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

Program: B Tech Computer Science and Engineering (Data Science)				**Semester:** II	
Course : Physics				**Code:** 702BS0C002	
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 Nil

Course Objective

The knowledge of Physics relevant to engineering is critical for converting ideas into technology. An understanding of Physics also helps engineers understand the working and the limitations of existing devices and techniques, which eventually leads to new innovations and improvements. This course aims to make students understand the basic concepts of Physics thoroughly with a view to lay foundations for the various engineering courses.

Course Outcomes

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

1. relate and interpret the relationship and interaction between the nature and the matter with a scientific outlook
2. identify and apply different processes of physics that have wide applications in industrial and technological sectors
3. develop creative thinking, problem solving abilities and considerable scientific skills, viz. experimental, observational, manipulative, investigatory and decision making etc.

Detailed Syllabus

Unit	**Description**	**Duration**
1.	**Semiconductors Physics** Formation of energy bands and classification of solids into conductors, semiconductors and insulators, direct and indirect band gap semiconductors, fermi levels in semiconductor, energy gap and its temperature dependence, physics of semiconductor junction, hall effect and application.	8
2.	**Optics** Interference: Thin film interference, wedge shaped film and Newton's rings and their applications.	9

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	Diffraction: Fraunhofer and Fresnel diffraction, Fraunhofer diffraction at single slit, double slit, and multiple slits, Characteristics of diffraction grating and its applications.	
3.	**LASER and Fiber optics** Introduction to interaction of radiation with matter, Population inversion, pumping, various modes, threshold, population inversion, Solid state LASER, Semiconductor LASER, Gas LASER, applications of lasers. Introduction, optical fiber as a dielectric wave guide, total internal reflection, numerical aperture and various fiber parameters, losses associated with optical fibers, step and graded index fibers, application of optical fibers.	9
4.	**Electricity and Magnetism** Laws and applications of electrostatics and magnetostatics, Maxwell's equations and applications, introduction to waveguides.	6
5.	**Nuclear and Plasma Physics** Introduction to nuclear physics, types of nuclear reactions, nuclear fission as a source of energy, Particle accelerators: Cyclotron, Synchrotron, Nuclear radiation counters: Geiger Muller Counter, scintillation counter. Basic concepts of Plasma physics: Plasma as a state of matter, Debye length, plasma frequency, collisions, dc conductivity, ac conductivity Applications of plasma physics.	8
6.	**Modern Engineering materials** (Introduction and basic properties of each material) Nanomaterials, Superconductors, Dielectrics, metallic glasses, biomaterials.	5
	Total	**45**

Text Books

1. H.K Malik and A.K. Singh, *Engineering Physics*, 2nd Edition, Tata McGraw Hill, 2017.

Reference Books

1. Jearl Walker, David Halliday and Robert Resnick, *Fundamentals of Physics*, 10th edition, Wiley India, 2013.
2. James F.Shackelford and Madanapalli K. Muralidhara, *Materials Science for Engineers,* 7th edition, Pearson Education, 2006.
3. Francis F. Chen, *Introduction to Plasma Physics*, Springer, 2012.

Laboratory Work

8 to 10 experiments based on the syllabus.

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

Program: B Tech Computer Science and Engineering (Data Science)				**Semester:** II	
Course: Critical Thinking				**Code:** 702BS0C007	
Teaching Scheme				**Evaluation Scheme**	
Lecture Hours per week	**Practical Hours per week**	**Tutorial Hours per week**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 100)**	**Term End Examinations (TEE) (Marks -100)**
2	0	0	0	Marks Scaled to 50	---

Pre-requisite: Nil

Course Objective

This course examines the basic nature of reasoning and the fallacies which prevent good reasoning and decision making. Both the theory and practice of critical thinking are covered. Emphasis will be on understanding the logical structure of an argument and on recognizing the influence of bias and emotional persuasion on decision making.

Course Outcomes

After completion of the course, students will be able to

1. solve problems or take decisions by processing information in a clear, logical, reasoned and reflective manner
2. recognise, build and appraise arguments
3. analyse contexts effectively
4. recognise bias and its impact on decision making

Detailed Syllabus

Unit	Description	Duration
1.	**Brain and Thinking:** Introduction to Thinking, Types of Thinking, Brain and Thinking, Curiosity, Creativity and Different thinking, Critical thinking basics, Meta thinking	10
2.	**Social, Psychological Aspects of Thinking:** Top barriers to critical thinking, Rationality Bounded Rationality and its model, Fast and Slow Thinking, Objectivity, Subjectivity, Assumptions and Skepticism. Paradigm shift, Perception, prejudice and stereotype, Attribution, Heuristics, Cognitive Biases and Errors, examining critical thinking, Critical Thinking Process, Framework, & Tools, Problems and critical thinking.	10
3.	**Deductive and Inductive:** Arguments, Principle of Clarity, Truth, Deductive validity, Conditional Propositions, Inductive reasoning, Inductive inferences, Deductive v/s Inductive, Formal fallacies, Informal fallacies.	10

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	Total	**30**

Text Books

1. Paul Herrick, *Think with Socrates: An Introduction to Critical Thinking*, 1st edition, 2014.
2. Lewis Vaughan, *The Power of Critical Thinking*, 5th edition, 2012,

Reference books: NA

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Program: B Tech Computer Science and Engineering (Data Science)				**Semester:** II	
Course: Digital Manufacturing Laboratory				**Code:** 702MEOC016	
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)**
0	2	0	1	Marks Scaled to 50	-

Pre-requisite: Nil

Course Objective

The course aims to introduce digital fabrication tools and methods. It familiarizes the students with various principles of 3D printing along with solid modeling, part slicing and fabrication using Fused deposition modelling (FDM) process.

Course Outcomes

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

1. Describe FDM Technology
2. Prepare given model for 3D printing
3. Create products of complex geometries using 3D printer

Detailed Syllabus

Unit	Description	Duration
1	**Introduction to Digital Manufacturing and Technical Design** Overview of 3D printing laboratory equipment, pre-fabricating requirements – printer bed size, hardware and materials required.	**02**
2	**3D Printing Process steps** 3D printing concepts for converting CAD model into real parts, process steps involved in 3DP, creation of solid model, conversion to STL file, slicing the file or select a STL model from online resources, machine set up, build.	**06**
3	**3D Printing with Fused Deposition Modeling (FDM)** Operating principle and workflow of a Fused Deposition Modeling (FDM) 3D Printing machine, effect of layer thickness, infill density, part orientation and overhang angles on FDM printed parts, study of lithophane.	**10**
4	**Project Involving Ideation, Design and 3D Printing** Briefing of idea, designing of product, solid model creation, final fabrication using 3D printer.	**12**
	Total	**30**

Text Books

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1. Noorani, Rafiq, *3D Printing: Technology, Applications, and Selection*, 1st edition, CRC Press, 2017.
2. Filemon Schöffer, Ben Redwood, Brian Garret, *The 3D Printing Handbook: Technologies, design and applications*, 3D Hubs, 2017

Reference Books

1. **Chua, C. L., Lim, K., *Rapid Prototyping: Principles and Applications*, 3rd edition, World Scientific Publishing Co. Pte. Ltd., 2010**

Laboratory Work

6 to 8 laboratory exercises (and a mini project) based on the syllabus.

List of Experiments

1) To design an object using an open source software (Tinkercad).
2) To understand the working of slicing software (Repetier Host)
3) To examine the effect of layer thickness, infill density and orientation on build time and material consumption.
4) To generate code for designed object using Repetier host software for 3D printing.
5) To study the components of a Fused Deposition Modeling (FDM) 3D Printing machine.
6) To prepare FDM machine for printing the given object.
7) To print object using FDM machine.
8) To carry out post processing on the printed object.
9) To evaluate the effect of overhang angles on build quality of polylactic acid (PLA) and Acrylonitrile butadiene styrene (ABS) parts made using FDM.
10) To build parts of same geometry in PLA and ABS and compare the bending strength.
11) To create an object using lithophane technique.
12) Mini project.

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SVKM's Narsee Monjee Institute of Management Studies
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Program: B Tech Computer Science and Engineering (Data Science)				**Semester:** II	
Course: Electrical and Electronics Workshop				**Code:**702EX0C021	
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 ---)**
0	2	0	1	Marks Scaled to 50	--

Pre-requisite – Nil

Course Objective

This course gives the basic working knowledge required for the production of various engineering products. It is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the engineer working in the various engineering industries and workshops.

Course Outcomes

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

1. Identify correct testing instruments and tools for various tasks
2. Build PCB circuits using through hole and SMD components for small applications
3. Make use of required electrical components for building domestic wiring circuits
4. Assemble PC hardware and configure network topology

Detailed Syllabus

Unit	Description	Duration
1.	**Familiarization and application of testing instruments and commonly used measuring instruments and tools** Multimeter, Function generator, Power supply, Digital Storage Oscilloscope (DSO) etc. Soldering iron, De-soldering pump, Pliers, Cutters, Wire strippers, Tweezers, Crimping tool, Hot air soldering and de-soldering.	4
2.	**Printed circuit boards (PCB)** Types, Single sided, Double sided, PTH, Processing methods, schematics design using open source software and fabrication of a single sided PCB for a simple circuit with manual etching (Ferric chloride) and drilling. **Soldering and Joining Processes –** Introduction, Techniques and circuit assembly. Assembling of electronic circuits using SMT (Surface Mount Technology) components/stations.	8

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3.	**Study, demonstration and identification of common electrical materials such as wires, cables, switches, fuses and connectors** Wiring of fan, tube light, two-way control (staircase wiring), Earthing- Need, objectives and types – Plate, Pipe, Rod and maintenance free earthing. Understanding of electric shock, understand rating and working of Miniature Circuit Breakers (MCB), Electric Leakage Circuit Breaker (ELCB), Residual Current Circuit Breaker (RCCB) and Fuse.	8
4.	**Introduction to PC Hardware –** Assembly of I/O peripherals, memories and storage devices, Central Processing Unit (CPU), Graphic Processing Unit (GPU), and SMPS. LAN configuration using device (MAC) address, Switch/Hub configuration (4/8 port), router configuration using GSM. Study of ARDUINO boards (uno/mega), sensors – Temperature, Humidity, LDR, Smoke, Ultrasonic etc., Shields – Motor driver, wi-fi, IO, DC gear motors, Stepper motor.	10
	Total	**30**

Text Books

1. R.S. Khandpur, *Printed Circuit Boards: Design, Fabrication, assembly and testing*, 3rd ed. Tata McGraw Hill, , 2017.
2. Dan Gookin, *Troubleshooting and maintaining your PC*, 3rd ed., Wiley, 2017.
3. R.P. Singh, *Electrical Workshop: Safety, Commissioning, maintenance and testing of electrical equipment*, 3rd ed., IK International Publishing, 2012.

Reference Books

1. John H. Watt, Terrell Croft, *American Electricians' Handbook: A Reference Book for the Practical Electrical Man*, 9th ed., McGraw-Hill, 2018.

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Laboratory Work

6 to 8 laboratory exercises (and a practicum) based on the syllabus.

List of experiments:

1. To identify electronic components with specification (Functionality, type, size, color coding, package, symbol, cost etc). (wires, Cables, Connectors, Fuses, Switches, Relays, Heat sink etc.)
2. To understand and use measuring and testing instruments (Mutimeter, Function generator, Power supply, Digital Storage Oscilloscope)
3. To design PCB schematics using suitable software.
4. To fabricate single sided PCB for a simple electronic circuit.
5. To assemble and test an electronic circuit.
6. To study functioning of circuit breakers.
7. Experiment based on house hold wiring of appliances such as fan, tube light etc.
8. Dis-assemble and assemble of PC.
9. To configure LAN, switch and router for network topology.
10. To simulate and implement simple applications using ARDUINO.
11. Practicum

Signature (Head of the Department)	Signature (Dean)

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

Program: B Tech Computer Science and Engineering (Data Science)				**Semester:** II	
Course: Environmental Science				**Code:** 702CI0C014	
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- ---)**
1	0	1	2	Marks Scaled to 50	--

Pre-requisite: Fundamental Knowledge of physics, chemistry and mathematics

Course Objective

This course aims to understand the multidisciplinary nature of environmental sciences, greenhouse effect and climate change. It also aims to discuss the basics of natural resources, biodiversity, environmental pollution.

Course Outcomes

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

1. Explain the concept of natural resources, ecosystem and biodiversity
2. Relate the various aspects of environmental pollutions with its cause and effect
3. Explain the greenhouse effect and climate change

Detailed Syllabus

Unit	Description	Duration
1	**Multidisciplinary nature of environmental science** Definition, scope and importance of environmental sciences.	**01**
2	**Natural Resources** Natural resources: Forest resources, Water resources, Mineral resources, Food resources. Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.	**02**
3	**Ecosystems** Concept of an ecosystem. Structure and function of an ecosystem. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features of the following ecosystem:- a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems.	**02**
4	**Biodiversity** Definition: genetic, species and ecosystem diversity. Value of biodiversity: consumptive use, productive use. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.	**02**
5	**Environmental Pollution**	**04**

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	Definition, Cause and effects for Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards and Solid waste pollution.	
6	**The Science of Climate Change** Greenhouse effect, Global warming, Global environmental changes, Acid rain Ozone layer depletion, Carbon footprint	**04**
	Total	**15**

Text Books

1. Erach Bharucha, *Textbook of Environmental Studies*, 2nd Edition, University Press, 2019.

Reference Books

1. MP Poonia & SC Sharma, *Environmental Studies*, 1st Edition, Khanna Publishing House, 2017.
2. Rajagopalan, *Environmental Studies*, 3rd Edition, Oxford University Press, 2015.

Tutorial Work

8 to 10 Tutorial exercises based on the syllabus.

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

Program: B Tech Computer Science and Engineering (Data Science)				**Semester:** II	
Course: Linear Algebra and Differential Equations				**Code:** 702BS0C051	
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: Knowledge of fundamental concepts in Algebra, Differential and Integral Calculus.

Course Objective

This course aims to instil in prospective engineers knowledge of concepts and techniques in Linear Algebra and Differential Equations. It also prepares the students to deal with advanced level of Mathematics and applications that would be essential for their disciplines.

Course Outcomes

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

1. demonstrate understanding of the fundamental concepts of Linear Algebra and carry out related computational skills
2. use effective mathematical methods for solving Differential Equations
3. analyse functions, matrices and equations
4. apply Calculus techniques and Algebraic skills to solve real life problems

Detailed Syllabus

Unit	Description	Duration
1.	**Linear Equations and Vector Spaces** Rank of Matrix, System of linear equations, Vector space, Subspace of vector space, Linear span, Linear independence and dependence, Basis, Dimension.	10
2.	**Linear Transformation and Eigenvalues** Linear transformation, Matrix associated with linear transformation, Composition of linear maps, Kernel and Range of a linear map, Rank-Nullity Theorem, Inverse of a linear transformation, Cayley- Hamilton Theorem, Eigenvalues, Eigenvectors, Eigenvalues of symmetric, skew-symmetric, Hermitian and Skew-Hermitian matrices, Diagonalization, Orthogonal Diagonalization of a real symmetric matrix.	12

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3.	**First order Ordinary Differential Equations** Exact equations, Equations reducible to exact equations using integrating factors, Linear equations, Bernoulli equation, Orthogonal trajectories.	5
4.	**Higher order Ordinary Differential Equations** Higher order linear differential equations with constant coefficients, operator method, undetermined coefficients, Wronskian, variation of parameters method, Euler-Cauchy equation, power series solution: Example - Legendre and Bessel Differential Equations.	12
5.	**Partial Differential Equations** Introduction, Formation of Partial Differential Equations, Classification of second order Partial Differential Equations, Integrals of Partial Differential Equations, Solutions of Partial Differential Equations by the Method of Direct Integration, separation of variables method to simple problems in Cartesian coordinates, Initial & boundary value problems and solutions by separation of variables.	6
	Total	**45**

Text Books

1. B.V. Ramana, *Higher Engineering Mathematics*, 1st Edition , McGraw Hill Education, 2017.
2. B.S. Grewal, *Higher Engineering Mathematics*, 44th Edition, Khanna Publishers, 2017.
3. D. Poole, *Linear Algebra: A Modern Introduction*, 3rd Edition , Brooks/Cole, 2010.

Reference Books

1. G. B. Thomas, *Calculus*, Pearson, 13th Edition 2014.
2. Veerarajan T, *Engineering Mathematics- I*, 1st Edition, McGraw-Hill Education, 2016.
3. Erwin Kreyszig, *Advanced Engineering Mathematics*, 10th Edition ,Wiley India, 2017.
4. G. Strang, *Introduction to linear algebra*, 5th Edition, Wellesley Cambridge Press, 2016.
5. G. F. Simmons, *Differential equations with applications and historical notes*, 2nd Edition McGraw-Hill Education, 2017.
6. W. E. Boyce and R. C. DiPrima, *Elementary Differential Equations and Boundary Value Problems*, 9th Edition, ,Wiley India, 2015.
7. S.L. Ross, *Differential Equations*, 3rd Edition,Wiley India, 2016
8. H. K. Dass, *Advanced Engineering Mathematics*, 22nd Edition ,S. Chand, 2019.

Tutorial Work

8 to 10 Tutorial exercises based on the syllabus.

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Program: B Tech/ MBA Tech Data Science				**Semester:** III	
Course: Python for Data Analysis				**Code:** 702DB0C011	
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)**
0	4	0	2	Scaled to 50 marks	Scaled to 50 Marks

Pre-requisite: Programming for problem solving

Course Objective

The aim of the course is to provide students with the knowledge of Creating Data Science Pipeline, Preparing the data, performing exploratory data analysis and apply visualization techniques. It will also educate students on preprocessing various types of information from different sources within the integrated development environment.

Course Outcomes

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

1. Explain the role of python in data science
2. Apply the python libraries to execute, visualize and analyse data in python ecosystem
3. Analyze raw data and perform wrangling to improve data usability

Detailed Syllabus

Unit	Description	Duration
1	**Overview of Python** Basics of Python and its role in data science, data types, variables, expressions, objects and functions. Python data structures including String, Array, List, Tuple, Set, Dictionary and operations them.	07
2	**Working with Real Data** Accessing Data in Structured Flat-File Form ,Reading from a text file Reading CSV delimited format, Reading Excel and other Microsoft Office files, Sending Data in Unstructured File Form, Managing Data from Relational Databases, Interacting with Data from NoSQL Databases, Accessing Data from the Web.	09
3	**NumPy Basics** Arrays and Vectorized Computation Multidimensional Array Object, Operations between Arrays and Scalars, Basic Indexing and Slicing, Data Processing Using Arrays	07

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4	**Introduction to Pandas** Essential functionality, arithmetic and data alignment, function application and mapping, Handling Missing Data, Filtering Out Missing Data, Filling in Missing Data, Other pandas Topics	10
5	**Data Loading, Storage, and File Formats** Reading and Writing Data in Text Format, reading Text Files in Pieces, Writing Data Out to Text Format, JSON data, interacting with HTML and Web APIs	07
6	**Data Visualization** Introduction to Matplotlib, Plotting Functions in pandas, Plotting Maps, Python Visualization Tool Ecosystem	03
7	**Data wrangling** Combining and merging data set, Reshaping and pivoting, Group wise operation and data Transformation, Sting Manipulation	06
8	**Time Series** Date and Time Data Types and Tools, Converting between string and datetime, Indexing, Selection, Subsetting, Date Ranges, Frequencies, and Shifting, Period Frequency Conversion, Time Series Plotting	07
9	**Financial and Economic Data Application**	04
	Total	**60**

Text Books

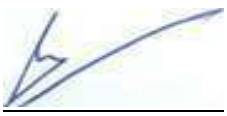
1. Daniel Y. Chen, *Pandas for Everyone: Python Data Analysis*, 1st edition, Pearson Education, 2018
2. Wes Mckinney, *Python for Data Analysis*, 2nd edition, O'Reilly, 2017

Reference Books

1. John Paul Mueller, *Python for Data Science for Dummies*, 1st edition, Wiley, 2015
2. Alex Galea, *Applied Data Science with Python and Jupyter*,1st edition, Packt, 2018

Laboratory/ Tutorial Work

8 to 10 programming exercises (and a practicum) based on the syllabus



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Program:	B Tech (Computer Science)			**Semester:** III	
Course:	Digital Circuits and Computer Architecture			**Code:**	
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 in Question Paper)**
3	2	0	4	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Basic knowledge of Electronics Engineering

Objective:
The objectives of offering this course are to provide a brief overview of Boolean Algebra, Combinational Logic, and Sequential Logic; to understanding the fundamental structure and functions of a computer, including the arithmetic and logic units, as well as the implementation of fixed-point and floating-point arithmetic and finally to learn the different ways of communication with I/O devices.

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

1. Understand number systems and Boolean algebra concepts in Digital Systems.
2. Apply concepts of Combinational and Sequential logic for designing Circuits.
3. Understand the fundamental structure and functioning of a computer, as well as arithmetic operations, and Central Processing Unit.
4. Understand the memory organization and working of I/O

Detailed Syllabus:

Unit	Description	Duration
1.	**Boolean Algebra:** Binary logic functions, Boolean Laws, Truth tables, Associative and distributive properties, De-Morgan's Theorems.	3
2.	**Combinational Logic and Circuits:** Switching equations, Canonical logic forms, Sum of product & Product of sums, Karnaugh maps, Simplification of expressions,Code conversion Design : Decoder, Encoder, Priority encoder, Multiplexers as function generators, Binary Full Adder, Subtractor, BCD adder	7
3.	**Sequential Logic and Circuits:** Flip Flops: Clocked and edge triggered flip-flops, SR Flip-Flop, D Flip-Flop, JK Flip-Flop, T Flip-Flop Registers: Serial input -serial output; serial input-parallel output; Parallel In - Parallel Out, Serial In -Serial Out. Design of Asynchronous and Synchronous Counters, Modulo Counters, UP-DOWN counter.	8
4.	**Basic Structure of a Computer System** Functional Units, Basic Operational Concepts, Performance Instructions: Language of the Computer, Operations, Operands Instruction representation, Logical operations, decision making, MIPS Addressing.	3
5.	**Arithmetic for Computers** Addition and Subtraction, Multiplication Division, Booth Multiplication, Floating Point Representation, Floating Point Operations	3
6.	**Central Processing Unit** Major Components of CPU, Instruction Formats, Addressing Modes, Data Transfer and manipulation, Program Control, Subroutine Call and Return,	6

Seema Shah

	RISC vs CISC, Pros and Cons of RISC and CISC.	
7.	**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. Semiconductor main memory- Advanced DRAM organizations, Chip logic, Memory module organization. High speed memories- Associative memory, High speed memories- Interleaved memory.	10
8.	**Input and Output Unit**: Input and output- External Devices, Keyboard, Monitor, Disk drive and device driver. I/O modules- Programmed I/O, I/O modules-Interrupt Driven I/O, DMA. I/O modules- I/O channels and I/O processors, Serial transmission and synchronization.	5
	Total	**45**

Text Books:

1. M. Morris Mano, "Digital Design with an Introduction to Verilog HDL", PHI, 5th Edition 2013.
2. William Stallings, "Computer Organization and Architecture: Designing for Performance", Pearson Education, 10th Edition 2019.

Reference books

1. R P Jain, "Modern Digital Electronics", McGraw Hill Education, 4th Edition, 2013.
2. B. Holdsworth," Digital Logic Design" Elsevier Science ,2nd Edition 2014.
3. Andrew Tannenbaum, Todd Austin, "Structured Computer Organization", 6th Edition, Prentice-Hall,2013.
4. David Harris Sarah Harris, "Digital Design and Computer Architecture", Second Edition, Elsevier Science, 2012.
5. V. Carl Hamacher and Zaky, "Computer Organization",5th Edition, Tata Mc-Graw Hill, 2011.

Any other information:
Total Marks of Internal Continuous Assessment (ICA): 50 Marks
Distribution of ICA Marks:

Description of ICA	Marks
Test	**20**
Term Work	**30**
Total	**50**

Details of Term Work:
Term work should consist of the following

1. At least ten laboratory experiments based on the entire syllabus duly recorded and graded.
2. Presentation/Application based experiment and Quiz/Practical exam/Viva/Any other mode of evaluation.

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Signature
(Approved by Dean)

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

Program : B Tech /MBA Tech				**Semester :** III/IV/V/VI	
Course : Principles of Economics and Management				**Code:** 702TG0C001	
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	---	---	3	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: NIL

Course Objective

This course provides basic orientation towards economic (micro and macroeconomics) principles and help them understand the functions of management. This course also aims to understand issues dealing with small-scale economic phenomena and concepts such as prices and output of firms, industries and resource owners along with examining market impact of technological change with regards to understand broader aspects of the economy and its environment.

Course Outcomes

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

1. Illustrate basic concepts of economics (demand, supply, elasticity, scarcity) and explain behaviour on individual, households and firm and Handle economic data and write economic report,
2. Analyse and evaluate the impact of Economic Policies and its implication on the Business Environment,
3. Demonstrate and determine the students towards basic management principles and act as foundation for higher levels of learning and to be able to handle basic functions of management (planning, organizing, coordination, and control).

Detailed Syllabus

Unit	**Description**	**Duration**
1	**Introduction** Definition of Economics, Types of Economic Systems, Problem of Scarcity of Economic Resources. **Demand and Supply** Demand Curve and Supply Curve, Equilibrium of Demand and Supply, Shift in Demand and Supply. **Application of Demand and Supply** Price Elasticity of Demand, Price Elasticity of Supply, Factors which influence Elasticity, Elasticity and Revenue.	6

2	**Market Structure /Industry Analysis Types of Competition** Monopoly, Oligopoly, Monopolistic Competition, Perfect and Imperfect Competition, Government Policies towards Industries. Circular Flow of Economy, Structures, Role of Government, Business Cycles. **Macroeconomics** National Income – Gross Domestic Product (GDP), Gross National Product (GNP), Inflation – Cost Push and Demand Pull Inflation, Unemployment, Philips Curve.	6
3	**Functions of Central Bank, Money supply, RBI & Monetary Policy. (Current Credit Policy to be critiqued) Stabilization Policy** Role of Fiscal Policy. Demand and Consumer Behavior: Utility and Marginal Utility. New Economic Policy: Liberalization, Privatization and Globalization	6
4	**Theory of Production** Law of Diminishing Returns, Returns to Scale, Productivity. Analysis of Costs: Types of Costs – Total Cost, Fixed Cost, Variable Cost, Marginal Cost, Impact of Marginal Cost on Average Cost.	6
5	**Introduction to Management** Management & Organizations, Management History. Understanding Management Thought, Contribution of F.W. Taylor, Henry Fayol, Elton – Mayo Contexts- Constraints & Challenges. Planning: Managers as Decision Makers, Foundations of Planning, Strategic Management.	9
6	**Organizing** Line and Staff Relationships, Centralization and Decentralization, Role of Delegation, Managing Human Resources, Managing Teams. Leading and Motivation: Basic Concepts and Practices –Maslow's, Herzberg, McClelland 's Theory of Achievement.	6
7	**Controlling** Introduction to Controlling Inventory, Quality Control. Orientation towards Finance, Marketing, Human Resources and Operation Departments.	6
	Total	**45**

Text Books

1. Samuelson and Nordhaus, *Economics Special Indian Edition*, 20th edition Tata McGraw Hill Publication, 2020
2. Mishra and Puri, *Indian Economy*, 36th Revised Updated Edition, Himalaya Publishing House, 2018

3. Koontz. H. and Weihrich H., *Essentials of Management: An International, Innovation and Leadership Perspective,* 10th reprint Edition, McGraw Hill Education (India), 2018
4. Deviga V. and Karunagaran M., *Principles of Economics*, 3rd Edition, Oxford University Press, 2013

Reference Books

1. Mankiw Gregory, *Economics: Principles and applications*, Cengage Learning, 2011
2. Robbins et al., *Management*, 14th Edition, Pearson India, 2019

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Signature (Head of the Department)

Signature (Dean)