SVKM's Narsee Monjee Institute of Management Studies
Mukesh Patel School of Technology Management & Engineering

Program: B Tech (All program except CSBS, CSDS), MBA Tech Mechanical and Computer, B Tech Integrated Mechanical and Computer				**Semester :** III / IV / VII / VIII	
Course: Complex Variables and Transforms				**Code:** 702BS0C057	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations(TEE) (Marks- 100)**
3	0	1	4	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Calculus, Linear Algebra and Differential Equations

Course Objective

This course aims to instil in students an understanding of Complex Variables, Laplace Transforms, Fourier series, Fourier Transforms and their applications. It equips the students with mathematics
fundamentals necessary to formulate, solve and analyse complex engineering problems.

Course Outcomes

After completion of the course, the student will be able to -

1. demonstrate understanding of the concepts of Complex variables, Laplace Transforms, Fourier series and Fourier Transforms
2. solve problems based on complex variables, Laplace Transforms, Fourier series and Fourier Transforms
3. apply the techniques of Complex variables, Laplace Transforms, Fourier series and Fourier
   Transforms to solve engineering problems

Detailed Syllabus

Unit	**Description**	**Duration**
1	**Complex Variables – Differentiation** Complex differentiation, Cauchy-Riemann equation, analytic functions, harmonic functions, harmonic conjugate, Elementary analytic functions (exponential, trigonometric, logarithmic functions), Conformal mappings: definition and problems, Mobius transformation and their properties.	**07**
2	**Complex Variables – Integration** Contour Integrals: definition and problems, Cauchy-Goursat theorem, Cauchy Integral formula, Zeros and singularities of analytic functions, Taylor's series, Laurent's series, Residues, Cauchy Residue theorem.	**08**
3	**Laplace Transforms** Definition of Laplace Transform, Laplace Transform of 1, e^{at}, $\sin at$, $\cos at$, $\sinh at$, $\cosh at$, t^n, Properties of Laplace Transforms: Linearity property, First and second shifting theorems of Laplace Transform, Change of scale property, $L\{t^n f(t)\}$, $L\left\{\frac{f(t)}{t}\right\}$, $L\{f^n(t)\}$, $L\{\int_0^t f(u)\,du\}$, Evaluation of Inverse Laplace Transform by partial fraction, Convolution theorem, Laplace Transforms of Periodic functions, Unit step functions, Dirac delta functions. Applications: Evaluation of Integrals using Laplace Transforms, Solving initial and boundary value problems involving ordinary differential equations.	**11**

4	**Fourier Series** Orthogonality and Orthonormality, Periodic function, Trigonometric Series, Dirichlet's conditions, Euler's formulae (Derivative of Fourier coefficients a_0, a_n, b_n is not expected), Fourier Series of Functions for the interval [□,□ □ 2□] and [□,□ □ 2*c*] , Functions having points of discontinuity, Even and odd functions, half range sine and cosine expansions, Complex form of Fourier Series. Applications: Applications to Wave equation, Heat equation and Laplacian equation.	**12**
5	**Fourier Transforms** Fourier integral theorem, Fourier sine and cosine integral. Fourier Transform, Fourier Sine Transform, Fourier Cosine Transform, Properties of Fourier Transforms (Linearity property, Change of scale property, Shifting property), Inverse Fourier Transform, Inverse Fourier Sine Transform, Inverse Fourier Cosine Transform, Finite Fourier Transform. Applications: Solving differential equations using Fourier Transforms.	**07**
	Total	**45**

Text Books

1. B. V. Ramana, *Higher Engineering Mathematics*, 1st Edition, McGraw Hill Education, 2017.
2. T. Veerarajan, *Engineering Mathematics,* 3rd Edition, McGraw Hill Education, 2007.

Reference Books

1. Erwin Kreyszig, *Advanced Engineering Mathematics*, 10th Edition, Wiley India, 2017.
2. B. S. Grewal, *Higher Engineering Mathematics*, 44th Edition, Khanna Publishers, 2017.
3. James Ward Brown, Ruel V. Churchill, *Complex Variables and Applications*, 8th Edition, McGraw Hill Education", 2014.

Tutorial Work

Minimum Ten Tutorial exercises based on the syllabus.

Mukesh Patel School of Tech. Mgmt. & Engg. SVKM'S NMIMS Mumbai 56

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Program: B Tech /MBA Tech (Computer Engineering /IT) B Tech (AI & ML, Cyber Security, CSBS) BTI Computer Engineering				**Semester:** IV/III/VIII	
Course: Computer Organization and Architecture				**Code:** 702CO0C023	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks- 50)**	**Term End Examinations (TEE) (Marks- 100)**
3	0	0	3	Marks Scaled to 50	Marks Scaled to 50

Prerequisite: NA

Course Objective

To provide knowledge of the basic principles of the organization, operation and performance of modern day computer systems and the underlying semiconductor circuit architectures used to construct parallel computer components.

Course Outcomes: After completion of the course, student will be able to -

1. Discuss the functional blocks of computers and the interconnections
2. Evaluate the memory system
3. Explain the components of the Central Processing Unit
4. Describe Input Output and Parallel Organization

Detailed Syllabus

Unit	Description	Duration
1	**Overview** General Organization and architecture, Structural/functional view of a computer, Computer Functional Components.	**03**
2	**System Buses** Overview of basic instruction cycle, Interrupts, Bus interconnection, Elements of bus design, Read and write timings diagram, Bus hierarchy, Bus arbitration techniques.	**06**
3	**Memory Organization** Internal Memory- Memory characteristics and memory hierarchy. Cache Memory**-** Elements of cache design, Address mapping and Translation-Direct mapping, Address mapping and translation- Associative mapping, Address mapping and translation -Set associative mapping, Performance characteristics of two level memory, Semiconductor main memory- Types of RAM, DRAM and SRAM, Chip logic, Memory module	**10**

Mukesh Patel School of Tech. Mgmt. & Engg. SVKM'S NMIMS Mumbai 56

Signature

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	organization. High speed memories- Associative memory, High speed memories- Interleaved memory.	
4	**Data path Design** IEEE 754 data format, IEEE 754 data format numerical, Design of serial and parallel adder and subtractor, Booth's algorithm, ALU -Combinational and sequential ALU. Block diagrams of high speed adders multipliers, Block diagrams of high speed multipliers, Overview of math coprocessor.	**09**
5	**Central Processing Unit** Basic Instruction Cycle and Instruction set, Formats and addressing, Processor Organization and Register Organization, Instruction Pipelining, Co-processors, Pipeline processors, RISC and CISC computers.	**06**
6	**Control Unit and Peripheral Devices** Control Unit- Micro Operations, Hardwired Implementations, Micro Programmed control, Micro instruction format and applications of microprogramming, I/O modules- Programmed I/O, I/O modules-Interrupt Driven I/O, DMA.I/O processors and channels, General-Purpose Graphics Processing Unit, GPU applications, synchronization, coherence.	**09**
7	**Multiprocessor Processor Organizations** Flynn's classification of parallel processing Systems, Superscalar Processors.	**02**
	Total	**45**

Text Books

1. William Stallings, *Computer Organization and Architecture: Designing and Performance*, Prentice Hall, 11th Edition, Pearson Education, 2022.
2. John P. Hayes Mc-Graw Hill, *Computer Architecture and Organization*, 2nd Edition, 2010. ISBN-13 : 978-1259028564
3. Morris Mano, Computer System Architecture, PHI, 3rd Edition, Pearson Education, 2017.

Reference Books:

1. Andrew Tannenbaum, *Structured Computer Organization*, 6th Edition, PHI, Pearson Education, 2016.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Naraig "*Computer Organization and Embedded Systems* " 6th Edition, 2023.

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SVKM's NMIMS University
Mukesh Patel School of Technology Management & Engineering

Program: B Tech/MBA Tech (Computer Engineering, Artificial Intelligence) B Tech (CSBS, Computer Science) BTI Computer Engineering	**Semester :** IV/ V/VII /VIII
Course: Design and Analysis of Algorithms	**Code:** 702CO0C010

Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks-50)**	**Term End Examinations (TEE) (Marks -100)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Programming for Problem Solving, Data Structures, Discrete Mathematics

Course Objective

Objective of this course is to demonstrate a familiarity with major algorithm design paradigm. Analyze the asymptotic performance of algorithms and Devise efficient algorithms in common engineering design situations.

Course Outcomes-

After completion of the course, student will be able to -

1. Understand the space-time complexity of an algorithm
2. Evaluate divide and conquer approach of algorithm design
3. Apply greedy technique of algorithm design
4. Analyze dynamic programming and Backtracking algorithm design paradigm.

Detailed Syllabus

Unit	Description	Duration
1.	**Introduction** What is Algorithms, types of Algorithms: greedy, divide & conquer, backtracking, etc. Analysis of Algorithms complexity. Introduction of P, NP, NP Complete and NP hard problems.	04
2.	**Analysing the Algorithms** Time and Space Complexity of Algorithms, Asymptotic notations, Asymptotic order, Properties of big oh, big omega, and big theta, Classifying functions by their asymptotic growth rates, Best case, average Case and worst case analysis. Master's Theorem and Substitution Method, Recursion Tree Method.	06
3.	**Divide and Conquer Technique**	04

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	The general method, control abstraction for divide and conquer, Finding the maximum and minimum: straightforward and recursive algorithm, Merge sort, Quick sort.	
4.	**Greedy Technique** The general method, control abstraction, Optimal storage on tapes, Knapsack problem, Job sequencing with deadlines, Optimal merge patterns, Huffman code.	05
5.	**Dynamic Programming** The general method, principle of optimality, Multistage graphs, Single source shortest path - Bellman Ford algorithm, 0/1-knapsack, Matrix Chain multiplication, Longest Common Subsequence problem.	08
6.	**Backtracking** The general method, The n–queens problem, Sum of subsets, Graph coloring.	03
	Total	30

Text Books:

1. Ellis Horowitz, and Sartaj Sahani, *Fundamentals of Computer Algorithms*, 2nd Edition, University Press, 2008.
2. Thomas H. Cormen, Charles E., Leiserson, Ronald L. Rivest, *Introduction to Algorithms,* 2nd Edition, PHI Learning, 2010.

Reference Books:

1. Sara Baase and Alan Van Gelder, *Computer Algorithms Introduction to Design and Analysis*, 3rd Ed, Pearson Education, 2002 ISBN-13 : 978-8131702444
2. Aho, Hopcroft and Ullman, *Data Structures and Algorithms*, Addison-Wesley, Pearson Education 2000. ISBN-13 : 978-8178081021

Laboratory Work

8 to 10 experiments (and a practicum where applicable) based on the syllabus

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SVKM's NMIMS
Mukesh Patel School of Technology Management & Engineering

Program: B Tech (Artificial Intelligence, Data Science, Computer Engineering, Information Technology, CSE (Cyber), AI and ML, AI and DS, CSBS, CSE (DS), Computer Science) MBA Tech (All Programs) B Tech Integrated (Data Science, Computer Engineering, Information Technology)	**Semester:** III/IV/ VII/ VIII
Course: Database Management Systems	**Code:** 702AI0C001

Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks - 100)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Nil

Course Objective

The objective of the course is to provide a comprehensive introduction to the fundamental concepts for design and development of database systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a database management system

Course Outcomes

After completion of the course, students will be able to -

1. Describe core concepts of database and model a database management system through ER modelling
2. Apply knowledge of relational algebra and structured query language to retrieve and manage data from relational database
3. Demonstrate the use of normalization for database design
4. Demonstrate the concept of transactions and use modern database techniques such as NoSQL

Detailed Syllabus

Unit	**Description**	**Duration**
1.	**Introduction** Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Data Models, Database Users and Administrator	**03**
2.	**Database Design and the E-R Model** Overview of the Design Process, The Entity-Relationship Model, Constraints, Entity Relationship Diagrams, Reduction to Relational Schemas, Schema Diagrams , Entity-Relationship Design Issues, Extended ER features	**05**
3.	**Introduction to the Relational Model** Structure of Relational Databases, Database Schema, Keys, Relational Algebra, Basic operators of Relational Algebra,	**03**
4.	**Structured Query Language** Overview of the SQL Query Language, SQL Data Definition, SQL Constraints, Basic Structure of SQL Queries, Additional Basic Operations, DML operations, Set operations, Aggregate Functions, Nested Sub-queries, Joins, views	**06**

Signature

(Head of the Department)

5.	**Relational Database Design** Features of Good Relational Designs, Problems with bad design, Decomposition using concept of functional dependencies, Armstrong's axioms, Closure of functional dependency, Closure of attribute, Introduction to process of Normalization and de-normalization, Normal Forms- 1NF, 2NF, 3NF, BCNF	**05**
6.	**Transactions** What is Transactions? Properties of transaction, Transaction states, Issues with concurrent executions, Schedules, Serializability- Conflict and View	**04**
7.	**Introduction to NoSQL** Overview of NoSQL, characteristics of NoSQL, Storage types of NoSQL, Implementing NoSQL in MongoDB - Managing Databases and Collections from the MongoDB shell, Finding Documents in MongoDB collection from the MongoDB shell.	**04**
	Total	**30**

Text Books

1. Hennery Korth and Abraham Silberschatz, *Database System Concepts*, 7th Edition, McGraw Hill, 2019.
2. Elmarsi and Navathe, *Fundamentals of Database Design*, 7th Edition, Addison Wesley, 2019.
3. A Phaltankar, J. Ahsan, M. Harrison, L. Nevdov, *MondoDB Fundamental*, Packt Publishing, 2020.

Reference Books

1. Bob Bryla, Kevin Loney *Oracle Database 12C The Complete Reference*, 1st Edition, Tata McGraw Hill, 2017.
2. Marko Aleksendric, Arek Borucki, *Mastering MongoDB 7.0*, Packt Publishing, 2024.

Laboratory Work

8 to 10 experiments (and a practicum where applicable) based on the syllabus

Signature
(Head of the Department)

Program: B Tech/ MBA Tech (Computer Engineering) / B Tech (CSBS, Computer Science) BTI Computer Engineering				**Semester:** IV/III/ /VIII	
Course: Theoretical Computer Science				**Code:**702CO0C011	
Teaching Scheme				**Evaluation Scheme**	
Lecture Hours per week	**Practical Hours per week**	**Tutorial Hours per week**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks- 100)**
2	0	1	3	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Data Structures

Course Objective

To introduce fundamental principle of automata theory and formal languages. To understand various types of automata and their relationships.

Course Outcomes- After successful completion of the course, student will be able to-

1. Understand the concepts of Automata theory and formal language,
2. Identify different formal language classes and their relationships,
3. Design grammars and recognizers for different formal languages.

Detailed Syllabus

Unit	Description	Duration
1.	**Introduction to Automata theory**: Basic concepts of String, Formal languages, Chomsky hierarchy, Grammar and its type – Type 0, 1, 2 and 3, Derivation Tree, Application of the subject in complier construction	03
2.	**Finite State Machine & Regular Set**: Concept of DFA, NFA, Epsilon NFA, Converting NFA to Minimized DFA, Regular Expressions, DFA to R. E Conversion, Regular language, Closure properties & Pumping Lemma for regular sets	08

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3.	**Moore and Mealy machine:** Designing of Mealy machine and Moore machine, Conversion from Mealy to Moore and Moore to Mealy	03
4.	**Context Free Grammar:** Basic concept of Context Free Grammar and Language, Ambiguous CFG, Simplification of CFG, Chomsky's Normal Form, Griebach Normal Form.	05
5.	**Push Down Automata:** Tuples and elements in PDM, Design of PDA for CFL, Power of PDA over FSM, Closure Properties of CFL	05
6.	**Turing Machine:** Turing Machine Definition, Examples of TM designing, Recursive and recursively enumerable, Universal Turing machine, Church Turing Hypothesis, Halting problem, Power of TM over PDA	06
	Total	**30**

Text Books:

1. Peter Linz, Narosa, "Introduction to Formal Languages and Automata", 6th Edition, 2016.
2. Vivek Kulkarni, "Theory of Computation", Oxford, 1st Edition, 2013.

Reference Books:

1. J.E. Hopcrof t, J.D. Ullman, Motwani, "Introduction to Automata theory, Languages and Computation", 3rd Edition, Pearson Education, 2008.
2. Michael Sipser, Introduction to the Theory of Computation, 3rd edition, Cengage Learning, 2013.

Laboratory/ Tutorial Work

8 to 10 tutorials based on the syllabus.

Mukesh Patel School of Tech. Mgmt. & Engg. SVKM'S NMIMS Mumbai 56

Signature
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Program: B Tech (Artificial Intelligence, Computer Engineering, Information Technology, CSE (Cyber), AI and ML, AI and DS, CSE (DS), Computer Science) MBA Tech (Artificial Intelligence, Computer Engineering, Information Technology) B Tech Integrated (Computer Engineering, Information Technology)	**Semester:** III/IV/V/VII/VIII/ V-VII
Course: Web Programming	**Code:** 702AI0E005

Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks - 100)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Prerequisite: Computer Programming

Course Objective

The objective of this course is to develop modern web application by leveraging latest technologies. It helps them to learn new technologies by applying foundation paradigms, building strong expertise to develop end to end application - web frontend and backend development.

Course Outcomes

After completion of the course, students will be able to -

1. Explain the fundamentals of web programming
2. Design front end of a web application
3. Establish database connectivity between front-end and back-end

Detailed Syllabus

Unit	Description	Duration
1.	**Introduction** Concept of website, its need and purpose, Types of websites: Static and dynamic website, Introduction to HTML, XML, JSON, Web Browsers, − Web Servers, Uniform Resource Locator, Tools and Web Programming Languages, HTTP, Web Standards, Tiered Architecture: Client Server Model, Three Tier Model	**02**
2.	**Hyper Text MarkUp Language** Languages used for website development, HTML5: basic tags, formatting tags, Adding images, Lists, Embedding multimedia in Web pages, Inserting tables, Internal and External Linking, Frames, Forms	**05**
3.	**Cascading Style Sheets (CSS3)** Basics of Cascading Style sheets, Advantages of CSS, External Style sheet, Internal style sheet, Inline style sheet, CSS Syntax, color, background, Font, images	**05**
4.	**Java Script** Features of JavaScript, extension of JavaScript, Syntax of JavaScript: data types, operators, variables, tag, Document Object Model (DOM) with JavaScript, Selection Statement using if and Switch, Iterative statement: for, for/in, while, do while, break and continue, Form Validation using JavaScript.	**04**

Signature
(Head of the Department)

5.	**Angular JS** Introduction to Angular JS, Single Page Application, Angular features, Expressions, Modules, Directives, Model, controllers, Data bindings, Scopes, Tables, Angular JS Forms and validation, Services, HTTP, Dependency Injection, Events.	**08**
6.	**Node JS** Introduction, Modules, HTTP module, URL module, File system, NPM, Events and Event Emitter, Exception handling. **MYSQL Database with Node.js** Introduction, Express.js, create database, create table, insert, update select, delete, where, order by, drop table.	**06**
	Total	**30**

Text Books

1. Terry Felke-Morris, *Web Development and Design Foundations with HTML5*, 9th Edition, Pearson Education, ISBN-10: 9353438829, Nov 2019.
2. Julie C. Meloni, Jennifer Kyrnin, *Sams Teach Yourself HTML, CSS, and JavaScript All in One,* 3rd Edition, Pearson Education, ISBN-10: 9389552419, 8th May 2020.
3. Greg Lim, *Beginning Angular with Typescript*, ISBN-13:-978-9811480270, 1st Sep 2020.

Reference Books

1. David Herron, *Node.js Web Development - Fourth Edition: Server-side development with Node 10 made easy*, 4th Edition, Packet Publishing, May 2018.
2. Joel Murach, *Murach's MySQL*, ISBN 978-1-943872-36-7, Murach Books publishing, Published March 2019.
3. Greg Lim, *Beginning Angular with Typescript*, ISBN:- 9811480273, 1st September 2020.

Laboratory Work

8 to 10 experiments (and a practicum where applicable) based on the syllabus

Signature
(Head of the Department)

Program: B Tech/ MBA Tech (Computer Engineering) / B Tech Computer Science/ BTI Computer Engineering	**Semester:** IV/ VIII
Course: Object Oriented Programming through JAVA	**Code:** 702CO0C038

Teaching Scheme				**Evaluation Scheme**	
Lecture Hours per week	**Practical Hours per week**	**Tutorial Hours per week**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (Marks- 50)**
0	2	0	1	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Programming for Problem Solving

Course Objective

To develop the abilities for object-oriented programming using Java, to gain knowledge of the basic data structures supported by Java, concepts of object-oriented programming, exception handling, graphical user interface and collection framework in Java.

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

1. Understand java programming fundamentals
2. Write program using object-oriented programming concepts
3. Use exception handling and collection framework in Java
4. Design graphical user interface

Detailed Syllabus:

Unit	Description	Duration
1.	**Introduction to object-oriented programming** Features of object-oriented programming, datatypes, variables, literals, operators, constants, identifiers.	02
2.	**Control Statements** selection statements, Iterations, Jump statements.	02
3.	**OOP's concept** Class, methods, objects, constructor, polymorphism-method overloading, encapsulation, access modifiers, packages, introduction to string & string buffer.	07
4.	**Inheritance in Object Oriented design** Types of inheritance, method overriding, abstraction-abstract class, abstract method, Introduction to interfaces, implementing interface, keywords-super, final. JS3 pages.	07
5.	**Exception handling**	02

Mukesh Patel School of Tech. Mgmt. & Engg. SVKM'S NMIMS Mumbai 56

Signature

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AY 2024-25

	What is exception handling, Difference between exception and error, try, catch, finally, throw, throws, finally.	
6.	**Spring** MVC Architecture using spring, Containers- JFrame, JApplet, JWindow, JDialog, JPanel, Controlling Layout, Event Handling.	06
7.	**Collection Framework Overview** The Collection Interfaces-List interface, set interfaces, The Collection Class- The Array List, The Linked List, accessing a collection- using an Iterator and For-each loop.	04
	Total	**30**

Text Books:

1. R. Nageswara Rao, *Core Java: An Integrated Approach, New: Includes All Versions upto Java 8*, Dreamtech Press ,1st January 2016.

Reference books

1. E Balaguruswamy, *Programming with Java*, 6th edition, Tata McGraw Hill,2019.
2. Herbert Schildt, *Java The Complete Reference - Eleventh Edition*, McGraw Hill, 11th edition.

Laboratory / Tutorial work

8 to 10 experiments (and a practicum where applicable) based on the syllabus.

Mukesh Patel School of Tech. Mgmt. & Engg. SVKM'S NMIMS Mumbai 56

Signature

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Program: B Tech / MBA Tech (Computer Engineering) BTI Computer Engineering				**Semester:** IV / VIII	
Course: Microprocessor and Microcontroller				**Code-**702CO0C009	
Teaching Scheme				**Evaluation Scheme**	
Lecture Hours per week	**Practical Hours per week**	**Tutorial Hours per week**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks- 100)**
3	2	0	4	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Digital Logic Design, Computer Organization and Architecture

Course Objective

Introduction on architecture of 8086 and 8051.To cover different instruction set and addressing modes in 8086 and 8051 to develop programs for desired microprocessor and microcontroller

Course Outcomes- After successful completion of this course, student will be able to

1. Understand the architectural design of 8086 along with its features,
2. Design Interfacing of 8085 with peripherals and develop programs for 8086,
3. Analyze the architectural design of 8051 and develop programs for 8051 using instruction set,
4. Understand the key features of advanced microcontroller and microprocessor.

Detailed Syllabus:

Unit	Description	Duration
1.	**Intel 8086/8088 microprocessor family:** Feature of 8086 Architecture and programming model of 8086, Microprocessor family Latches 8282, clock generator 8284, Transceiver 8286. Min and Max Mode Timing diagram of 8086, 8288 bus controller.	08
2.	**Programming of 8086:** Introduction, Addressing Modes, Instruction sets of 8086, Assembly language programming, Assembler Directive, Passing parameter to Procedure and Macro.	06
3.	**8086 Interrupt Structure:** Instruction, Hardware software and program generated interrupts in 8086. Response to interrupt, Interrupt vector	06

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	Table, Interrupt acknowledge machine cycle, 8259 PCI, EOI, and interfacing with 8086.	
4.	**8087 Math Co-processor:** Study of architecture of 8087, architecture of NIC architecture of 8087. Data type Supported by 8087.	05
5.	**Introduction and Hardware of 8051 Microcontrollers:** Comparison of microprocessor and microcontroller, architecture and pin functions of 8051 chip controller, CPU timing and machine cycles, internal memory Organization, program counter and stack, input/output ports, counters and timers, Serial data input and output interrupts	08
6.	**8051 Assemble language programming:** Introduction to 8051 Assembly programming, Data Types and directives, 8051 flag bits an PSW register. Register banks and stack. Jump loop and call instructions, I/O Port Programming: Addressing modes and accessing memory using various addressing modes. Arithmetic instructions and programs, Logic instructions and programs, Timer/counters of 8051	07
7.	**Introduction to Advanced Microprocessor and Microcontrollers:** Introduction to Arduino-features, types, basic Architecture Overview on advanced processor and controller used in Industry	05
	Total	**45**

Text Books:

1. Badri Ram, "Advanced Microprocessors and Interfacing", 3rd Edition, Tata McGraw Hill Publication, 2018.
2. Muhammad Ali Mazidi, "Microcontroller & Embedded system", 2nd Edition, Prentice Hall publication, 2011.

Reference Books:

1. Douglas Hall, "Microprocessors Interfacing and Programming", Tata McGraw Hill publication, 2017.
2. Raj Kamal , "Microcontrollers-architecture, programming, Interfacing and system design", 2nd Edition, Pearson publication, 2012.

Laboratory/ Tutorial Work

8 to 10 experiments (and a practicum where applicable) based on the syllabus

Mukesh Patel School of Tech. Mgmt. & Engg. SVKM'S NMIMS Mumbai 56

Signature

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