XI	UCAM504	Software Engineering	5	4	4
	III	Core XII	UCAM505	Web Programming	6	5	5
	III	Core XIII	UCAM508	Open Source Technology	6	5	5
	III	Core Practical VI	UCAR506	Open Source Technology - Practical	3	2	2
	III	Core Practical VII	UCAR505	Web Programming - Practical	3	2	2
	IV	Value Education			2	1	1
Total					**30**	**24**	**24**
VI	III	Core XIV	UCAM609	Data Mining	5	4	4
	III	Core XV	UCAM610	Software Testing	5	4	4

	III	Core XVI	UCAM611	Internet of Things	4	3	3
	III	Core Practical VIII	UCAR602	Data Mining - Practical	4	3	3
	III	Core Project	UCAP601	Project Work	5	5	5
	III	Major-Elective	UCAO606/ UCAO604	Network Security/ Cloud Computing	5	4	4
	III	Viva-Voce	UCAM601	Comprehensive Viva Voce	-	1	1
	IV	Soft Skill			2	1	1
	V	Extension Programme/ Physical Education/NCC			-	-	2
				Total	**30**	**25**	**27**
				Grand Total	**180**	**140**	**150**

NON-MAJOR ELECTIVES-UG

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit
II	IV	NME	UCAE208	R Programming	4	2
			UCAE209	Cyber Forensics	4	2
			UCAE210	PyMOL	4	2

EXTRA CREDIT EARNING PROVISION

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit Min	Max
II	III	Summer Internship	UCAI201	Summer Internship	-	-	1
IV	III	Summer Internship	UCAI401	Summer Internship	-	-	1
V	III	Self Study	UCSS501/ UCAS501	R-Programming	2	-	2
V	III	Self Study	UCSS502/ UCAS502	Android Applications	2	-	2
VI	III	Self Study	UCSS601/ UCAS601	Angular JS	2	-	2
VI	III	Self Study	UCSS602/ UCAS602	Green Computing	2	-	2

UCSM305/ UCAM310 JAVA PROGRAMMING

Semester : III   **Credit** : 5
Category : Core IV   **Hours/Week** : 5
Class & Major : II BCA   **Total Hours** : 65

Objectives
To enable the students
- Understand the OOP Concepts, Exception and String Handling in Java.
- Construct programs using Applets and JDBC concepts.
- Execute Java and Applet Programs in various applications.

UNIT - I INTRODUCTION   **10 Hrs**
Fundamentals of Object Oriented Programming: Java Evolution – Overview of Java Language – Data Types, variables, arrays – Operators – Control statements.

UNIT – II CLASSES AND METHODS   **15 Hrs**
Introduction to classes – class fundamentals – Declaring objects – Constructors – Methods and Classes – Overloading methods – static - final - Nested and Inner classes – Inheritance – Method Overriding – Abstract Classes – Packages – Interfaces.

UNIT – III EXCEPTION HANDLING AND FILES   **15 Hrs**
Exception handling – Types of Exception – try and catch – nested try – throw and throws – Multithreading Programming –I/O Streams – Reading and Writing files – Reading and writing Console I/O.

UNIT – IV STRING HANDLING AND APPLETS   **15 Hrs**
String Handling- String Operations: Comparison – Modifying String – String Buffer - Applet Class – Applet Architecture – The HTML Applet Tag – Passing parameters in Applets – Applet Context – Improving the Banner Applet – get() Method - JDBC Concepts.

UNIT – V AWT   **10 Hrs**
AWT classes – Window fundamentals – Working with Frame windows, Graphics – Controls – Layout Managers - Java Swing.

Text Books
- Herbert Schildt, *Java - The Complete Reference*, Tata McGraw Hill, 10th Edition, Nov 2017.

Reference Books
- E. Balagurusamy , *Programming with Java A Primer*, Tata McGraw Hill, Fourth Edition, 2010.

- Cay S. Horst Mann & Gary Cornell, *Core java*, Volume II (9th ed.), Sun Microsystems Press Java Series, 2012.

e-Resources
- http://www.w3schools.com/html/
- https://www.youtube.com/watch?v=oqJy4e6Aa0M
- https://www.youtube.com/watch?v=7r3Vln4bGLk

UCAM308 MIS AND ERP

Semester   : III   **Credit   : 4**
Category   : Core V   **Hours/Week   : 5**
Class & Major: II BCA   **Total Hours   : 65**

Objectives
To enable the students
- Define transaction and decision making process.
- Analyse the risks and benefits of MIS and ERP in enterprises.
- Evaluate the production, marketing and accounting information in ERP.

UNIT - I OVERVIEW OF MIS   **13 Hrs**
Definition of MIS-MIS as an evolving concept-MIS and other academic disciplines-Structure of a MIS: Operating elements of an information system-Management activity-organizational function-Hardware, software AND communications technology for information system: A computer system-Data representation for computers-instructing a computer-communication facilities-communication networks-distributed systems.

UNIT - II STORAGE AND RETRIEVAL OF DATA   **12 Hrs**
Physical versus logical models of data-logical data concepts and definitions-physical storage devices-file organizations-Database organizations-Transaction processing systems, office automation and information processing control functions: transaction processing- document preparation-message and document communication-information processes control.

UNIT - III DECISION MAKING PROCESS   **15 Hrs**
Intelligence and design phases-concepts of decision making-behavioral models of the decision maker-behavioral model of organizational decision making-decision making under psychological stress-methods for deciding among alternatives-documenting and communicating decision rules-Relevance of decision-making concepts for information system design. Concepts of information: definition-information in the mathematical theory of communication-quality of information-value of information in decision making.

UNIT - IV ERP AND FUNCTIONAL MODULES   **13 Hrs**
Overview of enterprise systems – Evolution - Risks and benefits - Fundamental technology - Issues to be consider in planning design and implementation of cross functional

integrated ERP systems- Overview of ERP software solutions- Small medium and large enterprise vendor solutions, BPR, Business Engineering and best Business practices - Business process Management.

UNIT - V CRM 12 Hrs

Marketing information system and sales order process in ERP: Sales and distribution in ERP- Pre sales activities- Sales order processing- inventory sourcing- Delivery- Billing- Payment- Customer relationship management- benefits of CRM.

Text Books

- Gordon B. Davis AND Margrathe H.Olson , *Management Information System*, Mc Graw Hill, Third edition, 2010.
  - Unit-I : Chapter 1,2,3,4
  - Unit-II : Chapter 5,7,8,9
  - Unit-III : Chapter 10,11,12
- Alexis Leon, "*ERP demystified*", Third Edition, Tata McGraw-Hill, 2014
  - Unit IV : Chapter 3,4,5,6
  - Unit V : Chapter 7,8,9

Reference Books

- *Enterprise Resource Planning – A Managerial Perspective*, Tata McGraw Hill, First Edition, 2011.
- O'Brein & Marakas, *Management information System*, Mc Graw- Hill, Tenth Edition, 2010.

E- Resources

- https://www.cs.utah.edu/~swalton/Documents/Computer-Fundamentals.pdf
- http://www.w3schools.com/erp.html/

UCAM311 DATA COMMUNICATION NETWORKS

Semester	: III	**Credit**	: 5
Category	: Core VI	**Hours/Week**	: 6
Class & Major	: II BCA	**Total Hours**	: 78

Objectives

To enable the students

- Identify the different types of network model.
- Apply Multiplexing techniques in the Telecommunication.
- Select appropriate routing algorithm.

UNIT - I INTRODUCTION 15 Hrs

Introduction to Data Communication, Network. Protocols & standards and standards organizations - Line Configuration - Topology - Transmission node - Classification of Network OSI Model - Layers of OSI Model.

UNIT - II TRANSMISSIONS   **16 Hrs**

Parallel and Serial Transmission - Modems - Guided Media Unguided Media - Performance - Types of Error - Error Detection - Error Corrections.

UNIT – III MULTIPLEXING APPLICATIONS   **16 Hrs**

Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone systems project 802 - Ethernet - Token Bus - Token Ring FDD IEEE 802.6 - SMDS - Circuit Switching - Packet switching.

UNIT – IV LAYERS   **16 Hrs**

History of Analog and Digital Network - Access to ISDN - ISDN Layers - Broadband ISDN X.25 Layers - Packet Layer Protocol - ATM - ATM Architecture - ATM Applications.

UNIT – V NETWORKS   **15 Hrs**

Repeaters –Bridges- Routers - Gateway - Routing algorithms - TCP/IP Network, Transport and Application Layers of TCP/IP- SMTP - SNMP - World Wide Web- Frame relay-ATM- ATM LANs –X.25 - relay.

Text Books
- B. Forouzan, *Introduction to Data Communications in Networking*, Fourth Edition, TataMcGraw-Hill, New Delhi, 2017

    Unit I   : Chapter 1,2,3
    Unit II   : Chapter 6,7,9
    Unit III   : Chapter 8,12,14
    Unit IV   : Chapter 16,19
    Unit V   : Chapter 21,24,25

- William Stallings, *Data and Computer Communication*, Tenth Edition, Prentice Hall of India, Sep 2013

Reference Books
- A. S.Tanenbaum, *Computer Networks*, Fourth Edition, Pearson Education, (Prentice hall of India Ltd), New Delhi, 2011.

E-Resources
- http://www.w3schools.com/dcn.html/
- http://freevideolectures.com/Course/2278/Data-Communication

UCAR304/UCSR308 JAVA PROGRAMMING – PRACTICAL

Semester   : III   **Credit   : 3**
Category   : Core Practical III   **Hours/Week   : 4**
Class & Major : II BCA   **Total Hours : 52**

Objectives

To enable the students

- Create programs using Inheritance, Exception and String Handling.
- Build programs using Threads, Packages and Interfaces.
- Design simple applet programs using Swing and JDBC.

Lab Exercise

1. Classes and Objects
2. Constructors
3. Method Overloading
4. Implementing Single and Multiple Inheritance concepts.
5. Method Overriding
6. Implementing Package Concepts.
7. Implementing Interfaces Concepts.
8. Implementing Exception Handling.
9. Implementing Multithreading.
10. Implementing String manipulation using string and string buffer classes
11. Implementing Graphics using Applet.
12. Implementing Swing Concepts.
13. JDBC Connectivity

UCAM404 DATABASE MANAGEMENT SYSTEM

Semester	: IV	**Credit**	: 5
Category	: Core VII	**Hours/Week**	: 6
Class & Major	: II BCA	**Total Hours**	: 78

Objectives

To enable the students

- Understand the data models and represent the database system using ER diagram.
- Create a database using SQL queries and access database using normal forms.
- Query the database using PL/SQL commands.

UNIT – I DATABASES AND DATABASE USERS   **16 Hrs**

Introduction –Characteristics of the database approach –Database Actors – Advantages of using DBMS approach - Database Applications - Database System Concepts and Architecture: Data models, schemas and Instances- three schema architecture and data independence - Data Base Languages and interfaces – Database architecture.

UNIT – II DATA MODELING USING ENTITY RELATIONSHIP MODEL   **16 Hrs**

Conceptual data models – Entity types, Entity sets, Attributes and key – Relationship types, Relationship sets, Roles & Structural constraints – ER diagrams. Relational model: Relational model concepts – Relational model constraints & Relational database schemas –

Update operations & Dealing with constraint violations. Relational Algebra & Calculus: Unary Relational operations – Relational Algebra operations from set theory – Binary relation operations.

UNIT – III RELATIONAL DATABASE DESIGN & TRANSACTION PROCESSING CONCEPTS   16 Hrs

Informal Design guidelines for relational schemas – Functional Dependencies – Normal forms based on primary keys – second & third Normal forms – Boyce-Codd Normal Form.Introduction – Transaction & System concepts – Characterizing schedules – Concurrency control techniques – Database Recovery concepts. Database Security & Authorization: Introduction to Database security issues – Discretionary Access control based on Granting & Revoking privileges.

UNIT – IV SCHEMA DEFINITION, BASIC CONSTRAINTS & QUERIES   15 Hrs

SQL Data Definition – specifying Basic Constraints in SQL – Schema change statements in SQL – Basic queries in SQL – More complex SQL queries – insert, delete and update statements in SQL – Views in SQL – Embedded SQL, Dynamic SQL.

UNIT – V PL/SQL   15 Hrs

Introduction to PL/SQL- Creating and running PL/SQL Code- Navigating the Database- Creating and Editing the source code- SQL* Plus- Running a SQL statement- Running a PL/SQL- Running a script

Text Books
- Shamkant B.Navathe, Ramez Elmasri, *Fundamentals of Database Systems*, Sixth Edition, Pearson Education, New Delhi, 2011.
    - Unit I   : Chapter 1 to Chapter 2
    - Unit II   : Chapter 3,4,5
    - Unit III   : Chapter 8,11,12
    - Unit IV   : Chapter 7
- Steven Feuerstein & Bill Pribyl*, Oracle PL/SQL programming,* Sixth Edition, O'Reilly Media, 2014.
    - Unit V   : Chapter 1 & 2

Reference Books
- Silberschatz, Korth and Sudarshan, *Database System Concepts,* Sixth Edition, McGraw Hill, New Delhi, 2010.
- Raghu Ramakrishnan, *Database Management System*, Third Edition, Tata McGraw-Hill Publishing Company, New Delhi, 2012.

E-Resources
- http://www.w3schools.com/dbms.html/
- https://www.youtube.com/watch?v=aR44FbeeFH8
- https://www.youtube.com/watch?v=1057YmExs

UCAM403 OBJECT ORIENTED ANALYSIS AND DESIGN

Semester : IV   **Credit** : 4
Category : Core VIII   **Hours/Week** : 5
Class & Major : II BCA   **Total Hours** : 65

Objectives
To enable the students
- Understand the concepts of object oriented and designing process.
- Analyze and compare various designing patterns.
- Choose appropriate testing strategies and debugging principles.

UNIT- I INTRODUCTION   13 Hrs

An overview – Object basics – Object state and properties – Behavior – Methods - Messages – Information hiding – Class hierarchy – Relationships – Associations – Aggregations- Identity – Dynamic binding – Persistence – Meta classes – Object oriented system development life cycle.

UNIT - II UML   13 Hrs

Introduction – Survey – Rambough, Booch, Jacobson methods – Patterns – Frameworks - Unified approach – Unified modeling language – Static and Dynamic models – UML diagrams – Class diagram – Use case diagrams – Dynamic modeling – Model organization – Extensibility.

UNIT - III USE CASE APPROACH   13 Hrs

Identifying Use case – Business object analysis – Use case driven object oriented analysis – Use case model – Documentation – Classification – Identifying object, relationships, attributes, methods – Super-sub class – A part of relationships Identifying attributes and methods – Object responsibility.
Case Study: Library Management System, Mark Analysis System, Ticket Reservation System, Banking Transaction.

UNIT - IV UML DESIGN PROCESS   13 Hrs

Design process – Axioms – Corollaries – Designing classes – Class visibility – Refining attributes – Methods and protocols – Object storage and object interoperability – Databases – Object relational systems – Designing interface objects – Macro and Micro level processes – The purpose of a view layer interface.

UNIT - V TESTING STRATEGIES   13 Hrs

Quality assurance – Testing strategies – Object Orientation Testing – Test cases – Test Plan – Debugging principles – Usability – Satisfaction – Usability testing – Satisfaction Testing.

Text Book
- Ali Bahrami, *Object Oriented System Development*, McGraw Hill International Edition, 2008

Reference Book

- Grady Booch, Robert Maksimchuk, *Object Oriented Analysis and Design*, Pearson Education, 2007.

UCAM406 PYTHON PROGRAMMING

Semester	: IV	**Credit**	: 5
Category	: Core IX	**Hours/Week**	: 6
Class & Major	: II BCA	**Total Hours**	: 78

Objectives

To enable the students

- Understand the basics of algorithmic problem solving
- Develop Python programs with conditionals and loops.
- Design Python data structures - lists, tuples, dictionaries.

UNIT I   ALGORITHMIC PROBLEM SOLVING   16 Hrs

Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion).

UNIT II DATA,EXPRESSIONS,STATEMENTS   16 Hrs

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments.

UNIT III CONTROLFLOW,FUNCTIONS   16 Hrs

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays.

UNIT IV LISTS,TUPLES,DICTIONARIES   15 Hrs

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing – list comprehension.

UNIT V FILES,MODULES,PACKAGES   15 Hrs

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages.

Text Books

- Allen B. Downey, *Think Python: How to Think Like a Computer Scientist*, Shroff Publishers & Distributors Pvt. Ltd,2nd edition, 2016.
- Guido van Rossum and Fred L. Drake Jr, *An Introduction to Python, Revised and updated for Python 3.2*, Network Theory Ltd., Mar 2011.

Reference Book

- Charles Dierbach, *Introduction to Computer Science using Python: A Computational Problem-Solving Focus*, Wiley India Edition, 2013.
- John V Guttag, *Introduction to Computation and Programming Using Python*, Revised and expanded Edition, MIT Press , 2013
- Robert Sedgewick, Kevin Wayne, Robert Dondero, "*Introduction to Programming in Python: An Inter-disciplinary Approach*, Pearson India Education Services Pvt. Ltd., 2016.

E-Resources

- http://www.w3schools.com/dbms.html/
- http://greenteapress.com/wp/think- python/

UCAR402 DATABASE MANAGEMENT SYSTEM – PRACTICAL

Semester	: IV	**Credit**	: 2
Category	: Core Practical IV	**Hours/Week**	: 3
Class & Major	: II BCA	**Total Hours**	: 39

Objectives

To enable the students

- Develop practical skills on various queries, views, indexes, triggers in SQL.
- Design the database for different applications using Oracle.
- Implement the Procedures and functions in PL/SQL to access the database.

Lab Exercises

1. Create a Student_Information and Mark _Details data bases using DDL, DML, TCL and DCL.
2. Create a Library data base and perform the Aggregate Function & SET Operations.
3. Create a Hospital data base and perform the Inner and Outer Joins Operations.
4. Create Bank database and query it using group by having and order by.
5. Create Employee database and query it using sub queries.
6. Create Views and indexes for the Phone Directory database.
7. Create PL/SQL Block for Mark sheet processing.
8. Create PL/SQL for Cursor.
9. Create the Procedures for Stock management data base.
10. Create the Functions for Real estate data base.
11. Create different types of triggers for Event Management database.

Note: All the tables should be created with Constraints.

UCAR404 PYTHON PROGRAMMING –PRACTICAL

Semester : IV   **Credit** : 2
Category : Core Practical V   **Hours/Week** : 3
Class & Major : II BCA   **Total Hours** : 39

Objectives
To enable the students
- Design Python programs with conditionals statements, loop and functions.
- Discover how to work with lists and sequence data
- Use Python to read and write files

Lab Exercise

1. Compute the GCD of two numbers.

2. Find the square root of a number (Newton's method)

3. Exponentiation (power of a number)

4. Find the maximum of a list of numbers

5. Linear search and Binary search

6. Selection sort, Insertion sort

7. Merge sort

8. First n prime numbers

9. Multiply matrices

10. Programs that take command line arguments (word count)

11. Find the most frequent words in a text read from a file

12. Simulate elliptical orbits in Pygame

13. Simulate bouncing ball using TRINKET.

III and IV Evaluation Components of CIA

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
III	III	Core IV	UCAM310/ UCSM305	Java Programming	Assignment	Presentation using ICT Technique
	III	Core V	UCAM308	MIS and ERP	Assignment	Presentation using ICT Technique
	III	Core VI	UCAM311	Data Communication Networks	Assignment	Presentation using ICT Technique
	III	Core Practical III	UCAR304/ UCSR306	Java Programming - Practical	DPA	Viva-voce
IV	III	Core VII	UCAM404	Database Management System	Assignment	Presentation using ICT Technique
	III	Core VIII	UCAM403	Object Oriented Analysis and Design	Assignment	Presentation using ICT Technique
	III	Core IX	UCAM406	Python Programming	Assignment	Presentation using ICT Technique
	III	Core Practical IV	UCAR402	Database Management System-Practical	DPA	Viva-voce
	III	Core Practical V	UCAR404	Python Programming- Practical	DPA	Viva-voce