KANNUR UNIVERSITY

(Abstract)

Complementary Elective Course (Computer Science) for New Generation Programme B.Sc. Life Science (Zoology) & Computational Biology programme (CBCSS-OBE) w.e.f 2020 admission -- Scheme, Syllabus and pattern of question paper with modified Course Code - Implemented - Orders Issued

ACADEMIC C SECTION

Acad/C2/12371/2019   Dated: 22.10.2021

Read:-1. U.O Acad/C2/16579/NGC/2021 dated 05.06.2021
  2. U.O Note No. EX/EG-1-1/21498/PG/Oct2020 dated 14.09.2021
  3. Letter No. Acad C2/2408/2020 dated 24.09.2021
  4. Minutes of the meeting of Board of Studies in Computer Science(UG) held on 28.09.2021
  5. Order of the Vice-Chancellor dated 15.10.2021

ORDER

1. As per paper read (1) above, Scheme, Syllabus and pattern of question paper of Complementary Elective Course (Computer Science) for B.Sc. Life Science (Zoology) & Computational Biology programme under CBCSS w.e.f 2020 was implemented.

2. Examination Branch, as per paper read (2) above, pointed out the practical difficulty in conducting examinations for the Complementary Elective Course in Computer Science for B.Sc. Life Science (Zoology) & Computational Biology programme, as its Course Code is same as that of the conventional U.G Programme, B.Sc. Computer Science.

3. As per paper read (3) above, the Board of Studies in Computer Science (UG) was entrusted to modify the Course Code of the Complementary Elective Course in Computer Science offered for B.Sc. Life Science (Zoology) & Computational Biology programme in B.Sc. Computer Science Syllabus.

4. The Board of Studies in Computer Science (UG), resolved to change the Course Code of of Complementary Elective Courses in B.Sc. Computer Science programme, by suffixing - **ZCB** to the existing existing Course Codes, as 1C01CSC-ZCB, 2C02CSC-ZCB, 3C03CSC-ZCB, 4C04CSC-ZCB, 4C05CSC-ZCB.

5. The Vice Chancellor, after considering the matter in detail and in exercise of the powers of Academic Council conferred under Section 11(1) Chapter III of Kannur University Act 1996, accorded sanction to implement the modified Scheme, Syllabus and model question paper of Complementary Elective Course in Computer Science for B.Sc. Life Science (Zoology) & Computational Biology Programme offered at St. Pius X College Rajapuram, with effect from 2020-21 admission, subject to reporting to the Academic Council.

6. The modified Syllabus and model question paper of Complementary Elective Course in Computer Science for B.Sc. Life Science (Zoology) & Computational Biology Programme w.e.f 2020-21 admission are uploaded in the University website.

7. U.O read (1) above, stands modified to this extent.

Orders are issued accordingly.

sd/-
BALACHANDRAN V K
DEPUTY REGISTRAR (ACAD)
For REGISTRAR

To: The Principal, St. Pius X College, Rajapuram
Copy To: 1. The Examination Branch (through PA to CE)
   2. PS to VC/PA to PVC/ PA to Registrar
   3. DR/AR Academic
   4. Web Manager (for uploading website)
   5. SF/DF/FC

Forwarded / By Order

SECTION OFFICER

KANNUR UNIVERSITY

BOARD OF STUDIES-COMPUTER SCIENCE (UG)

SYLLABUS FOR
B.SC. COMPUTER SCIENCE
COMPLEMENTARY ELECTIVE COURSE
FOR
B.SC LIFE SCIENCE (ZOOLOGY)
&
COMPUTATIONAL BIOLOGY

CHOICE BASED CREDIT AND SEMESTER SYSTEM
(OBE-Outcome Based Education System)

(2020 ADMISSION ONWARDS)

Kannur UniversityVision and Mission Statement

Vision: To establish a teaching, residential and affiliating University and to provide equitable and just access to quality higher education involving the generation, dissemination and application of knowledge with special focus on the development of higher education in Kasargode and Kannur Revenue Districts and the Manantavadytaluk of Wayanad Revenue District"

Mission:

➢ To produce and disseminate new knowledge and to find novel avenues for application of such knowledge.

➢ To adopt critical pedagogic practices which uphold scientific temper, the uncompromised spirit of enquiry and the right to dissent.

➢ To uphold democratic, multicultural, secular, environmental and gender

➢ sensitive values as the foundational principles of higher education and to cater to the modern notions of equity, social justice and merit in all educational endeavors.

➢ To affiliate colleges and other institutions of higher learning and to monitor academic, ethical, administrative and infrastructural standards in such institutions. To build stronger community networks based on the values and principles of higher education and to ensure the region's intellectual integration with national vision and international standards.

➢ To associate with the local self-governing bodies and other statutory as well as non-governmental organizations for continuing education and also for building public awareness on important social, cultural and other policy issues.

KANNUR UNIVERSITY

Programme Outcomes (PO)

PO 1. Critical Thinking:

1. Acquire the ability to apply the basic tenets of logic and science to thoughts, actions and interventions.
2. Develop the ability to chart out a progressive direction for actions and interventions by learning to recognize the presence of hegemonic ideology within certain dominant notions.
3. Develop self-critical abilities and also the ability to view positions, problems and social issues from plural perspectives.

PO 2. Effective Citizenship:

1. Learn to participate in nation building by adhering to the principles of sovereignty of the nation, socialism, secularism, democracy and the values that guide a republic.
2. Develop and practice gender sensitive attitudes, environmental awareness, the ability to understand and resist various kinds of discriminations and empathetic social awareness about various kinds of marginalisation.
3. Internalise certain highlights of the nation's and region's history. Especially of the freedom movement, the renaissance within native societies and the project of modernization of the post-colonial society.

PO 3. Effective Communication:

1. Acquire the ability to speak, write, read and listen clearly in person and through electronic media in both English and in one Modern Indian Language
2. Learn to articulate analysis, synthesis, and evaluation of situations and themes in a well-informed manner.
3. Generate hypothesis and articulate assent or dissent by employing both reason and creative thinking.

PO 4.Interdisciplinarity:

1. Perceive knowledge as an organic comprehensive, interrelated and integrated faculty of the human mind
2. Understand the issues of environmental contexts and sustainable development as a basic interdisciplinary concern of all disciplines.
3. Develop aesthetic, social, humanistic and artistic sensibilities for problem solving and evolving a comprehensive perspective.

PREFACE

Technological innovations have redefined the traditional concepts of education, profession and lifestyles in the contemporary scenario. Computer Systems are a part of every aspect of prevalent culture from home video game consoles to hospital monitoring equipment. Computer scientists design, build and improve these systems, finding new applications for sophisticated technology. India has been one of the leading exporters of IT talent and Indian computer professionals have played major role in the growth and development of IT sector in various countries.

The Board of Studies in Computer Science travails to offer students with a solid technological foundation through the reformed curriculum for undergraduate programme of Kannur University. The curriculum aims at developing technical caliber among students through academic explorations in the classroom, extended academic activities like seminars, workshops and conferences. Formative and summative assessments will absolutely be in tune with the learning outcomes and the instructional strategies.

In this era of unprecedented technological developments, the Board of Studies in Computer Science of Kannur University substantially emphasizes employment-based curriculum to empower the students with refined technical competence. This curriculum categorically states the graduate attributes / outcomes and has been developed after various workshops and academic deliberations with different stakeholders at various levels. The Board of Studies in Computer Science has resolved to introduce the syllabus for UG Programme in the affiliated colleges from 2019 admission onwards and I would like to place on record my gratefulness to the members of the Board of Studies, faculty and stakeholders for having helped me in the formulation of this syllabus.

Lt Dr. Thomas Scaria

Chairperson

Board of Studies, Computer Science (UG)
Kannur University

KANNUR UNIVERSITY

Programme Specific Outcome of B.Sc. Computer Science Programme

PSO1	Understand the concepts of Computer Science and Applications.
PSO2	Understand the concepts of System Software and Application Software.
PSO3	Understand the concepts of Algorithms and Programming.
PSO4	Understand the concepts of Computer Networks and Operating Systems
PSO5	Design, develop, implement and test software systems to meet the given specifications, following the principles of Software Engineering.

B.SC. COMPUTER SCIENCE COMPLEMENTARY ELECTIVE COURSES

B.SC LIFE SCIENCE (ZOOLOGY)
&
COMPUTATIONAL BIOLOGY

WORK AND CREDIT DISTRIBUTION

(2020 ADMISSION ONWARDS)

COURSE CODE	COURSE TITLE	SEME STER	HOURS PER WEEK	CREDIT	EXAM HOURS	MARKS (INTERNAL + EXTERNAL)
1C01CSC-ZCB	INTRODUCTION TO COMPUTERS,NETWORKS AND PROGRAMMING	1	2	2	3	8+32
4C05CSC -ZCB	LAB 1: PROGRAMMING IN JAVA, DBMS AND PYTHON PROGRAMMING	1	2	0	-	-
2C02CSC -ZCB	DATA BASE MANAGEMENT SYSTEM	2	2	2	3	8+32
4C05CSC -ZCB	LAB 1: PROGRAMMING IN JAVA, DBMS AND PYTHON PROGRAMMING	2	2	0	-	-
3C03CSC -ZCB	OBJECTORIENTED PROGRAMMING WITH JAVA	3	3	2	3	8+32
4C05CSC -ZCB	LAB 1: PROGRAMMING IN JAVA, DBMS AND PYTHON PROGRAMMING	3	2	0	-	-
4C04CSC -ZCB	COMPUTATION USING PYTHON	4	3	2	3	8+32
4C05CSC -ZCB	LAB 1: PROGRAMMING IN JAVA, DBMS AND PYTHON PROGRAMMING *	4	2	4	3	8+32

TOTAL 200 MARKS

- * PRACTICAL DONE IN ALL THE 4 SEMESTER

EVALUATION

ASSESSMENT	WEIGHTAGE
EXTERNAL	4
INTERNAL	1

CONTINUOUS EVALUATION FOR THEORY

COMPONENT	WEIGHTAGE	REMARKS
COMPONENT1: TEST	75%	MINIMUM OF 2 TESTS SHOULD BE CONDUCTED. MARKS FOR THE TEST COMPONENT SHOULD BE CALCULATED AS THE AVERAGE OF THE BEST TWO MARKS OBTAINED IN THE TESTS CONDUCTED.
COMPONENT 2: ASSIGNMENT/ SEMINAR/VIVA	25%	ANY ONE COMPONENT

PATTERN OF QUESTION PAPER FOR END SEMESTER EVALUATION

Part A	**Short Answer**	**5 Questions x 1 Mark = 5 Marks**
	Answer all questions	5 Questions x 1 Mark = 5 Marks
Part B	**Short Essay**	**6 Questions x 2 Marks = 12 Marks**
	Answer any 4 questions	4 Questions x 2 Marks = 8 Marks
Part C	**Essay**	**5 Questions x 3 Marks = 15 Marks**
	Answer any 3 questions	3 Questions x 3 Marks = 9 Marks
Part D	**Long Essay**	**4 Questions x 5 Marks = 20 Marks**
	Answer any 2 questions	2 Questions x 5 Marks = 10 Marks
Total Marks Including Choice: 52		
Maximum Marks for the Course: 32		

CONTINUOUS EVALUATION FOR PRACTICAL

COMPONENT	WEIGHTAGE	REMARKS
COMPONENT 1: LAB SKILLS, OBSERVATION NOTE AND PUNCTUALITY	25% FOR LAB SKILL 25% FOR OBSERVATION NOTE AND PUNCTUALITY	OBSERVATION NOTE IS MANDATORY. MARKS SHOULD BE GIVEN CONSIDERING OBSERVATION NOTE LAB SKILLS AND PUNCTUALITY.
COMPONENT1: TEST	50%	MODEL EXAMINATION SHOULD BE CONDUCTED BEFORE EXTERNAL EXAM AND CONSIDERED FOR INTERNAL MARK

END SEMESTER EVALUATION FOR PRACTICAL

COMPONENT	PART A	PART B
Code Writing	7	7
Execution & Output	8	8
Record	2	
Total Marks	32	

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
1	1C01CSC -ZCB	2	2	3

COURSE OUTCOME

CO1: Familiarize with the hardware components of a digital computer
CO2: Understand the basic idea of how data is represented in computers
CO3: Familiarize with types of software
CO4: Ability to design algorithmic solutions to problems

Unit I: Introduction to Computers

Characteristics of Computers, Computer System Hardware, Basic Concepts of CPU,

ALU, Registers, Control Unit and System Bus, Components Inside a Computer Cabinet

(Motherboard, BIOS, CMOS Chip, Ports and Interfaces, Expansion Slots, Memory

Chips, Storage Devices, Processor - Basic functions), Computer Memory
Representation, Memory Hierarchy, Basic Concepts of Cache Memory, Primary
Memory (RAM and ROM), Secondary Memory Types (Working principle is not
required).

(10 Hrs)

Unit II: Network and Communications

Computer Networks – Types of Networks: WAN, MAN, LAN - Benefits of Networks -
Network Topology- Network Security – Firewalls - Communication Medium: Wired
and Wireless – Generations in Mobile Communication.

(8 Hrs)

Unit III: Types of Software

System Software, Operating System (Functions of Operating Systems), Application

Software, Software Acquisition (Retail, OEM, Demo, Shareware, Freeware, Open-Source Software)

(8 Hrs)

Unit IV: Introduction to Programming

Types of Computer Languages (Machine Language, Assembly Language, High-level Language) Basic Concepts of Compiler, Assembler, Interpreter, Linker and Loader. Program Development Life Cycle, Algorithm, Flowcharts, Program Control Structures (Sequential, Selection, Loop), Programming Paradigms (Structured Programming, Basic

(10 Hrs)

Books for Study:

1. Anita Goel, Computer Fundamentals, Pearson

2. Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson **Books for**

Reference:

1. Rajaraman V and Adabala N, Fundamentals of Computers, PHI

2. Brian W Kernighan, D is for Digital: What a well-informed person should know about computers and communications, Create Space Independent Publishing Platform

3. Stewart Venit and Elizabeth Drake, Prelude to Programming (6th Edition), Pearson

Marks including choice:

Unit	Marks
I	17
II	13
III	9
IV	13

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
2	2C02CSC -ZCB	2	2	3

COURSE OUTCOME

CO1: Familiar with organized data collection.
CO2: Able to design data bases.
CO3: Skilled to normalize the data bases.
CO4: Capable to frame queries for various purposes

Module I

Introduction– Purpose of Database systems. view of data Data Models, database structure, Database administrator , Data Base Users. Entity, Attribute

Module II

E-R model-Constraints; Keys; Primary, Foreign, candidate, E-R diagram, Normal forms– 1NF, 2NF, 3NF and BCNF

Module III

SQL : Data types in SQL, DDL; create, alter, Drop, DML, Insert into, Select, update, Delete, Ordering Tuples, Renaming Attributes, functions, Aggregate Functions in SQL, Group By and Having, Joins (Inner and Outer)

Module IV

Relational model – Fundamentals, Relational Algebra; Fundamental relational algebra operations, Field, Record, Relation, Domain.

Text books:

1. Database system concepts; Silberschatz, Korth and Sudarsan, 5th Edn; McGraw Hill.

2. The Database book : Principles and Practice Using MySQL; Gehani; University Press.

Reference:

1. Fundamentals of Database systems, E. Navathe, 4th edn, Pearson Education.

2. Introduction to data base systems ITL Education Solutions Limited.

<u>Marks including choice</u>:

Unit	Marks
I	13
II	10
III	17
IV	12

COMPLEMENTARY ELECTIVE COURSE III:
OBJECT ORIENTED PROGRAMMING WITH JAVA

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
3	3C03CSC -ZCB	3	2	3

COURSE OUTCOME

CO1: To acquire knowledge about programming in Java.
CO2: To develop skill in writing program in Java.

Module I
Introduction to object oriented programming – characteristics of OOP – data abstraction –encapsulation – polymorphism – inheritance – advantages of OOP – application of OOP.

Module II
Introduction to java – History-JVM- Bytecode- features – Java language fundamentals-elements of java language – execution of Java program. Introducing classes, methods, objects.

Module III
Java tokens – java character set – data types – keywords – identifiers – literals – operators – expressions – constants – variables – arrays- string functions.

Module IV
Control Statements: if statement, switch- case, for loop, while loop, break, continue; simple programs

References:
Programming with Java, A Primer, E. Balagurusamy.
Java The Complete Reference-Ninth Edition- Oracle Press- Herbert Schildt

Marks including choice:

Unit	Marks
I	12
II	12
III	14
IV	14

COMPLEMENTARY ELECTIVE COURSE IV:
COMPUTATION USING PYTHON

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
4	4C04CSC -ZCB	3	2	3

COURSE OUTCOME

CO1: Learn Python for expressing computation
CO2: Familiarize with functions and modules in python
CO3: Understand object-oriented programming concepts
CO4: Learn the techniques for data visualization in python

Unit I: Basic Elements and Control Statements

Features of Python, Different Methods to Run Python, Basic Elements (Objects,

Expressions, Numerical Types, Strings, Variables), Comments, Indentation in Python,

Input and Output in Python, import function, Operators in Python, Branching (if, else,

elif), Iteration (while, for), range and enumerate functions, Tuples, Lists, Sets,

Dictionaries, Built-in methods of lists, sets and dictionaries, Mutable and Immutable

Objects.

(16 Hrs)

Unit II: Functions, Modules and Exception Handling

Functions Definition, Function Calling, Function Arguments (Required, Keyword,

Default), Recursion, Modules, Built-in Modules (math, statistics), Creating Modules, File

Handling (Opening, Closing, Writing, Reading), Exceptions, Built-in Exceptions (Index

Error, Overflow Error, Zero Division Error, Runtime

Error), Exception Handling.

Unit III: Object Oriented Programming

Class Definition, Object Creation, Built-in Attribute Methods, Encapsulation, Data Hiding, Inheritance, Multi-Level Inheritance, Polymorphism (Method Overriding, Operator Overloading)

(10 Hrs)

Unit IV: Arrays and Data Visualization

Arrays in Python, Numpy Module, ndarray, Creating Arrays (array, zeros, ones, empty, linspace, arrange, random), Two-Dimensional Array, Indexing, Slicing, Iterating, Copying, Splitting, Shape Manipulation (reshape, transpose, resize), Arithmetic Operations on Arrays.

Data Visualization in Python (matplotlib Module, pyplot, plot(), hist, scatter, bar charts, Formatting, figure(), subplot(), text(), xlabel(), ylabel(), title(), Plotting Simple Mathematical Functions (sin x, x^2)

(12 Hrs)

Books for Study:

1. Taming Python By Programming, Dr. Jeeva Jose, Khanna Publishing

2. Introduction to Computation and Programming Using Python with Application to

    Understanding Data - John V. Guttag, PHI (2016)

3. https://www.numpy.org/devdocs/user/quickstart.html

4. https://matplotlib.org/users/pyplot_tutorial.html **Books for Reference:**

1. https://www.tutorialspoint.com/python/

2. Introduction to Computer Science using Python - Charles Dierbach, Wiley (2015)

3. Python for Education by Ajith Kumar B P

4. https://docs.python.org/3/tutorial/index.html

5. Introduction to Computer Science and Programming Using Python Provided by Massachusetts Institute of Technology (MITx) - Available at : (https://www.edx.org/course/introduction-to-computer-science-and-programmingusing-python-2)

Marks including choice:

Unit	Marks
1	15
2	15
3	10
4	12

COMPLEMENTARY ELECTIVE COURSE V: LAB 1
PROGRAMMING IN JAVA, DBMS AND PYTHON PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
4	4C05CSC -ZCB	2*	4	3

*Lab will be conducted for 2 hours each in I, II, III and IV semesters

COURSE OUTCOME

CO1: Achieve skills to use java language for problem solving
CO2: Understand SQL and basic web programming
CO3: Achieve skills to use Python for problem solving