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. (All Program)				**Semester :** I	
Course/Module : Calculus				**Module Code:** 702BS0C001	
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	0	1	4	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite

Knowledge of vector algebra, functions, limits, differentiation and integration of functions**.**

Course Objectives

The course will help the students to achieve a better and more rigourous understanding of the calculus of one and several variables. It will help the students to recognize the problem type, select an appropriate technique and apply rules and procedures of Differential and Integral calculus for solving the problem. This course will equip the students with intermediate to advanced level concepts and aligned tools to help them tackle advanced mathematics and related applications.

Course Outcomes

After completion of the course, students would be able to

1. implement appropriate techniques of Differential and Integral Calculus to solve problems, analyse functions using the techniques of calculus,
2. apply the knowledge of Differential and Integral Calculus to solve real life problems.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**Differential Calculus of functions of one variable** Rolle's theorem, Lagrange's Mean value theorem, Cauchy's Mean value theorem, Convergence of Sequences and series, Taylor's and Maclaurin's Series Expansion, Indeterminate forms, L'Hospital's rule.	9
2.	**Partial Differentiation** Functions of several variables: Limits and continuity, Partial differentiation, Taylor's theorem of function of two variables, Maxima, Minima, Lagrange's Method of Undetermined Multiplier.	9
3.	**Integral Calculus of functions of one variable**	8

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

Signature
(Prepared by Concerned Faculty/HOD)

	Volume of solid of revolution, Area of the surface of a solid of revolution, Improper Integrals, Special functions: Beta and Gamma functions.	
4.	**Multiple Integrals** Double Integral, Change of order of Integration, Change of variables, Jacobian, Application of Double Integral to find area, Triple Integral, Change of variable to spherical and cylindrical co-ordinates, Application of Triple Integral to find volume.	10
5.	**Vector Calculus** Gradient, Directional Derivative, Divergence, Curl, Scalar Potential, Harmonic function, Line Integral, Surface Integral, Greens Theorem, Stokes Theorem and Gauss Divergence Theorem.	9
	Total	**45**

Text Books

1. B.V. Ramana, "Higher Engineering Mathematics", McGraw Hill Education, 1st Edition 2017.
2. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 44th Edition 2017.

Reference Books

1. G. B. Thomas, "Calculus", Pearson, 14th Edition 2018.
2. Veerarajan T, "Engineering Mathematics- I", McGraw-Hill Education, 1st Edition 2017.
3. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India, 10th Edition 2017.
4. T. M. Apostol, "Calculus", Volume – I, Wiley Eastern, 2nd Edition 2007.
5. H. K. Dass, "Advanced Engineering Mathematics", S. Chand, 22nd Edition 2019.

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

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

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

Signature
(Prepared by Concerned Faculty/HOD)

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. (All Program)				**Semester:** I	
Course/Module: Physics				**Module 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 in Question Paper)**
3	2	0	4	Marks Scaled to 50	Marks Scaled to 50

Course Objectives

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 would 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: (per session plan)

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. Diffraction: Fraunhofer and Fresnel diffraction, Fraunhofer diffraction at single slit, double slit, and multiple slits, Characteristics of diffraction grating and its applications.	9

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

Signature
(Prepared by Concerned Faculty/HOD)

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", Tata McGraw Hill, 2nd Edition 2017.

Reference Books

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

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

Signature
(Prepared by Concerned Faculty/HOD)

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

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

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (All Program except Civil, CSBS, CSDS) / MBA Tech. (All Program)				**Semester:** I / II	
Course/Module: Elements of Biology				**Module Code:** 702BS0C049	
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	0	0	3	Marks Scaled to 50	Marks Scaled to 50

Course Objectives

The principal objective of this course is to provide a basic understanding of biological mechanisms of living organisms from the perspective of engineers. To encourage engineering students to think about solving biological problems with engineering tools. To make them aware of the application of engineering principles in biology and engineering robust solutions inspired by biological examples.

Course Outcomes

After successful completion of the course, student would be able to

1. convey that all forms of life have the same building blocks and yet the manifestations are diverse,
2. identify and classify microorganisms while understanding molecular basis of DNA as a genetic material for information transfer,
3. classify enzymes and distinguish between different mechanisms of enzyme action.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**Introduction** Convey that Biology is as important a scientific discipline as Mathematics, Physics and Chemistry Bring out the fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Mention the most exciting aspect of biology as an independent scientific discipline. Why we need to study biology? Discuss how biological observations of 18th Century that lead to major discoveries. Examples from - Brownian motion and the origin of thermodynamics by referring to the original observation of Robert Brown and Julius Mayor. These examples will highlight the fundamental importance of observations in any scientific inquiry.	3

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

Signature
(Prepared by Concerned Faculty/HOD)

2.	**Classification** Convey that classification per se is not what biology is all about. The underlying criterion, such as morphological, biochemical or ecological be highlighted. Hierarchy of life forms at phenomenological level. A common thread weaves this hierarchy Classification.Discuss classification based on (a) cellularity-Unicellular or multicellular (b) ultrastructure- prokaryotes or eucaryotes. (c) energy and Carbon utilization -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion - aminotelic, uricoteliec, ureotelic (e) Habitata- acquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. A given organism can come under different category based on classification. Model organisms for the study of biology come from different groups. E.coli, S.cerevisiae, D. Melanogaster, C. elegance, A. Thaliana, M. musculus	6
3.	**Genetics** Convey that "Genetics is to biology what Newton's laws are to Physical Sciences" Mendel's laws, Concept of segregation and independent assortment. Concept of allele. Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis be taught as a part of genetics. Emphasis to be give not to the mechanics of cell division nor the phases but how genetic material passes from parent to offspring. Concepts of recessiveness and dominance. Concept of mapping of phenotype to genes. Discuss about the single gene disorders in humans. Discuss the concept of complementation using human genetics.	6
4.	**Biomolecules** Convey that all forms of life has the same building blocks and yet the manifestations are as diverse as one can imagine Molecules of life. In this context discuss monomeric units and polymeric structures. Discuss about sugars, starch and cellulose. Amino acids and proteins. Nucleotides and DNA/RNA. Two carbon units and lipids.	5
5.	**Enzymes** Convey that without catalysis life would not have existed on earth Enzymology: How to monitor enzyme catalyzed reactions. How does an enzyme catalyze reactions. Enzyme classification. Mechanism of enzyme action. Discuss at least two examples. Enzyme kinetics and kinetic- parameters. Why should we know these parameters to understand biology? RNA catalysis.	5

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

Signature
(Prepared by Concerned Faculty/HOD)

6.	**Information Transfer** The molecular basis of coding and decoding genetic information is universal Molecular basis of information transfer. DNA as a genetic material. Hierarchy of DNA structure- from single stranded to double helix to nucleosomes. Concept of genetic code. Universality and degeneracy of genetic code. Define gene in terms of complementation and recombination.	6
7.	**Macromolecular analysis** How to analyses biological processes at the reductionistic level Proteins-structure and function. Hierarch in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.	5
8.	**Metabolism** The fundamental principles of energy transactions are the same in physical and biological world. Thermodynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergonic reactions. Concept of Keq and its relation to standard free energy. Spontaneity. ATP as an energy currency. This should include the breakdown of glucose to CO2 + H2O (Glycolysis and Krebs cycle) and synthesis of glucose from CO2 and H2O (Photosynthesis). Energy yielding and energy consuming reactions. Concept of Energy Charge.	5
9.	**Microbiology** Concept of single celled organisms. Concept of species and strains. Identification and classification of microorganisms. Microscopy. Ecological aspects of single celled organisms. Sterilization and media compositions. Growth kinetics.	4
	Total	**45**

Text Books

1. Arthur T. Johnson, "Biology For Engineers" CRC Press Taylor & Francis group, 2nd edition 2018.
2. Prescott, L.M J.P. Harley and C.A. Klein, "Microbiology", McGraw-Hill Higher Education. 7th edition 2008.

Reference Books

1. Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B., "Biology: A global approach", Pearson Education Ltd. 10th edition 2014.
2. Nelson, D. L.; Lehninger, A. L.; and Cox, M. M., Principles of Biochemistry, W.H. Freeman, 8th edition 2020.

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

Signature
(Prepared by Concerned Faculty/HOD)

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

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

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (All Program except CSBS, CSDS) / MBA Tech. (All Program)				**Semester:** I / II	
Module/ Course : Programming for Problem Solving				**Code**: 702CO0C001	
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)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Nil

Course Objectives

Enable students to understand problem statements and solve those using basic programming constructs. Develop skills to analyze real life problem statements and implement using Object Oriented Programming.

Course Outcomes

After successful completion of this course, students would be able to

1. comprehend problem statements, build logic and draw flowchart,
2. develop complex logic using control structures,
3. implement programs using arrays, function and pointers,
4. solve real life problems using Object Oriented paradigm.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**Introduction to problem solving skills,** flowcharts, algorithms, basic program structure of C++, I/O statements, data types, variables, operators, expressions, pre-processor directives.	4
2.	**Control structures:** Conditional branching, looping, nested looping, recursion.	8
3.	**Programming constructs** 1 – D and 2 - D arrays, strings.	4
4.	**Modular Programming:** functions, parameter passing, inline function, macro functions.	4

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

Signature
(Prepared by Concerned Faculty/HOD)

5.	**Programming** using structures and pointers	3
6.	**Introduction to Object Oriented programming:** necessity for OOP, data hiding, data abstraction and encapsulation. Classes and Objects.	2
7.	**Programming** using constructors, polymorphism and inheritance.	5
	Total	**30**

Text Books

1. Bjarne Stroustrup, "The C++ Programming Language", Addison Wesley, 4th Edition 2013.

Reference Books

1. Bjarne Stroustrup, "Programming – Principles and Practice Using C++", Addison Wesley, 2nd Edition 2014.
2. KR Venugopal, Rajkumar, "Mastering C++", Tata McGraw-Hill, Paperback Edition, 2013.

Any other information

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

Distribution of ICA Marks

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

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

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (All Program except CSBS, CSDS) / MBA Tech. (All Program)				**Semester:** I / II	
Course/Module: Engineering Graphics and Design				**Module Code**: 702ME0C001	
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-50 in Question Paper)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Nil

Course Objectives

This course is aimed at providing basic understanding of the fundamentals of Engineering Graphics; mainly visualization, graphics theory, standards & conventions of drawing, the tools of drawing and the use of drawings in engineering applications. The course has been structured to include sufficient simulations which would aid the student in visualization of three-dimensional objects and developing the drawing.

Course Outcomes

After completion of the course, students would be able to

1. interpret and communicate drawings effectively using different types of curves, lines, planes,
2. analyze the concepts of projections and section of right regular solids with their development,
3. apply the techniques, skills, and modern tools to create projections of machine components with the help of software.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**Introduction to Engineering Drawing** Principles of engineering graphics and their significance, usage of drawing instruments, lettering, numbering; Conic sections (ellipse, parabola, hyperbola - general method only) including the rectangular hyperbola; cycloid, epi-cycloid, hypo-cycloid	4

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

Signature
(Prepared by Concerned Faculty/HOD)

	and involutes.	
2.	**Projections of Lines and Planes** Introduction to projections of points, conventions; points locating in all quadrants. **Projections of lines**: Introduction, lines inclined to one plane and parallel to other plane, lines inclined to both planes. **Projections of planes**: Introduction, types of planes, plane surface inclined to both reference planes, projection of auxiliary planes	5
3.	**Projections of Regular Solids** Introduction to projection of regular solids, types of solids; Projections of regular solids (prisms, pyramids, cylinders, cones) covering those inclined to both the reference planes	5
4.	**Section and Development of Regular Solids** Introduction to section and development of regular solids; Section of regular prisms, pyramids, cylinders, cones; Development of surfaces of right regular solids namely prisms, pyramids, cylinders and cones.	4
5.	**Orthographic Projections** Principles of orthographic projections, conventions used in quadrant formation, conversion of isometric models to orthographic views and vice-versa, orthographic views of geometrical solids and objects from industry.	4
6.	**Sectional Orthographic Projections** Principles of sectional orthographic projection, need of sectional views, types of sections, hatching of sectioned part and principles, sectional orthographic views of geometrical solids and objects from industry.	4
7.	**Isometric Projections** Principles of isometric projection-Isometric scale, isometric views, conventions; isometric views of lines, planes, simple and compound solids; conversion of orthographic views to isometric models to and vice-versa; isometrics projections of given views	4
	Total	**30**

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

Signature
(Prepared by Concerned Faculty/HOD)

Text Books

1. N. D. Bhatt, V. M. Panchal and P. R. Ingle, "Engineering Drawing", *Charotar Publishing House*, 53rd edition 2014.

Reference books

1. M. B. Shah and B. C. Rana, "Engineering Drawing", Pearson Education, 2nd edition 2014.
2. K. Venugopal and V. Prabhu Raja, "Engineering Drawing + AutoCAD", New Age International (P) Ltd. Publishers, 6th edition 2011.

Any other information: http://nptel.ac.in/courses/112103019/

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

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

Details of Term Work

Term work should consist of the following -

1. Minimum 4 drawing exercises/ assignment exercises (manual drawing based) covering contents from unit 1 to unit 4.
2. Minimum 6 drawing exercises/ assignment exercises covering contents from unit 5 to unit 7 by using suitable drafting software (AutoCAD).
3. Laboratory examination/quiz based on AutoCAD practical exercises.

Note: Term End Examinations (TEE) will be conducted on AutoCAD software.

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

Signature
(Prepared by Concerned Faculty/HOD)

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. (All Program)				**Semester:** I / II	
Course/Module: Professional Ethics				**Module Code:** 702BS0C005	
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)**
1	0	0	1	Scaled to Marks 50	---

Course Objectives

1. To inculcate human values to grow as a responsible human being
2. To maintain ethical conduct in discharging professional duties

Course Outcomes

After completion of the course, students would be able to

1. understand the engineering code of ethics and be able to apply them as necessary,
2. understand moral complexities in many engineering activities and decision-making processes,
3. understand some of the contemporary issues in the engineering professions,
4. effectively communicate their knowledge and understanding of engineering ethics.

Detailed Syllabus

Unit	Description	Duration
1.	**Introduction to Ethics-** • Concept of morals and ethics, • Study of engineering ethics; • Laws and ethics; • Personal and professional ethics.	2
2.	**Professional Practice in Engineering-** • Common morality ASME code of ethics, • Technical codes and standards, • Accepted standards of Engineering practice and the standard of care.	2
3.	**Ethics as design-doing justice to moral Problem-** • Discuss about ethics as a design to solve moral problems • Comparison between moral problems and engineering design problems; • Moral lessons from design problems; • Implications of the dynamic character of problem situations.	2
4.	**Rights and Responsibilities of Engineers-**	4

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

Signature
(Prepared by Concerned Faculty/HOD)

	• Moral responsibilities; • Conflicts of interests; • Confidentiality, • Engineers, organizations and ethics, • Engineer-manager relationships; • loyalty; • The concept of whistleblowing.	
5.	**Responsibility for the Environment-** • Rapid Technological growth and depletion of resources, • Reports of the Club of Rome. • Limits of growth: sustainable development • Energy Crisis: Renewable Energy Resources • Environmental degradation and pollution. • Eco-friendly Technologies. • Environmental Regulations, • Environmental Ethics • Appropriate Technology, • Movement of Schumacher; later developments of Technology and developing notions. • Problems of Technology transfer, • Technology assessment impact analysis. • Problems of man, machine, interaction, • Impact of assembly line and automation. • Human centered Technology	5
	Total	**15**

Text Books

1. M.W. Martin and R. Schinzinger, "Ethics in Engineering", McGraw-Hill, 2nd Edition, 2005.
2. Charles B. Fleddermann, "Engineering Ethics", Pearson, 3rd Edition, 2007.
3. P.A. Vesilind and A. S Gunn, "Engineering Ethics and Environment", Cambridge University Press, 1st Edition, 1998.

Reference Books

1. Caroline Whitbeck, "Ethics in Engineering – Practice and Research", Cambridge University Press, 2nd Edition, 2011.

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

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

Signature
(Prepared by Concerned Faculty/HOD)

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

Details of Term Work (any of the following)

1. Case studies
2. Review of Research papers
3. Presentations
4. Assignments

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (All Program except CSBS, CSDS) / MBA Tech. (All Program)				**Semester:** I / II	
Course/Module : Constitution of India				**Module Code :** 702BS0C006	
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)**
1	0	0	0	Marks Scaled to 50	__

Course Objectives

The course would enable students to get a brief introduction of the Indian Constitution and its principles. The students would have knowledge of concept of 'State' and interdependencies of its institutions vis a vis their relation with fundamental rights.

Course Outcomes

After completion of the course, students would be able to

1. understand the historic evolution of the Indian Constitution, its drafting, nature and to understand the principles mentioned in its Preamble,
2. inculcate fundamental rights in its true sense and also the permissible restrictions upon it so as to enjoy these rights within permissible limits while simultaneously performing their duties and to apply these principles into their professional lives,
3. ingrain the structure of our polity and role of Judiciary in maintaining the basic structure of the Constitution,
4. attain knowledge of the Emergency provisions, when and how it is imposed, to know the additional powers the bestowed upon the Government at times of Emergency and to understand the Amendment procedure.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	Nature, Characteristics and Sources of Indian Constitution	2
2.	Fundamental rights and Fundamental duties – Concept of State, Right to Equality under Articles 14 and 15, Right to certain freedoms under Article 19, Right to Life and liberty under Article 21, Right to religion under Article 25 and 26, Right to remedy under Article 32 and Fundamental duties	6
3.	Indian Judiciary – Concept of Supreme Court and High Courts, Appointment of Judges, Independence of Judiciary, Jurisdictions of Supreme Court and High Courts	3

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

Signature
(Prepared by Concerned Faculty/HOD)

4.	Emergency Provisions – Concept of National Emergency under Article 352, Financial Emergency under Article 360 and President rule under Article 356 of the Constitution	4
	Total	**15**

Text Books

1. Dr. Durga Das Basu, "Introduction to the Constitution of India" Lexis Nexis, 24th Edition 2019.

Reference Books

1. P. M. Bakshi, "The Constitution of India" Universal Law Publishing, 17th Edition 2020.
2. J. N. Pandey, "Constitutional Law of India" Central Law Agency, 57th Edition 2020.
3. N. A. Palkhivala, "We the people" UBS Publishers Distributors, 1999.

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

Description of ICA	**Marks**
Class Test	NA
Term Work	50
Total Marks	**50**

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

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (All Program except CSBS, CSDS) / MBA Tech. (All Program)				**Semester:** I / II	
Course/Module: Critical Thinking				**Module 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 in Question Paper)**
2	0	0	0	Marks Scaled to 50	---

Course Objective

1. 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 would 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: (per session plan)

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,	10

Signature
(Prepared by Concerned Faculty/HOD)

	Inductive inferences, Deductive v/s Inductive, Formal fallacies, Informal fallacies.	
	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

Any other information

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

Distribution of ICA Marks

Description of ICA	**Marks**
Class Test	NA
Term Work	50
Total Marks	**50**

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

Signature
(Prepared by Concerned Faculty/HOD)

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. (All Program)	**Semester:** I / II
Module/Course: Basic Electrical and Electronics Engineering	**Module Code :** 702EX0C001

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)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: NIL

Course Objectives

The main objective of this course is to equip the students with the ability to solve, assemble and test simple AC and DC electrical circuits. Further, the course also enables the student to obtain a basic understanding of the working principle and applications of electronics devices.

Course Outcomes

After completion of the course, students would be able to

1. interpret DC circuits, theorems and time domain analysis of first order RL circuit,
2. solve series and parallel AC circuits and compare star/delta configurations,
3. explain the principles of transformer and electrical machines,
4. understand the construction, working principle and applications of electronics devices and logic circuits.

Detailed Syllabus: (per session plan)

Unit	**Description**	**Duration**
1.	**DC Circuits** Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff's current law, Kirchhoff's voltage laws, Analysis of simple circuits with dc excitation, Superposition Theorem, Thevenin's Theorems, Norton's Theorems. Time-domain analysis of first-order RL circuits.	6
2.	**AC Circuits** Generation of alternating emf, instantaneous, rms, peak, average values and related other terms, vector representation of AC quantities, Steady state analysis	8

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

Signature
(Prepared by Concerned Faculty/HOD)

	of R, L, C series and parallel circuits, resonance. Generation of three-phase emf, star connection, delta connection, relationship between line and phase quantities.	
3.	**Transformers and Electrical Machines** Construction and working of single-phase transformer Ideal and practical transformer, equivalent circuit, Losses in transformers, Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Single-phase induction motor, construction and working, DC motor construction, working and types.	6
4.	**Analog Electronics (**no mathematical treatment and design) Half and full wave rectifiers, special purpose diodes -zener regulator, BJT and its applications, amplifier, oscillator, overview of opto-electronics devices, opto-couplers, concepts of transducer, Operational amplifier (IC-741), Inverting and Non-Inverting, Comparator, Timer (IC-555) and multivibrators.	5
5.	**Digital Electronics** Logic gates, concept of universal logic; implementation of Boolean expressions using logic gates, application of digital circuits: e.g., adder, subtractor, multiplexer, de-multiplexer, Analog to Digital Converter, Digital to Analog Converter.	5
	Total	**30**

Text Books

1. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill Education,1st Edition 2017.
2. E. Hughes, "Electrical and Electronics Technology", Pearson Education, 10th Edition 2013.
3. Boylstad R.L., Nashelsky L., "Electronic Devices and Circuit Theory", Pearson, 12th Edition, 2012.
4. M. Morris Mano, "Digital Logic and Computer Design", Prentice Hall India, 10th Edition 2008.

Reference Books

1. V. D. Toro, "Electrical Engineering Fundamentals", Pearson Education India, 2nd Edition 2015.
2. Jacob Millman & Halkias, "Electronic Devices & Circuits", Tata McGraw Hill, 2nd edition, 2013.

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

Signature
(Prepared by Concerned Faculty/HOD)

Any other information

Total Marks of Internal Continuous Assessment (ICA): -- 50 Marks

Distribution of ICA Marks

Description of ICA	**Marks**
Class Test	20
Term Work	30
Total Marks	**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.

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

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (All Program except CSBS, CSDS) / MBA Tech. (All Program)				**Semester:** I / II	
Course/Module: English Communication				**Module Code:** 702BS0C010	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credits**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks- 100 in Question Paper)**
1	2	1	3	Marks Scaled to 50	Marks Scaled to 50

Course Objectives

The objective of the course is to develop students' competency in the English language in relation to Listening, Speaking, Reading and Writing (LSRW) and also enable them to develop the basic functional communication abilities requisite for workplace environments.

Course Outcomes

After successful completion of this course, students would be able to

1. develop their total language capacity,
2. appraise their knowledge regarding the basic conventions of writing in English,
3. defend, argue, judge and support effective arguments in varied contexts,
4. critique, weigh and use workplace communication related literacies.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**Vocabulary Building and developing basic writing skills** • The concept of Word Formation • Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives. • Synonyms, antonyms and standard abbreviations • Sentence Structure • Importance of proper punctuation • Organizing principles of paragraphs in documents	2
2.	**Identifying Common Errors in Writing** • Subject-verb agreement • Noun-pronoun agreement • Misplaced modifiers • Articles • Prepositions	3

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

Signature
(Prepared by Concerned Faculty/HOD)

	• Redundancies • Clichés	
3.	**Nature and Style of sensible Writing Practices** • Comprehension • Précis Writing • Essay Writing • Email Writing • Abstract writing	3
4.	**Technical Writing** • Report Writing (Term Projects) • Project Presentations • Poster Presentations	3
5.	**Oral Communication** • Communication at Workplace • Elevator pitch • Group Discussions • Interviews (Resumes and cover letter)	4
	Total	**15**

Text Book

1. Mark Lester and Larry Beason, "The McGraw Hill Handbook of English Grammar and Usage", McGraw Hill Education, 2017.
2. Hory Sankar Mukherjee, ''Business Communication: Connecting at work'', Oxford University Press, 2nd edition 2016.

Reference Books

1. Dr Meenakshi Raman and Dr Sangeeta Sharma, "Technical Communication'', Oxford University Press, 2nd edition 2015.
2. Bovee Courtland and John Thill, "Business Communication Today'', Pearson Education, 14th edition 2017.
3. John Seely, "Oxford Guide to Effective Writing and Speaking'', Oxford University Press, 3rd edition 2013.
4. Michael Swan, ''Practical English Usage'', OUP, 4th edition 1995.
5. F.T. Wood, "Remedial English Grammar'', Macmillan. 2007
6. William Zinsser, "On Writing Well'', Harper Resource Book, 30th edition 2001.
7. Liz Hamp-Lyons and Ben Heasly, "Study Writing'', Cambridge University Press. 2006.

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

Signature
(Prepared by Concerned Faculty/HOD)

8. Sanjay Kumar and Pushplata, ''Communication Skills'', Oxford University Press. 2011.
9. Norman Lewis, ''Word Power Made Easy'', Goyal Publisher, Reprint Edition 2011.

Suggested Reading

1. Arvind Krishna Mehrotra, "A Concise history of Indian Writing in English'', Permanent Black
2. The Old Man and the Sea, Ernest Hemingway.
3. Pygmalion, George Bernard Shaw.

Other sources of references

1. Selected TED talks
2. Episodes of Yes Minister
3. Episodes of Sherlock

Any other information

This subject will be covered in 15 hours of Theory, 30 hours of Practical and 15 hours of Tutorial

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

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

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

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (All Program except CSBS, CSDS) / MBA Tech. (All Program)				**Semester:** I / II	
Course/Module: Design Thinking				**Module Code:** 702BS0C011	
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)**
2	0	0	0	Marks Scaled to 50	---

Course Objectives

1. Understand the concepts of Design Thinking and Innovation
2. Understand the various phases of Design Thinking
3. Apply the phases of Design Thinking to take an idea to launch

Course Outcomes

After completion of the course, students would be able to

1. develop a human-centric approach towards problem solving,
2. apply design thinking principles to come up with innovative solutions to problems and challenges.

Detailed Syllabus: (per session plan)

Unit	Descriptions	Duration
1.	Introduction to Design Thinking -Design Thinking as 'Experience Innovation' - Concepts of Customer Desirability, Technological Feasibility, Business Viability and their significance	2
2.	Case Study: Discussion on HBR article Design Thinking by Tim Brown (Pre-Read based analysis of all four case studies covered in article)	2
3.	Mindset Creation - Growth Mindset vs. Fixed Mindset - Essential elements of Design Thinking Mindset - Case Study: Jeff Bezos-Amazon's approach of being Customer Obsessed	2
4.	- Pillars of Design Thinking - Introduction to Stages of Design Thinking based on Stanford d. School	2

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

Signature
(Prepared by Concerned Faculty/HOD)

5.	Case Study for Application of Design Thinking IDEO Shopping Cart (Case Video followed by debrief/class discussion)	2
6.	Empathy [A] -Introduction to empathy -Decoding Customer Behaviour using DT (using case study method)	2
7.	Empathy [B] -Tools:Understanding Consumer's Unmet Needs & Pain Points: (Observation, Focused Interviews, Shadowing, Journey Mapping) - Rules and tips for each specific tool (Class activity based learning for each tool)	4
8.	Empathy [C] Debrief of Class Activity for Journey Mapping Empathy Case Study: 'Embrace- Infant Incubator'	2
9.	Define -Analysis of data gathered from Empathy stage through tools like Clustering & Affinity Diagrams -Building Problem Statements & understanding POV -Tools: Framing problems as 'How Might We?' questions	2
10.	Ideate -Concept of Semi-structured approach to Ideation in DT -Rules of Ideation -Tools: Brainstorming, Brainwriting, Dot Voting	2
11.	Ideate -Class Activity to demonstrate Brainstorming & Dot Voting - Case Study for Out of the Box Idea Generation: Steelcase	2
12.	Prototype -Introduction to concept of prototyping & basic techniques of rapid prototyping -Introduction to Low fidelity vs. High fidelity prototypes and their significance in the Design Thinking process -General information on user testing & MVPs - Case Study for Prototyping & User Testing: Nordstorm Innovation Lab	2
13.	Term End Group Project Analysis of Design Thinking success stories from across various domains –	4

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

Signature
(Prepared by Concerned Faculty/HOD)

	Students are expected to build a presentation based on the design thinking led success story of their chosen company/organization	
	Total	**30**

Textbook and Reference Books

1. Idris Mootee , "Design Thinking for Strategic Innovation'', Wily, 2014.

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

Description of ICA	**Marks**
Class Test	NA
Term Work	50
Total Marks :	**50**

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

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (All Program except Civil, CSBS, CSDS) / MBA Tech. (All Program)				**Semester:** I / II	
Course/Module: Workshop Practice				**Module Code:** 702ME0C003	
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)**
0	4	0	2	Marks Scaled to 50	--

Course Objectives

Impart hands-on experience in performing mechanical operations like fitting, welding, sheet metal and plumbing. Ensure implementation of safety measures for the operator, equipment and product in all operations to develop the knowledge of standard practices of the workshop trades.

Course Outcomes

After completion of the course, students would be able to

1. apply the safety measures practiced while using the tools,
2. develop hands-on skills for various workshop trades,
3. design application based circuits (PCB) by assembling Electronics & Electrical components,
4. install OS and device drivers.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	Industrial Processes and Safety Measures. Study of various hand tools. Assembly and disassembly of Machines as per specifications. Demonstration of Power tools like lathe, shaping, drilling and cutting tools. Introduction to pattern making.	8
2.	Fitting: Use and setting of fitting tools for chipping, cutting, filing, Marking, center punching, drilling, tapping Sheet Metals fabrication: Use of hand tools for cutting, shearing, bending, edge folding and other operations.	12
3.	Welding: Study of operation of Arc welding, Simple butt and Lap welded joints, Fabrication of a welding job; Simple assignments to build proof of concept.	10

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

Signature
(Prepared by Concerned Faculty/HOD)

4.	Printed Circuit boards Designing: Understanding the safety measures for assembly and identification of components; Ability to design PCB for small applications	10
5.	Soldiering and Joining Processes: Introduction to joining processes and soldering; Soldering Techniques and circuit assembly	4
6.	Study, demonstration and identification of common electrical materials such as wires, cables, switches, fuses.	4
7.	Introduction to PC Hardware: Study of basic I/O systems, Types of Memories- Static RAM and Dynamic RAM, ROM, PROM, EPROM, EEPROM, CPU (Central Processing Unit)- ALU and control unit. Knowledge of PC Configurations. Power on Self-Test for debugging. Installation of OS (Operating Software) Windows XP, installation of different types of Service Packs, Vista and Windows-7 etc. Installation of Device Drivers: Different types of Motherboard drivers, LAN, Audio, and Video.	12
	Total	**60**

Text Books

1. K.C. John, "Mechanical Workshop Practice", PHI Learning Pvt. Ltd. 2nd Edition 2014.
2. P. N. Rao, "Manufacturing Technology-Vol I, Tata McGraw Hill. 4th Edition 2014.
3. R.S. Khandpur, "Printed Circuit Boards: Design, Fabrication, assembly and testing", Tata McGraw Hill, 1st Edition 2005.
4. Dan Gookin, "Troubleshooting and maintaining your PC", Wiley, 3rd Edition 2017.

Reference Books

1. P.F. Ostwald, ''Manufacturing Processes and Systems", John Willy & Sons INC. UK, 9th Edition 2008.
2. R.P. Singh, "Electrical Workshop: Safety, Commissioning, maintenance and testing of electrical equipment", IK International Publishing House Pvt. Ltd. 3rd Edition 2012.

Any other information

Total Marks of Internal Continuous Assessment (ICA): -- <u>50 Marks</u>

Distribution of ICA Marks

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

Signature
(Prepared by Concerned Faculty/HOD)

Description of ICA	**Marks**
Class Test	NA
Term Work	50
Total Marks	**50**

Details of Term Work

1. Demonstration of Industrial Safety practices
2. Demonstration of Power Tools
3. Jobs involving fitting,
4. Jobs involving sheet metal
5. Jobs involving welding
6. Designing of Printed Circuit Board (PCB) for small electronic applications
7. Classify and summarize different types of:
   a. cables, connectors, plugs and sockets
   b. switches ,holders, earthling and household wirings
8. Study of joining processes and soldering technique for circuit assembly
9. Study of basic I/O systems, Static RAM and Dynamic RAM, ROM, PROM, EPROM, EEPROM, CPU (Central Processing Unit)- ALU and control unit
10. Study of installation of device drivers including different types of Motherboard drivers, LAN, Audio, and Video.

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (Civil Engineering)				**Semester:** I	
Course/Module: Engineering Workshop				**Module Code:** 702CI0C001	
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-50 in Question Paper)**
0	4	0	2	Marks Scaled to 50	---

Pre-requisite: NIL

Course Objectives

This course aims to impart the knowledge about various workshop practices, study the properties of building materials, methods of construction of various buildings and various building services. It also aims to identify minor instruments used for surveying.

Course Outcomes

After completion of the course, students would be able to

1. Develop the skills for fabrication and electrical fittings,
2. Illustrate the properties of building materials and methods of construction,
3. Describe various building services
4. Demonstrate the use of minor surveying instruments.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**Industrial Processes and Safety Measures:** Study of various hand tools. Demonstration of Power tools like lathe, drilling and cutting tools. **Sheet Metals fabrication**: Use of hand tools for cutting, shearing, bending, edge folding and other operations. **Welding:** Study of operation of Arc welding, Simple butt and Fillet welded joints, Fabrication of a welding job.	12
2.	**Electrical Fittings:** Study, demonstration and identification of common electrical materials such as wires, cables, switches, fuses. **Soldiering and Joining Processes:** Introduction to joining processes and soldering; Soldering Techniques and circuit assembly	4

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

Signature
(Prepared by Concerned Faculty/HOD)

3.	**Building Materials:** Study of properties and applications of various building materials like stones, bricks, tiles, cement, cement mortar, concrete, structural steel and reinforcement, timber, glass, gypsum, etc.	12
4.	**Components of Building:** Study of various types of buildings as per NBC, different types of structures like load bearing, framed etc., various components of building like foundations, columns, beams, slabs, floors, roofs, doors, windows, staircases and their suitability.	8
5.	**Building Services:** Different types of pipes, joints, taps, fixtures and accessories used in plumbing, components (pipes, bends, chambers etc.) used in sanitary/sewerage lines, scheme/plan for water supply and sanitary system for a simple residential building, building electrical systems, lifts and escalators.	8
6.	**Surveying Instruments:** Use of minor equipment for surveying, study of chains, tapes, cross-staffs, ranging rods, magnetic compass	8
7.	**Site Visits:** Study of different construction activities at site.	8
	Total	**60**

Text Books:

1. K.C. John, "Mechanical Workshop Practice", PHI Learning Pvt. Ltd, 2nd Edition 2010.
2. P. N. Rao, "Manufacturing Technology-Vol I", Tata McGraw Hill, 4th Edition 2017.
3. S. K. Duggal, "Building Materials", New Age International Pvt. Ltd, 4th Edition 2012.

Reference Books:

1. P.F. Ostwald, "Manufacturing Processes and Systems", John Willy & Sons INC, UK, 9th Edition 2008 (Classic Book).
2. R.P. Singh, "Electrical Workshop: Safety, Commissioning, maintenance and testing of electrical equipment", IK International Publishing House Pvt. Ltd, 3rd Edition 2012.
3. S.C. Rangawala, "Engineering Materials", Charotar Publishing House Pvt. Ltd, 43rd Edition 2017.
4. S.C. Rangawala, "Building Construction", Charotar Publishing House Pvt. Ltd, 33rd Edition 2016.

Any other information

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

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

Signature
(Prepared by Concerned Faculty/HOD)

Distribution of ICA Marks

Description of ICA	**Marks**
Class Test	NA
Term Work Marks	50
Total Marks	**50**

Detail of Term Work

Term work should consist of

1. Prepare jobs involving sheet metal and welding.
2. Report on experiments covering the following topics
   - Classify and summarize different types of cables, connectors, plugs and sockets
   - Classify and summarize different types of switches, holders, earthing and household wirings
   - Soldering Techniques and circuit assembly
3. Prepare minimum two models of different types of structures.
4. A3 size drawing sheets covering components of building (minimum four).
5. A detailed report about properties of various building materials and their market rates by conducting a market survey.
6. A detailed report on site visits (minimum two).
7. To prepare a report on use of surveying instruments used in Civil Engineering project.
8. To prepare a report on use of plumbing and sanitary fixtures.

Signature
(Prepared by Concerned Faculty/HOD)

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. (All Program)				**Semester :** II	
Course/Module : Linear Algebra and Differential Equations				**Module 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 in Question Paper)**
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 Objectives

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 would 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: (per session plan)

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

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

Signature
(Prepared by Concerned Faculty/HOD)

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

Reference Books

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

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

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

Signature
(Prepared by Concerned Faculty/HOD)

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

Details of Term work

- Minimum ten Tutorials.
- Two Home Assignments.
- Presentations by students.

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (IT, Computer Engineering, Computer Science, EXTC, Mechatronics, Data Science, Cyber Security) / MBA Tech. (IT, Computer, Data Science)				**Semester:** II	
Course/Module: Quantum and Statistical Physics				**Module Code**: 702BS0C009	
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)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Course Objectives

This course is aimed to teach the drawbacks of classical physics in explaining several experimental observations and old quantum theory; and to discuss the necessity of new mechanics and the laws related to it.

Course Outcomes

After completion of the course, students would be able to

1. define and illustrate the basic laws related to quantum and statistical mechanics,
2. interpret the concepts related to quantum and statistical mechanics to explain observed phenomena in nature,
3. apply the concepts of quantum and statistical mechanics to solve different engineering problems.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	Introduction to Quantum Physics, Black body radiation, Explanation of it using the photon concept, Photoelectric effect, Compton effect, de Broglie hypothesis, Experiments demonstrating wave properties of electron: Electron interference (double slit experiment), Electron Diffraction (Davison - Germer experiment), Uncertainty Principle. Wave-particle duality, Born's interpretation of the wave function, Verification of matter waves, Uncertainty principle.	6
2.	Basic postulates of quantum mechanics, concept of wave function, Superposition principle of eigenstates. Concept of collapse of wave function. Time dependent and time independent Schrodinger Equation, Concept of free particle, particle in an infinite and finite potential well, box problem. Bound vs. unbound states.	8

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

Signature
(Prepared by Concerned Faculty/HOD)

3.	Concept of Quantum Tunnelling. Reflection and Transmission coefficients. Few realistic examples of tunnelling, e.g., alpha decay, Probe microscopes (Scanning Tunnelling microscope). Simple Harmonic Oscillator, explanation in 1D (no detailed derivation). Hydrogen atom.	6
4.	Introduction to Statistical Physics. Ensembles (Canonical, Micro canonical and Grand canonical) Classical (Maxwell-Boltzmann) and Quantum statistics, [Bose Einstein (BE) and Fermi Dirac (FD)]. Derivation of classical statistics and BE and FD statistics.	6
5.	Applications: equipartition of energy, Planck's distribution, Bose-Einstein Condensation	4
	Total	**30**

Text Books

1. A. Beiser, S. Mahajan and S. Choudhury, "Concept of Modern Physics", Tata McGraw Hill, 7th edition (SIE) 2015.
2. Arthur Beiser, ''Perspectives of Modern Physics'', McGraw Hill, 1969

Reference Books

1. Eisberg and Resnik, "Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles" Wiley, 2nd edition 2006.
2. R. A. Serwey, C. J. Moses, C. A. Moyer, "Modern Physics", Thomson, 3rd edition 2005.
3. David J. Griffiths, "Introduction to Quantum Mechanics", Pearson, 2nd edition 2015.
4. Frederick Reif, "Fundamentals of Statistical and Thermal Physics", Waveland press, 2010.

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

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

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

Signature
(Prepared by Concerned Faculty/HOD)

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

Program: B. Tech Mechanical, Mechanical and Automation Engineering, Civil Engineering / MBA Tech Mechanical Engineering				**Semester:** II	
Course/Module: Chemistry				**Module Code:** 702BS0C014	
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)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Prerequisite: HSC level Chemistry

Course Objectives

The aim is to acquaint students with engineering materials like lubricants, polymers, nanomaterials and composites. Also to familiarize them with the industrial importance of water chemistry, application of fuels and concept of metal corrosion.

Course Outcomes

After completion of the course, students would be able to

1. rationalize fundamentals of corrosion and materials,
2. understand basic concepts in water, combustion of fuels and polymer chemistry,
3. solve numerical problems based on water, fuels and combustion, lubricants.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**Polymers** Introduction, basic concepts of degree of polymerization, tacticity, melting and glass transition temperature and its importance. Types of polymerization (Addition, condensation and co-polymerization). Smart polymer materials, conducting polymers, liquid crystals, applications of polymers.	5
2.	**Lubricants** Definition, Mechanism of lubrication, Properties- viscosity, viscosity index, flash & fire, cloud & pour points, oiliness, saponification & acid value (numericals based on saponification and acid value)	4
3.	**Fuels & Combustion**	6

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

Signature
(Prepared by Concerned Faculty/HOD)

	Discuss the definition, classification and characteristics. Calculation of Calorific value-Theoretical & Experimental method (Bomb calorimeter). Solid Fuels: Coal, proximate and ultimate analysis, Numerical based on analysis of coal. (Dulong's formula) and bomb calorimetry. Combustion: calculation on air and oxygen requirement. Liquid fuels: Mining of Petroleum, Cracking, Reforming, Knocking in IC engines, Octane number, Cetane number & anti-knocking agents (TEL and MTBE) Gaseous fuel: (LPG, CNG) Composition, properties and application.	
4.	**Water Chemistry** Concept of hardness of water, types of hardness and its determination by EDTA methods, numerical based on water hardness. Water softening processes by: Lime-soda method, ion-exchange process and reverse osmosis process. Role of water as a universal solvent.	5
5.	**Chemistry of Corrosion and protection** Introduction, types of corrosion, chemical and electrochemical theories of Corrosion and their sub-types (corrosion by oxygen and other gases and liquids), factors affecting corrosion, preventive measures for corrosion-Cathodic and anodic protection methods, use of protective coatings (galvanization, tinning, metal cladding, electroplating, organic coatings like paints and varnishes).	5
6.	**Chemistry of Important Engineering Materials and Nanomaterials** Introduction to alloys (steels, special steels, Carbon steel, brass, bronze and applications). Introduction to composites; Classification (Polymer, Metal & Ceramic composites, Cement), applications of composites. Introduction to nanomaterials, Structural features and properties of Nanomaterials, recent advances in nanomaterials, application of nano materials in catalysis, medicine, construction chemicals, paints and pigments and heat transfer fluids.	5
	Total	**30**

Text Books

1. Palanna. O.G., Engineering Chemistry, Tata McGraw Hill Education. Pvt. Ltd, 1st Edition 2009.

Reference Books

1. Advance Organic Chemistry, Jerry March,7th edition ,2013

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

Signature
(Prepared by Concerned Faculty/HOD)

2. P. W. Atkins, Physical Chemistry, ELBS/Oxford, 9th Edition, 2010.
3. Textbook of Nanoscience and Nanotechnology, B.S. Murty, P. Shankar, Baldev Raj, B B Rath, James Murday, Springer Science, 2013

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

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

Signature

(Prepared by Concerned Faculty/HOD)

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

Program: B. Tech. (All Program except Mechanical, Mechanical and Automation Engineering, Civil, CSBS, CSDS) / MBA Tech. (All Program except Mechanical)				**Semester**: II	
Course/Module: Data Structures and Algorithms				**Module Code:** 702CO0C003	
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)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Programming for Problem Solving

Course Objectives

To impart knowledge of data structures and algorithms so that students can identify and implement appropriate data structure and determine the computational complexity of the given problem.

Course Outcomes

After completion of the course, students would be able to

1. Comprehend space and time complexity of the algorithms,
2. Identify and implement appropriate linear data structures for the given problem,
3. Identify and implement appropriate non-linear data structures for the given problem,
4. Differentiate and implement various searching, sorting algorithms and hashing.

Detailed Syllabus:

Unit	Description	Duration
1.	**Basic Terminologies & Introduction to Algorithm and Data Organization**: Algorithm specification, Recursion, Performance analysis, Asymptotic Notation - The Big-O, Omega and Theta notation, Programming Style, Refinement of Coding - Time-Space Trade Off, Testing, Data Abstraction	4
2.	**Linear Data Structure:** Array, Stack, Queue, Linked-list and its types, Various Representations, Operations & Applications of Linear Data Structures	9
3.	**Non-linear Data Structure:** Trees - Binary Tree, Threaded Binary Tree, Binary Search Tree, B & B+ Tree, AVL Tree, Splay Tree. Graphs (Directed, Undirected) - Various Representations: Adjacency Matrix, Adjacency List, Operations: search and traversal algorithms and complexity analysis.	9

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

Signature
(Prepared by Concerned Faculty/HOD)

	Applications of Non-Linear Data Structures.	
4.	**Searching and Sorting:** Sequential Search, Binary Search, Breadth First Search, Depth First Search, Insertion Sort, Selection Sort, Shell Sort, Divide and Conquer Sort: Merge Sort, Quick Sort, Heap Sort, Introduction to Hashing.	8
	Total	**30**

Text Books

1. Y. Langsam, M.J. Augenstein, A.M. Tenenbaum, "Data Structures using C and C++", 2nd Edition, PHI, 2015.
2. E. Horowitz and S. Sahni, "Fundamentals of Data Structures", Universities Press, 2nd Edition 2008.

Reference Books

1. Donald E. Knuth,"The Art of Computer Programming: Volume 1: Fundamental Algorithms", Pearson, 3rd Edition 2009.
2. Thomas, H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", MIT Press, 3rd Edition 2009.
3. Alfred V. Aho, John E. Hopperoft, Jeffrey D. UIlman, "Data Structures and Algorithms", Addison Wesley, 1st Edition 1983.

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

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

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

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (Mechanical, Mechanical and Automation Engineering / MBA Tech. (Mechanical Engineering)				**Semester :** II	
Course/Module : Environmental Science				**Module 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- 100 in Question Paper)**
1	0	1	2	Marks Scaled to 50	--

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

Course Objectives

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, students would 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: (per session plan)

Unit	Description	Duration
1.	**Multidisciplinary nature of environmental science** Definition, scope and importance of environmental sciences.	1
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.	2
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	2

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

Signature
(Prepared by Concerned Faculty/HOD)

	ecosystems.	
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.	2
5.	**Environmental Pollution** • Definition, Cause and effects for Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards and Solid waste pollution.	4
6.	**The Science of Climate Change** • Greenhouse effect • Global warming • Global environmental changes • Acid rain • Ozone layer depletion • Carbon footprint	4
	Total	**15**

Text Books

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

Reference Books

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

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks

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

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

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (Civil Engineering)				**Semester:** II	
Course/ Module: Engineering Mechanics				**Module Code:** 702CI0C002	
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)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: NIL

Course Objectives

This course explains the various systems of forces in equilibrium, physical and mathematical principles used in mechanics. It aims to calculate the centroid and moment of inertia of a plane area and apply equations of motions to rigid bodies for resolving force system

Course Outcomes

After successful completion of this course, students should be able to

1. solve the system of forces in equilibrium,
2. determine the centroid and moment of Inertia of a plane area,
3. evaluate the velocity, acceleration and displacement of a moving body,
4. analyze the forces developed on the bodies subjected to rigid body displacements and rotations.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**System of forces:** Rectangular components of forces in space, moment of a force about a point, moment of a force about a given axis, resultant of general force system, Coplanar & non-coplanar force system, forces and their components, resultant of coplanar force system - concurrent forces, parallel forces, non-concurrent non-parallel system of forces, moment of force about a point, couple, Varignon's theorem.	**8**
2.	**Forces and equilibrium:** Free body diagram with examples on modelling of typical supports and joints, condition for equilibrium in three and two dimensions. **Friction:** Limiting and non-limiting cases, Laws of friction, angle of friction, angle of repose, cone of friction, Equilibrium of bodies on rough horizontal	**5**

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

Signature
(Prepared by Concerned Faculty/HOD)

	and inclined plane, application to problems involving wedges, ladder. Belt friction, flat belts on the flat pulleys Analysis of pin jointed plane trusses: Perfect truss, method of joints and method of section.	
3.	**Centroid and moment of inertia:** Centroid, moment of inertia, polar moment of inertia, and product of inertia, parallel and perpendicular axis theorem.	**2**
4.	**Kinematics of particle:** Velocity and acceleration in terms of rectangular coordinate system, rectilinear motion, motion along plane curved path, tangential and normal component of acceleration, acceleration - time, velocity- time graphs and their uses, relative velocity, projectile motion, simple harmonic motion. **Kinematics of rigid bodies:** Translation, pure rotation and plane motion of rigid bodies, instantaneous centre of rotation for the velocity for bodies in plane motion, link mechanisms (up to two links).	**7**
5.	**Kinetics of particles:** Newton's laws of motion, D'Alembert's principle, equation of dynamic equilibrium, linear motion, curvilinear motion. **Kinetics of rigid bodies:** D'Alembert's principle for bodies under translational motion, rotational motion about a fixed axis and plane motion. Application to motion of bars, cylinders, spheres.	**8**
	Total	**30**

Text Book

1. Beer & Johnston et. Al., "Vector Mechanics for Engineers- Statics and Dynamics", Tata McGraw Hill, 12th edition 2020.
2. R. C. Hibler, ''Engineering Mechanics'', McMillan Publishers, 14th edition 2017.

Reference Books

1. F. L. Singer, "Engineering Mechanics", Harper & Raw Publication 3rd edition 1975 (Classic Book).
2. D. S. Kumar, ''Engineering Mechanics'', Tata McGraw Hill, 2013.
3. Macklin & Nelson, ''Engineering Mechanics'', Tata McGraw Hill, 2010 (Schaum's Series).
4. A. K. Tayal, ''Engineering Mechanics'', Umesh Publication 14th edition 2019.

List of Experiments

1. To find reactions of simply supported beam (Parallel force system).
2. To verify polygon law of forces for Concurrent force system.

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

Signature
(Prepared by Concerned Faculty/HOD)

3. To verify polygon law of forces for Non-concurrent force system.
4. To verify Lami's theorem using simple jib crane.
5. Equilibrium of non-concurrent non parallel force system.
6. To verify moment equilibrium condition using bell crank lever.
7. To determine coefficient of friction using friction plane.
8. To determine coefficient of friction using angle of repose method.
9. To determine coefficient of Friction using simple screw jack.
10. To determine centroid and moment of inertia of irregular areas
11. To determine natural frequency using simple pendulum
12. To determine natural frequency using compound pendulum
13. To determine efficiency of fly wheel

Any other information

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

Distribution of ICA Marks

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

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

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. (Civil Engineering)				**Semester:** II	
Course/Module: Construction Technology				**Module Code:** 702CI0C003	
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)**
2	0	0	2	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Engineering Workshop

Course Objectives

This course imparts basic knowledge of construction activities and their sequence, the process of concreting from manufacturing to finishing. It aims to compare various types of flooring and their applications in different scenarios

Course Outcomes

After completion of the course, students would be able to

1. Describe various construction activities and their sequence,
2. Explain the process of concreting from manufacturing to finishing,
3. Discuss various types of flooring and their applications.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**Excavation:** Manual and mechanical method of Excavation, disposal of excavated material, dewatering of trenches, shoring and strutting of Trenches, precaution while excavation, fencing – caution signs.	**4**
2.	**Foundation:** Necessity and Purpose of Foundation, Shallow Foundation, Spread foundation, raft foundation, deep foundation and its types, Precast concrete piles. Modern methods of pile installation	**4**
3.	**Masonry:** Terminology, Preparation, construction procedure, post construction precautions, brick masonry stretcher bond and half brick thick masonry, hollow and solid concrete block masonry, fixing of door and window frame in masonry, block masonry. Procedure of constructing un-coursed Rubble and coursed masonry. **Pointing & Plastering:** Necessity and types, methods of providing pointing and plastering	**6**

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

Signature
(Prepared by Concerned Faculty/HOD)

4.	**Formwork and Scaffolding:** Types, basic factors governing selection. Erecting and removal of formwork. Scaffolding types, precautions	**4**
5.	**Concrete:** Procedure of mixing concrete, manual and machine mixing, types of mixers, transporting, laying, compacting and curing of concrete, different types of vibrators, underwater concreting.	**6**
6.	**Floors:** Solid ground floor, plinth fillings, floor finish with murum, brick-bat concrete, Indian patent stone, cement tiles, China mosaic, floorings for special purposes such as factories, warehouses, stables, garages, railway platforms, upper floors: jack arch construction, mezzanine floors and lofts, false flooring for control rooms.	**6**
	Total	**30**

Text Books

1. Rangwala S C , "Building Construction", Charotar Publications, 33rd edition 2016.

Reference Books

1. Mathur S., "Building Construction Handbook", SBS Publishers, 2012.
2. McKay, "Building Construction", Pearson India, 2013.
3. Mantri Sandeep, "The A to Z of Practical Building Construction and its Management", Mantri Publications, 2017.

Any other information

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

Distribution of ICA Marks

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

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

Signature
(Prepared by Concerned Faculty/HOD)

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

Program: B. Tech. (Artificial Intelligence, Artificial Intelligence and Machine Learning, Artificial Intelligence and Data Science) / MBA Tech. (Artificial Intelligence)				**Semester :** II	
Course/Module : Probability and Random Variables				**Module Code:** 702BS0C021	
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)**
2	0	1	3	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Knowledge of Permutation, Combination and Pre-Calculus.

Course Objectives

To equip the students with intermediate to advanced level concepts and tools in probability and statistics that help them tackle relevant problems within engineering domain.

Course Outcomes

After completion of the course, students would be able to

1. Know the concept of probability and random variables,
2. Solve problems involving conditional probability and moments,
3. Demonstrate understanding of the applications of various probability distributions, measures of central tendency to solve real life problems,
4. Analyse the different probability density functions and their applications.

Detailed Syllabus:

Unit	Description	Duration
1.	**Probability:** Concept of experiments, sample space, event. Definition of Combinatorial Probability. Conditional Probability, Mutually exclusive events, Joint probability of related and independent events, Statistical independence, Total Probability theorem, Bayes theorem.	6
2.	**Random Variables** Random Variables, Cumulative Distribution function, Probability Density Function, Mathematical expectation and its properties, Moments (including variance) and their properties, interpretation, Moment generating function.	8
3.	**Two dimensional Random Variables:**	8

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

Signature
(Prepared by Concerned Faculty/HOD)

	Joint PDF's and CDF's, Conditional PMF and PDF, Marginal PDF, Conditional Mean &Variance, Rule for Independence, Covariance and correlation of random variables	
4.	**Probability distributions:** Discrete probability distributions: Binomial, Poisson and Geometric distributions, Uniform distribution. Continuous probability distributions: Exponential, Normal distribution, Chi-square, t, F distributions.	8
	Total	**30**

Text Books:

1. T. Veerarajan, "Probability, Statistics and Random Processes", Tata McGraw-Hill 2003, 3rd edition, 2008.
2. S. M. Ross, "Introduction of Probability Models", Academic Press, N.Y.
3. A. Goon, M. Gupta and B. Dasgupta, "Fundamentals of Statistics", vol. I & II, World Press.

Reference Books:

1. S. M. Ross, "A first course in Probability", Prentice Hall, 10th Edition, 2018.
2. I. R. Miller, J.E. Freund and R. Johnson, "Probability and Statistics for Engineers", 4th Edition, PHI.
3. A. M. Mood, F.A. Graybill and D.C. Boes, "Introduction to the Theory of Statistics", McGraw Hill Education.
4. Anthanasios Papoulis, S. Unnikrishna Pillai, Probability, Random Variables and Stochastic Processes, Tata McGraw-Hill 2002, 4th edition, 2008.

Any Other Information

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

Distribution of ICA Marks:

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

Details of Term work: As per Institute Norms.

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

Signature
(Prepared by Concerned Faculty/HOD)