BHARATHIDASAN UNIVERSITY  **TIRUCHIRAPPALLI-620024.**

B.Sc. COMPUTER SCIENCE CHOICE BASED CREDIT SYSTEM

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS-LOCF)

(Applicable to the candidates admitted from the academic year 2022-2023 onwards)

Sem.	Part	Course	Title	Ins. Hrs	Credits	Exam Hours	Marks		Total
							Int.	Ext.	
I	I	Language Course –I Tamil$/Other Languages+#		6	3	3	25	75	100
	II	English Course-I		6	3	3	25	75	100
	III	Core Course–I(CC)	Programming in C and Data Structures	5	5	3	25	75	100
		Core Practical–I(CP)	Programming in C Lab	4	4	3	40	60	100
		First Allied Course–I(AC)		4	4	3	25	75	100
		First Allied Course–II(AC)		3	-	-	-	-	-
	IV	Value Education		2	2	3	25	75	100
	TOTAL			**30**	**21**	**-**	**-**	**-**	**600**
II	I	Language Course -II Tamil$/Other Languages+#		6	3	3	25	75	100
	II	English Course-II		6	3	3	25	75	100
	III	Core Course–II(CC)	Programming in Java	5	5	3	25	75	100
		Core Practical–II(CP)	Programming in Java Lab	4	4	3	40	60	100
		First Allied Course–II(AC)		3	2	3	25	75	100
		First Allied Course–III (AC)		4	4	3	25	75	100
		Add on Course–I##	Professional English –I	6*	4	3	25	75	100
	IV	Environmental Studies		2	2	3	25	75	100
	VI	Naan Mudhalvan Scheme(NMS) @@	Language Proficiency for Employability- Effective English	-	2	3	25	75	100
	TOTAL			**30**	**29**	**-**	**-**	**-**	**900**

III	I	Language Course –III Tamil$/Other Languages+#		6	3	3	25	75	100
	II	English Course-III		6	3	3	25	75	100
	III	Core Course–III(CC)	Programming in Python	5	5	3	25	75	100
		Core Practical-III(CP)	Programming in Python Lab	4	4	3	40	60	100
		Second Allied Course –I(AC)		4	4	3	25	75	100
		Second Allied Practical (AP)		3	-	-	-	-	-
		Add on Course–II##	Professional English - II	6*	4	3	25	75	100
	IV	Non-Major Elective -I@ Those who choose Tamil in Part I can choose a non-major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level or b) Special Tamil if Tamil language was studied up to10th&12th std.	Fundamentals of Information Technology	2	2	3	25	75	100
	TOTAL			**30**	**25**	**-**	**-**	**-**	**700**
IV	I	Language Course–IV Tamil$/Other Languages+#		6	3	3	25	75	100
	II	English Course–IV		6	3	3	25	75	100
	III	Core Course-IV(CC)	Database Management Systems	5	5	3	25	75	100
		Core Practical - IV(CP)	Database Management Systems lab	4	4	3	40	60	100
		Second Allied Practical (AP)		3	2	3	40	60	100
		Second Allied Course –II(AC)		4	4	3	25	75	100
	IV	Non-Major Elective II@ Those who choose Tamil in Part I can choose a non-major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level or b) Special Tamil if Tamil language was studied up to10th&12th std.	Working Principles of Internet	2	2	3	25	75	100
	VI	Naan Mudhalvan Scheme (NMS)@@	Digital Skills for Employability	-	2	3	25	75	100
	TOTAL			**30**	**25**	**-**	**-**	**-**	**800**

V	III	Core Course-V(CC)	Fundamentals of Algorithms	5	5	3	25	75	100
		Core Course– VI(CC)	Computer Networks	5	5	3	25	75	100
		Core Course– VII(CC)	Digital Electronics and Microprocessor	5	5	3	25	75	100
		Core Practical-V(CP)	Digital Electronics and Microprocessor Lab	4	4	3	40	60	100
		Major Based Elective – I (Anyone)	1. Artificial Intelligence and Expert Systems 2. Computer Graphics	5	4	3	25	75	100
	IV	Skill Based Elective I	Web Technology	4	2	3	25	75	100
		Soft Skills Development		2	2	3	25	75	100
	TOTAL			**30**	**27**	**-**	**-**	**-**	**700**
VI	III	Core Course-VIII(CC)	Operating Systems	6	5	3	25	75	100
		Core Course-IX(CC)	Programming in PHP	6	5	3	25	75	100
		Core Practical –VI(CP)	Programming in PHP Lab	4	4	3	40	60	100
		Major Based Elective-II (Anyone)	1. Software Engineering 2. Big Data Analytics	5	4	3	25	75	100
		Project		4	3	-	40	60	100
	IV	Skill Based Elective–II	Mobile Application Development	4	2	3	25	75	100
	V	Gender Studies		1	1	3	25	75	100
		Extension Activities**		-	1	-	-	-	-
	VI	Naan Mudhalvan Scheme(NMS)@@		-	2	3	25	75	100
	TOTAL			**30**	**27**	**-**	**-**	**-**	**800**
GRANDTOTAL				**180**	**154**	**-**	**-**	**-**	**4500**

List of Allied Courses

First Allied Course	**Second Allied Course**
Mathematics	Applied Physics

$ For those who studied Tamil upto10th+2(Regular Stream).

+ Syllabus for other Languages should be on par with Tamil at degree level.

#Those who studied Tamil upto 10th +2 but opt for other languages in degree level under Part-I should study special Tamil in Part–IV.

The Professional English – Four Streams Course is offered in the 2nd and 3rd Semester (only for 2022-2023 Batch) in all UG Courses. It will be taught part from the Existing hours of teaching / additional hours of teaching (1 hour /day) as a 4 credit paper as an add on course on par with Major Paper and completion of the paper is must to continue his / her studies further. (As per G.O. No. 76, Higher Education (K2) Departmentdated:18.07.2020).

*TheExtra6hrs /cycle as per theG.O.76/2020 will be utilized for the Add on Professional English Course.

@ NCC Course is one of the Choices in Non-Major Elective Course. Only the NCC cadets are eligible to choose this course. However, NCC Course is not a Compulsory Course for the NCC Cadets.

**Extension Activities shall be outside instruction hours.@@Naan Mudhalvan Scheme.

SUMMARY OF CURRICULUM STRUCTURE OF UG PROGRAMME

Sl. No.	Part	Types of the Courses	No.of Courses	No.of Credits	Marks
1.	I	Language Courses	4	12	400
2.	II	English Courses	4	12	400
3.	III	Core Courses	9	45	900
4.		Core Practical	6	24	600
5.		Allied Courses I&II	4	16	400
6.		Allied Practical	2	4	200
7.		Major Based Elective Courses	2	8	200
8.		Add–on Course (Professional English I&II)	2	8	200
9.		Project	1	3	100
10.	IV	Non-Major Elective Courses	2	4	200
11.		Skill Based Elective Courses	2	4	200
12.		Soft Skills Development	1	2	100
13.		Value Education	1	2	100
14.		Environmental Studies	1	2	100
15.	V	Gender Studies	1	1	100
16.		Extension Activities	1	1	---
17.	VI	Naan Mudhalvan Scheme	3	6	300
	Total		**46**	**154**	**4500**

PROGRAMME OUTCOMES:

- Graduates will be able to comprehend the basic concepts learnt and apply in real life situations with analytical skills.
- Graduates with acquired skills and enhanced knowledge will be employable/become entrepreneurs or will pursue higher Education.
- Graduates with acquired knowledge of modern software tools will be able to contribute effectively as software engineers.
- Graduates will be able to comprehend the related concepts to Computer Science with Allied papers.
- Graduates will be imbibed with ethical values and social concerns to ensure peaceful society.

PROGRAMMESPECIFICOUTCOMES:

- Acquired the required knowledge in the Hardware and Software aspects of Computer Science domain and the art of programming.
- Understood the development methodologies of software systems and the ability to analyze design and develop computer applications for real life problems.
- Gained knowledge and skills to collaborate and communicate with peers in IT/ITES industries.
- The ability to understand, adjust and adapt with the dynamic technical environment for the growth of IT industry.
- The capacity to transfer the skills gained, to provide innovative and novel solutions by maintaining ethical norms for the betterment of human society.

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CORE COURSE I
PROGRAMMING IN C AND DATA STRUCTURES

Semester I

Code: 22SCCCS1 (Theory) Credit: 5

COURSE OBJECTIVES:

- To know about the basics of C Programming, Control and Looping
- Structures and programming with it.
- To understand Arrays, Pointers and String Processing in C
- language
- To know about the basic concepts in Data Structures.

UNIT - I:

Basic of C: History of C and its importance – Structure of a C program – Data Types – Constants and Variables – Operators and Expressions – Order of Precedence, Evaluating of Arithmetic Expressions – Type Conversion- Decision Statements: if, if-else, and nested if statements.

UNIT - II:

Loops Structures: For Loop, While, Do-while loop – Arrays: - One Dimensional Array, Two-dimensional Arrays, Character Arrays and Strings – Functions: Function with arrays - Function with decision and looping statements - Recursion.

UNIT - III:

Pointers: Introduction – Pointer Expressions – Chain of Pointers – Pointers and Arrays – Array of Pointers – Pointers as function arguments – Functions returning Pointers – Pointers to Functions – Function pointer – Structures - declaration, initialization, Array of Structures – Pointer to structures, Structures and functions – Typed of Enumerated data types, Unions.

UNIT - IV:

Strings Processing, Standard string library functions – Files: introduction and files functions – Writing and reading in Text mode – Simple application: Display the contents of a file. Write data to a file. Append data to an existing file – File IO– Reading and writing structures.

UNIT - V:

Stack: LIFO concept, Stack operations, Array implementation of stack – Queue: FIFO concept, Queue operations, Array implementation of queue – Singly Linked List: concepts, operations – Doubly Linked List: concepts, operations – Trees: General trees, Binary trees.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only):
Contemporary Developments Related to the Course during the Semester Concerned.

REFERENCES:

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, Seventh Edition, 2016.

2. E.Horowitz, S.Sahni and Susan Anderson Freed, "Fundamental Data Structures in C", 2ed, Orient BlackSwan Publisher, 2009.

3. Byron S. Gottfried, "Programming with C", Schaum's Outline Series, Tata-McGraw Hill Edition, New Delhi, 1991.

4. E. Karthikeyan, "A Textbook on C Fundamentals, Data Structures and Problem Solving", Prentice-Hall of India Private Limited, New Delhi, 2008.

5. Yashavant Kanetkar, "Let us C", BPB Publications, Tenth Edition, New Delhi, 2010.

6. Szuhay, Jeff, and Szuhay, Jeff, "Learn C Programming: A Beginner's Guide to Learning C Programming the Easy and Disciplined Way", Packt Publishing, 2020.

7. Jena, Sisir Kumar, and Jena, Sisir Kumar, "C Programming: Learn to Code", CRC Press, 2021.

8. https://www.tutorialspoint.com/cprogramming/index.htm

9. https://www.w3schools.in/data-structures/intro

COURSE OUTCOMES:

CO	COURSEC OUTOME	K LEVEL
CO1	To Summarize the basic knowledge to develop C programs	K2
CO2	To Manipulate Looping, arrays and functions	K4
CO3	To Apply and write programs for solving real world problems	K3
CO4	To Create open, read, manipulate, write and close files.	K5
CO5	To Understand the basic concepts in data structures	K2

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	-	2	3	2	2	1	2
CO2	1	2	2	1	1	1	2	1	1	1
CO3	2	1	3	1	2	3	1	3	2	1
CO4	1	2	2	-	3	1	2	2	1	2
CO5	2	2	3	-	3	2	1	1	1	3

CORE PRACTICAL I

First Year **Semester I**

PROGRAMMING IN C LAB

Code: 22SCCCS1P (**Practical)** **Credit: 4**

COURSE OBJECTIVES:

- To understand the programming fundamentals of C language.
- To impart writing skill of C programming and data structures for a list of problems.
- To impart hands on training for writing a C program using computers.

1. Write a Program
   (i) To convert temperature from degree Centigrade to Fahrenheit,
   (ii) Find whether given number is Even or Odd,
   (iii) Find the greatest of three numbers.
2. Write a Program to display Monday to Sunday using switch st
3. Write a Program to display first Ten Natural Numbers and their sum.
4. Write a Program to perform Multiplication of Two Matrices.
5. Write a Program
   (i) To find the maximum number in an Array using pointer.
   (ii) To reverse a number using pointer.
   (iii) To add two numbers using pointer.
6. Write a Program to solve Quadratic Equation using functions.
7. Write a Program to find factorial of a number using Recursion.
8. Write a Program to demonstrate Call by Value and Call by Reference.
9. Write a Program to create a file containing Student Details.
10. Write a program to implement a stack using singly linkedlist, Implement Queue using Linked List.

COURSE OUTCOMES:

After completion of the course the students will be able to realize the following outcomes:

CO	COURSEC OUTOME	K LEVEL
CO1	To Relate the use of language constructs to solves impel programs	K4

CO2	To Develop programs for various concepts in C language	**K4**
CO3	To Understand and trace the execution of the list of programs	**K2**
CO4	To Understand the usage of file handling in C programming Solved at a problems related to data structures	**K2**
CO5	To Understand the basic concepts in C	**K2**

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES:

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	2	3	2	2	2	2	3
CO2	2	2	2	2	3	2	2	2	2	3
CO3	1	1	3	1	3	1	1	3	1	3
CO4	2	3	1	2	2	2	3	1	2	2
CO5	3	2	1	2	2	3	2	1	2	2

ALLIEDCOURSE I
ALGEBRA AND CALCULUS

Code: 22SCACMM2A (Theory) Credit:4

COURSEOBJECTIVES:

- To train the students to solve the problems in theory of equations
- To provide knowledge about the matrix, differentiation and various methods for evaluation of integrals.

UNIT–I:

Theory of Equations: Relation between roots & coefficients –Transformations of Equations–Diminishing, Increasing &multiplying the roots by a constant-Forming equations with the given roots–Rolle‘s Theorem, Descarte‘s rule of Signs(statement only)– simple problems.

UNIT–II:

Matrices: Singular matrices–Inverse of a non-singular matrix using adjoint method-Rankofa Matrix – Consistency - Characteristic equation, Eigen values, Eigen vectors – Cayley Hamilton‘s Theorem (proof not needed) –Simple applications only

UNIT–III:

Differentiation: Maxima & Minima– Concavity, Convexity – Points of inflexion - Partial differentiation – Euler‘s Theorem - Total differential coefficients (proof not needed)–Simple problems only.

UNIT–IV:

Integration: Evaluation of integrals of types:

$\frac{dx}{px+q}$ $\frac{dx}{\sqrt{px+q}}$ $\frac{dx}{ax^2+bx+c}$ $\frac{dx}{\sqrt{ax^2+bx+c}}$

1) $\int \frac{}{ax^2+bx+c}\,dx$ 2) $\int \frac{}{\sqrt{ax^2+bx+c}}\,dx$ 3) $\int \frac{}{a+b\cos x}$ 4) $\int \frac{}{a+b\sin x}$

Evaluation using Integration by parts–Properties of definite integrals– Fourier Series in the range $(0, 2\pi)$ – Odd & Even Functions – Fourier Half range Sine &Cosine Series.

UNIT–V:

Differential Equations: Variables Separable–Linear equations– Second order of types$(aD^2 + bD + c)y = F(x)$where a,b,c are constants and $F(x)$is one of the following types (i)e^{Kx}(ii)sin(kx) or cos(kx) (iii)x^n, n being an integer(iv)$e^{Kx}f(x)$

UNIT–VI CURRENT CONTOURS (For Continuous Internal Assessment Only): Derivatives of Implicit and parametric Functions

REFERENCES:

1. T.K.ManickavasagamPillai&others,Algebra,VolumeI,S.VPublications, 1985RevisedEdition(UnitsI,II)
2. S.Narayanan, T.K. Manicavachagam Pillai, Calculus,Vol.II,S.ViswanathanPvtLimited,2003.(Units III,IVandV)
3. M.L.Khanna,DifferentialCalculus,JaiprakashnathandCo.,Meerut-2004.

COURSE OUTCOMES:

After completion of the course the students will be able to realize the following outcomes:

CO	COURSE OUTOME	K LEVEL
CO1	Train the students to solve the problems in theory of equations.	K1
CO2	Apply Cayley Hamilton theorem for finding the inverse of square matrices.	K3
CO3	Get exposed the basic concepts of differentiation and integration.	K2
CO4	Acquire the knowledge about differential equations.	K5
CO5	Learn the concepts of second – order differential equations with constant coefficients and train the students to solve it	K4,K5

Mapping with Programme and Programme specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**2**	**3**	**3**	**1**	**2**	**2**	**1**	**2**	**3**	**2**
CO2	**1**	**2**	**2**	**1**	**1**	**3**	**2**	**3**	**1**	**2**
CO3	**2**	**1**	**3**	**1**	**2**	**1**	**3**	**2**	**3**	**2**
CO4	**1**	**2**	**2**	**2**	**3**	3	2	1	2	3
CO5	**2**	**2**	**3**	**1**	**3**	3	1	2	3	3

PART-IV VALUE EDUCATION COURSE

FOR ALL UG ARTS, SCIENCE, COMMERCE AND MANAGEMENT
CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)
(Applicable to the candidates admitted from the academic year 2022-2023 onwards)

First Year | PART-IV | Semester-I

VALUE EDUCATION

Code: 22UGVED | (Theory) | Credit: 2

OBJECTIVES:

- To understand the philosophy of life and values through Thirukural To analyse the components of values education to attain the sense of citizenship.
- To understand different types of values towards National Integration and international understanding.
- To learn yoga as value education to promote mental and emotional health.
- To understand human rights, women rights and other rights to promote peace and harmony.

UNIT I: PHILOSOPHY OF LIFE AND SOCIAL VALUES:

Human Life on Earth (Kural 629) -Purpose of Life (Kural 46) -Meaning and Philosophy of Life (Kural 131, 226) -Family (Kural 45), Peace in Family (Kural 1025) Society (Kural 446), The Law of Life (Kural 952), Brotherhood (Kural 807) Five responsibilities / duties of Man (a) to himself (b) to his family (c) to his environment (d) to his society, (e) to the Universe in his lives (Kural 43, 981).

UNIT-II – HUMAN VALUES AND CITIZENSHIP

Aim of education and value education: Evolution of value oriented education, Concept of Human values: types of Values- Character Formation – Components of Value education- A P J Kalam's ten points for enlightened citizenship- The role of media in value building.

UNIT-III VALUE EDUCATION TOWARDS NATIONAL AND GLOBAL DEVELOPMENT:

Constitutional or national values: Democracy, socialism, secularism, equality, Justice, liberty, freedom and fraternity - Social Values: Pity and probity, self-control, universal brotherhood - Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith -

Religious Values: Tolerance, wisdom, character – Aesthetic Values- Love and appreciation of literature and fine arts and respect for the same- National Integration and International Understanding.

UNIT IV: YOGA AND HEALTH:

Definition, Meaning, Scope of Yoga - Aims and objectives of Yoga – Yoga Education with modern context - Different traditions and schools of Yoga – Yoga practices: Asanas, Pranayama and Meditation.

UNIT V: HUMAN RIGHTS:

Concept of Human Rights: Indian and international perspectives- Evolution of Human Rights- definitions under Indian and International documents –Broad classification of Human Rights and Relevant Constitutional Provisions: Right to
Life, liberty ad Dignity- Right to equality- Right against exploitation- Cultural and Educational Right- Economic Rights- Political Rights- Social Rights - Human Rights of Women and Children – Peace and harmony.

UNIT - VI: CURRENT CONTOURS: (for continuous internal assessment only):

BOOKS FOR REFERENCES:

1. Thirukkural with English Translation of Rev. Dr. G.U. Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613 004.
2. திருக்குறள் - ஜி.யு.போப் - ஆங்கில மொழியாக்கத்துடன் உமா நூல், வெளியீட்டகம், தஞ்சாவூர்
3. Leah Levin, Human Rights, NBT, 1998
4. V.R. Krishna Iyer, Dialetics and Dynamics of Human Rights in India, Tagore Law Lectures.
5. Yogic Thearpy - Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry of Health, New Delhi.
6. SOUND HEALTH THROUGH YOGA - Dr.K.Chandrasekaran, Prem Kalyan Publications, Sedaptti, 1999.
7. Grose. D. N – "A text book of Value Education' New Delhi (2005)
8. Gawande . EN – "Value Oriented Education" – Vision for better living. New Delhi (2002) Saruptsons.
9. Brain Trust Aliyar- "Value Education for Health, Happiness and Harmony" Erode (2004) Vethathiri publications.

COURSE OUTCOMES: After completion of the course, the student will be able to:

CO	COURSE OUTCOME	K LEVEL

CO1	Apply the values in thirukural to be peaceful, dutiful and responsible in family and society.	K3
CO2	Develop character formation and sense of citizenship.	K3
CO3	Be secular, self-control, sincere, respectful and moral.	K2
CO4	Master yoga, asana and meditation to promote mental health.	K2
CO5	Be attitudinal to follow the constitutional rights.	K1

Mapping with Programme and Programme specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	-	-	1	2	-	2	3	3	3	2
CO2	2	-	-	2	-	2	2	2	3	3
CO3	2	-	-	2	-	3	2	2	3	2
CO4	3	-	-	2	-	3	3	3	2	3
CO5	-	-	1	-	-	3	3	3	2	2

FirstYear **CORECOURSEII**

PROGRAMMING IN JAVA **Semester II**

Code: 22SCCCS2(Theory) **Credit:5**

COURSEOBJECTIVES:

- To acquire the programming skills with java.

- To implement the object-oriented concepts with java language
- To learn the art of GUI programming with Applet.

UNIT-I:

Foundation,Essentials,ControlStatementandClasses & Objects, Stage ofJava–origin of Java – challenges - features - Object-Oriented Programming;JavaEssentials:Elements-API-variables- primitive data types – StringClass-operators–combinedassignmentoperators-conversion–scope–comments-keyboardinput;ControlStatements:if,if-else,nestedif&if-else-ifstatements–logicaloperators–comparison–conditionaloperator–switch–increment and decrement – while, do-while & for loops – nested loops – breakandcontinue;ClassesandObjects:classesandobjects-modifiers-passingarguments–constructors-package&import-staticclassmembers–methodoverloading–constructoroverloading –returning objects – thisvariable–recursion–nested&innerclasses–abstractclasses&methods.

UNIT-II:

Arrays,StringHandling,Inheritance,InterfaceandPackages,Introduction–processingarray–passingarrays–returningarrays–Stringarrays–twoDimensional Arrays - Arrays with Three or More Dimensions; StringHandling:Stringclass – concatenation– comparison –substring–methods –othermethods–StringBuffer,StringBuilder&StringTokenizerclasses;Inheritance:basics–inheritingandoverridingsuperclassmethods–callingsuperclassconstructor–polymorphism–inheritfrom different classes –abstractclasses – final Class; Interfaces: Basics – multiple Interfaces –multipleinheritanceusinginterface–multilevel interface–Packages – CreateandaccesspackagesinNetBeansIDE – static Import and package class –accessspecifiers.

UNIT-III:

ExceptionHandling,I/OandFileHandlingandMultithreading,Introduction

-tryandcatch block - multiple catch block - nested try - finally Block – throw Statement – exception propagation – throw Clause - custom exception–built-in exception; Multithreading: Introduction – threads – thread creation– life cycle – joining a thread – scheduler &priority – synchronization – inter-threadcommunication–thread control – thread Pool – thread group – daemonthread;FilesandI\OStreams:fileClass–streams – bytestreams–filteredbytestreams–RandomAccessFileclass–characterstreams.

UNIT-IV:

AppletandGUIPartI,Fundamentals– applet class – life cycle – steps forappletprogram–passingvaluesthroughparameters– graphics – eventhandling;GUII:GUI–creatingwindows– dialog boxes – layout managers –AWTcomponentclasses–Swingcomponent classes– applicationsofAWTcontrols.

UNIT-V:

GUIPartIIandJavaDatabaseConnectivity,Eventhandling– AWTcomponents – AWT graphics classes – Swing controls – application usingSwing and AWT; Java Database Connectivity:types of drivers – JDBCarchitecture – JDBC classes &interfaces – steps in JDBC applications –creatinganewDatabaseandtablewithJDBC.

UNIT–VI CURRENTCONTOURS (Forcontinuous internalassessmentonly)

ContemporaryDevelopmentsRelatedtotheCourseduringtheSemesterConcerned.

REFERENCES:

1. S. Sagayaraj, R. Denis, P. Karthik&D. Gajalakshmi, "ConstructiveJavaProgramming",UniversitiesPress,2021.
2. E.Balagurusamy,"ProgrammingwithJAVA",TataMcGrawHill,NewDelhi,2019.
3. C.Muthu,"ProgrammingwithJAVA",VijayNicoleImprintsPrivateLimited,Chennai,SecondEdition,2011.
4. BruceEckel,ChuckAllison,"ThinkinginJava",PrenticeHallPublications,2006
5. MalinaPronto,"Java:How ToLearnJavaProgramming:How To ImproveYourJavaCodingIn2020/2021:5ProgrammingLanguagesTo LearnForBeginnersInTech",IndependentlyPublished,2020.
6. NickSamoylov,"LearnJava12Programming:AStep-by-stepGuidetoLearningEssentialConceptsinJava",PacktPublishing,2019.
7. https://www.javatpoint.com/java-tutorial

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COURSEOUTCOMES (CO)

After completion of the course the students will be able to realize the followingoutcomes:

CO	COURSEC OUTOME	K LEVEL
CO1	Understand the concept of OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.	K1
CO2	Identifymembersofaclassandtoimplementthem.	K1
CO3	Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and properprogramstructuring(e.g.,by using access controlidentifies,and create user define package for specific task (reusability concepts)error exception handling).	K2
CO4	DevelopprogramsusingtheJavastandardclasslibrary.	K3
CO5	DevelopsoftwareusingJavaprogramminglanguage,(usingapplet,AWTcontrols, andJDBC).	K4,K5

Semester: II	Core Course: II	Programming in JAVA	Credit: 5	Allotted hours per week: 5

Mapping with Programme and Programme specific Outcomes:

PSO-PO-CO MAPPING MATRIX										
PO & PSO / CO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03	PSO04	PSO05
CO01	2	2	3	2	2	3	1	2	3	2
CO02	1	2	2	1	2	3	2	1	3	3
CO03	2	2	3	1	2	3	1	2	3	2
CO04	1	2	2	-	3	3	2	2	2	3

CO05	**2**	**2**	**3**	**2**	**3**	3	3	2	2	2

FirstYear **COREPRACTICAL**

PROGRAMMINGINJAVALAB SemesterII

Code:22SCCCS2

(Practical)Credit:4COURSEOBJECTIVES:

- TounderstandthebasicsofJAVAprogramsandtheirexecution.
- Tolearnconceptslikeinheritance,packagesandinterfaces.
- Tounderstandthelifecycleoftheapplets,databaseconnectivityandtheirfunctionality.

1. Writeaprogramtosortthegivennumbersusingarrays.
2. Writeaprogramtoimplementthe FIND and REPLACE operations inthegiventext.
3. WriteaprogramtoimplementacalculatortoperformbasicarithmeticOperations,doingwithconstructers
4. Write a program to find the student's percentage and grade usingcommandlinearguments.
5. Writeaprogramtodrawcircleortriangleorsquareusingpolymorphismandinheritance.
6. Implementmultipleinheritanceconceptsinjavausing interface,youcanchooseyourownexampleofacompanyoreducationinstitution or a general concept which requires the use of interfacetosolveaparticularproblem.
7. Writeaprogramtocreatethreadsandperformoperations like start,stop,suspend,resume
8. Write a program to develop an applet to play multiple audio clipsusingmultithreading.
9. Writeaprogramtoretrieveemployeedatafromafile
10. WriteaprogramtoretrievestudentdatafromaDatabase

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COURSEOUTCOMES (CO)

After completion of the course the students will be able to realize the followingoutcomes:

CO	COURSEC OUTOME	K LEVEL
CO1	Understand the concept of OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.	K1
CO2	Identifymembersofaclassandtoimplementthem.	K1
CO3	Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and properprogramstructuring(e.g.,by using access controlidentifies,and create user define package for specific task (reusability concepts)error exception handling).	K2
CO4	DevelopprogramsusingtheJavastandardclasslibrary.	K3
CO5	DevelopsoftwareusingJavaprogramminglanguage,(usingapplet, AWTcontrols, andJDBC).	K4,K5

Mapping with Programme and Programme specific Outcomes:

PSO-PO-CO MAPPING MATRIX										
PO & PSO / CO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03	PSO04	PSO05
CO01	2	2	2	3	3	3	2	2	3	2
CO02	2	2	1	3	3	3	2	2	3	3
CO03	2	2	2	2	2	3	2	2	3	2
CO04	2	2	2	3	3	3	3	2	2	3
CO05	2	2	3	2	2	3	2	2	2	2

PROFESSIONAL ENGLISH FOR PHYSICAL SCIENCE -I [PART-III - ADDONCOURSE]

UNIT1:COMMUNICATION

1. **Listening**:Listeningtoinstructions

2. **Speaking**:Telephoneetiquette andOfficialphoneconversations

3. **Reading** short passages (3 passages, one from each – Physics, Chemistry,Mathematics/ComputerScience)

5. **Writing:** LettersandEmailsinprofessionalcontext

6. **GrammarinContext:**

- Wh and yes orno,
- Qtags
- Imperatives

7.**VocabularyinContext:**Wordformation-

i) CreatingantonymsusingPrefixes
ii) Intensifyingprefixes(E.g inflammable)

Changingwordsusingsuffixes

A) NounEndings
B) AdjectiveEndings
C) VerbEndings

UNIT2:DESCRIPTION

Listening–Listeningtoprocessdescription

Speaking- Roleplay

Formal:Withfacultyandmentorsinacademicenvironment,workplacecommunication
Informal: With peers in academic environment, workplacecommunication
Reading–Readingpassagesonproducts,equipmentandgadgets

Writing–Writing sentencedefinitions(e.g.computer) andextended definitions(e.g. artificialintelligence)
PictureDescription–DescriptionofNaturalPhenomena

Grammarin Context: Connectives andlinkers.

Vocabulary –Synonyms(register)-Compare&contrastexpressions.

UNIT3:NEGOTIATION STRATEGIES

Listening-Listeningtointerviewsofspecialists/inventorsinfields(Subjectspecific)

Speaking–Brainstorming.(mindmapping).Smallgroupdiscussions(subject-specific)

Reading– longerReading text.(Comprehensivepassages)

Writing – Essay Writing (250-word essay on topics related to subject area, likepollution, use of pesticides in cultivation, merits and demerits of devices likemobilephones, meritsand demerits oftechnologyin development)

GrammarinContext: Activevoice&Passivevoice–Ifconditional-Collocations–Phrasalverbs

UNIT4:PRESENTATION SKILLS

Listening-Listeningtopresentation.Listeningtolectures.Watching–documentaries (discovery/ historychannel)

Speaking –Shortspeech

-Makingformalpresentations(PPT)

Reading–Readingawrittenspeechbyeminentpersonalitiesintherelevant field/Short poems / Short biography.

Writing-WritingRecommendations

Interpretingvisuals-charts /tables/flowdiagrams/charts
GrammarinContext–Modals

Vocabulary (register)-Singlewordsubstitution

UNIT5:CRITICALTHINKINGSKILLS

Listening -Listeningtoadvertisements/newsandbriefdocumentaryfilms(withsubtitles)

Speaking –Simpleproblemsandsuggestingsolutions.

Reading:MotivationalstoriesonProfessionalCompetence,ProfessionalEthicsandLife Skills (subject-specific)

WritingStudyingproblemandfinding solutions-(Essayin200 words)

Grammar-Makesimple sentences

Vocabulary -Fixedexpressions

COURSEOUTCOMES (CO)

After completion of the course the students will be able to realize the followingoutcomes:

CO	COURSEC OUTOME	K LEVEL
CO1	Developthelanguageskillsofstudentsbyofferingadequatepracticeinprofessionalcontexts.	K1
CO2	Enhancethelexical,grammaticalandsocio-linguisticandcommunicativecompetenceoffirstyearphysicalsciencesstudents.	K1
CO3	Focusondevelopingstudents'knowledgeofdomainspecificregistersand therequired languageskills.	K2
CO4	Developstrategiccompetencethatwillhelp inefficientcommunication.	K3
CO5	Sharpenstudentscriticalthinkingskillsandmakestudentsculturallyaware ofthetarget situation.	K4,K5

Mapping with Programme and Programme specific Outcomes:

PSO-PO-CO MAPPING MATRIX										
PO & PSO / CO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03	PSO04	PSO05
CO1	2	3	2	2	2	3	2	2	3	2
CO2	2	2	2	1	1	1	2	1	3	3
CO3	2	1	3	1	2	3	1	3	3	2
CO4	1	2	2	2	3	1	2	2	2	3
CO5	2	2	2	2	3	2	2	3	2	2

NUMERICALANALYSISAND PROBABILITY

Code: 22SCACMM2B **(Theory)** **Credit:2**

COURSEOBJECTIVES:

- Tolearn knowledgeaboutan algebraicandtranscendental equations.
- Tomakethestudentsgainwideknowledgeinprobabilitywhichplaysamainroleinsolvingreal lifeproblems.

UNIT–I:

Algebraic&Transcendentalequations:BisectionMethod,NewtonRaphsonMethod, Iteration method - Finite differences – Forward, Backward differences – Newton‘sforward&backwarddifferenceinterpolationformulae– Lagrange‘sinterpolatingpolynomial.

UNIT–II:

Numericaldifferentiation-NumericalIntegrationusingTrapezoidalruleandSimpson‘s first & second rules (proof not needed) - Solutions to Linear Systems –Gaussian Elimination Method – Jacobi & Gauss Siedal iterative methods –Theoryandproblems.

UNIT–III:

Numerical solution of ODE: Solution by Taylor Series Method, Euler‘s Method,Runge - Kutta 2nd order method- Adam‘s Predictor Corrector Method and Milne‘sPredictorCorrectorMethods.

UNIT–IV:

Arithmetic Mean – Geometric Mean – Harmonic Mean - Median, Mode, StandardDeviation-QuartileDeviation–Percentiles-Expectation– Varianceandcovariance.

UNIT–V:

CorrelationandRegression–PropertiesofSimpleCorrelationandregressioncoefficients– SimpleNumericalProblemsonly.

REFERENCES:

1. S.S.Sastry,NumericalAnalysis(Unit1,2,3)
2. Gupta.S.C&Kapoor,V.K,FundamentalsofMathematicalStatistics,SultanChand&sons,NewDelhi-1994.(Units4&5)
3. M.K.Jain,S.R.K.IyengarandR.K.Jain,NumericalMethodsforScientificandEngineeringComputation,NewAgeInternationalPrivateLimited,1999.
4. C.E.Froberg,IntroductiontoNumericalAnalysis,IIEdn.,AddisonWesley,1979.

COURSEOUTCOMES (CO)

After completion of the course the students will be able to realize the following outcomes:

CO	COURSEOUTOMES	K LEVEL
CO1	Solve algebraic and transcendental equations.	K 3
CO2	Apply the various methods of Numerical differentiationand Integration.	K3
CO3	Getexposedthebasicconceptsof mean, median and mode.	K2
CO4	Understand thestudentstosolvetheproblems of CorrelationandRegression.	K2
CO5	Appreciatetheimportanceofprobabilityofrandomvariablesandunderstandthecorrelationandregressioncoefficients.	K4

MappingwithProgramme Outcomes and Programme SpecificOutcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**3**	**2**	**3**	**2**	**1**	**2**	**3**	**3**	**3**	**2**
CO2	**3**	**2**	**3**	**1**	**2**	**2**	**2**	**2**	**3**	**3**
CO3	**1**	**3**	**1**	**2**	**2**	**3**	**2**	**2**	**3**	**2**
CO4	**2**	**2**	**1**	**3**	**3**	**3**	**3**	**3**	**2**	**3**
CO5	**2**	**1**	**2**	**3**	**2**	**3**	**3**	**3**	**2**	**2**

ALLIEDCOURSEIII
OPERATIONSRESEARCH

Code: 22SCACMM2C **(Theory)** **Credit:4**

COURSEOBJECTIVES:

- Tolearnthebasic concepts about Linear Programming Problem,TransportationProblemAssignmentProblem,Sequencing Problem andNetwork.
- TomakestudentssolvereallifeproblemsinBusinessandManagement.

UNIT–I:

OperationsResearch:Introduction-BasicsofOR–OR&decisionmaking–Roleof Computers in OR - Linear programming formulations & graphical solution oftwovariables–Canonical&standardformsofLPP

UNIT–II:

Simplex Method: Simplex Method for <, =, > constraints – Charne‘s method ofpenalties–TwophaseSimplexmethod.

UNIT–III:

Transportationproblem:Transportationalgorithm–Degeneracyalgorithm– DegeneracyinTransportationProblem,Unbalancedtransportationproblem-Assignmentalgorithm–UnbalancedAssignmentproblem

UNIT–IV:

Sequencing problem: Processing of n jobs through two machines – Processing of njobsthrough3machines–processingoftwojobsthroughmmachines.

UNIT–V:

Networks: Network – Fulkerson‘s rule - measure of activity – PERT computation – CPMcomputation-Resourcescheduling.

REFERENCES:

1. Manmohan&Gupta,OperationsResearch,SultanChandPublishers,NewDelhi
2. PremKumarGuptaandD.S.Hira,OperationsResearch:AnIntroduction,
3. S.ChandandCo.,Ltd.NewDelhi,
4. Hamdy A. Taha, Operations Research (7th Edn.), McMillan PublishingCompany,NewDelhi,1982.

COURSEOUTCOMES (CO)

After completion of the course the students will be able to realize the following outcomes:

CO	COURSEC OUTOME	K LEVEL
CO 1	AcquirethebasicconceptsofLPP.	K 2
CO2	Apply variousmethodsforfindingasolutionofan LPP.	K3
CO3	Categorize the various simplex methods.	K2
CO4	Evaluate transportationand degeneracyalgorithms.	K4
CO5	UsethebasicconceptsofTP,APandNetworkProblemstodeveloptheproblemsolvingskills.	K3

MappingwithProgramme Outcomes and Programme SpecificOutcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**3**	**2**	**2**	**3**	**1**	**2**	**3**	**1**	**1**	**2**
CO2	**2**	**1**	**2**	**3**	**2**	**1**	**2**	**1**	**3**	**3**
CO3	**2**	**3**	**2**	**1**	**2**	**3**	**2**	**2**	**3**	**2**
CO4	**1**	**2**	**2**	**3**	**2**	**1**	**3**	**1**	**2**	**3**
CO5	**2**	**2**	**1**	**2**	**2**	**2**	**3**	**3**	**1**	**1**

FirstYear **PART-IV** **Semester-II**

ENVIRONMENTALSTUDIES

(Theory) **Credit:2**

COURSEOBJECTIVES:

- Toappreciate thescope of Environmental Studies, Community ecology andthe interdisciplinarynatureofenvironmentalissues
- TohaveabasicknowledgeofNaturalresourcesitsclassification,concepts,andnatural resources of India.
- The course designed to gain knowledge on values of biodiversity and conservation on global,national, and local scales
- Tostudyaboutsourcesandeffectsofenvironmentalpollutionlikeair,water,soil,thermal, marine, nuclear and noise
- TounderstandtheconcernsrelatedtoSustainableDevelopmentonenvironmentandhealth
- To introduce the students in the field of Law and Policies and Acts both at the national and international level relating to environment.

UNIT-1: TheMultidisciplinarynatureofenvironmentalstudies

Definition, scope and importance. (2lectures)
Need for public awareness

UNIT-2: NaturalResources:

Renewableandnon-renewableresources:

Naturalresourcesandassociatedproblems.

a) Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effectson forests and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, damsbenefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extractingand using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Casestudies.

f) Land resources: Land as a resources, land degradation, man induced Landslides, soil erosion and desertification.

- Roleofanindividualinconservationof naturalresources.
- Equitableuseofresourcesforsustainablelifestyles.

(8lectures)

Unit:3 Ecosystems

- Concept ofanecosystem.
- Structureandfunctionofanecosystem.
- Producers,consumersanddecomposers
- Energyflowintheecosystem
- Ecologicalsuccession.
- Foodchains,foodwebsandecologicalpyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem:-
- a.Forest ecosystem
- b.Grasslandecosystem
- c.Desertecosystem
- d.Aquatic ecosystems, (ponds,streams,lakes,rivers,oceans,estuaries)

(6lectures)

Unit:4 Biodiversityanditsconservation

- Introduction–Definition:Genetic,speciesandecosystemdiversity
- BiogeographicalclassificationofIndia
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversityatglobal,Nationalandlocallevels
- Indiaasamega-diversitynation
- Hot-spotsof biodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- EndangeredandendemicspeciesofIndia
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- BiologicalDiversityAct2002/BDRules,2004

(8lectures)

Unit:5 EnvironmentalPollution

Definition

Causes,effectsandcontrolmeasuresof :

a. AirPollution
b. WaterPollution
c. Soil Pollution
d. MarinePollution
e. Noisepollution
f. ThermalPollution
g. Nuclearhazards

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

- Roleofanindividualinpreventionof pollution
- Pollutioncase studies
- Disastermanagement:floods,earthquake,cyclone andlandslides.
- Ill-EffectsofFireworks:Fireworkand Celebrations,HealthHazards, TypesofFire,FireworkandSafety

(8lectures)

Unit:6 SocialIssuesandtheEnvironment

- From Unsustainable toSustainable development.
- Urbanproblemsrelatedtoenergy.
- Waterconservation,rainwaterharvesting,watershedmanagement.
- Resettlement and rehabilitation of people; its problems and concerns. Case studies
- Environmentalethics:Issuesandpossiblesolutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerismandwasteproducts.
- EnvironmentProtectionAct.
- Air(PreventionandControlofPollution)Act.
- Water(PreventionandControlofPollution) Act.
- WildlifeProtectionAct.
- ForestConservationAct.
- Issuesinvolvedinenforcementofenvironmentallegislation
- Publicawareness.

(7lectures)

Unit:7 HumanPopulationandtheEnvironment

- Populationgrowth,variationamong nations.
- Populationexplosion–FamilyWelfareProgrammes
- Environmentandhumanhealth
- HumanRights-Value Education

- HIV/ AIDS-WomenandChildWelfare
- RoleofInformationTechnologyinEnvironmentandhumanhealth
- Case studies.

Unit:8 FieldWork

- Visit to a local area to documentenvironmental assets-river / forest/ grassland/ hill / mountain

References:

1. Agarwal,K.C.2001Environmental Biology,NidiPublicLtdBikaner.
2. BharuchaErach, The Biodiversityof India, Mapin PublishingPvt ltd, Ahamedabad – 380013, India, E-mail: mapin@icenet.net(R)
3. BrunnerR.C.1989,HazardousWasteIncineration,McGrawHillInc480p
4. ClarkR.S.MarinePollution,ClandersonPressOxford(TB)
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8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. StockholmEnv. Institute Oxford University,Press 473p.
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11. Jadhav, H &Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub. House, Delhi 284 p.
12. Mckinney, M.L. &Schoch R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition 639 p.
13. Mhaskar A.K.MatterHazardous,Techno-SciencePublications(TB)
14. MillerT.G.Jr.EnvironmentalScience,WadsworthPublishingCo.(TB)
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16. Rao MN &Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt Ltd 345 p.
17. SharmaB.K.2001EnvironmentalchemistryGoelPublHouse,Meerut.
18. SurveyoftheEnvironment,TheHindu(M).
19. Townsend C. Harper, J and Michael Begon, Essentials of Ecology, Blackwell science (TB)
20. TrivediR.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R).
21. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB).
22. Wagner K.D. 1998 EnvironmentalManagement. W.B. Saunders Co. Philadelphia USA 499 p (M) Magazine (R) Reference (TB) Textbook

COURSEOUTCOMES (CO)

After completion of the course the students will be able to realize the followingoutcomes:

CO	COURSEC OUTOME	K LEVEL
CO1	Understandtheenvironmentalimportanceincludinginteractionsacrosslocaltoglobalscales.	K1
CO2	Thelearnerstoupdateandanalyzeenvironmentalrelationshipsandinteractionsof environmental components.	K1
CO3	Thestudenttogainknowledgeonimportanceofnaturalresourcesinasystematicway.	K2
CO4	The course content is introducing the concept ofrenewable and non-renewable energy resources and its scenario in India and at global level.	K3
CO5	The studentswillknow the relationship between biodiversity and ecosystem functions, direct and indirect values of biodiversity resources and their bioprospecting opportunities.	K4,K5

Mapping with Programme and Programme specific Outcomes:

PSO-PO-CO MAPPING MATRIX										
PO & PSO / CO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03	PSO04	PSO05
CO1	-	-	-	2	-	2	3	3	3	2
CO2	2	-	2	2	-	2	2	2	3	3
CO3	1	-	-	-	-	3	2	2	3	2
CO4	-	-	1	2	-	3	3	3	2	3
CO5	1	-	-	3	-	3	3	3	2	2

Second Year CORECOURSEIII SemesterIII

PROGRAMMING IN PYTHON

Code:22SCCCS3 (Theory)

Credit:5COURSEOBJECTIVES:

- Todevelopprogramsusingfunctionsandpassargumentsin Python.
- Towriteprogramsusingloopsanddecisionstatementsin Python.
- TodesignandprogramPythonapplications.

UNIT-I:

IntroductiontoPython:FeaturesofPython-HowtoRunPython-Identifiers-ReservedKeywords-Variables-CommentsinPython-Indentation inPython-Multi-LineStatements- Multiple StatementGroup(Suite)-QuotesinPython-Input,OutputandImportFunctions-Operators.DataTypesandOperations:Numbers–Strings–List–Tuple
–Set–Dictionary–Datatypeconversion.

UNIT-II:

FlowControl:DecisionMaking–Loops–NestedLoops–Types ofLoops. Functions: Function Definition – Function Calling -Function Arguments-Recursive Functions - Function with morethanonereturnvalue.

Unit-III:

Modules and Packages: Built-in Modules - Creating Modules - importStatement-LocatingModules-NamespacesandScope-Thedir()function -The reload()function - Packages in Python - Date andTimeModules.FileHandling-DirectoriesinPython.

UNIT-IV:

Object-OrientedProgramming:ClassDefinition-CreatingObjects-Built-in Attribute Methods - Built-in Class Attributes- DestructorsinPython–Encapsulation-DataHiding–Inheritance-MethodOverriding-Polymorphism.

UNIT-V:

ExceptionHandling:Built-inExceptions-Handling Exceptions-ExceptionwithArguments-Raising Exception - User-definedException-AssertionsinPython.RegularExpressions:Thematch()function-Thesearch()function-SearchandReplace-RegularExpressionModifiers:OptionFlags-RegularExpressionPatterns-CharacterClasses-SpecialCharacterClasses-Repetition Cases - findall()method-compile()method.

UNIT–VI CURRENT CONTOURS (Forcontinuousinternalassessmentonly):

AnIntroduction toInteractive Programming in Python - Study on Julia – anhighlevel language approach.

REFERENCES:

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2. MarkSummerfield.—ProgramminginPython3:ACompleteintroductiontothePythonLanguage,Addison-WesleyProfessional,2009.
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5. Timothy A Budd, "Exploring Python", Tata McGraw Hill, New Delhi,2011
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8. GuidovanRossumandFredL.DrakeJr, —AnIntroductiontoPython– RevisedandupdatedforPython 3.2, NetworkTheory Ltd.,2011.

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COURSEOUTCOMES (CO)

After completion of the course the students will be able to realize the followingoutcomes:

CO	COURSEC OUTOME	K LEVEL
CO1	Torecalland understandthe featuresofpythonprogramming language.	K1
CO2	Toillustratevariousprogrammingmechanismusedinpython.	K1
CO3	Toapplyvariouslanguageconstructtowritesimpleprogramsin python.	K2
CO4	Toexaminetheapplicationofobject- orientedconceptinpython.	K3
CO5	Todistinguishthevariousconstructsusedinpython	K4,K5

. **Mapping with Programme and Programme specific Outcomes:**

PSO-PO-CO MAPPING MATRIX										
PO & PSO / CO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03	PSO04	PSO05
CO01	2	2	3	-	2	2	3	3	3	2
CO02	1	2	2	1	2	2	2	2	3	3
CO03	2	2	3	1	2	3	2	2	3	2
CO04	1	2	2	-	3	3	3	3	2	3
CO05	2	2	3	-	3	3	3	3	2	2

SecondYear **COREPRACTICALIII** **SemesterIII**

PROGRAMMING IN PYTHON LAB

Code: 22SCCCS3P **(Practical)** **Credit:4**

COURSEOBJECTIVES:

- Towrite, test, and debugsimplePython programs.
- ToimplementPythonprogramswithconditionalsandloops.
- TorepresentcompounddatausingPythonlists,tuples,anddictionaries.

1. Flowcontrols,FunctionsandStringManipulation
2. OperationsonTuplesandLists
3. Operationonsets
4. OperationsonDictionary
5. SimpleOOP–Constructors–createaclassforrepresentingacar
6. MethodOverloading–createclassesforvehicleandBusanddemonstratemethodoverloading
7. Files–ReadingandWriting–performthebasicoperationofreadingandwritingwithstudentfile
8. RegularExpressions
9. Modules
10. Packages
11. ExceptionHandling

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COURSEOUTCOMES (CO)

Semester: III	Core Practical: III	Programming in Python Lab	Credit: 4	Allotted hours per week: 4

CO1: Write simple programsusing controlstructures, functions andstrings.
CO2: Developprogramsusingtuples,lists,setsanddictionary.
CO3: Write simple programs using Constructors, Method overloading andinheritance.
CO4: Developprogramsusingfilesandregularexpressions
CO5: Writesimpleprogramsusingpackagesandexceptionhandling.

PSO-PO-CO MAPPING MATRIX										
PO & PSO CO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03	PSO04	PSO05
CO01	2	2	1	2	2	2	3	3	3	2
CO02	2	1	2	3	2	2	2	2	3	3
CO03	2	2	2	1	1	3	2	2	3	2
CO04	3	3	1	3	3	3	3	3	2	3
CO05	3	2	1	3	1	3	3	3	2	2

PROFESSIONAL ENGLISH FOR PHYSICAL SCIENCE-II [PART-III-ADDON COURSE]

Unit1-CommunicativeCompetence

Listening–Listeningtotwotalks/lecturesbyspecialistsonselectedsubject specific topics -(TED Talks) and answering comprehension exercises (inferentialquestions)

Speaking:Smallgroupdiscussions(thediscussionscouldbebasedonthe listeningandreadingpassages-openendedquestions

Reading: Two subject-based reading texts followed by comprehension activities/exercises

Writing: Summary writing based on the reading passages.

Grammarandvocabularyexercises/taskstobedesignedbasedonthe discoursepatternsofthelisteningandreadingtextsinthebook.Thisis applicableforalltheunits.

Unit2-PersuasiveCommunication

Listening:listeningtoaproductlaunch-sensitizinglearnerstothenuances of persuasivecommunication

Speaking: debates – Just-A Minute Activities

Reading: reading texts on advertisements (on products relevant to the subject areas) and answering inferential questions

Writing: dialogue writing- writing an argumentative /persuasive essay.

Unit3-DigitalCompetence

Listening to interviews (subject related)

Speaking:Interviewswithsubjectspecialists(using videoconferencingskills)

Creating Vlogs (How to become a vlogger and use vlogging to nurture interests – subject related)

Reading:Selectedsample ofWebPage(subjectarea)

Writing:CreatingWebPages

Reading Comprehension: Essay on Digital Competence for Academic and Professional Life.

TheessaywilladdressallaspectsofdigitalcompetenceinrelationtoMS Officeandhowtheycanbeutilizedinrelationtoworkinthesubjectarea

Unit4-CreativityandImagination)

Listeningtoshort(2to5minutes)academicvideos(preparedbyEMRC/ other MOOC videos on Indi https://www.youtube.com/watch?v=tpvicScuDy0)

Speaking:Makingoralpresentationsthroughshortfilms–subjectbased

Reading:EssayonCreativityandImagination(subjectbased)

Writing – Basic Script Writing for short films (subject based)

- Creatingblogs,flyersandbrochures(subjectbased)
- Postermaking–writingslogans/captions (subjectbased)

Unit5-WorkplaceCommunication&BasicsofAcademicWriting

Speaking: Short academic presentation using PowerPoint

Reading&Writing:ProductProfiles,Circulars,MinutesofMeeting.

Writinganintroduction,paraphrasing Punctuation (period, question mark, exclamation point, comma, semicolon, colon, dash, hyphen, parentheses, brackets, braces, apostrophe, quotation marks, and ellipsis Capitalization (use of upper case)

Semester: III	Add-on Course: II	Professional English for Physical Science -II	Credit: 4	Allotted hours per week: 6

COURSE OUTCOMES :

After completion of the course the students will be able to realize the followingoutcomes:

CO	COURSEC OUTOME	K LEVEL
CO 1	DeveloptheircompetenceintheuseofEnglishwithparticularreference totheworkplacesituation.	K1
CO 2	Enhancethecreativityofthestudents,whichwillenablethemtothinkof innovativewaystosolveissuesintheworkplace.	K1

CO 3	Developtheircompetenceandcompetitivenessandtherebyimprove their employabilityskills.	**K2**
CO 4	Helpstudentswitharesearchbentofminddeveloptheirskillsinwriting reportsandresearchproposals.	**K3**
CO 5	Demonstrate basic understanding of present conclusions effectively, orally, and in writing	**K4,K5**

PSO-PO-CO MAPPING MATRIX										
PO & PSO CO	**PO01**	**PO02**	**PO03**	**PO04**	**PO05**	**PSO01**	**PSO02**	**PSO03**	**PSO04**	**PSO05**
CO1	**2**	**2**	**2**	**2**	**3**	2	3	3	3	2
CO2	**2**	**2**	**2**	**2**	**3**	2	2	2	3	3
CO3	**1**	**1**	**3**	**1**	**3**	3	2	2	3	2
CO4	**2**	**3**	**1**	**2**	**2**	3	3	3	2	3
CO5	**3**	**2**	**1**	**2**	**2**	3	3	3	2	2

ALLIED COURSE I

APPLIED PHYSICS I

Code: **(Theory)** **Credit: 4**

COURSE OBJECTIVES:

- To bring out the subjects related with the computer field which help students to keeppace with these topics.
- To make the students understand the basic concepts of current electricity alternatingcurrent and the related laws.
- To enable the learners to acquire knowledge about four different number systems,conversion, Boolean algebra, Logic gates and semiconductor memories.

UNIT – I CURRENT ELECTRICITY:

Ohm's Law- Verification of Ohm's Law-Kirchhoff's law- Applications of Kirchhoff's law Wheat stone's bridge - Metre bridge- Carey Foster's bridge- Potentiometer Measurement of Current and Resistance- Calibration of low range Voltmeter.

UNIT – II ALTERNATING CURRENT:

AC circuits with double components – measurement of current and voltage – power in an AC Circuit-Power Factor (derivation)- Wattless current – Choke - series and parallel resonant circuits - Impedance-Q factor- Sharpness of resonance.

UNIT - III NUMBER SYSTEMS CODES AND LOGIC GATES:

Number Systems - Conversions - Binary: Addition, Subtraction, Multiplication, Division- 8421 Code - BCD Code - Excess 3 code - Gray code - Binary to Gray and Gray to Binary Conversion - ASCII code – Basic and Derivative Gates: AND, OR, NOT, NAND, NOR, EX-OR - NAND & NOR as Universal Gates.

UNIT – IV BOOLEAN ALGEBRA, ARITHMETIC AND COMBINATIONAL LOGICCIRCUITS:

Basic laws of Boolean algebra - De Morgan's theorem - Verification of Boolean expression using Boolean laws - Half-adder - Full adder - Half-Sub tractor- Full sub tractor (using basic gates) – Encoder - Decimal to BCD encoder- Decoder - BCD to decimal decoder.

UNIT – V SEMICONDUCTOR MEMORIES:

Introduction – ROM using diodes and transistors – ROM in terms of digital circuits – Building memory of larger capacity – PROM – EPROM – EEPROM – ROM as a unit in microcomputers – RAM – Static RAM – Dynamic RAM – Memory Parameters.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only):

Solar electricity- Hydroelectricity -Digital camera-Digital television-CRO-Digital computer

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COURSE OUTCOMES :

After completion of the course the students will be able to realize the followingoutcomes:

CO	COURSEC OUTOME	K LEVEL
CO1	Recall the basic concepts of current electricity and its various laws.	K1
CO2	Solve basic electronics problems with ac circuits that involve capacitance,inductance, impedance, reactance and power calculations.	K1
CO3	Differentiateall the four number systems studied.	K2
CO4	Review Boolean algebra and draw arithmetic circuits.	K3

CO5	Analyse the calibration of electrical instruments.	**K4,K5**

PSO-PO-CO MAPPING MATRIX										
PO & PSO / **CO**	**PO01**	**PO02**	**PO03**	**PO04**	**PO05**	**PSO01**	**PSO02**	**PSO03**	**PSO04**	**PSO05**
CO1	**2**	**2**	**2**	**2**	**3**	2	3	3	3	2
CO2	**2**	**2**	**2**	**2**	**3**	2	2	2	3	3
CO3	**1**	**1**	**3**	**1**	**3**	3	2	2	3	2
CO4	**2**	**3**	**1**	**3**	**2**	3	3	3	2	3
CO5	**2**	**3**	**2**	**2**	**3**	3	3	3	2	2