T.Y.B.Sc. Information Technology

Semester I

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TEACHING PLAN

Academic Year: **2020-21**

Name of Teacher: Mrs Hemlata Harul Patil

Faculty: Science **Department:** Computer Science & IT

CLASS: T.Y.B.Sc **Subject:** INFORMATION TECHNOLOGY

Paper Code and Title of Paper: (UG-IT-311) Systems Programming

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July	Admission Procedure		
August	**Introduction** 2.1 System Software 2.2 Goal of system software 2.3 System program and system programming 2.4 View of system software	11	
September	**Software Tools** 2.5 What is a Software Tools? 2.6 Software Tools for Program Developments 2.7 Editors 2.8 Debug Monitors 2.9 Programming Environments **Overview of Language Processors** 3.1 Programming Languages and Language Processors 3.2 Language Processing Activities 3.3 Fundamentals of Language Processing	12	
October	**Assembler** 4.1 Definition. 4.2 Features of assembly language, advantages	12	

	4.3 Statement format, types of statements 4.4 Constants and Literals. 4.5 Advanced assembler directives 4.6 Design of assembler – Analysis Phase and Synthesis Phase. 4.7 Overview of assembly process 4.8 Pass Structure of Assembler – One pass, Two pass assembler. 4.9 Problems of One-pass assembler 4.10 Design of Two-pass Assembler **Unit-5. Macro and Macro Preprocessor** 5.1 Macro Definition and Call 5.2 Macro Expansion 5.3 Nested Macro Calls 5.4 Tables used in Macro 5.5 Advanced Macro Facilities 5.6 Design of Macro Preprocessor		
November	**Unit-6. Compiler** 6.1. What is Compiler 6.2. Scanning and Parsing 6.2.1.Programming Language Grammars 6.2.2.Scanning 6.2.3.Parsing 6.3.Language Processors Development Tools **Unit-7. Linkers and Loaders** 7.1 Introduction 7.2 Relocation and Linking Concepts 7.3 Self Relocating Programs 7.4 Linking for Overlays 7.5 Dynamic Linking 7.6 Loaders	12	

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER: Miss. DIPALI GHANSHAM KHADKE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE AND I.T

CLASS: **T.Y.B.Sc** SUBJECT: INFORMATION TECHNOLOGY

PAPER CODE and TITLE OF PAPER: DSC (UG-IT-502): Database Management System

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July	ADMISSION PROCESS		
August	1.1 Overview, Definition 1.2. Types of DBMS 1.3. Describing & storing data (Data models (relational,hierarchical, network)), 1.4. Levels of abstraction , data independence, 1.5. Queries in DBMS (SQL : DDL,DML,DCL,TCL), Users of DBMS, Advantages of DBMS	06	
September	2.1. Overview of DB design, 2.2. ER data model (entities, attributes, entity sets, relations, relationship sets) , 2.3. Conceptual design using ER (entities VS attributes, Entity Vs relationship, binary Vs ternary). Relations (concepts, definition), 3.2. Conversion of ER to Relational model , 3.3. Integrity constraints (key, referential integrity, general constraints) 3.4 Codd's Rules, Functional Dependency, Data Normalization (1NF, 2NF, 3NF, BCNF)	12	
October	4.1. Preliminaries 4.2. Relational algebra (selection, projection, set operations, renaming, joins, division) 5.1 Database security 5.2 Database integrity 5.3 Transaction Concept 5.4 Transaction State 5.5 Transaction Properties (ACID)	12	

November	6.1Lock-Based protocol, 6.2 Timestamp-Based protocol 6.3 Log base Recovery 6.4 Shadow Paging 6.5 Differed Updates.	12	

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TEACHING PLAN

Academic Year: **2020-21**

Name of Teacher: Mrs Hemlata Harul Patil

Faculty: Science **Department:** Computer Science &IT

CLASS: T.Y.B.Sc **Subject:** INFORMATION TECHNOLOGY

Paper Code and Title of Paper: (UG-IT-313) Software Engineering

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July	Admission Procedure		
August	**Introduction to Software Engineering:** 1.1 Software and Software Engineering 1.2 Evolution of Software 1.3 Software Characteristics 1.4 Software Applications 1.5 Software Myths 1.6 Software Process 1.7 Software Development Life Cycle (SDLC) **2. Software Development Model:** 2.1 Waterfall Model 2.2 Prototyping Model 2.3 Incremental Development Model 2.4 RAD model 2.5 Spiral Model	11	

September	**Requirement Analysis and Specification:** 3.1 Requirements Engineering 3.2 Fact finding Techniques 3.3 Introduction to Types of Requirement Modeling 3.4 Data Modeling Concepts- Data Objects, Data Attributes & Relationship. **4. Design Engineering:** 4.1 Characteristics of good Software Design	12	
October	Design Concepts- Architecture, Modularity, Information Hiding 4.3 Cohesion & Coupling 4.4 Decision Table & Decision Tree 4.5 Data flow Diagram 4.6 Data Dictionary	12	
November	**5 Software Coding & Testing:** 5.1 Coding standards & Guidelines 5.2 What is testing? 5.3 Testing Activities 5.4 Black box testing 5.5 White box testing 5.6 Introduction to Debugging Approaches – Brute force Method, Backtracking, Case Elimination Method, Programming Slicing. **6. Software Quality:** 6.1 What is Quality? 6.2 Software Quality - Garvin's quality dimensions, Mc Calls quality factors, ISO 9125 quality factors 6.3 Elements of Software Quality Assurance 6.4 ISO 9000 & Certification	12	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Mrs. Archana Patil

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE & IT

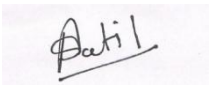
CLASS: **T.Y.B.Sc.** SUBJECT: INFORMATION TECHNOLOGY

PAPER CODE and TITLE OF PAPER: UG IT 504 CYBER LAW AND IT ACT

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July	ADMISSION PROCESS		
August	Cyber world, Cyber Space, Cybernetics, Electronic Data Interchange (EDI). E–governance, E–commerce. B2B, B2C, & C2B, C2C, G2B (Government to Business), G2C (Government to Citizens) Concept of Cyber Crimes – Categories of cyber crime, Types of Cyber crimes. Viruses, worms, software piracy. Web jacking, Web Defacement, Cyber Stalking, Cyber Pornography. Hacking, Phishing, e-fraud, threatening email, Cyber Terrorism.	08	
September	Introduction to Cyber Law Definition, Objective of Cyber Law – Need and Scope Copyright issues in Cyberspace, Data encryption, Cryptography, Digital Signatures. Password, Encrypted smart card, Bio-metric, firewall. Information Security Management System and other Security Compliances.	06	

October	Background of Information Technology Act 2000 Preliminary, Definitions, amendments. Authentication of electronic records, Legal recognition of electronic Legal recognition of digital signatures, Attribution, Regulation of Certifying Authorities. Acknowledgment and Dispatch of electronic records. . Secure records and secure digital signatures, Functions of controller, Duties of Subscribers, Penalties and Offences.	04	
November	Introduction Objective of copyright Requirement and meaning of copyright Copyright as bundle of rights, Framing Linking and infringement Information technology act related to copyright	06	



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TEACHING PLAN

ACADEMIC YEAR: 2020-21
NAME OF TEACHER: MISS. DIPALI GHANSHAM KHADKE
FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE & I.T
CLASS: **T.Y.B.Sc.(I.T)** SUBJECT: INFORMATION TECHNOLOGY
PAPER CODE and TITLE OF PAPER: DSC (UG-IT-505) Android Application Development– I
FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July	ADMISSION PROCESS		
August	Overview of Mobile Platform development , History of Mobile Application Development , History of Android Features of Android ,Architecture of Android Android SDK Overview Creating first Hello word Android Application	6	
September	Introduction to Activities. , Activity Lifecycle ,Introduction to Intents, Linking Activities using Intents Calling built-in applications using Intents ,Introduction to Fragments ,Lifecycle of Fragment ,Add Dynamic Fragments Interaction between Fragments	12	
October	Introduction,Understanding the Component of a Screen Views and ViewGroups ,Adapting to Display Orientation Managing Changes to Screen Orientation Utilizing Action Bar, Basic Views TextView, Button, ImageButton, EditText, CheckBox, ToggleButton, RadioButton, and RadioGroup Views, ProgressBar View, AutoCompleteTextView View,	12	
November	Using Picker Views ,TimePicker View,DatePicker View List Views to Display Long Lists ,ListView View Spinner View ,Specialized Fragments ,ListFragment, DialogFragment, PreferenceFragment	12	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Swapnali Prashant Waghulde

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE & IT

CLASS: **T.Y.B.Sc.** SUBJECT: INFORMATION TECHNOLOGY

PAPER CODE and TITLE OF PAPER: DSC (UG-IT-506 A): Elective A - Internet Programming using PHP I

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July	Admission Process		
August	**Unit–1 The Basics of PHP** • Introduction to PHP • Working of PHP • Structure of PHP • Structure & Syntax of PHP PHP with HTML Comments • Data Types and Variables • Operators • Flow Control Statements • ConditionalStatements • Looping Statements • Exit, Return, Die, Include and Require Statements	12	
September	**Unit – 2 Arrays, Function and String** Introduction to Array • Types of Array: Index, Associative, Multidimensional Array • Different array function in PHP • Traversing arrays, Sorting arrays Introduction to Function • Defining and Calling a function • Scope of variables in function • Function Parameters • Returning Values from a function • Recursive Functions String functions in PHP • Printing functions • Comparing strings • Manipulating and Searching strings Regular Expressions **Unit – 3Object-OrientedPHP** • Introduction and Benefits of OOPs in PHP • Creating a Class in PHP	12	

October	Creating an Object in PHP • Adding a Methods • Adding a Properties • Visibility (Public, Private and Protected) Constructor and Destructors Inheritance (Extending a class) Abstract classes, Final classes Interfaces Exception handling Serialization **Unit – 4WebTechniques** Introduction o HTTP Basics	12	
November	Processing Forms • Methods (Get and Post Method) • Parameters ($_GET and $_POST) • Self-Processing Pages • File Uploads Maintaining State • Cookies • Sessions • Combining Cookies and Sessions **Unit – 5 PHPwithMySQL** Introduction to MySQL Interaction between PHP and MySQL Error Checking Execute DDL Statements Execute DML Statements	12	

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Semester II

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER:Mrs. Archana Patil.

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE & IT

CLASS: **T.Y.B.Sc.** SUBJECT: INFORMATION TECHNOLOGY

PAPER CODE and TITLE OF PAPER: UG IT 601 OPERATING SYSTEM

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
JANUARY	**TERM END EXAM**		
FEBRUARY	What is an operating system? 1.2 Types of Operating System 1.3 Services of Operating System 1.4 Functions of operating system. 2.1 Multiprogramming Concepts 2.2 Basic Concept of CPU scheduling: CPU-I/O burst cycle, CPU scheduler, Preemptive scheduling, Dispatcher 2.3Performance criteria's 2.3 Scheduling Algorithms:FCFS, SJF, Priority scheduling, Round-robin scheduling 2.4 Multilevel queues, multilevel feedback queue	15	
MARCH	Logical versus Physical Address space 3.2 Swapping 3.3 Multiple partition allocation MFT , MVT 3.4 Paging 3.5 Segmentation 3.6Virtual Memory Management – Background, Demand paging 4.1 First Come first serve scheduling 4.2 Shortest Seek Time First Scheduling 4.3 SCAN Scheduling 4.4 C-SCAN Scheduling	15	

APRIL	Concept of Deadlock 5.2 Deadlock Characterization 5.3 Deadlock Prevention 5.4 Deadlock Avoidance 5.5 Deadlock Detection 5.6 Recovery from Deadlock 6.1 What is android operating system. 6.2 Android Architecture 6.3 Features of Android operating system 6.4 Applications of android operating system 6.5 What is Google play store	15	
MAY	**TERM END EXAM**		

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Mrs. SHUBHANGI SANJEEV BHANGALE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE & IT

CLASS: **T.Y.B.Sc.** SUBJECT: INFORMATION TECHNOLOGY

PAPER CODE and TITLE OF PAPER: CS – 602 R-DBMS

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
DECEMBER	**TERM END EXAM**		
JANUARY	**TERM END EXAM**		
FEBRUARY	INTRODUCTION TO RDBMS Introduction to RDBMS,• Introduction to Open Source software PostgreSQL,• Installation of open source software PostgreSQL on Windows and Linux,• Data types of PostgreSQL DATABASE AND TABLE OPERATIONS : Database Operations - 1.Creating a Database 2.Dropping the Database• Table Operations – 1. Create 2. Alter3. Drop SQL – STATEMENTS, OPERATORS, FUNCTIONS Statements - SELECT, INSERT, UPDATE, DELET	12	
MARCH	Null value and Default value Operators - Arithmetic, Logical, Comparison, Bitwise, Relational• Functions - Aggregate functions, Date and Time functions, String functions• Clauses:- where, order by, AND, OR, Between, Like, CASE, Distinct, Group by, Having• VIEW, JOIN and DATA CONSTRANTS in Constraints - Data Integrity, Entity Integrity• Keys - PRIMARY KEY, UNIQUE, FOREIGN KEY, CHECK, Not	12	

	Null• Views - Create, Alter, Drop• Join - Joins, Cross Join, Inner Join, Outer Join, Self-Join• Subquries -Subqueries as Constants, Subqueries as Correlated Values, Subqueries as• Lists of Values, NOT IN and Subqueries with NULL Values, Subqueries Returning Multiple Columns Statement - MERGE Statement• Set operations-UNION, EXCEPT, and INTERSECT• Clauses -ANY, ALL, and EXISTS Clauses		
APRIL	TRANSACTION COMMANDS , INDEX AND SEQUENCE Transaction commands-Commit, Rollback• Indexing -Creating an Index, Unique Indexes• Sequences- Creating Sequence, using nextval(), currval() and setval()• Unit 6PL/PGSQL - SQL PROCEDURAL LANGUAGEIntroduction to PL/PGSQL- Advantages of PL/PGSQL, structure of PL/PGSQL, basic• Statements and control structures Function -Creating functions, Removing functions• Cursors-Creation of Cursors, Using Cursors, Looping• Triggers-Introduction, Triggers Vs constraints, DML Triggers, DDL Triggers Under• Error handling -Introduction Error Handling, RAISE Statement•	12	
MAY	**TERM END EXAM**		

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TEACHING PLAN

Academic Year: **2020-21**
Name of Teacher: Mrs Hemlata Harul Patil
Faculty: Science **Department:** Computer Science & IT
CLASS: T.Y.B.Sc **Subject:** INFORMATION TECHNOLOGY
Paper Code and Title of Paper: (UG-IT-603)Computer Network

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December	**TERM END EXAM**		
January	**TERM END EXAM**		
February	**Introduction to Computer Network and Network Model** 1.1 What is Computer Network? 1.2 Application Of Computer Networks 1.3 Transmission Mode , Network Structure 1.4 Network Topologies 1.5 ISO OSI Reference Models, TCP / IP Reference Model & their Comparison. **Unit-2. Physical Layer** 2.1 Guided Media: 2.1.1 Twisted Pair 2.1.2 Coaxial Cable	12	
March	2.1.3 Fiber Optics 2.14 Satellite Communication 2.15 Microwave Communication 2.1.6 Submarine Cables. 2.2 Unguided Media 2.2.1. Electromagnetic Spectrum 2.2.2. Radio Transmission 2.2.3. Microwave Transmission 2.2.4. Infrared & Millimeter Waves 2.2.5. Light wave Transmission **The Data link Layer** 3.1 Services Provided to Network Layer 3.2 Framing, Error Control , Flow Control 3.3 Error Detection – Redundancy, Parity Check, Checksum	12	

	& CRC, 3.4 Error Correction – Hamming Code.		
April	**The Network Layer** 4.1 Logical Addressing 4.1.1 IP v4 Addresses - Address Space - Classful Addressing - Classless Addressing 4.2. Routing Algorithm 4.2.1. Shortest Path 4.2.2. Multicast Routing 4.3. Congestion Control 4.3.1. Introduction to Congestion Control 4.3.2. Deadlocks	12	
May	**Transport Layer** 5.1 Process to Process Delivery 5.1.1 Client-Server Paradigm 5.1.2 Multiplexing and Demultiplexing 5.1.3 Connectionless v/s Connection Oriented Services 5.1.4 Reliable v/s Unreliable Transmission 5.2 UDP and TCP 5.2.1 UDP – Operations and uses 5.2.2 TCP – Services and features **Unit-6. Cryptography and Public key Infrastructure** 6.1 Introduction: 6.1.1 Cryptography, Cryptanalysis, Cryptology, Substitution 6.1.2 Techniques: Caesar's cipher, Monoalphabetic and Polyalphabetic, 6.1.3 Transposition techniques – Rail fence technique, Simple Columnar 6.2 Public key infrastructures: 6.2.1 basics, digital certificates, certificate authorities, registration authorities, Digital Signature	12	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: MRS. UJWALA PRASHANT MAHAJAN

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE & IT

CLASS: **T.Y.B.SC.** SUBJECT: INFORMATION TECHNOLOGY

PAPER CODE AND TITLE OF PAPER: IT-604 THEORETICAL COMPUTER SCIENCE

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
January	**TERM END EXAM**		
February	**TERM END EXAM**	15	
March	3.1 Regular Expressions 3.2 FA & Regular Expressions 3.2.1 Convert Regular Expression to FA 3.2.2 Construct FA from Regular Expression 3.3 Pumping Lemma for Regular Sets and applications 4.1 Introduction to Context Free Grammars 4.2 Derivation Trees 4.2.1 Ambiguity in CFG 4.3 Simplification of Context Free Grammars 4.3.1 Useless Symbols 4.3.2 Null Production 4.3.3 Unit Production 4.4 Normal forms for CFG 4.4.1 Chomsky Normal Form (CNF) 4.4.2 Greibach Normal Form (GNF)	15	

April	5.1Basic Definitions 5.2 Types of PDA 5.3 Acceptance by Pushdown Automata 5.4 PDA and Context Free Language 6.1 Introduction 6.2 Turing Machine Model 6.3 Representation of Turing Machine 6.4 Design of Turing Machine	15	

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER: Miss. DIPALI GHANSHAM KHADKE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

AND I.T CLASS: **T.Y.B.Sc.** SUBJECT: INFORMATION TECHNOLOGY

PAPER CODE and TITLE OF PAPER: DSC (UG-IT-605) Android Application Development – II

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December	TERM END EXAM		
January	TERM END EXAM		
February	Threads running on UI thread (runOnUiThread) ,Worker thread ,Handlers & Runnable , AsynTask (in detail) , Broadcast Receivers ,Services and notifications , Toast ,Alarms, Multimedia API ,Playing Audio ,Creating Audio Player , Playing Video , Android Animation API , Android Drawable class , Android Rotate, Fade, Zoom Animation	12	
March	Graphics API , 2D Graphics , Android.Graphics.Canvasclass ,Android.Graphics.Paint class, Introduction to SQLite ,SQLiteOpenHelper and SQLiteDatabse ,Creating, Opening and Closing Database ,Working with Cursor – Insert, Update and Delete ,Building and executing queries	12	
April	SMS messaging ,Sending SMS Messages ,Getting Feedback after Sending a Message ,Receiving SMS Message ,Sending E-mail, Google Maps ,Maps API Key , Displaying the Maps , Displaying Zoom Control , Changing Views ,Getting Location Data ,Monitoring a Location	12	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: SWAPNALI PRASHANT WAGHULDE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE &IT

CLASS: **T.Y.B.Sc.** SUBJECT: INFORMATION TECHNOLOGY

PAPER CODE and TITLE OF PAPER: DSC (UG-IT-606 A):Programming in PHP - II

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
January	सत्रांत परीक्षा		
February	**Unit – 1 Advanced PHP** Emailing in PHP • Sending Free SMS to Mobile • Loading PHP application on web server By FTP. • Web services **Unit –2 Files and directories** Working with files and directories • Opening and Closing files, • Coping,renaming and deleting a file • Reading and writing characters in file • Reading entire file • Working with directories	12	
March	**Unit –3 PHP with MySQL** Introduction to MySQL • Interaction between PHP and MySQL • Connecting to a Database • Error Checking • Execute DDL Statements • Execute DML Statements **Unit –4 Ajax with PHP** Introduction Of Ajax	12	
April	• How AJAX Works • Steps of AJAX Operation • Ajax object in Different Browser **Unit –5 CMS Technology in PHP** • Introduction of CMS • What is Joomla? • Installation of joomala	12	
May	Steps of Joomla installation & Configuration Various Managers in Joomla • Installing an plug-in/extension **TERM END EXAM**	08	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21
NAME OF TEACHER: Mrs. SHUBHANGI SANJEEV BHANGALE
FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE
CLASS: **M.Sc.-I** SUBJECT: COMPUTER SCIENCE
PAPER CODE and TITLE OF PAPER: DSC : CS-101: Digital Image Processing

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December			
January	**Introduction** Introduction to DIP, Application of Digital Image Processing, Fundamental Stepsin Digital Image Processing, Components of an Image Processing System, Image data types,image file formats (GIF, BMP,TIFF,JPEG). **ImageProcessingFundamental** Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling andQuantization. Some Basic Relationships between Pixels.Linear and Nonlinear Operations.	16	
February	**Image Enhancement** Background. Some Basic Gray Level Transformations. Histogram Processing. EnhancementUsing Arithmetic/Logic Operations. Basics of Spatial Filtering. SmoothingSpatial Filters. Sharpening Spatial Filters .Combining Spatial Enhancement Methods. Introduction to the Fourier Transform and the Frequency Domain. Smoothing Frequency- Domain Filters.Sharpening Frequency Domain Filters. Homomorphic Filtering. Implementation.	15	
March	**Image Restoration and Transforms** A Model of the Image Degradation/Restoration Process. Noise Models. Restoration in the presence of Noise Only-Spatial Filtering. Periodic Noise Reduction by Frequency domain filtering. Linear, Position-Invariant Degradations. Estimating the degradation function. Inverse filtering. Minimum Mean Square Error (Wiener) Filtering. Constrained least Squares Filtering. Geometric Mean Filter .Geometric Transformations. Discrete Fourier transform, Walsh transform(WT), Hadamard transform, Cosine transform, Haar transform, Wavelet transform.	16	

	Color Image Processing Color Fundamentals. Color Models. Pseudo color Image Processing. Basics of Full-color imageProcessing.ColorTransformations. Smoothing and Sharpening Concept of Image, Audio and Video Compression.		
April	**Morphological Image Processing & Segmentation** Detection of Discontinuities, Edge linking & Boundary Detection, Thresholding, Region based Segmentation Laplacian of Gaussian, Derivative of Gaussian, Canny edge detection, Morphological operation : Dilation erosion, Opening & Closing, basic morphological Algorithm, Image representation schemes. **MATLAB Image Processing** Introduction to matrix operations, introduction to image processing tool box image read &write,Filters (spatial, frequency domain), Image Restoration and reconstruction, morphological Operations, edge detection and linking, segmentation.	16	
May	**(प्रथमसत्रपरीक्षा)**		

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: MRS HEMLATA HARUL PATIL

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS:M.Sc-I SUBJECT: COMPUTER SCIENCE

PAPER CODE AND TITLE OF PAPER:CS-102 ADVANCED OPERATING SYSTEMS

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December	Admission Procedure		
January	**Overview -**Introduction to Kernel, Architecture of UNIX operating system , Introduction to system concepts, Introduction to shell programming and UNIX commands. **Buffer cache -**Buffer headers, Structure of the buffer pool, Scenarios for retrieval of a buffer – Reading and writing disk blocks, Advantages and disadvantages of the buffer cache.	12	
February	**File Subsystem -**Internal representation of files: Inodes, Structure of a regular file and Directories, Conversion of a path name to an Inode, Super block, Inode assignment to a new file, Allocation of disk blocks.**System Calls for the File System -**Open – Read – Write – File and record locking – Adjusting the position of file I/O lseek – Close, File creation – Changing directory, root, owner, mode, stat and fstat, Pipes – Dup, Mounting and unmounting file systems - Link – unlink.	16	
March	**Processes -**Process states and transitions, Layout of system memory, The context of a process, Saving the context of a process, Manipulation of the process address space - Sleep. **Process Control -**Process creation Signals, Process termination, Awaiting process termination, Invoking other programs –	16	

April	user id of a process – Changing the size of a process, Shell – System boot and theINIT process– Process Scheduling. **Memory Management and I/O:** Memory Management Policies: Swapping – Demand paging, Driver Interface – Disk Drivers – Terminal Drivers, Streams, Inter process communication	16	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21
NAME OF TEACHER: Mrs. Archana Patil
FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE
CLASS: **F.Y.M.Sc.** SUBJECT: COMPUTER SCIENCE
PAPER CODE and TITLE OF PAPER: CS-105 Advanced C++

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December			
January	Class Derivation, Access Control, Base Class Initialization, Initializing Class Type Members,Polymorphism and Virtual Functions, Pointer Conversion, Virtual Destructors, Abstract Classes and Pure Virtual Functions C++ Exception Mechanism, Exceptions Compared to Other Error Handling Techniques, throw, try and catch, Exception Context and Stack Unwinding, Uncaught Exceptions, Automatic Cleanup in Exception Handling Runtime Type Information (RTTI) Mechanism, type_info Class and typeid Operator, Type Safe Pointer Conversion, New C++ Cast Syntax Collection Classes in Object-Based Hierarchies, Independent Class Hierarchies in C++, Duplicate Sub objects Virtual Base Classes	10	
February	Object Validation, Smart Pointers, Reference Counting, Generic Smart Pointers Templates, Template functions, Specializing a template function, Overloading template functions,Disambiguation under specialization, Template classes, An array template class,	08	

March	Instantiating a template class object, Rules for templates, Non member function with a template argument Friends of template classes, Templates with multiple type parameters, Non type parameters for template classes, Comments regarding templatesWhy STL, Sequential, Container Adapter, Associative Container, Iterator, Algorithms.	06	
APRIL	Introduction,Input iterators, Output iterators, Forward iterators, Backward iterators. Sequential Container:-vector, deque list Container Adapter: Stack, Queue, Proiority Queue Associative Containers: Set, Multiset, Map, Multimap Non modifying algorithms, mutating algorithms, sorting algorithms	04	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: MRS. UJWALA PRASHANT MAHAJAN

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **M.SC.-I** SUBJECT: COMPUTER SCIENCE

PAPER CODE AND TITLE OF PAPER:CS-106 AUTOMATA THEORY AND COMPUTABILITY

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December			
January	Introduction : States and Automata, Finite Automata as Language Acceptors, Deterministic andNon deterministic Finite Automata, Properties of Finite Automata : Equivalence of finiteAutomata, transitions, Moore and Mealy machine models, Regular expressions : Definition andexamples, Regular expressions and finite automata, Regular expressions from DFAPumping lemma for regular sets, application of pumping lemma, closure properties of regular sets. Context free grammar, Derivation tree: Leftmost, rightmost, ambiguous grammar,Simplification of context free grammar: Construction of reduced grammar, elimination of nullproduction and elimination of unit production. Normal forms: Chomsky Normal Form, GriebachNormal Form.	12	
February	Acceptance by empty store and final state, equivalence between pushdown automata and contextfree grammar, Closure properties of CFL, Deterministic PDA.Techniques for TM construction : Generalized and restricted versions equivalent to the basicmodel,Godel numbering, universal TM, recursive enumerable sets and recursive sets,	16	

March	computable functions, time-space complexity measures, context sensitive languages and linearbounded automata(LBA), multitapeturing machinePost correspondence problem, decidability of membership, emptiness and equivalence problemsof languages.	16	
April	Primitive Recursive functions : Initial function, Primitive recursive functions over N, primitiverecursive functions{a,b}. Recursive functions.Time and tape complexity measures of Turing machines, random access machines, the classes Pand NP, NP completeness.	16	
May	(**FIRST TERM EXAM)**		

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TEACHING PLAN

ACADEMICYEAR: 2020-21
NAME OF TEACHER: Dr. LEENA YOGESH BHOLE
FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE
CLASS: **M.Sc-I** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: DSC : CS -201SOFTWARE ENGINEERING

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
June			
July	**Introduction to Software Engineering-** The nature of software, Defining software, Software Application Domain, Legacy Software, Software Engineering, Software Process **Software Process Models:** Incremental Process Model, Concurrent Process Model, Specialized Process Model-	16	
August	**Requirement Specifications:**Requirements Engineering, Establishing the ground work, Eliciting Requirements Developing Use cases, Building the requirements model, validating requirements**Design Concepts-** Design Process, Concepts, Design Models, Architectural Design- Software architecture, Architectural Design	15	
September	User Interface Design – User Interface Analysis and Design, Pattern based Design – Design Pattern **Testing-**Levels of testing – Functional, Structural, Test Plan, Test case specification, Types of testing – Unit testing, Integration Testing, Function Testing, System testing, Performance testing, Accepting testing **Quality Management -**What is quality? , Software quality- Gravin's quality dimension, McCall's quality factor, ISO 9126 quality factors, Targeted quality factor, Review Technique- Formal Technical Review	16	

October	**Software Configuration Management (SCM) and Project Scheduling -**Software Configuration Items, SCM Repository, SCM Process, Scheduling Timelinecharts, tracking the schedule	16	
November	**(सत्रांतपरीक्षा)**		

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER: SWAPNALI PRASHANT WAGHULDE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **M.Sc-I** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: DSC : CS -202 Designs and Analysis of Algorithm

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July	**Introduction:-**Algorithm definition, Analysis of Algorithms, Principles of Algorithm, Some stylistic issues, Euclid's algorithm, Recursion - Removal of Recursion (GCD, Factorial), Asymptotic complexity, Heaps (Insert, Adjust),Finding Maximum and Minimum	16	
August	**Divide and Conquer:** Introduction, Control Abstraction for Divide and Conquer, Binary Search, Sorting(Merge, Quick), Matrix Multiplication. **Greedy Algorithms:** Introduction, Control Abstraction for Greedy Algorithms, Single source shortest path,	15	
September	Minimum cost spanning tree(Kruskal, Prims), Fractional knapsack, Huffman Coding **Dynamic Programming:** Introduction, Control Abstraction for Dynamic Programming, All pair shortest path, Knapsack (0/1) ,Matrix chain multiplication , Longest common subsequence, DFS and BFS	16	

October	**Backtracking:** GeneralMethod,8-Queen'sproblem, Sum of subset problem, Graph coloring problem, Hamiltonian cycle **Problem Classifications:** Nondeterministic Algorithm, The class of P,NP, NP-hard and NP-Complete problem, Significance of cook's theorem	16	
November	**(सत्रांतपरीक्षा)**		

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER: Miss. DIPALI GHANSHAM KHADKE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE & I.T

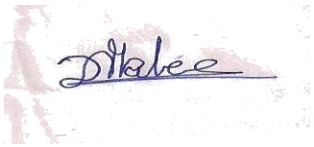
CLASS: **MSC.I** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER:CS-205 Optimization Algorithms

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December	सत्रांतपरीक्षा		
July	Introduction, Quantitative Techniques and their field of applications, Classification of Quantitative Techniques, Limitations of QuantitativeTechniques Introduction – Graphical Solution; Graphical Sensitivity Analysis– The Standard Form Of Linear Programming Problems – Basic Feasible Solutions -Unrestricted Variables – Simplex Algorithm – Artificial Variables – Big M And Two Phase Method –Degeneracy Alternative, Optimal – Unbounded Solutions – Infeasible Solutions.	16	
August	Relation between Primal and Dual Problems – Dual Simplex Method, Starting Solutions. North West Corner Rule Lowest Cost Method, Vogelsapproximation,MODI Method ,Method , , Stepping Stone Method, Transportation Algorithms –Assignment Problem –Hungarian Method.	16	
September	Introduction, Two-Person Zero-Sum Games, Some Basic Terms, the MaxminiMinimax Principle, Games Without Saddle Points-Mixed Strategies, Graphic Solution of 2 * N and M*2 Games, Dominance Property. Definitions – CPM and PERT Network Minimization, Shortest Route Problem,	16	
October		15	

	Critical Path Calculations, PERT Calculation, Float Analysis.Processing N Jobs through 2 Machines, N Jobs through 3 Machines, Two Jobs through M Machines.		
November			



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TEACHING PLAN

ACADEMIC YEAR: 2020-21
NAME OF TEACHER: Mrs. ArchanaPatil
FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE
CLASS: **M.Sc-I**SUBJECT: COMPUTER SCIENCE
PAPER CODE and TITLE OF PAPER: CS-206 ARTIFICIAL INTELLIGENCE

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
June			
July	What is Machine Intelligence? The AI Problems, What is an AI Technique, Criteria forSuccess, AI Task domains. Defining the Problem as a State Space Search, Production systems, ProblemCharacteristics ,Production System Characteristics, Issues in the Design of SearchPrograms, Uninformed Search Techniques: DFS and BFSGenerate-and-Test, Hill Climbing, Best-First Search, A* Search, AO* Search	07	
August	Knowledge Representation Issues, Representations and Mappings, Approaches toKnowledge Representation, Issues in Knowledge Representation, The Frame Problem.Representing Instance and Isa Relationships, Computable Functions and Predicates,Resolution, Natural Deduction.Semantic Nets, Frames Conceptual Dependency, Scripts	06	
September	What is learning?, Rote Learning, Learning by taking advice ,Learning in problemsolving, Learning from examples, Explanation based learningIntroduction, An example Domain – the block world, Components of the planningsystem ,What is understanding?, What makes understanding hard, Understanding asconstraints satisfactionMachine Learning Using Neural Network, Adaptive Networks, Feed forward Networks,	08	

	Supervised Learning Neural Networks, Radial Basis Function Networks, Reinforcement Learning, UnsupervisedLearning.		
October	Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions, FuzzyRules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems ,FuzzyDecision Making.	08	
November	Introduction to Genetic Algorithms (GA) ,Applications of GA in Machine Learning ,Significance of the Genetic Operators	04	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: MRS HEMLATA HARUL PATIL

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS:M.Sc-IISUBJECT: COMPUTER SCIENCE

PAPER CODE AND TITLE OF PAPER:CS-301 ADVANCED NETWORK PROGRAMMING

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July			
August	**Network fundamentals** Project model IEEE 802, Network topologies Network infrastructure, Network Protocols UDP, TCP, Introduction to TCP/IP Architecture of the TCP/IP model. **Client server Programming and Application** The client server model and software design, the socket interface, concurrent processing in client- server software,	16	
September	program interface to protocol algorithms & issues in client Software design, example client software, algorithms & issues in server software design Iterative connectionless server, iterative connection oriented server, single process Concurrent server concurrent connection oriented server, multiprotocol server , multi-service server concurrency in client external data representation remote procedure call concept, RPCgen concept.	16	
October	**Network Interface Layer** Overview of network interface layer media access control standards, mapping the Physical address to the IP address. Internet Layer: Purpose of the internet layer, classes of lpv4 addresses, basics of routing, IP datagram ICMP, IGMP Transport Layer Types of data transfer connection-less data transfer, connection-oriented data transfer	16	

November	**Mobile Ad-Hoc Network-**Overview of Wireless Ad-Hoc Network- MANET and WSN, Routing in Ad-Hoc Network, Routing Protocols for Ad-Hoc Wireless Network (Proactive, Reactive and Hybrid) Clustering Protocols	12	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21
NAME OF TEACHER: Dr. LEENA YOGESH BHOLE
FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE
CLASS: **M.SC.-II** SUBJECT: COMPUTER SCIENCE
PAPER CODE AND TITLE OF PAPER: CS-302 Data Warehousing and Data Mining

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July			
August	**Introduction to Data Warehousing**-Evolution of decision system, Failure of past decision support system, Operational v/s decision support systems, Multidimensional data models, Star schema, Snowflake schema. Data warehousing lifecycle, Architecture, Building blocks, Components of DW, Data Marts. Metadata – Definition, Metadata Interchange, initiative and metadata repository and management.	08	
September	**Data Pre-processing**-Need for pre-processing of the data, Descriptive data summarization, Data cleaning, Data Integration and transformation, Data reduction, Data discretization and concept hierarchy generation. **Data Mining**-Introduction-Data Mining functionalities, Classification of Data Mining Systems, basic Data Mining task, Data Mining Issue	16	
October	**Association Rule Mining**-Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining. **Classification and Prediction-** Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners	16	

November	Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section. **Cluster Analysis**-Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – GridBased Methods – Model-Based Clustering Methods – Clustering High-Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis	16	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21
NAME OF TEACHER: MRS. UJWALA PRASHANT MAHAJAN
FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE
CLASS: **M.SC.-II** SUBJECT: COMPUTER SCIENCE
PAPER CODE AND TITLE OF PAPER:CS-305COMPILERCONSTRUCTION

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July			
August	Analysis-synthesismodelofcompilation,variousphasesofacompiler,tool-based approach tocompiler construction	08	
September	Interfacewithinput,parserandsymboltable,token,lexemeandpatterns,Difficulties inlexicalanalysis,Errorreporting, Implementation,Regulardefinition,Transition diagrams,LEX. CFGs, ambiguity, associativity, precedence, top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing,operatorprecedence grammars, LR parsers (SLR, LALR, LR), YACC.	16	
October	Syntax directed definitions: inherited and synthesized conversion,overloaded functions and operators, polymorphic functions.. Storageorganization, activation tree, activation record, parameter passing, symbol table, dynamicstorage allocation. Intermediaterepresentations,translationofdeclarations,assignments,controlflow, Booleanexpressions and procedurecalls.	16	
November	Implementation issues. Issues, basicblocks andflow graphs, register allocation, codegeneration, dag representation of programs, codegeneration fromdags, peep hole optimization, code generatorgenerators, specifications of machine.	16	

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TEACHING PLAN

ACADEMICYEAR: 2020-21
NAME OF TEACHER: SWAPNALI PRASHANT WAGHULDE
FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE
CLASS: **M.Sc.** SUBJECT: COMPUTER SCIENCE
PAPER CODE and TITLE OF PAPER: CS-306: Web Programming using ASP.NET

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
June			
July	प्रवेशप्रक्रिया		
August	**Understanding the .Net Framework -** What is .NET?-The Pieces of .NET, Why we need .NET? The Common Language Runtime(CLR)- Common Functionality, Namespaces, Common Type System, Assemblies-Versioning and Securing Code. **Web Applications in ASP.NET -** ASP.NET Coding Models- Inline Code Model, The Code-Behind Model-ASP.NET Page Directives, Page Events and Page Life Cycle	15	
September	ASP.NET Application Directory Structure,ASP.NET Application Compilation Models- Normal Compilation Model, Deployment Pre-Compilation, Full Runtime Compilation. **Server Controls and Validation**- ASP.NET Server Controls- The Web Control Class, The Label Control, The TextBox Control, The Button Control, The Hyper Link Control, The LinkButton Control, The DropDownList Control, The ListBox Control, The Check Button List Control, Radio ButtonList Control, The Check Box Control, The Radio Button Control, The Image Control	15	
October	HTML Controls- The Html Control Class, The Html Input Control Class, The Html InputText Control, The Html Text Area Control, The Html Input Button Control, The Html Select Control, The Html Input Check Box Control, The Html Input Radio Button Control, The Html Image Control, The Html Input File Control. Validation Controls, Rich Controls- The Calendar, The Ad Rotator. **State Management** Understanding the Problem of State, Using View State, Transferring Information Between Pages, Using Cookies, Managing Session State, Configuring Session State, Using Application State, Comparing State Management Options.ASP.NET Security: Login Controls	16	

November	**Master Pages and Navigation -** Master Pages: Creating Simple and Nested Master Pages, Creating Content Pages, Themes. Wed Site Navigation and Properties: The Site Map Path Control, The TreeView Control, The Menu Control, Other navigation methods(Response. Redirect(),Server. Transfer()). **Building Database – Driven Web Sites with Database Controls** ADO.NET Fundamentals: ADO.NET architecture and Objects (Data Reader, Data Set, Data Adaptor, Command), Editing data in Data Tables. Understanding SQL Basics: SELECT Statement, WHERE Clause, LIKE clause, DISTINCT Clause, ORDER BY Clause, GROUP BY Clause, HAVING Clause, DELETE Statement, UPDATE Statement, Joining Tables Data Bound Controls: Grid View Control, FormView Control, Details View Control, Repeater Control, DataList Control, Using Bound list Controls	14	

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER: Dr. LEENA YOGESH BHOLE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE & I.T

CLASS: **MSC.II** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER:CS-401Current Computing Trends- Python Programming

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December	सत्रांत परीक्षा		
January	सत्रांत परीक्षा		
February	**Introduction to Python-** Datatypes in Python- Built-in data types, boolDatatype, Sequences in Python, Sets . Literals in Python, Determining the Datatype of a Variable User-defined Datatypes, Constants in Python, Identifiers and Reserved words ,Naming Conventions in Python, Operators in Python, Input and Output statements, Control Structures: if Statement, for Loop, Two Dimensional Lists, while Loop, More Loop Patterns, Additional Iteration Control Statements **Arrays and Functions** - Arrays in Python-Types of Arrays, Comparing Arrays, Aliasing the Arrays ,Viewing and Copying Arrays, Dimensions of Arrays ,Attributes of an Array, The reshape() Method ,The flatten() Method Working with Multi-dimensional Arrays,	16	
March	Strings and Characters- Operations on Strings, Index Operator: Working with the Characters of a String, Functions- Calling Functions, Passing Functions, Formal Arguments, Variable length Arguments, Functional Programming, Recursive Functions, Anonymous Functions or Lambdas, Function Decorators, Lists and Tuples- Tuples, Tuple operators and built-in functions, Tuples and Mutability, Tuple Assignment, Tuples as Return Values. **Dictionaries**-Dictionaries, Dictionary Operations, Dictionary Methods, Dictionary Keys, Hash Tables, Aliasing and Copying, Sparse Matrices, Working with Data Files, Finding a File on your Disk, Reading a File, Iterating over lines in a file, Writing Text Files, Object Oriented Programming, Classes, Instances, Class method Calls, Coding Class Tree, Attributes, Building and Method Invocation, Composition, Inheritance, Operator Overloading, Encapsulation and Information Hiding.	16	

April	**Functional Programming Tools-** filter and reduce, List Comprehensions Revisited: Mappings. Modules: Python Program Architecture, Module Creation, Module usage, Module Namespaces, Reloading Modules, Module Packages. Data Hiding in Modules, Enabling Future Language Features, Mixed Usage Modes, Changing the Module Search Path, The import as Extension, Relative Import Syntax, Module Design Concepts	16	
May	**Database Connectivity-**DBMS, Advantages of a DBMS over Files, Types of Databases Used with Python Installation of MySQL Database Software, Setting the Path to MySQL Server. Verifying MySQL in the Windows Operating System Installing MySQL Connector Verifying the Connector Installation, Working with MySQL Database,Using MySQL from Python, Retrieving All Rows from a Table Inserting Rows into a Table Deleting Rows from a Table, Updating Rows in a Table Creating Database Tables through Python	16	

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER: Miss. DIPALI GHANSHAM KHADKE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE & I.T

CLASS: **MSC.II** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER:CS-405 Information Security

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December	सत्रांत परीक्षा		
January	सत्रांत परीक्षा		
February	Security, Attacks, Computer Criminals, Security Services, Security Mechanisms. Substitution ciphers, Transpositions Cipher, Confusion, diffusion, Symmetric, Asymmetric Encryption. DES Modes of DES, Uses of Encryption, Hash function, key exchange, Digital Signatures, Digital Certificates.	16	
March	Secure programs, Non malicious Program errors, Malicious codes virus, Trap doors, Salami attacks, Covert channels, Control against program , Protection in OS: Memory and Address Protection, Access control, File Protection, User Authentication.	16	
April	Requirements, Reliability, Integrity, Sensitive data, Inference, Multilevel Security. Threats in Networks, Security Controls, firewalls, Intrusion detection systems, Secure e-mails	16	
May	Security Planning, Risk Analysis, Organisational Security Policy, Physical Security. Ethical issues in Security: Protecting Programs and data. Information and law.	16	

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TEACHING PLAN

ACADEMICYEAR: 2020-21
NAME OF TEACHER: SWAPNALI PRASHANT WAGHULDE
FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE
CLASS: **M.Sc.** SUBJECT: COMPUTER SCIENCE
PAPER CODE and TITLE OF PAPER: CS-406 Internet of Things (IoT)

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December	सत्रांतपरीक्षा		
January	सत्रांतपरीक्षा		
February	**INTRODUCTION-** What is the Internet of Things? : History of IoT, About IoT, Overview and• Motivations, Definition, Characteristics of IoT, IoT Conceptual framework, IoT Architectural view, Physical design of IoT, Logical design of IoT, IoT Network Architecture and Design, Application of IoT, IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates, Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle, ITU-T Views	15	
March	**SERVICES OF IoT-** Machine-to-machine (M2M), SDN (software defined networking) and NFV(network• function virtualization) for IoT, data storage in IoT, IoT Cloud Based Services. Design Principles for Web Connectivity: Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, SOAP, REST, HTTP• Restful and Web Sockets. Internet Connectivity Principles: Internet Connectivity, Internet based communication, IP addressing in IoT, Media Access control. Unit-3 FUNDAMENTAL IOT MECHANISMS AND KEY TECHNOLOGIES 12h Identification of IoT Objects and Services, Structural Aspects of the IoT, Environment Characteristics, Traffic Characteristics	15	

April	Traffic Characteristics, Scalability, Interoperability, Security and Privacy, Open Architecture, Key IoT Technologies, Device Intelligence, 16 Communication Capabilities, Mobility Support, Device Power, Sensor Technology, RFID Technology, Satellite Technology **RADIO FREQUENCY IDENTIFICATION TECHNOLOGY** RFID: Introduction, Principle of RFID, Components of an RFID system, IssuesEPCGlobal Architecture Framework: EPCIS & ONS, Design issues, Technological challenges, Security challenges, IP for IoT, Web of Things.	15	
May	Wireless Sensor Networks: History and context, WSN Architecture, the node, Connecting nodes, Networking Nodes, Securing Communication, WSN specific IoT applications, challenges: Security, QoS, Configuration, Various integration approaches, Data link layer protocols, routing protocols and infrastructure establishment **IoT IMPLEMENTATION** IoT Physical Devices and Endpoints – Arduino UNO: Introduction to Arduino ,•Arduino UNO, Installing the software ,Funtamentals of Arduino Programming .IoT Physical Devices and Endpoints – RaspberryPi: Introduction to RaspberryPi ,About the RaspberryPi Board: Hardware Layout ,Operating systems on RaspberryPi , Configuring RaspberryPi , Programming RaspberryPi with Python , Wireless Temperature Monitoring System Using Pi , DS18B20 Temperature Sensor , Connecting Raspberry Pi via SSH , Accessing Temperature from DS18B20 sensors , Remote access to RaspberryPi , Smart and Connected Cities , An IoT Strategy for Smarter Cities , Smart City IoT Architecture , Smart City security Architecture , Smart City Use-Case Examples.	15	

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F.Y.B.Sc. Computer Science

Semester I

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: MRS. UJWALA PRASHANT MAHAJAN

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **F.Y.B.SC.** SUBJECT: COMPUTER SCIENCE

PAPER CODE AND TITLE OF PAPER: CS-111 FUNDAMENTALS OF COMPUTER AND DATA BASE MANAGEMENT SYSTEMS

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
November	Definition of computer, History of computers, Characteristics of computers. Block Diagram of Computer, Types of computer, Neumann machine, Memory hierarchy, I/O devices, , Inside a computer : SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors. Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation : Flowchart, Algorithms. Overview of Emerging Technologies: Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems. Concept of booting, POST, Bootstrap, Boot Drive. Definition of operating system, functions of operating system.	06	

December	Introduction of operating systems : DOS, Windows, Linux DOS: Introduction, Commands: Copy, Del, Ren, Md, Cd, Rd, erase, Dir, MKDir, Date and Time, Copycon What is Computer Network? Types of Networks (with Features and Application): LAN, WAN, MAN Wired Network, Wireless Network, MANET, Internet. Study of Web Browsers, Search Engines. Computer Virus: Indication of virus infection. Types of Viruses: Boot Sector Virus, Programs Virus, Macro Virus, Multipartite Virus, Polymorphic Virus, Worms, Malware: Spyware, Adware ,Remedies for viruses.	08	
January	Computer Ethics: Hacking, Software Piracy, Spamming, Phishing. Overview, Definition Types of DBMS Describing & storing data (Data models (relational, hierarchical, network)), Levels of abstraction , data independence. Structure of DBMS, Users of DBMS .Queries in DBMS with examples (SQL :DDL,DML,DCL,TCL) Overview of Database design	08	
February	ER-Model, Constraints, ER-Diagrams, ER Issues, weak entity sets, Relational database model: Logical view of data, keys, integrity rules. Relational Database design: Features of good relational database design Relations (concepts, definition, Conversion of ER to Relational model , Integrity constraints (key, referential integrity, general constraints) Codd's rules ,functional dependencies, normal forms upto third normal form	08	
March	**FIRST TERM EXAM**		

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Mrs. SHUBHANGI SANJEEV BHANGALE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **F.Y.B.Sc.** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: DSC CS-112 Imperative Programming

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
November	**2.1 Conditional Statements and Loops:** Decision Making Within A Program, Conditions, Relational Operators, Logical Connectives, If Statement, If-Else Statement, While Loop, Do While, For Loop, Nested Loops, Infinite Loops, Switch Statement **2.2 Functions:** defining a function, accessing a function, passing arguments to a function, specifying argument data types, function prototypes recursion, modular programming and functions,standard library of c functions, prototype of a function, formal parameter list, return type,	07	
December	function call, block structure, passing arguments to a function return type,function call, block structure, passing arguments to a function **2.3 Program structure:** Storage classes, automatic variables, external variables, static variables, multifile programs,more library functions, **2.4 Preprocessor:**	08	

	Features, #define and #include, Directives and Macros **3.1 Arrays:** Definition, Processing, passing arrays to functions, multidimensional arrays,arrays and strings **3.2 Pointers:** Fundamentals, Declarations, Pointers Address Operators, Pointer Type Declaration,		
January	Pointer Assignment, Pointer Initialization, Pointer Arithmetic, Functions and Pointers, Arrays And Pointers, Pointer Arrays, passing functions to other functions **3.3 Structures and Unions:** Structure Variables, Initialization, Structure Assignment, Nested Structure, Structures and Functions, Arrays of Structures, Structures Containing Arrays, Unions, Structures and pointers **4.1 Graphics** : Introduction to Graphics in C , Initgraph(), putpixel(),line(),circle(),rectangle(),ellipse(),arc(), closegraph() ,outtextxy(), setcolor(),setbgcolor(), bar().	07	
February	**4.2 File handling** :Concept of files, records, field, Accessing a files, various mode of file opening, closing files ,Various Functions like: fprintf(), fscanf(), getc(), putc(),getw(), putw(),feof(), rewind(), fseek(), ftell(), fputs(), fgets(), Command line argument	08	
March	**FIRST TERM EXAM**		

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F.Y.B.Sc. Computer Science

Semester II

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: MRS. UJWALA PRASHANT MAHAJAN

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **F.Y.B.SC.** SUBJECT: COMPUTER SCIENCE

PAPER CODE AND TITLE OF PAPER: CS-121 DATA BASE MANAGEMENT SYSTEMS

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
May	1.1. Preliminaries 1.2. Relational algebra (selection, projection, set operations, renaming, joins, division) 2.1 Basic structure 2.2 Aggregate operator (group by,having) 2.3 Aggregate functions 2.4 Null values 2.5 Nested Subqueries 2.6 SQL mechanisms for joining relations (inner joins, outer joins and their types)	08	
June	3.1 PL/PgSqL: Datatypes, Language structure 3.2 Controlling the program flow, conditional statements, loops 3.3 Views 3.4 Stored Functions, Stored Procedures 3.5 Handling errors and exceptions 3.6 Cursors 3.7 Concepts of Triggers	08	

July	4.1 Database security 4.2 Database integrity 4.3 Transaction Concept, Transaction State, 4.4 Transaction Properties (ACID)	08	
August	5.1 Failure classification 5.2 Recovery concepts 5.3 Log base recovery 5.4 Checkpoints 5.5 Recovery with concurrent transactions (Rollback, checkpoints, commit) 5.6 Database backup and recovery from catastrophic failure.	08	
September	**SECOND TERM EXAM**		

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Mrs. SHUBHANGI SANJEEV BHANGALE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **F.Y.B.Sc.** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: DSC CS-122 Object Oriented Concepts using C++

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
May	**1.1 Introduction** : -What is Procedure Oriented?, Advantages and Disadvantages of Procedure Oriented Languages . **1.2 Object Oriented Methodology** :- What is Object Oriented? , What is Object Oriented Development? , Object Oriented Themes . **1.3 Principles of OOPS** :- OOPS Paradigm , Basic Concepts of OOPS , Benefits and Application of OOPS , Introduction to structure of C++ program. **1.4 Basics of C++** :- Header Files , Access Modifiers , Tokens, Expressions and Control Structures ,Predefine and User Define Data Types. additional operators in C++: scope resolution operator, insertion and extraction operator, new and delete operators, manipulators in C++: endl, setw. **2.1 Classes and Objects**:-Simple classes (Class specification, class members accessing), Defining member functions ,Passing object as an argument ,Returning object from functions ,friend classes	08	

June	Array of object, Pointer to object ,Array of pointer to object. **2.2 Functions in C++** :- What is Function and its needs? , Function Prototype ,Call by value and Call by reference , Inline Function , Friend functions . **2.3 Constructors and Destructors** :- Introduction , Default Constructor ,Parameterized Constructor and examples , Destructors.	08	
July	**3.1 Polymorphism** :- Concept of function overloading, Overloaded operators, overloading unary and binary operators, overloading comparison, arithmetic assignment, Data conversion between objects and basic types. **3.2 Virtual Functions** :- Introduction & need, Pure Virtual Functions, Static Functions ,Assignment & this Pointer, abstract classes ,virtual destructors **3.3 Program development using Inheritance** :- Introduction, Derived class declaration, derived class constructors, class hierarchies, multiple inheritance, multilevel inheritance, containership, hybrid inheritance, benefits of using inheritance.	08	
August	**4.1 Exception Handling** :- Introduction, Exception Handling Mechanism, Concept of throw & catch with Example **4.2 Templates** :-Introduction , Function Template and examples, Class Template **4.3 Working with Files** :- Introduction, File Operations, Various File Modes, File Pointer and their Manipulation	08	
September	**SECOND TERM EXAM**		

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Semester I

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Mrs. SHUBHANGI SANJEEV BHANGALE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **S.Y.B.Sc.** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: DSC CS-231 Data structure –I

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July	ADMISSION PROCESS		
August	**Introduction to Data Structure & Algorithm Notations** Introduction to Data Structure, Types of data structure 1. Primitive 2. Non Primitive 3. Linear 4. Non linear Need of data structure Algorithm Notations.:- Format Convention, Name of Algorithm, Introductory Comment, Steps, Comments Data Structure:- Arrays, Dynamic Storage allocation, Functions,Procedures	06	
September	**Introduction to Algorithm analysis for Time and Space Requirement** Rate of Growth, Basic time analysis of an algorithm ,Order Notation , More timing Analysis, Space analysis of an algorithm **Stacks** Definition and concept, Representations – static, Operations – push, pop, peep, change	08	

October	Applications- infix to postfix & prefix, postfix evaluation, recursion **Queues** Definition and Concept, Representation – static, Operations- Insert, Delete Circular queue : -Concept, Operations – insert, delete DeQue :- Concept, Priority queues :- Concept **Linked List** Introduction to Linked list, Implementation of List – Dynamic representation. Types of Linked List Singly Linked list : Operations- Insert, delete, search	08	
November	Circular linked list : Operations- Insert, delete, search Doubly linked linear list : Operations- Insert, delete, search Applications of linked list – polynomial manipulation **Searching Techniques** Linear Search, Binary Search, Hash Table Method, Introduction, Hashing Function, Collision Resolution Technique	06	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: MRS. UJWALA PRASHANT MAHAJAN

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **S.Y.B.SC.** SUBJECT: COMPUTER SCIENCE

PAPER CODE AND TITLE OF PAPER: CS-232 JAVA Programming –I

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July	**ADMISSION PROCESS**		
August	Features of Java, Java and Internet, JDK Environment (Java, Javac, Applet Viewer, Javadoc), Basic of Java Arrays .Object and classes: Introduction-Classes and Object, Types of Constructors, Overloading, Package, Access modifier, Abstract class	06	
September	String functions-concatenation, Sub string, String editing, testing for equality, Character extraction functions-CharAt, get Chars, get Byte, Formatting functions, Date and Time functions using Gregorian calendar class	08	
October	Inheritance-Inheritance, super class, overriding, polymorphism,Wrapper classes, Refelection-'Class' class, Interfaces, Inner classes, Multithreading Dealing with errors-Types of exceptions**,** How to throw the exception? , Catching Exceptions.	08	
November	Streams-stream family-Layering stream files, Data stream, Random access file stream, String tokenizers, Object Streams	06	

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER: Miss. DIPALI GHANSHAM KHADKE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **S.Y.B.Sc** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: CS-230 HTML 5 Programming-I

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July	ADMISSION PROCESS		
August	What is HTML5? History of HTML5, Vision philosophy behind HTML 5, Getting Started with HTML5	06	
September	Forms: need of Web Applications, Current solutions, New Input Types, New Attributes, Form Validation and Browser Support. Audio and video: State of Web Audio and video based Plug-in, state of Audio and video Codec, New Audio/Video Mark-up, Attributes and method, understanding Audio/video Events, Customizing Audio/video controls	08	
October	Overview of graphics in the browser, Using a canvas, Context and coordinates, drawing shapes, working with paths, drawing text, drawing images, working with pixels, understanding transforms, browser support. CSS Introduction: Syntax, Id and class Selector	08	

	CSS Styling: Styling backgrounds, Styling text, styling fonts,		
November	styling links, styling lists, styling tables Graphics using CSS: box Model, Border, Outline, Margin, Padding, Advanced, Grouping/Nesting, Dimension, Display, Positioning, floating, Align, Navigation Bar, Image gallery, Image Opacity, Image Sprites.	08	

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Semester II

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Mrs. Archana Patil

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **S.Y.BSc.** **S**UBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: UG-CS- 241 Data Structure -II

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
February	Definition and Concept, Binary tree, Storage representation and Manipulation of Binary trees Sequential Storage representation of Binary Tree, Linked Storage representation of Binary Tree	08	
March	Threaded storage representation of Binary Tree, Operations on Binary tree - Traversing Operations & Algorithms on BST – Create, Insert, Delete Search Trees- AVL Tree, single and double rotations, B-Trees- insertion and deletion, Introduction to B+ and B* Trees	08	
April	Introduction Sorting Techniques :- Selection Sort, Insertion sort, Bubble Sort, Merge Sort, Heap Sort Quick Sort, Radix Sort Sorting Method Comparison on Time and space Complexity attribute	08	
May	Introduction to file, Sequential File concept, Index Sequential File concept, Direct file concept	04	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Dr. LEENA YOGESH BHOLE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **S.Y.B.Sc** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: CS-242- JAVA PROGRAMMING-II

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December	Semester Exam		
January	Semester Exam		
February	**Graphics Programming-** Introduction-frames, frame Layouts**,** Displaying information in a frame ,graphics objects and paint component method, Text and fonts**,** Colors**,** Drawing shapes, Filling shapes**,** Paint mode and images **Event Handling-**Basic Event Handling**,** The AWT event hierarchy**,** Event handling summary-event sources and listener, adapter classes**,** Low level events-focus, window, keyboard,mouse events**,** Multicasting	8	
March	**Swing-** Basics of Swing ,JButton class ,JRadioButton class , JTextArea class ,JComboBox class ,JTable class , JColorChooser class ,JProgressBar class ,JSlider class ,Graphics in swing, Displaying Image **Menu and Dialog Box-** Menus-Building menus, Menu events, Popup menu, Keyboard mnemonics and Accelerators, enabling and disabling menus,	8	
April	Dialog boxes-opening dialogs using inbuilt dialog box **Applets-**Applet basics-Simple Applets, testing applets, Security basic, Converting application to applets, Life cycle of Applet, param tag	8	

May	**Introduction to Advanced JAVA -** Collections: Collection Framework ,Array List class ,LinkedList class ,ListIterator interface ,HashSet class ,LinkedHashSet class ,TreeSet class ,PriorityQueue class ,ArrayDeque class . Database connectivity-JDBC,Introduction to JavaBeans-Servlets,Java Server Pages(JSP),CORBA	8	

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER: Miss. DIPALI GHANSHAM KHADKE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

AND I.T CLASS: **S.Y.B.Sc.** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: CS-240 HTML5 programming-II

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December	FIRST TERM EXAM		
January	FIRST TERM EXAM		
February	Selectors and Pseudo classes : Attributes Selectors, The Target Pseudo-class, UI Element States Pseudo-classes, Negation Pseudo-class, structural Pseudo-classes, Introduction to:- CMS-Wordpress, Drupal, Joomla, JQuery, AngularJS, Bootstrap	12	
March	Font on the web, Font services, @Font-face Rule, Text shadow, Word WrappingColors, Gradients, Background Images and Masks: Color, the opacity Property, backgrounds, background-origin and background-size. Introduction to JavaScript, JavaScript Basics- Data Types, Control Structure,JavaScript Functions, Working with events, JS Popup boxes, JavaScript Objects, JavaScript HTML DOM	12	
April	Images borders, Rounded corners, box shadow Transitions ,Transforms and Animations: Transitions and transforms, Transitions. Layouts:Colums and Flexible Box: Layout, Columns and flexible box, Flexible Box Model, Vendor Prefixes: What are Vendor prefixes? Strategies Embedding Media: Video Formats, Styling video.	12	
May	Vendor Prefixes: What are Vendor prefixes? Strategies Embedding Media: Video Formats, Styling video.	04	

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T.Y.B.Sc. Computer Science

Semester I

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TEACHING PLAN

Academic Year: **2020-21**

Name of Teacher: Mrs Hemlata Harul Patil

Faculty: Science **Department:** Computer Science

CLASS: T.Y.B.Sc **Subject:** Computer Science

Paper Code and Title of Paper: (UG-CS-311) Systems Programming

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July	Admission Procedure		
August	**Introduction** 2.1 System Software 2.2 Goal of system software 2.3 System program and system programming 2.4 View of system software	11	

September	**Software Tools** 2.5 What is a Software Tools? 2.6 Software Tools for Program Developments 2.7 Editors 2.8 Debug Monitors 2.9 Programming Environments **Overview of Language Processors** 3.1 Programming Languages and Language Processors 3.2 Language Processing Activities 3.3 Fundamentals of Language Processing	12	
October	**Assembler** 4.1 Definition. 4.2 Features of assembly language, advantages 4.3 Statement format, types of statements 4.4 Constants and Literals. 4.5 Advanced assembler directives 4.6 Design of assembler – Analysis Phase and Synthesis Phase. 4.7 Overview of assembly process 4.8 Pass Structure of Assembler – One pass, Two pass assembler. 4.9 Problems of One-pass assembler 4.10 Design of Two-pass Assembler **Unit-5. Macro and Macro Preprocessor** 5.1 Macro Definition and Call 5.2 Macro Expansion 5.3 Nested Macro Calls 5.4 Tables used in Macro 5.5 Advanced Macro Facilities	12	

	5.6 Design of Macro Preprocessor		
November	**Unit-6. Compiler** 6.1. What is Compiler 6.2. Scanning and Parsing 6.2.1.Programming Language Grammars 6.2.2.Scanning 6.2.3.Parsing 6.3.Language Processors Development Tools **Unit-7. Linkers and Loaders** 7.1 Introduction 7.2 Relocation and Linking Concepts 7.3 Self Relocating Programs 7.4 Linking for Overlays 7.5 Dynamic Linking 7.6 Loaders	12	

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER: Miss. DIPALI GHANSHAM KHADKE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE AND I.T

CLASS: **T.Y.B.Sc** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: DSC (UG-CS-502): Database Management System

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
June			
July	ADMISSION PROCESS		
August	1.1 Overview, Definition 1.2. Types of DBMS 1.3. Describing & storing data (Data models (relational,hierarchical, network)), 1.4. Levels of abstraction , data independence, 1.5. Queries in DBMS (SQL : DDL,DML,DCL,TCL), Users of DBMS, Advantages of DBMS	06	
September	2.1. Overview of DB design, 2.2. ER data model (entities, attributes, entity sets, relations, relationship sets) , 2.3. Conceptual design using ER (entities VS attributes, Entity Vs relationship, binary Vs ternary). Relations (concepts, definition), 3.2. Conversion of ER to Relational model , 3.3. Integrity constraints (key, referential integrity, general constraints) 3.4 Codd's Rules, Functional Dependency, Data Normalization (1NF, 2NF, 3NF, BCNF)	12	

October	4.1. Preliminaries 4.2. Relational algebra (selection, projection, set operations, renaming, joins, division) 5.1 Database security 5.2 Database integrity 5.3 Transaction Concept 5.4 Transaction State 5.5 Transaction Properties (ACID)	12	
November	6.1Lock-Based protocol, 6.2 Timestamp-Based protocol 6.3 Log base Recovery 6.4 Shadow Paging .5 Differed Updates.	12	

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TEACHING PLAN

Academic Year: **2020-21**

Name of Teacher: Mrs Hemlata Harul Patil

Faculty: Science **Department:** Computer Science

CLASS: T.Y.B.Sc **Subject:** Computer Science

Paper Code and Title of Paper: (UG-CS-313) Software Engineering

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
July	Admission Procedure		
August	**Introduction to Software Engineering:** 1.1 Software and Software Engineering 1.2 Evolution of Software 1.3 Software Characteristics 1.4 Software Applications 1.5 Software Myths 1.6 Software Process 1.7 Software Development Life Cycle (SDLC) **2. Software Development Model:**	11	

	2.1 Waterfall Model 2.2 Prototyping Model 2.3 Incremental Development Model 2.4 RAD model 2.5 Spiral Model		
September	**Requirement Analysis and Specification:** 3.1 Requirements Engineering 3.2 Fact finding Techniques 3.3 Introduction to Types of Requirement Modeling 3.4 Data Modeling Concepts- Data Objects, Data Attributes & Relationship. **4. Design Engineering:** 4.1 Characteristics of good Software Design	12	
October	Design Concepts- Architecture, Modularity, Information Hiding 4.3 Cohesion & Coupling 4.4 Decision Table & Decision Tree 4.5 Data flow Diagram 4.6 Data Dictionary	12	
November	**Software Coding & Testing:** 5.1 Coding standards & Guidelines 5.2 What is testing? 5.3 Testing Activities 5.4 Black box testing 5.5 White box testing 5.6 Introduction to Debugging Approaches – Brute force Method, Backtracking, Case	12	

	Elimination Method, Programming Slicing. **6. Software Quality:** 6.1 What is Quality? 6.2 Software Quality - Garvin's quality dimensions, Mc Calls quality factors, ISO 9125 quality factors 6.3 Elements of Software Quality Assurance 6.4 ISO 9000 & Certification		

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER:Mrs. Archana Patil.

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **T.Y.B.Sc.** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: UG CS 504 COMPUTER AIDED GRAPHICS

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
JULY			
AUGUST	The origin of computer graphics Application of Computer Graphics Definitions: Pixel, Resolution, Aspect Ratio, Interactive, Non interactive graphics, Active graphics, Passive graphics How the interactive graphics display works. Display types: Random Scan and Raster Scan	08	
SEPTEMBER	Co-ordinate Systems The Simple DDA The Symmetrical DDA Bresenham's line drawing Algorithm Bresenham's circle drawing Algorithm Transformation principles Concatenations 2D Transformations**,** 2D Matrix Representation 3D Transformations, 3D Matrix Representation Transformation in Viewing The Perspective Transformation	06	

OCTOBER	Definitions: Window, View port, Clipping Cohen-Sutherland line clipping algorithm Mid-point Subdivision line clipping algorithm Polygon Clipping The Windowing Transformation 3-D Clipping Introduction Scan Converting Line and Polygon drawing Coherence (YX) Algorithm Priority: Painter's Algorithm	08	
NOVEMBER	Object Space and Image Space Algorithms The Depth Buffer Algorithm Warnock's Algorithm	04	

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER: Dr. LEENA YOGESH BHOLE

FACULTY:SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **T.Y.B.SC** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: CS-505 PYTHON PROGRAMMING-I

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
JULY	ADMISSION PROCESS		
AUGUST	**Introduction to Python Programming** History, versions,need of PythonFeatures of Python, Applications of PythonInstallation of Python on Linux, Windows, IDE **Basics of Python Programming** Python Identifiers, Variables and Keywords Putting Comments, Expressions and Statements	10	
SEPTEMBER	Standard Data Types – Basic, None, Boolean, Numbers. Type Conversion Function, Operators in Python Operator Precedence , Accepting Input and Displaying Output **Flow Control Statements** - Conditional Statements, Looping Statements, break, continue, pass Statements **Python Strings -** Introduction to String, String Literals, Assign String to a Variable, Multiline Strings	12	

OCTOBER	Operations on Strings, Index Operator: Working with the Characters of a String, String Methods, Length, The Slice Operator,Comparison, **Concepts of Python Lists:** Creating, Initializing and Accessing elements in lists, Traversing, Updating and deleting elements from Lists. List Operations: Concatenation, List Indexing, Slices Built- in List functions and methods , Aliasing, Cloning Lists **Python Tuples and Dictionary** **Introduction to Tuples -** Creating Tuples. Deleting Tuples. Accessing elements in a Tuple. Tuples Operations: Concatenation, Repetition, Membership, Iteration. Built- in Tuples functions and methods **Introduction to Dictionary -**Dictionaries: Concept of key-value pair. Creating, Initializing and Accessing elements in a Dictionary. Traversing, Updating and Deleting elements in a Dictionary Built- in Dictionary functions and methods	12	
NOVEMBER	**Python Functions and Modules -**Introduction to Functions- Defining, Calling a Function,Function Arguments – Required arguments, Keyword arguments, Default arguments, Variable-length arguments Scope of Variables Void functions and function returning values Recursion Advance Function Topics: Anonymous Function Lambda, Mapping Functions, Functional Programming Tools: **Introduction to Modules -** Creating Modules and Packages, Importing Modules , Using the dir() Function, Built-in Modules	10	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: SWAPNALI PRASHANT WAGHULDE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **T.Y.B.Sc.** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: DSC (UG-CS-506 A): Elective A - Internet Programming using PHP

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
JULY	Admission Process		
AUGUST	**Unit–1 The Basics of PHP** • Introduction to PHP • Working of PHP • Structure of PHP • Structure & Syntax of PHP PHP with HTML Comments • Data Types and Variables • Operators • Flow Control Statements • ConditionalStatements • Looping Statements • Exit, Return, Die, Include and Require Statements	12	
SEPTEMBER	**Unit – 2 Arrays, Function and String** Introduction to Array • Types of Array: Index, Associative, Multidimensional Array • Different array function in PHP • Traversing arrays, Sorting arrays Introduction to Function • Defining and Calling a function	12	

	• Scope of variables in function • Function Parameters • Returning Values from a function • Recursive Functions String functions in PHP • Printing functions • Comparing strings • Manipulating and Searching strings Regular Expressions **Unit – 3Object-OrientedPHP** • Introduction and Benefits of OOPs in PHP • Creating a Class in PHP		
OCTOBER	Creating an Object in PHP • Adding a Methods • Adding a Properties • Visibility (Public, Private and Protected) Constructor and Destructors Inheritance (Extending a class) Abstract classes, Final classes Interfaces Exception handling Serialization **Unit – 4WebTechniques** Introduction o HTTP Basics	12	
NOVEMBER	Processing Forms • Methods (Get and Post Method) • Parameters ($_GET and $_POST) • Self-Processing Pages • File Uploads Maintaining State • Cookies • Sessions • Combining Cookies and Sessions **Unit – 5 PHPwithMySQL** Introduction to MySQL Interaction between PHP and MySQL Error Checking Execute DDL Statements Execute DML Statements	12	

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Semester II

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TEACHING PLAN

ACADEMICYEAR: 2020-21

NAME OF TEACHER:Mrs. Archana Patil.

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **T.Y.B.Sc.** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: UG CS 601 OPERATING SYSTEM

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
DECEMBER	**TERM END EXAM**		
JANUARY	**TERM END EXAM**		
FEBRUARY	What is an operating system? 1.2 Types of Operating System 1.3 Services of Operating System 1.4 Functions of operating system. 2.1 Multiprogramming Concepts 2.2 Basic Concept of CPU scheduling: CPU-I/O burst cycle, CPU scheduler, Preemptive scheduling, Dispatcher 2.3Performance criteria's 2.3 Scheduling Algorithms:FCFS, SJF, Priority scheduling, Round-robin scheduling 2.4 Multilevel queues, multilevel feedback queue	15	
MARCH	Logical versus Physical Address space 3.2 Swapping 3.3 Multiple partition allocation MFT , MVT 3.4 Paging 3.5 Segmentation 3.6Virtual Memory Management – Background, Demand paging	15	

	4.1 First Come first serve scheduling 4.2 Shortest Seek Time First Scheduling 4.3 SCAN Scheduling 4.4 C-SCAN Scheduling		
APRIL	Concept of Deadlock 5.2 Deadlock Characterization 5.3 Deadlock Prevention 5.4 Deadlock Avoidance 5.5 Deadlock Detection 5.6 Recovery from Deadlock 6.1 What is android operating system. 6.2 Android Architecture 6.3 Features of Android operating system 6.4 Applications of android operating system 6.5 What is Google play store	15	
MAY	**TERM END EXAM**		

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Mrs. SHUBHANGI SANJEEV BHANGALE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **T.Y.B.Sc.** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: CS – 602 R-DBMS

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
DECEMBER	**TERM END EXAM**		
JANUARY	**TERM END EXAM**		
FEBRUARY	INTRODUCTION TO RDBMS Introduction to RDBMS,• Introduction to Open Source software PostgreSQL,• Installation of open source software PostgreSQL on Windows and Linux,• Data types of PostgreSQL DATABASE AND TABLE OPERATIONS : Database Operations - 1.Creating a Database 2.Dropping the Database• Table Operations – 1. Create 2. Alter3. Drop SQL – STATEMENTS, OPERATORS, FUNCTIONS Statements - SELECT, INSERT, UPDATE, DELET	12	

MARCH	Null value and Default value Operators - Arithmetic, Logical, Comparison, Bitwise, Relational• Functions - Aggregate functions, Date and Time functions, String functions• Clauses:- where, order by, AND, OR, Between, Like, CASE, Distinct, Group by, Having• VIEW, JOIN and DATA CONSTRANTS in Constraints - Data Integrity, Entity Integrity• Keys - PRIMARY KEY, UNIQUE, FOREIGN KEY, CHECK, Not Null• Views - Create, Alter, Drop• Join - Joins, Cross Join, Inner Join, Outer Join, Self-Join• Subquries -Subqueries as Constants, Subqueries as Correlated Values, Subqueries as• Lists of Values, NOT IN and Subqueries with NULL Values, Subqueries Returning Multiple Columns Statement - MERGE Statement• Set operations-UNION, EXCEPT, and INTERSECT• Clauses -ANY, ALL, and EXISTS Clauses	12	
APRIL	TRANSACTION COMMANDS , INDEX AND SEQUENCE Transaction commands-Commit, Rollback• Indexing -Creating an Index, Unique Indexes• Sequences- Creating Sequence, using nextval(), currval() and setval()• Unit 6PL/PGSQL - SQL PROCEDURAL LANGUAGEIntroduction to PL/PGSQL- Advantages of PL/PGSQL, structure of PL/PGSQL, basic• Statements and control structures Function -Creating functions, Removing functions• Cursors-Creation of Cursors, Using Cursors, Looping• Triggers-Introduction, Triggers Vs constraints, DML Triggers, DDL Triggers Under• Error handling -Introduction Error Handling, RAISE Statement•	12	
MAY	**TERM END EXAM**		

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TEACHING PLAN

Academic Year: **2020-21**
Name of Teacher: Mrs Hemlata Harul Patil
Faculty: Science **Department:** Computer Science
CLASS: T.Y.B.Sc **Subject:** Computer Science
Paper Code and Title of Paper: (UG-CS-325)Computer Network

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December	**TERM END EXAM**		
January	**TERM END EXAM**		
February	**Introduction to Computer Network and Network Model** 1.1 What is Computer Network? 1.2 Application Of Computer Networks 1.3 Transmission Mode , Network Structure 1.4 Network Topologies 1.5 ISO OSI Reference Models, TCP / IP Reference Model & their Comparison. **Unit-2. Physical Layer** 2.1 Guided Media: 2.1.1 Twisted Pair 2.1.2 Coaxial Cable	12	
March	2.1.3 Fiber Optics 2.14 Satellite Communication 2.15 Microwave Communication 2.1.6 Submarine Cables. 2.2 Unguided Media 2.2.1. Electromagnetic Spectrum 2.2.2. Radio Transmission 2.2.3. Microwave Transmission 2.2.4. Infrared & Millimeter Waves 2.2.5. Light wave Transmission **The Data link Layer** 3.1 Services Provided to Network Layer 3.2 Framing, Error Control , Flow Control	12	

	3.3 Error Detection – Redundancy, Parity Check, Checksum & CRC, 3.4 Error Correction – Hamming Code.		
April	**The Network Layer** 4.1 Logical Addressing 4.1.1 IP v4 Addresses - Address Space - Classful Addressing - Classless Addressing 4.2. Routing Algorithm 4.2.1. Shortest Path 4.2.2. Multicast Routing 4.3. Congestion Control 4.3.1. Introduction to Congestion Control 4.3.2. Deadlocks	12	
May	**Transport Layer** 5.1 Process to Process Delivery 5.1.1 Client-Server Paradigm 5.1.2 Multiplexing and Demultiplexing 5.1.3 Connectionless v/s Connection Oriented Services 5.1.4 Reliable v/s Unreliable Transmission 5.2 UDP and TCP 5.2.1 UDP – Operations and uses 5.2.2 TCP – Services and features **Unit-6. Cryptography and Public key Infrastructure** 6.1 Introduction: 6.1.1 Cryptography, Cryptanalysis, Cryptology, Substitution 6.1.2 Techniques: Caesar's cipher, Monoalphabetic and Polyalphabetic, 6.1.3 Transposition techniques – Rail fence technique, Simple Columnar 6.2 Public key infrastructures: 6.2.1 basics, digital certificates, certificate authorities, registration authorities, Digital Signature	12	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: MRS. UJWALA PRASHANT MAHAJAN

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **T.Y.B.SC. (C.S.)** SUBJECT: COMPUTER SCIENCE

PAPER CODE AND TITLE OF PAPER: CS-604 THEORETICAL COMPUTER SCIENCE

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
January	**TERM END EXAM**		
February	**TERM END EXAM**	15	
March	3.1 Regular Expressions 3.2 FA & Regular Expressions 3.2.1 Convert Regular Expression to FA 3.2.2 Construct FA from Regular Expression 3.3 Pumping Lemma for Regular Sets and applications 4.1 Introduction to Context Free Grammars 4.2 Derivation Trees 4.2.1 Ambiguity in CFG 4.3 Simplification of Context Free Grammars 4.3.1 Useless Symbols 4.3.2 Null Production 4.3.3 Unit Production 4.4 Normal forms for CFG 4.4.1 Chomsky Normal Form (CNF) 4.4.2 Greibach Normal Form (GNF)	15	

April	5.1Basic Definitions 5.2 Types of PDA 5.3 Acceptance by Pushdown Automata 5.4 PDA and Context Free Language 6.1 Introduction 6.2 Turing Machine Model 6.3 Representation of Turing Machine 6.4 Design of Turing Machine	15	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Dr. LEENA YOGESH BHOLE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

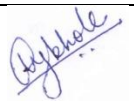
CLASS: **T.Y.B.SC** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: CS-506 PYTHON PROGRAMMING-II

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
DECEMBER	**TERM END EXAM**		
JANUARY	**TERM END EXAM**		
FEBRUARY	**Object Oriented Concepts in Python -** Overview of OOP Terminology, Creating Classes, Creating Instance Objects, Accessing Attributes, Built-In Class Attributes, Garbage Collection: Constructor , Overloading Methods and Operator Inheritance - Implementing a subclass, Overriding Methods **Python Exception Handling and Regular Expression** Introduction, Syntax Error, Handling Exception, Multiple Except Clauses, try…finally, Raising Exception, User Defined Exception List of Standard Exception, Regular Expression	10	
MARCH	**File Handling in Python-** File Objects, Writing Text Files, Appending Text to a File, Reading Text Files, File Exceptions, Paths and Directories, Exceptions in os, Paths, Directory Contents, Obtaining Information about Files, Renaming, Moving, Copying, and Removing Files, Creating and Removing Directories, Globbing	10	

APRIL	**GUI with Python -**GUI Programming Toolkits for Python, Tkinter Introduction, Creating GUI Widgets with Tkinter, Resizing the Widget, Configuring Widget Options, Putting the Widgets to Work, Creating Layouts, Packing Order, Controlling Widget Appearances, Radio Buttons and Checkboxes, Dialog Boxes, Other Widget Types	12	
MAY	**Python with MySQL -** Introduction to MySQL Installing ,MySQL Driver - MySQL Connector or MySQLdb MySQL Database connection with Python, Creating Database in MySQL using Python, Create a Table in MySQL with Python, Insert, Select, Update and Delete Operation in MySQL with Python COMMIT Operation, ROLLBACK Operation, Disconnecting Database **TERM END EXAM**	06	



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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: SWAPNALI PRASHANT WAGHULDE

FACULTY: SCIENCE DEPARTMENT: COMPUTER SCIENCE

CLASS: **T.Y.B.Sc.** SUBJECT: COMPUTER SCIENCE

PAPER CODE and TITLE OF PAPER: CS – 606 (A) Elective –A Web Programming using ASP.NET

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
December	**TERM END EXAM**		
January	**TERM END EXAM**		
February	**Unit1.Introduction** Introduction toAsp.Net Structure of Asp.Net Page ASP.Net Compilation Model Code Behind Model Execution Stages and Event Model for the Page Class **Unit 2. ASP.NET Controls** Introducing Web Forms HTML Controls	12	
March	Web Controls Basic Controls User Controls ASP.Net Rich Controls Validation Controls ASP.Net Page Directives **Unit 3. ASP.Net Intrinsic Objects** HTTP Request Object, HTTP Response Object HTTP Server Utility Object HTTP Application State Object	12	

April	HTTP Session state Object Object Context object **Unit 4. Data AccesswithADO.Net** ASP.Net Data List Controls Working With ADO.Net Using Basic SQL Working With ASP.Net Object Data Reader Object	12	
May	Data TableObject• Data RowObject• Data Column Object• Data RelationObject. **TERM END EXAM**	08	

(Teacher)

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