CMR Institute of Technology, Bangalore			
Department(s): Masters of Computer Applications			
Semester: 02	Section(s): A	Lectures/week: 04	
Subject: Python Programming		Code: 17MCA21	
Course Instructor(s): Deepa Anand			
Course duration: 01 Jan 2018 – 25 May 2018			
Course Site: https://sites.google.com/a/cmrit.ac.in/deepa-anand1/			

Course Objectives

➢ Develop algorithm for a given problem and convert it into python program using appropriate data types, operators and expressions.
➢ Use of basic programming constructs -conditional statements, loops and functions
➢ Design of composite data structures using arrays/lists, sets and dictionaries.
➢ files operations and applications
➢ Debug Python programs using shell and debugging tools
➢ Object Oriented concepts and GUI applications.

Pre requisites

No pre-requisite. Basic mathematics and knowledge of any programming language is preferable.

Lesson Plan				
Lecture #	**Book & Sections**	**Topics**	**Portions coverage**	
			Teaching Aids	% of Syllabus Covered
1-10	TB1 -1.5, 2.2-2.6, 3.1,3.5, 3.8, 4.1-4.5,	**UNIT – 1 INTRODUCTION :** Installing Python, Simple program using Python, Expressions and Values, Variables and Computer Memory, error detection, Multiple line statements, Designing and using functions, functions provided by Python, Tracing function calls in memory model, omitting return statement. Working with Text: Creating Strings of Characters, Using Special Characters in Strings, Creating a Multiline String, Printing Information, Getting Information from the Keyboard.	Chalk and Talk Video Lectures for some topics	20
Links to useful online course lectures on all topics of Python: https://www.codecademy.com/courses/learn-python/lessons/python-syntax/exercises/welcome?action= lesson _resume				
11-20	TB1 5.1 - 5.4 6.1- 6.4 7.1 - 7.4	**UNIT-2 - Conditional Statements, Debugging and String and List methods :** A Boolean Type , Choosing Statements to Execute, Nested If Statements , Remembering the Results of a Boolean Expression Evaluation , A Modular Approach to Program Organization, Importing Modules , Defining Your Own Modules, Testing Code Semi automatically Grouping Functions Using Methods: Modules, Classes, and Methods , Calling Methods the Object-Oriented Way, Exploring String Methods, Underscores.	Chalk and Talk Video Lectures for some topics	20

		UNIT 3- Loops, More about Lists: Storing Collections of Data Using Lists: Storing and Accessing Data in Lists, modifying Lists, Operations on Lists, Slicing Lists, Aliasing, List Methods, Working with a List of Lists. Repeating Code Using Loops: Processing Items in a List, Processing Characters in Strings, Looping Over a Range of Numbers, Processing Lists Using Indices, Nesting Loops in Loops, Looping Until a Condition Is Reached, Repetition Based on User Input, Controlling Loops Using Break and Continue Reading and Writing		
21-30	TB1 8.1-8.7 9.1-9.8		Chalk and Talk	20
31-40	TB1 10.1-10.7 11.1-11.7	UNIT 4- Files, Advanced Data Types - Sets, Tuples, Dictionaries : Files: Kinds of files, Opening a File, Techniques for Reading Files, Files over the Internet, Writing Files, and Writing Algorithms That Use the File-Reading Techniques, Multiline Records. Storing Data Using Other Collection Types: Storing Data Using Sets, Storing Data Using Tuples, Storing Data Using Dictionaries, Inverting a Dictionary, Using the In Operator on Tuples, Sets, and Dictionaries, Comparing Collections.	Chalk and Talk Video Lectures for some topics	20
41-50	TB1 14.1 - 14.4 16.1 - 16.7	UNIT 5 - OOPS and GUI: Collection of New Information Object-Oriented Programming : Understanding a Problem Domain , Function "Isinstance," Class Object, and Class Book , Writing a Method in Class Book, Plugging into Python Syntax: More Special Methods ,Creating Graphical User interface: Building a Basic GUI, Models, Views, and Controllers, Customizing the Visual Style Introducing few more Widgets, Object-Oriented GUIs, Keeping the Concepts from Being a GUI Mess.	Chalk and Talk	20

Text Books	
1.	Paul Gries, Jennifer Campbell, Jason Montojo : Practical Programming: An introduction to Computer Science Using Python, 2nd edition, The Pragmatic Bookshelf, 13-978-1-93778-545-1
2.	Learning with Python: How to Think Like a Computer Scientist Paperback – Allen Downey , Jeffrey Elkner, Green TRee Press, 2002, 0-9716775-0-6
Reference Books	
1.	Exploring Python, Timothy A. Budd, Mc Graw Hill Education, Tata McGrawHill, 978-0071321228

Syllabus for Internal Assessment Tests (IAT[*])

IAT #	Syllabus
IAT-1	Class # 01 – 20
IAT-2	Class # 21– 40
IAT-3	Class # 41– 50

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to
➢ Convert an algorithm into python program by applying knowledge of basic data types, operators and expressions
➢ Uses basic programming constructs -conditional statements, loops and functions as appropriate

➢	Have a thorough understanding of composite data structures such as arrays/lists, sets and dictionaries.	
➢	Understand files and its applications	
➢	Debug Python programs	
➢	Have a basic understanding of Object Oriented concepts and GUI applications	

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

	Course Outcomes	Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Convert an algorithm into python program by applying knowledge of basic data types, operators and expressions	1,2	1	2	3	-	1	-	-	-	1	-	1	-
CO2	Uses basic programming constructs - conditional statements, loops and functions as appropriate	2,3	2	2	3	1	1	-	-	-	1	-	1	-
CO3	Thorough understanding of composite data structures such as arrays/lists, sets and dictionaries.	3,4	2	3	3	2	1	-	-	-	1	-	1	-
CO4	Understanding files and its applications	4	2	1	2	1	1	-	-	-	1	-	1	-
CO5	Able to debug Python programs	2	1	1	-	-	2	-	-	-	1	-	2	-
CO6	Has a basic understanding of Object Oriented concepts and GUI applications	5	1	1	2	2	2	-	-	-	1	-	1	-

Note: Assignments, study material, Question bank and other course related content would be posted on site mentioned above.

Signature with date:	**Course Instructor**	**Program Coordinator**	**Head-CSE**

Appendix

Table 01: Cognitive Levels

Cognitive Levels	
Cognitive level	**Revised Blooms Taxonomy Keywords**
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

Table 02: Program Outcomes (PO) and Program Specific Outcomes (PSO)

Program Outcomes (PO), Program Specific Outcomes (PSO)	
PO1	**Computational Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and can come up with the solution of complex problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern IT tools including prediction and modelling to complex activities with an understanding of the limitations.
PO6	**Professional Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the practice.
PO7	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PO8	**Project management and finance:** Demonstrate knowledge, understanding and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO9	**Communication Efficacy:** Communicate effectively on complex activities with the community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO10	**Societal and Environmental Concern:** Understand the impact of the professional solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO11	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO12	**Innovation and Entrepreneurship:** Come up with new ideas and can bloom up with starts ups.

Table 03: Correlation Levels

Correlation Levels	
0	No Correlation
1	Slight/Low
2	Moderate/ Medium
3	Substantial/ High

CMR Institute of Technology, Bangalore		
Department(s): Master of Computer Applications		
Semester: 02	Section(s): A	Lectures/week: 04
Subject: Object Oriented Programming with C++		Code: 17MCA22
Course Instructor(s): Neha Agrawal		
Course duration: Feb 2018 – May 2018		
Course Site: https://sites.google.com/a/cmrit.ac.in/oops-with-c-mca/home		

Course Objectives

The course presents basics of C++ programming including: Basics of C++ environment, Data representation, Control structures, Functions, Arrays, Pointers, Strings, and Classes that aims to:

➢ Arm the students with the basic programming concepts.
➢ Introduce different techniques pertaining problem solving skills
➢ Arm the students with the necessary constructs of C++ programming.
➢ And to emphasis on guided practical sessions

Prerequisites

➢ C programming language. Concepts of variables, data types, functions, pointers

Lesson Plan				
Lecture #	**Book & Sections**	**Topics**	**Portions coverage**	
			Teaching Aids	% of Syllabus Covered
1-10	TB1: - 11,12	**Overview of C++:** The Origins of C++ , What Is Object-Oriented Programming? ,Encapsulation ,Polymorphism , Inheritance. Some C++ Fundamentals ,A Sample C++ Program ,A Closer Look at the I/O Operators, Declaring Local Variables ,No Default to int, The bool Data Type , Old-Style vs. Modern C++ , The New C++ Headers , Namespaces, Working with an Old Compiler, Introducing C++ Classes, Function Overloading, Operator Overloading ,Inheritance Constructors and Destructors ,The C++ Keywords, The General Form of a C++ Program. **Classes and Objects:** Classes, Structures and Classes Are Related, Unions and Classes Are Related , Anonymous Unions, Friend Functions, Friend Classes, Inline Functions, Defining Inline Functions Within a Class Parameterized Constructors, Constructors with One Parameter: A Special Case Static Class Members ,Static Data Members ,Static	Chalk and Talk/Flip Class	20

		Member Functions ,When Constructors and Destructors Are Executed ,The Scope Resolution Operator, Nested Classes, Local Classes, Passing Objects to Functions ,Returning Objects ,Object Assignment.		
Links to some useful online lectures:				
➤ https://www.youtube.com/watch?v=uwKCu2eSL2M				
11-20	TB1 13,14	**Arrays, Pointers, References, and the Dynamic Allocation Operators:** Arrays of Objects, Creating Initialized vs. Uninitialized Arrays , Pointers to Objects, Type Checking C++ Pointers , The this Pointer, Pointers to Derived Types , Pointers to Class Members , References, Reference Parameters, Passing References to Objects, Returning References, Independent References, References to Derived Types, Restrictions to References, A Matter of Style , C++'s Dynamic Allocation Operators ,Initializing Allocated Memory ,Allocating Arrays ,Allocating Objects ,The nothrow Alternative ,The Placement Form of new. **Function Overloading, Copy Constructors and Default Arguments:** Function Overloading, Overloading Constructors, Overloading a Constructor to Gain Flexibility, Allowing Both Initialized and Uninitialized Objects Copy Constructors , Finding the Address of an Overloaded Function , The overload Anachronism, Default Function Arguments, Default Arguments vs. Overloading, Function Overloading and Ambiguity.	Chalk and Talk/Flip Class	20
Links to some useful online lectures:				
➤ https://www.youtube.com/watch?v=d7IohNyEMQ0				
21-30	TB1 15,16	**Operator Overloading**: Creating a Member Operator Function, Creating Prefix and Postfix Forms, of the Increment and decrement Operators , Overloading the Shorthand Operators, Operator Overloading Restrictions, Operator Overloading Using a Friend Function, Using a Friend to Overload ++ or − −, Friend Operator Functions Add Flexibility , Overloading new and delete, Overloading new and delete for Arrays, Overloading the nothrow Version of new and delete, Overloading Some Special Operators, Overloading [ ] , Overloading ( ), Overloading − >, Overloading the Comma Operator. **Inheritances:** Base-Class Access Control, Inheritance and protected Members, Protected Base-Class Inheritance, Inheriting Multiple Base Classes, Constructors, Destructors, and Inheritance, When Constructors and Destructors Are Executed , Passing Parameters to Base-Class Constructors, Granting Access,	Chalk and Talk	20

		Virtual Base Classes.		
Links to some useful online lectures:				
		➢ https://www.youtube.com/watch?v=fCK7sLu0G0Y		
31-40	TB1 17,18,19	**Virtual Functions and Polymorphism:** Virtual Functions, Calling a Virtual Function Through a Base, Class Reference, The Virtual Attribute Is Inherited, Virtual Functions Are Hierarchical, Pure Virtual Functions, Abstract Classes, Using Virtual Functions, Early vs. Late Binding. **Templates:** Generic Functions, A Function with Two Generic Types, Explicitly Overloading a Generic Function, Overloading a Function Template, Using Standard Parameters with Template Functions , Generic Function Restrictions , Applying Generic Functions, A Generic Sort, Compacting an Array, Generic Classes, An Example with Two Generic Data Types, Applying Template Classes: A Generic Array Class, Using Non-Type Arguments with Generic Classes, Using Default Arguments with Template Classes, Explicit Class Specializations, The typename and export Keywords, The Power of Templates .**Exception Handling:** Exception Handling Fundamentals, Catching Class Types, Using Multiple catch Statements, Handling Derived-Class Exceptions, Exception Handling Options, Catching All Exceptions, Restricting Exceptions, Rethrowing an Exception, Understanding terminate( ) and unexpected( ), Setting the Terminate and Unexpected Handlers, The uncaught_exception( ) Function, The exception and bad_exception Classes Applying Exception Handling.	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures:				
		➢ https://waplic.com/video/download/abstract-class-and-pure-virtual-function-in--c----5-/SvesRBYu65k/index.html ➢ https://www.youtube.com/watch?v=cki2wRkhAWQ		
41-50	TB1 20,21,24	**Standard C++ I/O Classes :** Old vs. Modern C++ I/O, C++ Streams, The C++ Stream Classes, C++'s Predefined Streams, Formatted I/O, Formatting Using the ios Members, Setting the Format Flags, Clearing Format Flags, Overloading << and >>, Creating Your Own Inserters, Creating Your Own Extractors, Creating Your Own Manipulator Functions **C++ File I/O:** fstream> and the File Classes, Opening and Closing a File, Reading and Writing Text Files, Unformatted and Binary I/O, Characters vs. Bytes, put( ) and get( ), read( ) and write( ), More get( ) Functions, getline( ) , Detecting EOF, The ignore( ) Function, peek( ) and putback( ), flush( ), Random Access, Obtaining the Current File Position , I/O Status, Customized I/O and Files. **STL :** An Overview of the STL, Containers, Algorithms, Iterators and Function Objects, The String Class, Vector Class, Lists, Maps.	Chalk and Talk/Flip Class	20

Links to some useful online lectures:

➢ https://www.youtube.com/watch?v=Hg3cTlJVXa8

Text Books		
1.	Herbert Schildt: C++ The Complete Reference, 4th Edition, Tata McGraw Hill, 2014. (Listed topics only from Chapters 11,12,13,14, 15, 16, 17, 18, 19, 20, and21)	
2.	K R Venugopal, Rajkumar Buyya,T Ravishanker: Mastering C++,Tata McGraw Hill.	
Reference Books		
2.	Stanley B. Lippmann, Josee Lajore: C++Primer, 4th Edition, Addison Wesley.	
3.	Stephen Prata : C++ Primer Plus, 6th Edition, Pearson Education.	
4.	Object oriented programming with C++, E. Balaguruswamy, Tata McGraw Hill.	

Syllabus for Internal Assessment Tests (IAT[*])

IAT #	Syllabus
IAT-1	Class # 01 – 20
IAT-2	Class # 21–40
IAT-3	Class # 41–50

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to
CO1: Differentiate between object oriented programming and procedure oriented programming & Disseminate the importance of Object oriented programming
CO2: Apply C++ features such as Classes, objects, constructors, destructors, inheritance, operator overloading, and Polymorphism, Template and exception handling in program design and implementation.
CO3: Use C++ to demonstrate practical experience in developing object-oriented solutions.
CO4: Analyze a problem description and build object-oriented software using good coding practices and techniques.
CO5: Implement an achievable practical application and analyze issues related to object-oriented techniques in the C++ programming language

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

	Course Outcomes	Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Differentiate between object oriented programming and procedure oriented programming & Disseminate the importance of Object oriented programming	1	-	2	-	1	-	-	2	-	-	1	-	1

CO	Description	CL											
CO2	Apply C++ features such as Classes, objects, constructors, destructors, inheritance, operator overloading, and Polymorphism, Template and exception handling in program design and implementation.	1,3,4	2	2	2	1	2	-	2	-	-	1	-	1
CO3	Use C++ to demonstrate practical experience in developing object-oriented solutions	2,3,4,5	2	2	2	2	2	-	2	-	-	1	2	2
CO4	Analyze a problem description and build object-oriented software using good coding practices and techniques.	-	2	2	2	2	2	-	2	-	-	1	2	2
CO5	Implement an achievable practical application and analyze issues related to object-oriented techniques in the C++ programming language.	-	2	2	2	2	2	-	2	-	-	1	2	2

Note: Assignments, study material, Question bank and other course related content would be posted on site mentioned above.

Signature with date: | **Course Instructor**   **Program Coordinator**   **Head-MCA**

Appendix

Table 01: Cognitive Levels

Cognitive Levels	
Cognitive level	**Revised Blooms Taxonomy Keywords**
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

Table 02: Program Outcomes (PO)

Program Outcomes (PO)	
PO1	**Computational Knowledge :** Ability to apply knowledge of mathematics, computing fundamentals and specialization
PO2	**Problem Analysis** Ability to identify, formulate and analyze complex computing problems
PO3	**Design /Development of Solutions:** Ability to design, solve and evaluate solution for

	complex computing problems.
PO4	**Conduct investigations of complex Computing problems:** Ability to conduct systematic investigations of systems and data during design & development to derive valid conclusion.
PO5	**Modern Tool Usage:** Ability to use the techniques, skills, and modern tools necessary for complex computing techniques.
PO6	**Professional Ethics:** Ability to apply and commit professional ethics and cyber regulations in a global economic environment.
PO7	**Life-long Learning:** Ability to engage in independent learning for continual development with proactive measures.
PO8	**Project management and finance:** Ability to understand financial and management principle in multidisciplinary environment.
PO9	**Communication Efficacy:** Ability to comprehend and write effective reports, design documentation and make effective presentation.
PO10	**Societal and Environmental Concern:** Ability to analyze the global and local impact of business solutions on individuals, organizations and the society.
PO11	**Individual and Team Work:** Ability to act as a member or leader in diverse teams in multidisciplinary environments.
PO12	**Innovation and Entrepreneurship:** Ability to use creativity and entrepreneurial vision to create value and wealth for betterment of individual and society at large.

Table 03: Correlation Levels

Correlation Levels	
0	No Correlation
1	Slight/Low
2	Moderate/ Medium
3	Substantial/ High

CMR Institute of Technology, Bangalore			
Department(s): Master of Computer Applications			
Semester: 02	Section(s):	Lectures/week: 04	
Subject: Database Management System		Code: 17MCA23	
Course Instructor(s): Ms. B.Vijaya Lakshmi			
Course duration: Feb 2018 – July 2018			

Course Objectives

- ➢ Gain a good understanding of the architecture and functioning of Database Management Systems as well as associated tools and techniques.
- ➢ Understand and apply the principles of data modeling using Entity Relationship and develop a good database design.
- ➢ Understand the use of Structured Query Language (SQL) and its syntax.
- ➢ Apply Normalization techniques to normalize a database
- ➢ Understand the need of Database processing and learn techniques for controlling the consequences of concurrent data access.

Lesson Plan				
Lecture #	**Book & Sections**	**Topics**	**Portions coverage**	
			Teaching Aids	% of Syllabus Covered
1-10	TB1: - 1.1-1.6, 2.1- 2.6, 3.1-3.5.	**Module – 1 Introduction:** Characteristics of Database approach, Actors on the Scene, Workers behind the scene, Advantages of using DBMS approach, Data models, schemas and instances, Three -schema architecture and data independence, Database languages and interfaces, the database system environment, Centralized and client -server architectures, Classification of Database Management systems, Entity-Relationship Model: Conceptual Database using high le vel conceptual data models for Database Design, A Sample Database Application, Entity types, Entity sets Attributes and Keys Relationship types, Relationship Sets, Roles and Structural Constraints Weak Entity Types.	Chalk and Talk	20
Links to some useful online lectures: www.youtube.com/watch?v=F_xDqBa5w-s www.youtube.com/watch?v=SDsJG-a4WAI				
11-20	TB1 6.1 – 6.5, 7.1.	**Module-2 Relational Model** Relational Model and Relational Algebra: Relational Model Concepts, Relational Model Concepts, Relational Model Constraints and Relational Database Schema Update Operations, Transactions and Dealing with Constraint	Chalk and Talk	20

		violations, Unary Relational operations, Relational Algebra Operations from Set Theory, Binary Relational Operations, JOIN and DIVISION, Additional Relational Operations, Examples of Queries in Relational Algebra Relational Database Design Using ER-to-Relational Mapping		
21-30	TB2 3.1 – 3.9 TB1 9.1 - 9.2	**Module- 3 Introduction to SQL:** Overview of the SQL Query Language, SQL Data Definition, Basic structure of SQL Queries, Additional Basic Operations, Null values, Aggregate Functions, nested Sub queries, Modification of the Database, Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization. Database programming issues and techniques, Embedded SQL.	Chalk and Talk	20
31-40	TB1 10.1- 10.5	**Module 4- Database Design**: Informal Design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms based on Primary Keys, General Definitions of 2nd and 3rd Normal Forms, Boyce Codd Normal Forms, Stored Procedures and functions, Triggers.	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures: www.youtube.com/watch?v=UDFRhj_K508 www.youtube.com/watch?v=v3N5PlbUHTs				
41-50	TB2 14.1-14.9, 15.1-15.2, 16.1-16.4.	**Module 5 -Transaction Management:** Transaction Concept, A Simple Transaction Model, Transaction Atomicity and Durability, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels. Concurrency Control: Lock Based Protocols, Deadlock Handling. Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm.	Chalk and Talk	20
Links to some useful online lectures: www.youtube.com/watch?v=HAAhn--tZV8				

Text Books	
1. 2.	Elmasri and Navathe: Fundamentals of Database Systems, 5th Edition, Addison -Wesley, 2011. Silberschatz, Korth and Sudharshan Data base System Concepts,6th Edition, Tata McGraw Hill, 2011.
Reference Books	
5.	C.J. Date, A. Kannan, S. Swamynatham: An Introduction to Database Systems, 8th Edition, Pearson education,2009.
6.	Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems, 3rd Edition, McGraw-Hill, 2003.

Syllabus for Internal Assessment Tests (IAT[*])

IAT #	Syllabus

IAT-1	Class # 01 – 20
IAT-2	Class # 21–40
IAT-3	Class # 30–50

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to
1. Demonstrate the fundamentals of data models and conceptualize and depict a database system and Make use of ER diagram in developing ER Model
2. To Summarize the SQL and relational database design.
3. Illustrate transaction processing, concurrency control techniques and recovery
4. Inference the database design in the real world entities.

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

	Course Outcomes	Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Demonstrate the fundamentals of data models and conceptualize and depict a database system and Make use of ER diagram in developing ER Model	1	3	2	3	2	2	1	2	2	2	2	2	1
CO2	To Summarize the SQL and relational database design	2,3	2	1	3	1	3	2	1	-	-	1	1	-
CO3	Illustrate transaction processing, concurrency control techniques and recovery.	5	1	1	1	2	-	-	1	1	1	-	1	1
CO4	Inference the database design in the real world entities.	1,2,4	3	2	2	2	2	1	2	1	2	1	2	1

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Signature with date:	**Course Instructor**	**Program Coordinator**	**Head-CSE**

Appendix

Table 01: Cognitive Levels

Cognitive Levels	
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CMR Institute of Technology, Bangalore		
Department(s): Computer Applications		
Semester: 02	Section(s): A	Lectures/week: 04
Subject: Operating Systems		Code: 17MCA24
Course Instructor(s): Helen Josephine V L		
Course duration: 01 Jan 2018 – 25 May 2018		
Course Site: https://sites.google.com/a/cmrit.ac.in/helen-josephine-v-l/		

Course Objectives

➢ Define the basics of operating system and different types of system

➢ Learn the mechanisms of OS to handle processes and threads and their communication

➢ Explain memory management in contemporary OS,

➢ Learn Mutual exclusion algorithms, deadlock detection and prevention algorithms

➢ Understand File System and Secondary Storage

➢ Explain Computer Security and Case study of Linux Operating system

Lesson Plan				
			Portions coverage	
Lecture #	**Book & Sections**	**Topics**	Teaching Aids	% of Syllabus Covered
1-9	TB2: 1.1 - 1.7 TB1: 1.1 - 1.10 2.1 - 2.6	**UNIT – 1 INTRODUCTION :** Computer and Operating Systems Structure Basic Elements, Processor Registers, Instruction Execution, The Memory Hierarchy, Cache Memory, I/O Communication Techniques, Introduction to Operating System, Mainframe Systems, Desktop Systems, Multiprocessor Systems, Distributed Systems, Clustered Systems, Real - Time Systems, Handheld Systems, Feature Migration, Computing Environments. System Structures: System Components, Operating – System Services, System Calls, System Programs, System Structure, Virtual Machines, System Design and Implementation, System Generation	Chalk and Talk Flip class materials for some topics	18
Links to some useful online lectures: ➢ http://nrg.cs.ucl.ac.uk/mjh/3005/2006/3-os-intro.pdf ➢ https://www.wiley.com/college/silberschatz6e/0471417432/slides/pdf2/mod1.2.pdf				
10-20	TB2 : 3.1-3.4 4.1-4.3 5.1 - 5.6	**UNIT- 2- Process Management and Mutual Execution:** Process, Process States, Process Description, Process Control, Execution of the Operating System, , Processes and Threads, Symmetric Multiprocessing(SMP), Micro	Chalk and Talk	22

		kernels, CPU Scheduler and Scheduling. Principles of Concurrency, Mutual Exclusion: Hardware Support, Semaphores , Monitors , Message Passing, Readers/Writes Problem.		

Links to some useful online lectures:

- https://www.youtube.com/watch?v=tfvOSqmg0vk
- https://www.youtube.com/watch?v=kn2Okc2cAaQ

21-29	TB2: 6.1 - 6.6 7.1 - 7.5 TB1: 10.1-10.6	**UNIT - 3- Deadlock and Memory Management** : Principles of Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, An Integrated Deadlock Strategy, Dining Philosophers Problem Memory Management: Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Process Creation, Page Replacement, Allocation of Frames, Thrashing	Chalk and Talk Video Lectures for some topics	18

Links to some useful online lectures:

- https://www.youtube.com/watch?v=rCiQc3ife90
- https://www.youtube.com/watch?v=xAvC-MJ_Sz8

30-39	TB1: 11.1-11.6 12.1-12.5 14.1- 14.3	**UNIT 4- File System and Secondary Storage** : File Concept, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection, File – System Structure, File – System Implementation, Directory Implementation, Allocation Methods, Free–Space Management, Disk Structure, Disk Scheduling, Disk Management.	Chalk and Talk Flip class and video class materials for some topics	20

Links to some useful online lectures:

- https://www.youtube.com/watch?v=vqdTDdHyU5U&list=PL0SMgh8aTQIdmG1vQYI2HGFvqRitkffZB
- https://www.youtube.com/watch?v=LWPMnCNd1q8

40-50	TB1: 19.1 - 19.4 20.1 - 20.9	**UNIT 5 - Computer Security and Case study of Linux Operating system :** The Security Problem, User Authentication, Program Threats, System Threats. Linux System Linux history , Design Principles, Kernel modules, Process , management, scheduling, Memory management, File systems, Input and output, Inter-process communications	Chalk and Talk	22

Links to some useful online lectures:

- https://www.wiley.com/college/silberschatz6e/0471417432/slides/pdf2/mod19.2.pdf
- https://www.youtube.com/watch?v=84cHeoEebJM

Text Books	
1.	Silberschatz, Galvin, Gagne, "Operating System Concepts" John Wiley, Sixth Edition, 2004, ISBN # 978-0471417439
2.	William Stallings, "Operating Systems – Internals and Design Principles" Pearson, 6th edition, 2012 , ISBN # 10: 0133805913

Reference Books	
7.	Chakraborty , "Operating Systems" Jaico Publishing House, 2011, ISBN # 9788179929766
8.	Dhananjay M. Dhamdhere, "Operating Systems – A Concept – Based Approach", Tata McGraw – Hill, 3rd Edition, 2012, ISBN # 9781259005589

Syllabus for Internal Assessment Tests (IAT[*])

IAT #	Syllabus
IAT-1	Class # 01 – 15
IAT-2	Class # 16–34
IAT-3	Class # 35–50

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to
1. Understand the Basics of Computer and Operating Systems Structure
2. Realize the concept of Process Management and Mutual Execution
3. Understand the concepts of the Deadlock and different approaches to memory management
4. Learn the concepts of file system
5. Understand the concepts of Computer Security.

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

	Course Outcomes	Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Understand the Basics of Computer and Operating Systems Structure	1	3	1	1	-	-	-	-	-	-	-	-	-
CO2	Realize the concept of Process Management and Mutual Execution	2	3	3	3	1	-	-	-	-	-	-	-	-
CO3	Understand the concepts of the Deadlock and different approaches to memory management.	3	2	3	2	1	-	-	-	-	-	-	-	-
CO4	Learn the concepts of file system	4	2	2	2	-	-	-	-	-	-	-	-	-
CO5	Understand the concepts of Computer Security and case study of Linux operating system	5	2	2	2	2	-	-	-	-	-	-	-	-

Note: Assignments, study material, Question bank and other course related content would be posted on site mentioned above.

Signature with date: | **Course Instructor**   **Program Coordinator**   **Head-CSE**

Appendix

Table 01: Cognitive Levels

Cognitive Levels

Cognitive level	Revised Blooms Taxonomy Keywords
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

Table 02: Program Outcomes (PO)

PROGRAMME OUTCOMES(POs)	
PO1	**Computational Knowledge :** Ability to apply knowledge of mathematics, computing fundamentals and specialization
PO2	**Problem Analysis** Ability to identify, formulate and analyze complex computing problems
PO3	**Design /Development of Solutions :** Ability to design, solve and evaluate solution for complex computing problems.
PO4	**Conduct investigations of complex Computing problems :** Ability to conduct systematic investigations of systems and data during design & development to derive valid conclusion.
PO5	**Modern Tool Usage :** Ability to use the techniques, skills, and modern tools necessary for complex computing techniques.
PO6	**Professional Ethics :** Ability to apply and commit professional ethics and cyber regulations in a global economic environment.
PO7	**Life-long Learning :** Ability to engage in independent learning for continual development with proactive measures.
PO8	**Project management and finance :** Ability to understand financial and management principle in multidisciplinary environment.
PO9	**Communication Efficacy :** Ability to comprehend and write effective reports, design documentation and make effective presentation.
PO10	**Societal and Environmental Concern :** Ability to analyze the global and local impact of business solutions on individuals, organizations and the society.
PO11	**Individual and Team Work :** Ability to act as a member or leader in diverse teams in multidisciplinary environments.
PO12	**Innovation and Entrepreneurship :** Ability to use creativity and entrepreneurial vision to create value and wealth for betterment of individual and society at large.

Table 03: Correlation Levels

Correlation Levels	
0	No Correlation
1	Slight/Low
2	Moderate/ Medium
3	Substantial/ High

CMR Institute of Technology, Bangalore	
Department(s): Master of Computer Applications	
Semester: 02 Section(s): A Lectures/week: 04	
Subject: System Software Code: 17MCA25	
Course Instructor(s): Ms. Ashwini Patil	
Course duration: Feb 2018 – June 2018	
Course Site: https://sites.google.com/a/cmrit.ac.in/ashwini-patil/	

Course Objectives

➢ To view some of the major tasks of the system software of a computer system, focusing on

internal working of the hardware and software interface of a typical system.

Prerequisites

➢ Basic knowledge of mnemonic codes.

<table>
<tr><th colspan="5">Lesson Plan</th></tr>
<tr><th rowspan="2">Lecture #</th><th rowspan="2">Book & Sections</th><th rowspan="2">Topics</th><th colspan="2">Portions coverage</th></tr>
<tr><th>Teaching Aids</th><th>% of Syllabus Covered</th></tr>
<tr>
<td>1-10</td>
<td>TB1
1.1-1.3,
1.4.1,
1.5.1</td>
<td>Module – 1
Machine Architecture & Introduction to Assemblers
Introduction, System Software and Machine Architecture, Simplified Instructional Computer (SIC) – SIC Machine Architecture, SIC/XE Machine Architecture, SIC Programming Examples. VAX Architecture, UltraSPARC Architecture. Basic Assembler Function - A Simple SIC Assembler, Assembler Algorithm and Data Structures.</td>
<td>Chalk and Talk

Video Lectures for some topics</td>
<td>20</td>
</tr>
<tr>
<td colspan="5">Links to some useful online lectures:

➢   https://www.youtube.com/watch?v=VG9VopzV_T0
➢   https://www.youtube.com/watch?v=dJnMKsOIX9Y</td>
</tr>
<tr>
<td>11-20</td>
<td>TB1
2.1-2.4,
2.5.1,
2.5.2</td>
<td>Module -2 Assemblers
Machine Dependent Assembler Features - Instruction Formats & Addressing Modes, Program Relocation. Machine Independent Assembler Features – Literals, Symbol-Definition Statements, Expression, Program Blocks, Control Sections and Programming Linking, Assembler Design Operations - One-Pass Assembler, Multi-Pass</td>
<td>Chalk and Talk

Video Lectures for some topics</td>
<td>20</td>
</tr>
</table>

		Assembler, Implementation Examples – MASM Assembler, SPARC Assembler		
Links to some useful online lectures: ➢ https://www.tutorialspoint.com/computer_fundamentals/assembler.asp ➢ https://www.youtube.com/watch?v=6ipFf3vLifU&t=256s				
21-30	TB1 3.1-3.5	**Module – 3 Loaders and Linkers** Basic Loader Functions - Design of an Absolute Loader, A Simple Bootstrap Loader, Machine-Dependent Loader Features – Relocation, Program Linking, Algorithm and Data Structures for a Linking Loader; Machine-Independent Loader Features – Automatic Library Search, Loader Options, Loader Design Options - Linkage Editor, Dynamic Linkage, Bootstrap Loaders, Implementation Examples – MS-DOS linker, SunOS Linker, Cray MPP linker	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=OxjjxppyMsI				
31-40	TB1 4.1-4.4	**Module – 4 Macro Processor** Basic Macro Processor Functions - Macro Definitions and Expansion, Macro Processor Algorithm and Data Structures, Machine-Independent Macro Processor Features – Concatenation of Macro Parameters, Generation of Unique Labels, Conditional Macro Expansion, Keyword Macro Parameters, Macro Processor Design Options – Recursive Macro Expansion, General- Purpose Macro Processors, Macro Processing Within Language Translators, Implementation Examples - MASM Macro Processor, ANSI C Macro Processor., ELENA macro processor	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=bTkRvSUBkcA&t=2s				

| 41-50 | TB1 5.1-5.4, 5.5.1, 5.5.3 | **Module – 5 Compilers**
Basic Compilers Functions- Grammars, Lexical Analysis, Syntactic Analysis, Code Generation. Machine Dependent Compiler Features- Intermediate Form of the Program, Machine dependent code Optimization. Machine Independent Compiler Features- Structured variables, Machine Independent code Optimization. Compiler Design Options- Division into passes, Interpreters, P-code Compilers, Compiler-Compilers, SunOS C compiler, YACC Compiler-compiler. | Chalk and Talk

Video Lectures for some topics | 20 |

Links to some useful online lectures:

➢ https://www.youtube.com/watch?v=vZE4u-uI_Ig
➢ https://www.youtube.com/watch?v=WccZQSERfCM&index=2&list=PLEbnTDJUr_IcPtUXFy2b1sGRPsLFMghhS

Text Books	
1.	Leland.L.Beck: System Software, 3rd Edition, Addison-Wesley, 1997.
Reference Books	
9.	J.Nithyashri, "System Software", 2nd Edition, Tata McGraw Hill, 2010

Syllabus for Internal Assessment Tests (IAT[*])

IAT #	Syllabus
IAT-1	Class # 01 – 20
IAT-2	Class # 21–45
IAT-3	Class # 46–50

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to
1) Understand the introductory concepts of system software, SIC and SIC/XE machine architecture.
2) Understand the design and implementation of Assemblers with implementation examples.
3) Design and implement the linkers and loaders, macro processors and respective implementation examples.
4) Learn the basic design and working of compilers.

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

	Course Outcomes	Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Understand the introductory concepts of system software, SIC and SIC/XE machine architecture.	1	2	2	1	-	-	-	1	-	-	-	-	1

CO2	Understand the design and implementation of Assemblers with implementation examples.	2	-	1	2	-	-	-	1	-	-	-	-	1
CO3	Design and implement the linkers and loaders, macro processors and respective implementation examples.	3,4	-	1	2	-	-	-	1	-	-	-	-	1
CO4	Learn the basic design and working of compilers	5	-	2	2	1	-	-	1	-	-	-	-	1

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Signature with date: | **Course Instructor**   **Program Coordinator**   **Head-MCA**

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Table 02: Program Outcomes (PO) and Program Specific Outcomes (PSO)

Program Outcomes (PO), Program Specific Outcomes (PSO)	
PO1	**Computational Knowledge :** Ability to apply knowledge of mathematics, computing fundamentals and specialization.
PO2	**Problem Analysis:** Ability to identify, formulate and analyze complex computing problems
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