AC No.-4.17

Rayat Shikshan Sanstha's
KARMAVEER BHAURAO PATIL COLLEGE,
VASHI, NAVI MUMBAI
(EMPOWERED AUTONOMOUS)

Sector-15- A, Vashi, Navi Mumbai - 400 703

Program: B.Sc. Information Technology

Syllabus for S.Y.B.Sc. Information Technology

(NEP 2024-2025)

Rayat Shikshan Sanstha's

Karmaveer Bhaurao Patil College Vashi, Navi Mumbai Empowered Autonomous

[University of Mumbai]

Syllabus

Sr. No.	Heading	Particulars
1	Title of Course	S.Y.B.Sc. Information Technology
2	Eligibility for Admission	12thMaths
3	Passing Marks	40%
4	Ordinances/Regulatio ns (if any)	
5	No. of Years/Semesters	One year/Two semester
6	Level	U.G.
7	Pattern	Semester
8	Status	Revised
9	To be implemented from Academic year	2024-2025

Scheme of examination for Each Semester:

Continuous Internal Evaluation: 30 Marks(Common Test-20 Marks & 10 Marks for-Assignment, Projects, Group discussion, Open book test, online test etc.)
Semester End Examination: 45 Marks will be as follows -

I.	**Theory:** The Semester End Examination for theory course work will be conducted as per the following scheme.	
	Each theory paper shall be of two and half hour duration.	
	All questions are compulsory and will have internal options.	
	Q – I	From Unit – I (having internal options.) 10 M
	Q – II	From Unit – II (having internal options.) 10 M
	Q – III	From Unit – III (having internal options.) 10 M
	Q – IV	From Unit – IV (having internal options.) 10 M
	Q-V	From Unit – V (having internal options.)10 M
	Q-VI	From Unit – VI (having internal options.) 10 M
II.	**Practical**	The Semester End Examination for practical course work will be conducted as per the following scheme.

Sr. No	**Particulars of Semester End Practical Examination**	**Marks%**
1	Laboratory Work	15
2	Journal	05
3	Viva	05
	TOTAL	**25**

Rayat Shikshan Sanstha‟s
Karmaveer Bhaurao Patil College, Vashi
Navi Mumbai
(Autonomous
)
Department of Information Technology
B.Sc. Information Technology

Program Outcomes (POs)

Learners are able to-

PO-1	**Disciplinary Knowledge and Skills**	Acquire the comprehensive and in-depth knowledge of various subjects in sciences such as Physics, Chemistry, Mathematics, Microbiology, Bio-analytical Science, Computer Science, Data Science, Information Technology and disciplinary skills and ability to apply these skills in the field of science, technology, and its allied branches
PO-2	**Communication and Presentation Skills**	Develop various communication skills including presentation to express ideas evidently to achieve common goals of the organization.
PO-3	**Creativity and Critical Judgment**	Facilitate solutions to current issues based on investigations, evaluation and justification using evidence-based approach.
PO-4	**Analytical Reasoning and Problem Solving**	Build critical and analytical attitude in handling the problems and situations.
PO-5	**Sense of Inquiry**	Curiously raise relevant questions based on highly developed ideas, scientific theories and its applications including research.
PO-6	**Use of Digital Technologies**	Use various digital technologies to explore information/data for business, scientific research, and related purposes.
PO-7	**Research Skills**	Construct, collect, investigate, evaluate, and interpret information/data relevant to science and technology to adapt, evolve and shape the future.
PO-8	**Application of Knowledge**	Develop a scientific outlook to create consciousness against the social myths and blind faith.

PO-9	**Moral and Ethical Reasoning**	Imbibe ethical, moral, and social values to develop virtues such as justice, generosity, and charity as beneficial to individuals and society at large.

PO - 10	**Leadership and Teamwork**	Work cooperatively and lead proactively to achieve the goals of the organization by implementing the plans and projects in various field- based situations related to science, technology, and society at large.
PO - 11	**Environment and Sustainability**	Create social awareness about the environment and develop sustainability for betterment of the future.
PO - 12	**Lifelong Learning**	Realize that pursuit of knowledge is a lifelong activity and in combination with determined efforts, positive attitude and other qualities to lead a successful life.

Department of Information Technology
Program Specific Outcomes (PSO)

PSO-1	To acquaint students with the fundamental of computer hardware and software in information technology
PSO-2	To develop analytical skills and critical thinking through application of theory knowledge into practical course
PSO - 3	To construct and apply knowledge of programming, and appreciate the relationship between several programming languages and other disciplines
PSO - 4	To enable students to understand IT and its industrial and social context

Sem	Major (Sub-1)	Elective	Minor (Sub-2)	OE	VSC	IKS Generic	OJT, FP, RP, CEP	Cum Cr/Sem
					SEC	AEC, VEC	CC	
Sem 3	Advanced database Management System(3+1) Discrete and Applied Mathematics(3+1)	NA	Internet of Things(3+1)	Principles of Geographic Information System(2)	Core Java(2)	EVS(2) – Green Computing	CEP(4)	22
Sem 4	Computer Oriented Numerical and Statistical Techniques (3+1) Application based Python Programming(3+1)	NA	Computer Graphics And animation(3+1)	Business Intelligence(2)	Enterprise Java (2)	AEC(2)- Campus to Corporate	FP(4)	22
Total Credits	16		8	4	4	4	8	44

Semester – III

Course Code	Course Type	Course Title	Credits	Total
IT201	Major	Advanced database Management System(3+1)	04	22
IT202	Major	Discrete and Applied Mathematics(3+1)	04	
IT203	Minor	Internet of Things(3+1)	04	
IT204	OE	Principles of Geographic Information System	02	
IT205	VSC	Core Java	02	
IT206	AEC	Green Computing	02	
IT207	CEP/RP	Community Engagement Programme	04	

Semester – IV

Course Code	Course Type	Course Title	Credits	Total
IT251	Major	Computer Oriented Numerical and Statistical Techniques (3+1)	04	22
IT252	Major	Application based Python Programming(3+1)	04	
IT253	Minor	Computer Graphics and animation (3+1)	04	
IT254	OE	Business Intelligence	02	
IT255	VSC	Enterprise Java	02	
IT256	AEC	Campus to Corporate	02	
IT257	CEP/RP	Field Project	04	

***DSE: Discipline Specific Elective**
***OE: Open Elective**
***VSC: Vocational Skill Course**
***SEC: Skill Enhancement Course**

Semester – III

S.Y.B.Sc Information Technology
Course Code: IT201
Course Name: Advanecd Database Managment System

Periods per week(1 periods is 60 minutes)	No. of Credits	Evaluation System
03	**03**	**Th-45 Marks** **CIE-30Marks**

Advanecd Database Managment System

Course Outcomes: After successful completion of this course, students will be able to:

CO-1: understand database transaction
CO-2: Analyze concurrency control
CO-3: understand file organization in database.
CO-4: Implement cursor, trigger on database
CO-5: create and execute procedure and function

ICT Tools Used: Videos, PPT, Oracle 11g express edition

Students Centric Methods: Problem Solving and Participative
(Experimental, Participative, Problem Solving)

Links: SWAYAM / MOOCS:

1) https://onlinecourses.nptel.ac.in/noc24_cs21/preview
2) https://www.geeksforgeeks.org/dbms/

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	2	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	2	-	-	-	-	-	-	-	-
CO5	2	-	-	-	-	2	-	-	-	-	-	-

Unit	Details	Lectures
I	**Transaction and concurrency control:** Transaction: Transaction Property, States of Transaction, DBMS Schedule Testing of Serializability Conflict schedule View Serializability Recoverability of Schedule Failure Classification Log-Based Recovery DBMS Checkpoint Deadlock in DBMS Concurrency Control: Concurrency Contro lLock based Protocol Time stamping Protocol Validation based Protocol Thomas Write Rule Multiple Granularity Recovery Concurrent Transaction	**12**
II	**File organization** open link Sequential File Organization Heap File Organization Hash File Organization B+ File Organization ,DBMS Indexed sequential access method Cluster File Organization **Indexing and B+ Tree :**Indexing in DBMS,B+ Tree **Hashing:**Hashing ,Static Hashing, Dynamic Hashing RAID (Redundant Array of Independent Disk)	**12**
III	**PL-SQL:** Beginning with PL / SQL,Identifiers and Keywords,Operators, Expressions, Sequences,Control Structures, Cursors and Transaction, procedures,Functions, Exceptions Handling,Triggers.	**12**

Reference Books:

1. Raghu Ramakrishnan, Johannes Gehrke, “Database Management System”, McGraw Hill., 3rd Edition 2007.
2. Elmasri&Navathe,”Fundamentals of Database System,” Addison-Wesley Publishing, 5th Edition, 2008.
3. Date.C.J, “An Introduction to Database”, Addison-Wesley Pub Co, 8th Edition, 2006.
4. Oracle PL/SQL Programming, 6th Edition by Steven Feuerstein, Bill Pribyl Released February 2014 Publisher(s): O'Reilly Media, Inc. ISBN: 9781449324452

E-Books and Online Learning Material :

1. https://onlinecourses.nptel.ac.in/noc24_cs21/preview
2. https://www.geeksforgeeks.org/dbms/

S.Y.B.Sc Information Technology
Course Code: IT201
Course Name: Advanecd Database Managment System

Practical per week(1 periods is 60 minutes)	No. of Credits	Evaluation System
02	**01**	**PR-25 Marks**

List of Practical

1. **Practical on SQL Queries**
2. Write the pl/sql program to find addition of two number.
3. To study PL/SQL control structure .
4. To study the usage of procedures in PL/SQL.
5. To study function in PL/SQL.
6. To study and execute PL/SQL trigger
7. To study and execute PL/SQL cursor.
8. To study and execute PL/SQL exception.

S.Y.B.Sc Information Technology
Course Code: IT202
Course Name: Discrete and Applied Mathematics

Periods per week(1 periods is 60 minutes)	No. of Credits	Evaluation System
03	03	Th-45 Marks CIE-30Marks

Discrete and Applied Mathematics

Course Outcomes: After successful completion of this course, students will be able to:

CO-1: Understand basic set operations and notation.
CO-2: Understand the function properties such as injectivity, surjectivity, and bijectivity.
CO-3: Understand the matrix properties, determinants, complex conjugates and polar form. **CO-4:** Solve the first-order differential equations of higher degrees.
CO-5: Apply the Laplace transform techniques to solve differential equations

ICT Tools Used: Videos, PPT, Pen-Tablet, Scilab

Students Centric Methods: Problem Solving and Participative
(Experimental, Participative, Problem Solving)

Links: SWAYAM / MOOCS:
1) https://www.udemy.com/courses/search/?src=ukw&q=Discrete+and+Applied+Mathematics
2) https://www.coursera.org/search?query=Discrete%20and%20Applied%20Mathematics
3) https://onlinecourses.nptel.ac.in/noc24_cs58/preview

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	2	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	2	-	2	2	-	-	-	-	-	-	-	-
CO5	2	-	-	-	-	2	-	-	-	-	-	-

Unit	Detail s	Lectures

I	**Set Theory and Logic:** Fundamentals - Sets and subsets, Venn Diagrams, Operations on sets, Laws of Set Theory, Power Sets, Partition of sets, The principle of Inclusion-Exclusion, Propositions and Logical operations, Logical Equivalence, Implications, Laws of Logic, Conditional Statements. **Functions and Relations** : Definitions and Types of functions, One-to-One and Onto, Identity and Inverse Functions, Composition of Functions. Relations on Sets, Reflexivity, Symmetry, and Transitivity, Equivalence Relations. **Counting and Probability**: Introduction, The Multiplication Rule, Counting Elements of Disjoint Sets: The Addition Rule, The Pigeonhole Principle, Counting Subsets of a Set: Combinations, r-Combinations with Repetition Allowed, Probability Axioms and Expected Value, Conditional Probability.	**12**

II	**Matrices and Complex Numbers:** Definition, Types of matrices, Inverse of a matrix, Properties of matrices, Elementary Transformation, Rank of Matrix, Echelon or Normal Matrix, Inverse of Matrix, Characteristics roots and characteristics vectors, Cayley- Hamilton Theorem, Complex number, Equality of complex numbers,Graphical representation of complex number (Argand's Diagram), Polar form of complex numbers, Exponential form of complex numbers, Circular functions of complex angles, Definition of hyperbolic function, Relations between circular and hyperbolic functions, Inverse hyperbolic functions, **Equation of the first order and of the first degree:** Separation of variables, Equations homogeneous in x and y, Non-homogeneous linear equations, Exact differential Equation, Integrating Factor, Linear Equation **Linear Differential equations with constant coefficients:** Introduction, The Differential Operator, Linear Differential Equation f(D) y = 0, Different cases depending on the nature of the root of the equation f(D) = 0, Linear differential equation f(D) y = X, The complimentary Function, The inverse operator 1/f(D), Particular integral.	**12**
III	**The Laplace Transform**: Introduction, Definition of the Laplace Transform, Table of Elementary Laplace Transforms, Theorems on Important Properties of Laplace Transformation, First Shifting Theorem, Second Shifting Theorem, The Convolution Theorem, Laplace Transform of an Integral, Laplace Transform of Derivatives **The Inverse Laplace Transform:** Shifting Theorem, Partial fraction Methods, Use of Convolution Theorem, Solution of Ordinary Linear Differential Equations with Constant Coefficients **Multiple Integrals:** Double Integral, Change of the order of the integration, Double integral in polar coordinates, Triple integrals.	**12**

Reference Books:
1. Discrete Mathematics with Applications Sussana S. Epp Cengage Learning 4th 2010 2. Discrete Mathematics, Schaum's Outlines Series Seymour Lipschutz, Marc Lipson Tata MCGraw Hill 2007 3. Discrete Mathematics and its Applications Kenneth H. Rosen Tata MCGraw Hill 4. A text book of Applied Mathematics Vol I P. N. Wartikar and J. N. Wartikar Pune VidyathiGraha 5. Applied Mathematics II P. N. Wartikar and J. N. Wartikar Pune VidyathiGraha
E-Books and Online Learning Material :
1. https://www.udemy.com/courses/search/?src=ukw&q=Discrete+and+Applied+Mathematics 2. https://www.coursera.org/search?query=Discrete%20and%20Applied%20Mathematics 3. https://onlinecourses.nptel.ac.in/noc24_cs58/preview

S.Y.B.Sc Information Technology **Course Code: IT202** **Course Name: Discrete and Applied Mathematics Practical**		
Practical per week(1 periods is 60 minutes)	**No. of Credits**	**Evaluation System**
0 **2**	**0** **1**	**PR-25 Marks**
List of Practical: Write the programs for the following using SCILAB.		

1. Set Theory.
    a. Inclusion Exclusion principle.
    b. Power Sets

2. Functions and Algorithms.
    a. Cardinality
    b. Polynomial evaluation
    c. Greatest Common Divisor

3. Counting
    a. Sum rule principle
    b. Product rule principle
    c. Factorial

4. Probability Theory
    a. Sample space and events
    b. Finite probability spaces
    c. Equiprobable spaces
    d. Addition Principle

5. Problem Solving based on Matrices and Complex Numbers.

6. Problem Solving based on Equation of the first order and of the first degree.

7. Problem Solving based on Differential equation of the first order of a degree higher than the first.

8. Problem Solving based on Linear Differential Equations with Constant Coefficients.

9. Problem Solving based on The Laplace Transform and Inverse Laplace Transform.

10. Problem Solving based on Multiple Integrals.

S.Y.B.Sc Information Technology
Course Code: IT203
Course Name: Internet of Things

Periods per week(1 periods is 60 minutes)	No. of Credits	Evaluation System
03	03	Th-45 Marks CIE-30Marks

Internet of Things

Course Outcomes: After successful completion of this course, students will be able to: **CO-1:** Understand concepts, tech, and players shaping Internet of Things development. **CO-2:** Get Proficiency in IP, TCP, DNS, HTTP, HTTPS, and application layer protocols.
CO-3: Learn Techniques include sketching, laser cutting, 3D printing, CNC milling for creative implementation.
CO-4: Addressing privacy, control, environment, and solutions for ethical challenges in IoT technology.
CO-5: Skills in electronics, sensors, actuators, Arduino, Raspberry Pi, and hardware openness.

ICT Tools Used: Videos, PPT, Pen-Table, Tinkercad or SolidWorks for virtual prototyping.

Students Centric Methods: Problem Solving and Participative
(Experimental, Participative, Problem Solving)

Links: SWAYAM / MOOCS:
1) https://onlinecourses.nptel.ac.in/noc19_cs65
2) https://www.coursera.org/articles/internet-of-things
3) https://www.udemy.com/course/complete-guide-to-build-iot-things-from-scratch-to-market/

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	1	-	-	-	-	-	-
CO2	-	-	2	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	3
CO5	-	-	-	-	-	2	-	1	-	-	-	-

Unit	Details	Lectures

I	**The Internet of Things:** An Overview : The Flavor of the Internet of Things, The "Internet" of "Things", The Technology of the Internet of Things, Who is Making the Internet of Things? **Internet Principles:** Internet Communications: An Overview, IP, TCP, UDP, IP Addresses, DNS, Static IP Address Assignment, Dynamic IP Address Assignment, IPv6, MAC Addresses, TCP and UDP Ports, An Example: HTTP Ports, Other Common Ports, Application Layer Protocols, HTTP, HTTPS: Encrypted HTTP, Other Application Layer Protocols.	**12**

II	**Prototyping Embedded Devices:** Electronics, Sensors, Actuators, Scaling Up the Electronics, Embedded Computing Basics, Microcontrollers, System-on-Chips, Choosing Your Platform, Arduino, Developing on the Arduino, Some Notes on the Hardware, Openness, Raspberry Pi, Cases and Extension Boards, Developing on the Raspberry Pi, Some Notes on the Hardware, Openness. **Prototyping the Physical Design:** Preparation, Sketch, Iterate, and Explore, Non Digital Methods, Laser Cutting, Choosing a Laser Cutter, Software, Hinges and Joints, 3D Printing, Types of 3D Printing, Software, CNC Milling, Repurposing/Recycling.	**12**
III	**Techniques for Writing Embedded Code:** Memory Management, Types of Memory, Making the Most of Your RAM, Performance and Battery Life, Libraries, Debugging. **Business Models:** A Short History of Business Models, Space and Time, Who Is the Business Model For? Models, Make Thing, Sell Thing, Subscriptions, Customization, Be a Key Resource, Provide Infrastructure: Sensor Networks, Take a Percentage, Funding an Internet of Things Startup, Hobby Projects and Open Source, Venture Capital, Government Funding, Crowdfunding, Lean Startups. **Ethics:** Characterizing the Internet of Things, Privacy, Control, Disrupting Control, Crowdsourcing, Environment, Physical Thing, Electronics, Internet Service, Solutions.	**12**

Reference Books

Designing the Internet of Things	Adrian McEwen, Hakim Cassimally	WILEY	First	2014
Internet of Things – Architecture and Design	Raj Kamal	McGraw Hill	First	2017
Getting Started with the Internet of Things	Cuno Pfister	O"Reilly	Sixth	2018
Getting Started with Raspberry Pi	Matt Richardson and Shawn Wallace	SPD	Third	2016

S.Y.B.Sc Information Technology
Course Code: IT203
Course Name: Internet of Things

Practical per week(1 periods is 60 minutes)	No. of Credits	Evaluation System
02	01	PR-25 Marks

Practical No	Details
1	Starting Raspbian OS, Familiarising with Raspberry Pi Components and interface, Connecting to ethernet, Monitor, USB.
2	Displaying different LED patterns with Raspberry Pi.
3	Displaying Time over 4-Digit 7-Segment Display using Raspberry Pi
4	Raspberry Pi Based Oscilloscope
5	Controlling Raspberry Pi with WhatsApp.
6	Setting up Wireless Access Point using Raspberry Pi
7	Fingerprint Sensor interfacing with Raspberry Pi
8	Raspberry Pi GPS Module Interfacing
9	IoT based Web Controlled Home Automation using Raspberry Pi
10	Visitor Monitoring with Raspberry Pi and Pi Camera
11	Interfacing Raspberry Pi with RFID.
12	Building Google Assistant with Raspberry Pi.
13	Installing Windows 10 IoT Core on Raspberry Pi

S.Y.B.Sc Information Technology
Course Code:IT204
Course Name: Principles of Geographic Information System

Practical per week(1 periods is 60 minutes)	No. of Credits	Evaluation System
4	2	PR-50 Marks

Principles of Geographic Information System Practical

Course Outcomes: After successful completion of this course, students will be able to:
CO1: Explain geography and GIS.
CO2: Recognize the significance of coordinate systems, projection, and scale in GIS CO3: Recognize the differences between vector and raster data structures and when to use each one.
CO4: be familiar with the fundamentals of data collection, storing, processing, and output in a geographic information system
CO5: Recognize the differences between vector and raster data structures and when to use each one.

ICT **Tools Used:** Videos, PPT, QGIS

Students Centric Methods: Problem Solving and Participative (Experimental, Participative, Problem Solving)

Links: SWAYAM / MOOCS:

1. https://www.udemy.com/course/operating-system-j/
2. https://www.coursera.org/learn/gis
3. https://onlinecourses.nptel.ac.in/noc24_ce14/preview

The CO-PO Mapping Matrix

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	2	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	1	-	-	-	-	3	-	-	-	-	1	-
CO4	-	-	2	-	-	-	-	-	-	-	-	2
CO5	1	-	-	-	-	1	-	-	-	-	-	-

List of Practical: Write the programs for the following using QGIS.

Sr.No.	Details
1.	Familiarizing Quantum GIS: Installation of QGIS, datasets for both Vector and Raster data, Maps.
2.	Creating and Managing Vector Data: Adding vector layers, setting properties, formatting, calculating line lengths and statistics
3.	Exploring and Managing Raster data: Adding raster layers, raster styling and analysis, raster mosaicking and clipping
4.	Making a Map, Working with Attributes, Importing Spreadsheets or CSV files Using Plugins, Searching and Downloading OpenStreetMap Data
5.	Working with attributes, terrain Data
6.	Working with Projections and WMS Data
7.	Georeferencing Topo Sheets and Scanned Maps Georeferencing Aerial Imagery Digitizing Map Data
8.	Managing Data Tables and Spatial data Sets: Table joins, spatial joins, points in polygon analysis, performing spatial queries
9.	Advanced GIS Operations 1: Nearest Neighbour Analysis, Sampling Raster Data using Points or Polygons, Interpolating Point Data
10.	Advance GIS Operations 2: Batch Processing using Processing Framework Automating Complex Workflows using Processing Modeler Automating Map Creation with Print Composer Atlas
11.	Validating Map data

Reference Books:

1. Principles of Geographic Information Systems - An Introductory Text Book - Editors: Otto Huisman and Rolf A. The International Institute of Geoinformation Science and Earth Observation,Fourth Edition,2009
2. Principles of Geographic Information Systems - P.A Burrough and R.A.McDonnell, Oxford University Press, Third Edition,1999
3. Fundamentals of Spatial Information Systems - R.Laurini and D. Thompson, Academic Press, 1994
4. Fundamentals of Geographic Information Systems - Michael N.Demers, Wiley Publications, Fourth Edition, 2009
5. Introduction to Geographic Information Systems- Chang Kang-tsung (Karl), McGrawHill, 7th Edition, 2013
6. GIS Fundamentals - A First Text on Geographic Information Systems, Paul Bolsatd, XanEdu Publishing Inc., 5th Edition

E-Books and Online Learning Material :

1. https://www.udemy.com/course/operating-system-j/
2. https://www.coursera.org/learn/gis
3. https://onlinecourses.nptel.ac.in/noc24_ce14/preview

S.Y.B.Sc Information Technology
Course Code: IT205
Course Name: Core Java

Periods per week(1 periods is 60 minutes)	No. of Credits	Evaluation System
04	02	PR-50 Marks

IT Core Java

Course Outcomes: After successful completion of this course, students will be able to:

CO-1: Applying classes and methods concept.
CO-2: Implement constructors and destructors for efficient object initialization and cleanup.
CO-3: Design abstract classes to provide blueprints for subclasses, enforcing specific behaviors.
CO-4: Develop GUI applications with AWT

ICT Tools Used: Videos, PPT, Pen-Table, JDK, Notepad, CMD, Net beans

Students Centric Methods: Problem Solving and Participative (Experimental, Participative, Problem Solving)

Links: SWAYAM / MOOCS:

1. https://www.coursera.org/specializations/core-java
2. https://www.udemy.com/course/java-programming- tutorial-for- beginners/

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	-	3	3	-	-	-	3	-	-	-	-
CO-2	-	-	3	3	-	-	-	3	-	-	-	-
CO-3	2	-	2	2	-	-	-	-	-	-	-	-
CO-4	3	-	-	3	-	-	-	3	-	-	-	-

List of Practical

	Methods and Constructors
1.	Designed a class SortData that contains the method asec() and desc().
2.	Designed a class that demonstrates the use of constructor and destructor.
3.	Write a java program to demonstrate the implementation of abstract class.

	Inheritance
4.	Write a java program to implement single level inheritance.
5.	Write a java program to implement method overriding
6.	Write a java program to implement multiple inheritance.
	Packages and Arrays
7.	Create a package, Add the necessary classes and import the package in java class.
8.	Write a java program to add two matrices and print the resultant matrix.
	Multithreading
9.	Write a java program to implement thread life cycle.
10.	Write a java program to implement multithreading.
	GUI and Exception Handling

11.	Design a AWT program to print the factorial for an input value.
12.	Design an AWT program to perform various string operations like reverse string, string concatenation etc.
13.	Write a java program to implement exception handling.
	GUI Programming
14.	Design an AWT application that contains the interface to add student information and display the same.
15.	Design a calculator based on AWT application.
16.	Design an AWT application to generate result marks sheet.
Books and References:	

1. Core Java 8 for Beginners, Vaishali Shah, Sharnam Shah, SPD, 1st, 2015
2. Java: The Complete Reference, Herbert Schildt, McGraw Hill, 9th, 2014
3. Murach's beginning Java with Net Beans, Joel Murach , Michael Urban, SPD, 1st, 2016
4. Core Java, Volume I: Fundamentals, Hortsman, Pearson, 9th, 2013
5. Core Java, Volume II:Advanced Features, Gary Cornell and Hortsman, Pearson, 8th, 2008
6. Core Java: An Integrated Approach, R. Nageswara Rao, DreamTech, 1st, 2008

S.Y.B.Sc Information Technology
Course Code: IT206
Course Name: Green Computing

Periods per week(1 periods is 60 minutes)	**No. of Credits**	**Evaluation System**
02	**02**	**Th-30 Marks** **CIE-20Marks**

Green Computing

Course Outcomes: After successful completion of this course, students will be able to:
CO-1: Acquire knowledge to adopt green computing practices to minimize negative impacts on **t**he environment
CO-2: Enhance the skill in energy saving practices in their use of hardware.
CO-3: Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.
CO-4: Understand the ways to minimize equipment disposal requirements.
CO-5: Understand the Principles of Green Computing

ICT Tools Used: Videos, PPT, Python

Students Centric Methods: Problem Solving and Participative (Experimental, Participative, Problem Solving)

Links: SWAYAM / MOOCS:
1) https://www.learnbyexample.org/python/
2) https://www.learnpython.org/
3) https://pythontutor.com/visualize.html#mode=edit

The CO-PO Mapping Matrix

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO10**	**PO11**	**PO12**
CO1	3	-	-	3	-	-	-	-	-	-	-	-
CO2	2	-	-	2	-	-	-	-	-	2		-
CO3	2	-	-	2	-	-	3	-	-	-	2	-
CO4	2	-	-	2	-	-	2	-	-	-	-	2
CO5	-	-	-	-	-	2	-	-	-	-	-	-

Unit	**Details**	**Lectures**

I	**Overview and Issues:** Problems: Toxins, Power Consumption, Equipment Disposal, Company's Carbon Footprint: Measuring, Details, reasons to bother, Cost Savings: Hardware, Power. **Initiatives and Standards:** Global Initiatives: Basel Action Network, Basel Convention, WEEE Directive, RoHS, National Adoption, Asia:India **Minimizing Power Usage:** Power Problems, Monitoring Power Usage, Servers, Low-Cost Options, Reducing Power Use, Low- Power Computers, PCs, Linux, Components, Servers, Computer Settings, Storage, Monitors, Power Supplies, Wireless Devices, Software.	**12**
II	**Changing the Way of Work:** Old Behaviours, starting at the Top, Process Reengineering with Green in Mind, Analysing the Global Impact of Local Actions, Steps:Water, Recycling, Energy, Pollutants **Going Paperless:** Paper Problems, The Environment, Costs: Paper and Office, Practicality, Storage, Destruction, Going Paperless, Changing Over, Paperless Billing **Recycling:** Problems, Materials, Means of Disposal, Recycling, Refurbishing, Life Cycle, Recycling Companies, Checklist, Hard Drive Recycling, cleaning a Hard Drive, Pros and cons of each method, CDs and DVDs, good and bad about CD and DVDs disposal	**12**

Reference Books:

1. Geen IT –Toby Velte-Mc Graw Hill
2. Green Data Center steps for Journey- Alvin Galea-Shroff publisher

Semester – IV

S.Y.B.Sc Information Technology
Course Code: IT251
Course Name: Computer Oriented Numerical and Statistical Techniques

Periods per week(1 periods is 60 minutes)	No. of Credits	Evaluation System
03	03	Th-45 Marks CIE-30Marks

Computer Oriented Numerical and Statistical Techniques

Course Outcomes: After successful completion of this course, students will be able to:

CO-1: Analyze and solve algebraic and transcendental equations..
CO-2: Implement numerical techniques to solve first and second-order differential equations
CO-3: Understand random variables and their distributions.
CO-4: Calculate measures of central tendency including mean, median, and mode.
CO-5: Analyze moments, skewness, and kurtosis for data characterization.

ICT Tools Used: Videos, PPT, Pen-Tablet, Scilab, R

Students Centric Methods: Problem Solving and Participative
(Experimental, Participative, Problem Solving)

Links: SWAYAM / MOOCS:
1) https://www.udemy.com/courses/search/?src=ukw&q=Numerical+and+Statistical+Techniques
2) https://www.coursera.org/search?query=%20Numerical%20and%20Statistical%20Techniques
3) https://onlinecourses.nptel.ac.in/noc24_ma34/preview

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	2	-	2	-	-	-	-	-	-	-
CO3	1	2	2	-	-	-	-	-	-	-	-	-

CO4	2	2	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	3	-	2	-	-	-	-	-	-

Unit	Details	Lectures
I	**Solutions of Algebraic and Transcendental Equations:** The Bisection Method, The Newton-Raphson Method, The Regula-falsi method. **Interpolation:** Forward Difference, Backward Difference, Newton's Forward Difference Interpolation, Newton's Backward Difference Interpolation, Lagrange's Interpolation. **Numerical differentiation and Integration:** Numerical differentiation,Numerical integration using Trapezoidal Rule, Simpson's 1/3rd and 3/8th rules.	**12**
II	**Numerical solution of 1st and 2nd order differential equations:** Taylor series, Euler's Method, Modified Euler's Method, Runge-Kutta Method for 1st and 2nd Order Differential Equations. **Least-Squares Regression:** Linear Regression, Polynomial Regression, Multiple Linear Regression, General Linear Least Squares, Linear Programming: Linear optimization problem, Formulation and Graphical solution **Random variables:** Discrete and Continuous random variables, Probability density function, Probability distribution of random variables, Expected value, Variance.	**12**
III	**The Mean, Median, Mode, and Other Measures of Central Tendency:** The Arithmetic Mean, The Median, The Mode, The Empirical Relation Between the Mean, Median, and Mode, The Geometric Mean, The Harmonic Mean ,The Relation Between the Arithmetic, Geometric, and Harmonic Means, The Root Mean Square, Quartiles, Deciles, and Percentiles **The Standard Deviation and Other Measures of Dispersion:** The Range, The Mean Deviation, The Semi-Interquartile Range ,The 10–90 Percentile Range, The Standard Deviation, The Variance. **Moments, Skewness, and Kurtosis :** Moments, Relations Between Moments, Computation of Moments for Grouped Data, Skewness, and Kurtosis.	**12**

Reference Books:

1. Introductory Methods of Numerical Methods S. S. Shastri PHI Vol – 2
2. Numerical Methods for Engineers Steven C. Chapra, Raymond P. Canale Tata Mc Graw Hill 6th 2010.
3. Numerical Analysis Richard L. Burden, J. Douglas Faires Cengage Learning 9th 2011
4. Fundamentals of Mathematical Statistics S. C. Gupta, V. K. Kapoor Sultan Chand and sons 11th revised 2011.
6. A Practical Approach using R, R.B. Patil, H.J. Dand and R. Bhavsar SPD 1st 2017

E-Books and Online Learning Material :

1. https://www.udemy.com/courses/search/?src=ukw&q=Numerical+and+Statistical+Techniques
2. https://www.coursera.org/search?query=%20Numerical%20and%20Statistical%20Techniques
3. https://onlinecourses.nptel.ac.in/noc24_ma34/preview

S.Y.B.Sc Information Technology
Course Code: IT251
Course Name: Computer Oriented Numerical and Statistical Techniques Practical

Practical per week(1 periods is 60 minutes)	No. of Credits	Evaluation System
02	0 1	PR-25 Marks

List of Practical: Write the programs for the following using SCILAB and R.

1. Solution of algebraic and transcendental equation
   a. Program to solve algebraic and transcendental equation by bisection method.
   b. Program to solve algebraic and transcendental equation by false position method.
   c. Program to solve algebraic and transcendental equation by Newton Raphson Method.

2. Interpolation
   a. Program for Newton's forward interpolation.
   b. Program for Newton's backward interpolation.
   c. Program for Lagrange's interpolation.

3. Numerical Differentiation
   a. Programming to obtain derivatives numerically.

4. Numerical Integration
   a. Program for numerical integration using Trapezoidal rule
   b. Program for numerical integration using Simpson's 1/3rd rule.
   c. Program for numerical integration using Simpson's 3/8th rule.

5. Solution of differential equations.
   a. Program to solve differential equation using Euler's method
   b. Program to solve differential equation using modified Euler's method.
   c. Program to solve differential equation using Runge-kutta 2nd order and 4th order methods.

6. Using R execute the basic commands, array, list and frames.

7. Create a Matrix using R and Perform the operations addition, inverse, transpose and multiplication operations.

8. Using R Execute the statistical functions:mean, median, mode, quartiles, range,inter quartile range histogram.

9. Using R import the data from Excel / .CSV file and Perform the above functions.

10. Using R import the data from Excel / .CSV file and Calculate the standard deviation, variance, co-variance.

11. Using R import the data from Excel / .CSV file and draw the skewness.

S.Y.B.Sc Information Technology
Course Code: IT252
Course Name: Python Programming

Periods per week(1 periods is 60 minutes)	No. of Credits	Evaluation System
03	03	Th-45 Marks CIE-30Marks

Python Programming

Course Outcomes: After successful completion of this course, students will be able to:

CO-1: Learn the syntax and semantics of the Python programming language.
CO-2: Illustrate the process of structuring the data using lists, tuples
CO-3: Demonstrate the use of built-in functions to navigate the file system **CO-4:** Implement the Object Oriented Programming concepts in Python. **CO-5:** Develop programs for string processing and file organization

ICT Tools Used: Videos, PPT, Python

Students Centric Methods: Problem Solving and Participative (Experimental, Participative, Problem Solving)

Links: SWAYAM / MOOCS:

1. https://www.learnbyexample.org/python/
2) https://www.learnpython.org/
3) https://pythontutor.com/visualize.html#mode=edit

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	2	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	2	-	-	-	-	-	-	-	-
CO5	2	-	-	-	-	2	-	-	-	-	-	-

Unit	Details	Lectures

I	**Introduction:** The Python Programming Language, History, features, Installing Python, Running Python program, Interactive Mode and Script Mode, Debugging : Syntax Errors, Runtime Errors, Semantic Errors, Experimental Debugging, The Difference Between Brackets, Braces, and Parentheses, **Variables and Expressions**: Values and Types, Variables, Variable Names and Keywords, Type conversion, Operators and Operands, Expressions, Order of Operations. **Conditional Statements :** if, if-else, nested if –else, Looping: for, while, nested loops **Control statements** : Terminating loops, skipping specific conditions	**12**

II	**Functions:** Why Functions? Function Calls, Type Conversion Functions, Composition, Adding New Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters Are Local, Fruitful Functions and Void Functions, Return Values, Incremental Development, Composition, Boolean Functions, More Recursion, Checking Types **Strings:** A String Is a Sequence, Traversal with a for Loop, String Slices, Strings Are Immutable, Searching, Looping and Counting, String Methods, The in Operator, String Comparison, String Operations. **Lists :** Values and Accessing Elements, Lists are mutable, traversing a List, Deleting elements from List, Built-in List Operators, Concatenation, Repetition, In Operator, Built-in List functions and methods	**12**
III	**Tuples:** Accessing values in Tuples, Tuple Assignment, Tuples as returnvalues,Variable-length argument tuples,Basic tuples operations, Concatenation, Repetition, in Operator, Iteration, Built- in Tuple Functions Creating a Dictionary, Accessing Values in a dictionary, Updatin Dictionary,Deleting Elements from Dictionary, Properties of Dictionary keys, Operations in Dictionary, Built-In Dictionary Functions, Built-in Dictionary Methods **Text Files**: The File Object Attributes, Directories **Built-in Exceptions**:Handling Exceptions,Exception with Arguments, User- defined Exceptions **Classes and Objects :** Overview of OOP (Object Oriented Programming), Class Definition, Creating Objects, Instances as Arguments, Instances as return values, Built-in Class Attributes, Inheritance, Method Overriding, Data Encapsulation, Data Hiding **Multithreaded Programming :** Thread Module, creating a thread, synchronizing threads, multithreaded priority queue **Modules** : Importing module, Creating and exploring modules, Math module, Time module	**12**

Reference Books:

. Al Sweigart,"Automate the Boring Stuff with Python",1 stEdition, No Starch Press, 2015.

. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2 nd Edition, Green Tea Press, 2015.

E-Books and Online Learning Material :

1. https://onlinecourses.nptel.ac.in/noc24_cs21/preview
2. https://www.geeksforgeeks.org/dbms/

S.Y.B.Sc Information Technology
Course Code: IT252
Course Name: Python Programming

Practical per week(1 periods is 60 minutes)	**No. of Credits**	**Evaluation System**
02	**01**	**PR-25 Marks**

List of Practical

List of Practical

1. Write the program for the following:

a. Create a program that asks the user to enter their name and their age. Print out a message addressed to them that tells them the year that they will turn 100 years old.

b. Enter the number from the user and depending on whether the number is even or odd, print out an appropriate message to the user.

c. Write a program to generate the Fibonacci series.

d. Write a function that reverses the user defined value.

e. Write a function to check the input value is Armstrong and also write the function for Palindrome.

f. Write a recursive function to print the factorial for a given number.

2. Write the program for the following:

a. Write a function that takes a character (i.e. a string of length 1) and returns True if it is a vowel, False otherwise.

b. Define a function that computes the length of a given list or string.

c. Define a procedure histogram() that takes a list of integers and prints a histogram to the screen. For example, histogram([4, 9, 7]) should print the following:

****

****

****

3. Write the program for the following:

a. A pangram is a sentence that contains all the letters of the English alphabet at least once, for example: The quick brown fox jumps over the lazy dog. Your task here is to write a function to check a sentence to see if it is a pangram or not.

b. Take a list, say for example this one:
a=[1,1,2,3,5,8,13,21,34,55,89]and write a program that prints out all the elements of the list that are less than 5.

4. Write the program for the following:

a. Write a program that takes two lists and returns True if they have at least one common member.

b. Write a Python program to print a specified list after removing the 0th, 2nd, 4th and 5th elements.

c. Write a Python program to clone or copy a list

5. Write the program for the following:

a. Write a Python script to sort (ascending and descending) a dictionary by value.

b. Write a Python script to concatenate following dictionaries to create a new one. Sample Dictionary : dic1={1:10, 2:20} dic2={3:30, 4:40} dic3={5:50,6:60} Expected Result : {1: 10, 2: 20, 3: 30, 4: 40, 5: 50, 6: 60}

c. Write a Python program to sum all the items in a dictionary.

6. Write the program for the following:

a. Write a Python program to read an entire text file.

b. Write a Python program to append text to a file and display the text.
c. Write a Python program to read last n lines of a file.
7.Write the program for the following:
a. Design a class that store the information of student and display the same
b. Implement the concept of inheritance using python
c. Create a class called Numbers, which has a single class attribute called MULTIPLIER, and a constructor which takes the parameters x and y (these should all be numbers).

S.Y.B.Sc Information Technology
Course Code: IT253
Course Name: Computer Graphics and Animation

Periods per week(1 periods is 60 minutes)	No. of Credits	Evaluation System
03	03	Th-45 Marks CIE-30 Marks

Computer Graphics and Animation

Course Outcomes: After successful completion of this course, students will be able to:
CO-1: List the basic concepts used in computer graphics.
CO-2:Implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
CO-3:Understand and implement 2 dimensional transformations.
CO-4:Understand and implement 3 dimensional transformations.
CO-5: Understand and implement curve.

ICT Tools Used: Videos, PPT, Pen-Table, Turbo C

Students Centric Methods: Problem Solving and Participative
(Experimental, Participative, Problem Solving)

Links: SWAYAM / MOOCS:

1. https://www.udemy.com/course/computergraphics-for-_engineering-bca-entrance-exams/
2. https://onlinecourses.nptel.ac.in/noc23_cs115/preview
3. https://www.coursera.org/learn/interactive-computer-graphics

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	1	2	-	-	1	-
CO3	2	-	-	-	-	-	-	1	-	-	-	1
CO4	2	-	-	-	-	-	-	1	-	-	-	1
CO5	2	-	-	-	-	-	-	-	-	-	-	-

Unit	Details	Lectures
I	**Introduction to Computer Graphics:**Overview of Computer Graphics, Computer Graphics Application and Software, Description of some graphics devices, Active and Passive Graphics Devices, Display Technologies, Storage Tube Graphics Displays, Raster Refresh (Raster-Scan) Graphics Displays, cathode Ray Tube Basics, Color CRT Raster Scan Basics, Video Basics, The Video Controller, Random- Scan Display Processor, LCD display **Scan conversion**: Digital Differential Analyzer (DDA) algorithm, Bresenhams' Line drawing algorithm. Bresenhams' method of Circle drawing, Midpoint Circle Algorithm, Midpoint Ellipse Algorithm, Mid-point criteria, Problems of Aliasing, end-point ordering and	**12**
	clipping lines, Scan Converting Circles, Clipping Lines algorithms– Cyrus-Beck, Cohen-Sutherland and Liang- Barsky, Clipping Polygons problem with multiple components.	
II	**Two-Dimensional Transformations:** Matrices, Transformation Conventions, 2DTransformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Rotation, Reflection, Scaling, Combined Transformation, Rotation About an Arbitrary Point, Reflection through an Arbitrary Line, The Window-to-Viewport Transformations. **Three-Dimensional Transformations:** Three-Dimensional Scaling, Three-Dimensional Shearing, Three-Dimensional Rotation, Three-Dimensional Reflection, Three- Dimensional Translation, Perspective Transformations, Techniques for Generating Perspective Views, Vanishing Points, the Perspective Geometry and camera models, Orthographic Projections, Axonometric Projections, Oblique Projections, View volumes for projections.	**12**
III	**Viewing in 3D :** Stages in 3D viewing, Canonical View Volume (CVV), Specifying an Arbitrary 3D View, Examples of 3D Viewing **Computer Animation :** Principles of Animation, Key framing, Deformations, Character Animation, Physics-Based Animation, Procedural Techniques, Groups of Objects. **Image Manipulation and Storage:** What is an Image? Digital image file formats, Image compression standard – JPEG, Image Processing – Digital image enhancement, Contrast stretching, smoothing and median Filtering.	**12**
Reference Books:		

1. Computer Graphics -Principles and Practice J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Pearson
2. Steve Marschner, Peter Shirley, Fundamentals of Computer Graphics CRC press, 4th edition
3. Computer Graphics Hearn, Baker Pearson
4. Principles of Interactive Computer Graphics, William M. Newman and Robert F. Sproull, TMH 2nd Edition

E-Books and Online Learning Material :

1. https://www.udemy.com/course/computer- graphics-for-engineering-bca-entrance-exams/
2. https://onlinecourses.nptel.ac.in/noc23_cs115/preview
3. https://www.coursera.org/learn/interactive-computer-graphics

S.Y.B.Sc Information Technology Course Code: IT253 Course Name: Computer Graphics and Animation Practical		
Practical per week(1 periods is 60 minutes)	**No. of Credits**	**Evaluation System**
02	**01**	**PR-25 Marks**

List of Practical	
1	Solve the following: a. Study and enlist the basic functions used for graphics in C / C++ / Python language. Give an example for each of them. b. Draw a co-ordinate axis at the center of the screen.
2	Solve the following: a. Divide your screen into four region, draw circle, rectangle, ellipse and half ellipse in each region with appropriate message. b. Draw a simple hut on the screen
3	Draw the following basic shapes in the center of the screen : a. i. Circle ii. Rectangle iii. Square iv. Concentric Circles v. Ellipse vi. Line
4	Solve the following: a. Develop the program for DDA Line drawing algorithm. b. Develop the program for Bresenham's Line drawing algorithm
5	Solve the following: a. Develop the program for the mid-point circle drawing algorithm. b. Develop the program for the mid-point ellipse drawing algorithm.
6	Write a program to implement 2D scaling.
7	Write a program to perform 2D translation
8	Solve the following: a. Write a program to implement Cohen-Sutherland clipping. b. Write a program to implement Liang - Barsky Line Clipping Algorithm
9	a .Develop a simple text screen saver using graphics functions. b. Perform smiling face animation using graphic functions.
10	Draw the moving car on the screen.

S.Y.B.Sc Information Technology Course Code: IT254 Course Name: Business Intelligence		
Periods per week (1 periods is 60 minutes)	**No. of Credits**	**Evaluation System**
04	**02**	**PR-50 Marks**

Business Intelligence

Course Outcomes: After successful completion of this course, students will be able to:
CO1: Applying concepts of data extraction, transformation, and loading (ETL).
CO2: Designing and generating reports for data visualization and analysis.
CO3: Evaluating the results of linear regression and logistic regression for predictive analytics.

ICT Tools Used: Videos, PPT, Power BI,MS Excel,R studio

Students Centric Methods: Problem Solving and Participative (Experimental, Participative, Problem Solving)

Links: SWAYAM / MOOCS:

1. https://www.udemy.com/course/business-data-analysis-using-microsoft-power-bi/
2. https://www.coursera.org/learn/foundations-of-business-intelligence
3. https://onlinecourses.nptel.ac.in/noc20_mg11/preview

The CO-PO Mapping Matrix

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	2	-	-	-	2	-	-	-	-
CO2	2	-	2	1	-	-	-	-	-	-	-	-
CO3	-	-	1	-	-	-	-	1	-	-	-	-

List of Practicals:

Practical No	Details

S.Y.B.Sc Information Technology Course Code: IT255 Course Name: Enterprise Java		
Periods per week (1 periods is 60 minutes)	**No. of Credits**	**Evaluation System**

1	Import the legacy data from different sources such as (Excel, SqlServer, Oracle etc.) and load in the target system. (You can download sample database such as Adventureworks, Northwind, foodmart etc.)
2	Perform the Extraction Transformation and Loading (ETL) process to construct the database in the Sqlserver.
3	a. Create the Data staging area for the selected database. b. Create the cube with suitable dimension and fact tables based on ROLAP, MOLAP and HOLAP model.
4	a. Create the ETL map and setup the schedule for execution. b. Execute the MDX queries to extract the data from the data warehouse
5	a. Import the data warehouse data in Microsoft Excel and create the Pivot table and Pivot Chart. b. Import the cube in Microsoft Excel and create the Pivot table and Pivot Chart to perform data analysis.
6	Apply the what – if Analysis for data visualization. Design and generate necessary reports based on the data warehouse data.
7	Perform the data classification using classification algorithm.
8	Perform the data clustering using clustering algorithm.
9	Perform the Linear regression on the given data warehouse data.
10	Perform the logistic regression on the given data warehouse data.

Books and References:

1. Business Intelligence: Data Mining and Optimization for Decision Making, Wiley, First, 2009
2. Decision support and Business Intelligence Systems, Efraim Turban, Ramesh Sharda, DursunDelen, Pearson, Ninth, 2011
3. Fundamental of Business Intelligence, Grossmann W, Rinderle-Ma, Springer, First, 2015

04	02	PR-50 Marks

Enterprise Java

Course Outcomes: After successful completion of this course, students will be able to:

CO1: Implementing the Java Servlets into practice.

CO2: Implement the JDBC (Java Database Connectivity).

CO3: Understand how to implement the Request Dispatcher, COOKIES, Session in the application.

CO4: Implement Java Server Pages

ICT **Tools Used:** Videos, PPT, Digital Board

Students Centric Methods: Problem Solving and Participative
(Experimental, Participative, Problem Solving)

Links: SWAYAM / MOOCS:

1. https://www.coursera.org/specializations/java-ee
2. https://onlinecourses.nptel.ac.in/noc22_cs47/preview
3. https://www.udemy.com/course/java-jee-servlet-jsp-jstl/

The CO-PO Mapping Matrix

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	3	3	-	-	-	2	-	-	-	-
CO2	2	-	2	-	-	-	-	2	-	-	-	-
CO3	1	-	-	2	-	-	-	2	-	-	-	3
CO4	3	-	-	-	-	-	-	1	-	-	-	-

List of Practicals:

	Implement the following Simple Servlet applications.
1.	Create a simple calculator application using servlet.
2.	Create a servlet for a login page. If the username and password are correct then it says message “Hello <username>” else a message “login failed”
3.	Create a registration servlet in Java using JDBC. Accept the details such as Username, Password, Email, and Country from the user using HTML Form and store the registration details in the database.
	Implement the following Servlet applications with Cookies and Sessions.

4.	Using Request Dispatcher Interface create a Servlet which will validate the password entered by the user, if the user has entered "Servlet" as password, then he will be forwarded to Welcome Servlet else the user will stay on the index.html page and an error message will be displayed.
5.	Create a servlet that uses Cookies to store the number of times a user has visited servlet.
6.	Create a servlet demonstrating the use of session creation and destruction. Also check whether the user has visited this page first time or has visited earlier also using sessions.
	Implement the Servlet IO and File applications.

7.	Create a Servlet application to upload and download a file.
8.	Develop Simple Servlet Question Answer Application using Database.
	Implement the following JSP applications.
9.	Develop a simple JSP application to display values obtained from the use of intrinsic objects of various types.
10.	Develop a simple JSP application to pass values from one page to another with validations. (Name-txt, age- txt, hobbies-checkbox, email-txt, gender-radio button).
11.	Create a registration and login JSP application to register and authenticate the user based on username and password using JDBC.
	Implement the following JSP JSTL and EL Applications.
12.	Create an html page with fields, eno, name, age, desg, salary. Now on submit this data to a JSP page which will update the employee table of database with matching eno.
13.	Create a JSP page to demonstrate the use of Expression language.
14.	Create a JSP application to demonstrate the use of JSTL.
	Implement the following EJB Applications.
15.	Create a Currency Converter application using EJB.

Books and References:

1. Java EE 7 For Beginners, Sharanam Shah, Vaishali Shah, SPD, First, 2017
2. Java EE 8 Cookbook: Build reliable applications with the most robust and mature technology for enterprise development, Elder Moraes, Packt, First, 2018
3. Advanced Java Programming, Uttam Kumar Roy, Oxford Press, 2015

S.Y.B.Sc Information Technology
Course Code:IT256
Course Name: Campus to Corporate

Lectures per week(1 periods is 60 minutes)	**No. of Credits**	**Evaluation System**
2	**2**	**TH-50 Marks**

Campus to Corporate

Course Outcomes: After successful completion of this course, students will be able to:
CO1: Enabling the students discover and enhance the individual strengths
CO2: Kick - start strategies for the students to set goals to succeed in life
CO3: Ignite the students confidence, improve your understanding on the nuances of corporate Ethics & Etiquette
Co4:Tour the students through the world Business Communication

ICT **Tools Used:** Videos, PPT, QGIS

Students Centric Methods: start strategies for the students to set goals to succeed in life

Links: SWAYAM / MOOCS:

1. https://www.udemy.com/course/journey-from-campus-to-corporate/?couponCode=IND21PM

The CO-PO Mapping Matrix

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	-	-	-	-	-	-	-	2	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	1	-	-	-	-	3	-	-	-	-	1	-
CO4	-	-	2	-	-	-	-	-	-	-	-	2
CO5	1	-	-	-	-	1	-	-	-	-	-	-

Unit	**Details**	**Lectures**

I	**Introduction to Corporate Culture** Understanding corporate environments and expectations Importance of professionalism and workplace etiquette **Effective Communication Skills** Verbal and written communication in a corporate setting Email etiquette and professional phone communication **Time Management Techniques** Prioritizing tasks and meeting deadlines efficiently Introduction to effective time management tools **Personal Branding and Online Presence** Building a professional online brand using social media and LinkedIn Tips for creating an impactful personal brand statement **Problem Solving and Decision Making** Strategies for analyzing problems and making informed decisions Role-playing exercises for real-world scenarios **Team Collaboration and Leadership** Understanding team dynamics and effective collaboration Introduction to leadership skills and qualities	**12**
II	**Professional Networking and Building Relationships** Importance of networking for career growth Techniques for building and maintaining professional relationships **Emerging Technologies in IT** Overview of current and future trends in the IT industry Exploration of emerging technologies and their applications **Project Proposal Development** Identifying project objectives, scope, and stakeholders Techniques for creating a comprehensive project proposal **Project Planning and Timeline** Developing project timelines, milestones, and deliverables Introduction to project management tools and methodologies **Career Development Planning** Creating a personalized career development plan Identifying short-term and long-term career goals and strategies	**12**