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

Program: B. Tech. Computer Science and Business Systems				**Semester :** II	
Course/Module: Linear Algebra				**Module Code:** 702BS0C026	
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 Basic Concepts in Algebra.

Course Objectives

This course aims at providing adequate exposure to the theory and applications of Linear Algebra. It develops in students the computational competency in the subject and an ability to apply the theoritical constructs and computational techniques to solve problems within Engineering domain.

Course Outcomes

After completion of the course, students would be able to

1. demonstrate understanding of fundamental concepts of linear algebra,
2. make use of computational techniques of linear algebra to solve related problems,
3. analyse linear transformations, systems of linear equations and matrices,
4. demonstrate understanding of applications of linear algebra.

Detailed Syllabus

Unit	Description	Duration
1.	**Matrices and Determinants** Introduction to Matrices and Determinants; Solution of Linear Equations; Cramer's rule; Inverse of a Matrix.	07
2.	**Rank of Matrix** Vectors and linear combinations; Rank of a matrix; Gaussian elimination; LU Decomposition; Solving Systems of Linear Equations using the tools of Matrices.	08
3.	**Vector Space** Vector space; Basis; Dimension; Orthogonality; Projections; Gram-Schmidt orthogonalization and QR decomposition.	12
4.	**Linear transformation, Eigenvalues and vectors**	11

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

Signature
(Prepared by Concerned Faculty/HOD)

	Eigenvalues and Eigenvectors; Cayley Hamilton Theorem, Diagonalisation; Positive definite matrices; Linear transformations; Hermitian and unitary matrices.	
5.	**Introduction to applications** Singular value decomposition and Principal component analysis; Introduction to their applications in Image Processing and Machine Learning.	07
	Total	**45**

Text Books

1. David Poole, "Linear Algebra: A Modern Introduction", Brooks/Cole, Cengage Learning, 4th Edition 2014.
2. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publication, 44th Edition 2017.

Reference Books

1. David C. Lay, Steven R Lay, Judi J McDonald, "Linear Algebra and its applications", Pearson, 5th Edition 2015.
2. Gilbert Strang, "Introduction to linear algebra", Wellesley- Cambridge Press, 5th Edition 2016.
3. R C Gonzalez and R E Woods, "Digital Image Processing", Pearson, 4th Edition 2018.

Web Reference

1. https://machinelearningmastery.com/introduction-matrices-machine-learning/

Any other information

Note: Assignments & tutorials covering the following: Vectors and linear combinations, Matrices, Linear transformations, Complete solution to Ax = b, Determinants, Eigenvalues and Eigenvectors.

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. Computer Science and Business Systems				**Semester :** II	
Course/Module: Statistical Methods				**Module Code:** 702BS0C027	
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	1	5	Marks Scaled to 50	Marks Scaled to 50
Pre-requisite: Probability and Statistics					

Course Objectives

This course will help students to develop sound knowledge and skills in theoretical, computational and application-oriented statistics. The course will equip the students with intermediate to advanced level concepts in statistics using probability theory and basic concepts in statistics that will help them to tackle relevant problems within engineering domain.

Course Outcomes

After completion of the course, students would be able to

1. explain the concepts of sampling techniques, estimation, sufficient statistic, parametric and non-parametric inference,
2. solve problems involving correlation, linear and multiple regression, estimation techniques and time series,
3. apply knowledge of time series, parametric and non-parametric inference to analyze statistical data,
4. use various concepts in R programming to analyze statistical data samples.

Detailed Syllabus:

Unit	Description	Duration
1.	**Sampling Techniques:** Random sampling. Sampling from finite and infinite populations. Estimates and standard error (sampling with replacement and sampling without replacement), Sampling distribution of sample mean, stratified random sampling.	03
2.	**Linear Statistical Models:** Scatter diagram. Linear regression and correlation. Least squares method. Rank correlation. Multiple regression & multiple correlation, Analysis of variance (one way, two way with as well as without interaction).	12
3.	**Estimation:** Point estimation, criteria for good estimates (un-biasedness, consistency), Methods of estimation including	04

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

Signature

(Prepared by Concerned Faculty/HOD)

	maximum likelihood estimation.	
4.	**Sufficient Statistic:** Concept & examples, complete sufficiency, their application in estimation.	04
5.	**Test of hypothesis:** Concept & formulation, Type I and Type II errors, Neyman Pearson lemma, Procedures of testing.	10
6.	**Non-parametric Inference:** Comparison with parametric inference, Use of order statistics. Sign test, Wilcoxon signed rank test, Mann-Whitney test, Run test, Kolmogorov-Smirnov test. Spearman's and Kendall's test. Tolerance region.	07
7.	**Basics of Time Series Analysis & Forecasting:** Stationary, ARIMA Models: Identification, Estimation and Forecasting.	05
	Total	**45**

Text Books

1. I.R. Miller, J.E. Freund and R. Johnson, "Probability and Statistics for Engineers", Pearson Publication, 8th Edition, 2015.
2. A. Goon, M. Gupta and B. Dasgupta, "Fundamentals of Statistics", vol. I & II, World Press.
3. Chris Chatfield , "The Analysis of Time Series: An Introduction", Taylor and Francis India, 6th Edition, 2017.

Reference Books

1. D.C. Montgomery & E. Peck, "Introduction to Linear Regression Analysis", John Wiley and Sons, 5th Edition, 2012
2. A.M. Mood, F.A. Graybill & D.C. Boes, "Introduction to the Theory of Statistics", McGraw hill Education, 3rd Edition.
3. N. Draper & H. Smith, "Applied Regression Analysis" John Wiley and Sons, 3rd Edition.
4. Garrett Grolemund, "Hands-on Programming with R", O'Reilly Media, Inc, 2014.
5. Jared P. Lander," R for Everyone: Advanced Analytics and Graphics", Addison Wesley, 2nd Edition, 2013.

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

Signature
(Prepared by Concerned Faculty/HOD)

Any other information:

Laboratory
R statistical programming language: Introduction to R, Functions, Control flow and Loops, Working with Vectors and Matrices, Reading in Data, Writing Data, Working with Data, Manipulating Data, Simulation, Linear model, Data Frame, Graphics in R

Data Source: www.rbi.org.in

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. Computer Science and Business Systems				**Semester**: II	
Course/Module: Data Structures & Algorithms				**Module Code:** 702CO0C004	
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	1	4	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Fundamentals of Computer Science

Course Objectives

1. 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. determine the space and time complexity,
2. identify and implement appropriate linear data structure for the given problem,
3. identify and implement appropriate non-linear data structure 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	04
2.	**Linear Data Structure:** Array, Stack, Queue, Linked-list and its types, Various Representations, Operations & Applications of Linear Data Structures	08
3.	**Non-linear Data Structure:** Trees (Binary Tree, Threaded Binary Tree, Binary Search Tree, B & B+ Tree, AVL Tree, Splay Tree) and Graphs (Directed, Undirected), Various Representations, Operations (search and traversal algorithms and complexity analysis) &	09

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 on Various Data Structures:** 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	06
5.	**File**: Organisation (Sequential, Direct, Indexed Sequential, Hashed) and various types of accessing schemes.	03
	Total	**30**

Text Books

1. E. Horowitz and S. Sahni, "Fundamentals of Data Structures", Universities Press, 2nd Edition 2008.
2. Alfred V. Aho, John E. Hopperoft, Jeffrey D. UIlman, "Data Structures and Algorithms", Addison Wesley, 1st Edition 1983.

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. Pat Morin, "Open Data Structures: An Introduction (Open Paths to Enriched Learning), UBC Press, 31st Edition 2013.

Any other information

Laboratory

1. Towers of Hanoi using user defined stacks.
2. Reading, writing, and addition of polynomials.
3. Line editors with line count, word count showing on the screen.
4. Trees with all operations.
5. All graph algorithms.
6. Saving / retrieving non-linear data structure in/from a file

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. Computer Science and Business Systems				**Semester :** II	
Course/Module: Principles of Electronics Engineering				**Module Code:** 702EX0C004	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit (Hours per week)**	**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

1. Theory of semiconductor materials, their atomic structures and properties.
2. DC circuit analysis, AC fundamentals.

Course Objectives

The aim of the course is that the student should understand working principle, characteristics and simple applications of basic electronic devices. The course also helps students to understand the application of these devices in advanced circuits such as amplifiers. It also intends to impart hands on experience in assembling and testing simple circuits.

Course Outcomes

After completion of the course, students would be able to

1. describe the fundamentals of semiconductors,
2. understand characteristics and working of diodes, BJTs and FETs and solve simple circuits,
3. describe operational amplifier and illustrate its applications,
4. describe digital electronics fundamentals.

Detailed Syllabus:

Unit	Description	Duration
1.	**Semiconductors:** Crystalline material: Mechanical properties, Energy band theory, Fermi levels; Conductors, Semiconductors & Insulators: electrical properties, band diagrams. Semiconductors: intrinsic & extrinsic, energy band diagram, P&N-type semiconductors, drift & diffusion carriers.	04

Signature
(Prepared by Concerned Faculty/HOD)

2.	**Diodes and Diode Circuits:** Formation of P-N junction, energy band diagram, built-in-potential, forward and reverse biased P-N junction, formation of depletion zone, V-I characteristics, Zener breakdown, Avalanche breakdown and its reverse characteristics; Junction capacitance and Varactor diode. Simple diode circuits, load line, linear piecewise model; Rectifier circuits: half wave, full wave, PIV, DC voltage and current, ripple factor, efficiency, idea of regulation.	10
3.	**Bipolar Junction Transistors:** Formation of PNP / NPN junctions, energy band diagram; transistor mechanism and principle of transistors, CE, CB, CC configuration, transistor characteristics: cut-off active and saturation mode, transistor action, injection efficiency, base transport factor and current amplification factors for CB and CE modes. Biasing and Bias stability: calculation of stability factor	09
4.	**Field Effect Transistors:** Concept of Field Effect Transistors (channel width modulation), Gate isolation types, JFET Structure and characteristics, MOSFET Structure and characteristics, depletion and enhancement type; CS, CG, CD configurations; CMOS: Basic Principles	08
5.	**Feed Back Amplifier, Oscillators and Operational Amplifiers:** Concept (Block diagram), properties, positive and negative feedback, loop gain, open loop gain, feedback factors; topologies of feedback amplifier; effect of feedback on gain, output impedance, input impedance, sensitivities (qualitative), bandwidth stability; effect of positive feedback: instability and oscillation, condition of oscillation, Barkhausen criteria. Introduction to integrated circuits, operational amplified and its terminal properties; Application of operational amplifier; inverting and non-inverting mode of operation, Adders, Subtractors, Constant-gain multiplier, Voltage follower, Comparator, Integrator, Differentiator	09
6.	**Digital Electronics Fundamentals:** Difference between analog and digital signals, Logic ICs, half and full adder/subtractor, multiplexers, demultiplexers, flip-flops, shift registers, counters.	05
	Total	**45**

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

Signature
(Prepared by Concerned Faculty/HOD)

Text Books

1. A. S. Sedra and K. Carless Smith, "Microelectronics Circuits", Oxford University Press, 7th Edition 2017.
2. J. Millman, C. Halkias and C. Parikh, "Millman's Integrated Electronics", McGraw Hill Education, 2nd Edition 2017.
3. M. Morris Mano, "Digital Logic & Computer Design", Pearson Education India; 4th edition 2016.

Reference Books

1. R. L Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson, 10th Edition 2009.
2. B. Streetman and S. Banerjee, "Solid State Electronic Devices", Pearson, 7th Edition 2014.
3. A. Paul Malvino, "Electronic Principles", McGraw Hill Education, 8th Edition 2016.
4. D Schilling, C Belove, T Apelewicz and R Saccardi, ''Electronics Circuits: Discrete & Integrated'', McGraw Hill Education, 3rd Edition 2002.
5. J. Millman and A. Grabel, "Microelectronics", McGraw Hill Education, 3rd Edition 2017.
6. S. Salivahanan, N. Suresh Kumar and A. Vallavaraj, "Electronics Devices & Circuits", McGraw Hill Education, 3rd Edition 2012.

Any other Information

Laboratory

1. Semiconductor Diodes and application,
2. Transistor circuits,
3. JFET, oscillators and amplifiers.

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. Computer Science and Business Systems				**Semester :** II	
Course/Module : Fundamentals of Economics				**Module Code:** 702TM0C003	
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: Nil

Course Objective

1. Understand fundamental financial concepts of Microeconomics and Macroeconomics.

Course Outcomes

After completion of the course students would be able to

1. describe how microeconomic models can be used to consider fundamental economic choices of households and firms,
2. explain how macroeconomic models can be used to analyse the economy as a whole,
3. elucidate how government policy influences microeconomic choices and macroeconomic outcomes.

Detailed Syllabus:

Unit	Description	Duration
1.	**Microeconomics:** *Principles of Demand and Supply* — Supply Curves of Firms — Elasticity of Supply; *Demand Curves of Households* — Elasticity of Demand; Equilibrium and Comparative Statics (Shift of a Curve and Movement along the Curve); *Welfare Analysis* — Consumers' and Producers' Surplus — Price Ceilings and Price Floors; *Consumer Behaviour* — Axioms of Choice — Budget Constraints and Indifference Curves; *Consumer's Equilibrium* — Effects of a Price Change, Income and Substitution Effects —Derivation of a Demand Curve; *Applications* — Tax and Subsidies — Intertemporal Consumption — Suppliers' Income Effect; *Theory of Production* — Production Function and Iso-quants — Cost Minimization; *Cost Curves* — Total, Average and Marginal Costs — Long Run and Short Run Costs; *Equilibrium of a*	15

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

Signature
(Prepared by Concerned Faculty/HOD)

	Firm Under Perfect Competition; *Monopoly and Monopolistic Competition*	
2.	**Macroeconomics:** *National Income and its Components* — GNP, NNP, GDP, NDP; Consumption Function; Investment; *Simple Keynesian Model of Income Determination and the Keynesian Multiplier*; *Government Sector* — Taxes and Subsidies; *External Sector* — Exports and Imports; *Money* — Definitions; *Demand for Money* —Transactionary and Speculative Demand; *Supply of Money* — Bank's Credit Creation Multiplier; *Integrating Money and Commodity Markets* — IS, LM Model; *Business Cycles and Stabilization* — Monetary and Fiscal Policy — Central Bank and the Government; *The Classical Paradigm* — Price and Wage Rigidities — Voluntary and Involuntary Unemployment	15
	Total	**30**

Text Books:

1. Microeconomics, Pindyck, Robert S., and Daniel L. Rubinfeld.
2. Macroeconomics, Dornbusch, Fischer and Startz.
3. Economics, Paul Anthony Samuelson, William D. Nordhaus

Reference Books:

1. Intermediate Microeconomics: A Modern Approach, Hal R, Varian.
2. Principles of Macroeconomics, N. Gregory Mankiw.

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. Computer Science and Business Systems				**Semester :** II	
Course/Module: Business Communication & Value Science - II				**Module Code:** 702BS0C028	
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 English (verbal and written)
Completion of all units from Semester 1

Course Objectives
This course aims to sensitize the students towards concepts like morality; prejudice diversity and inclusion so that they can become better assets to society. The course also aims to develop in them advanced communication skills like group discusssions; Business Presentations and team dynamics to help them evolve into Professional well equipped to deal with Professional an dethical challenges.

Course Outcomes
After completion of the course students would be able to

1. understand and apply tools of structured written communication,
2. apply the communication strategies to use electronic/social media to powerfully share concepts and ideas,
3. understand and apply communication strategies to effectively listen and make presentations,
4. analyze and identify individual personality types, team roles, concepts of morality and diversity to communicate effectively and ethically in groups and teams as well as individually.

Detailed Syllabus:

Unit	Description	Duration
1.	**Leadership Oriented Learning (LOL) and Tools of Structured Written Communication**: Team based Project on a social issue towards LOL; Good and Bad Writing, Common errors, punctuation rules, use of words. Lucid Writing; (project- Applying written skills and creating and launching an e	10

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

Signature
(Prepared by Concerned Faculty/HOD)

	magazine)	
2.	**Presentation and Reading Skills**: Understand the basics of presentation, Apply effective techniques to make presentations, Assess presentation based on given criteria (Project based Presentations through creating of an NGO and Presenting Project Report); Introduction to Speed Reading -skimming and scanning	10
3.	**Creating and sharing Impactful Communication and Understanding Teams:** Creating Impactful Communication through designing Ad campaign ; Use of electronic Media to communicate by Publishing AD campaign; Understanding Teams- Theory to find out from the participants their views, observations and experiences of working in a team, Introduction of Dr. Meredith Belbin and his research on team work and how individuals contribute, Belbin's 8 Team Roles and Lindgren's Big 5 personality traits., Belbin's 8 team player styles, personality types and role in a team, concepts of outward behavior and internal behavior	12
4.	**Understanding and sharing the basic concepts of Morality and Diversity:** basic concepts of Morality and Diversity Different forms of Diversity in our society ; Project based Learning- correlate with the social cause supported by respective team's NGOs and share through storytelling and creating Blogs; Project based Learning- Creating Video Recordings of Diverse groups and publishing on Facebook; Prepared speech to narrate the challenges faced by a member of a diverse group	13
	Total	**45**

Text Books

1. Seely, John, 'Oxford Guide to Effective Writing and Speaking', Oxford University Press, 2013
2. Fred Luthans, 'Organizational Behavior', McGraw Hill, 12th Edition 2013.

Reference Books:

1. P. H. Diamandis and S Kotler, "Abundance: The Future is Better Than You Think", Free Press, 2012
2. Simon Sinek, "Start With Why: How Great Leaders Inspire Everyone to Take

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

Signature
(Prepared by Concerned Faculty/HOD)

Action"; Penguin, 2011.
3. S Moriarty, N Mitchell, W Wells, "Advertising & IMC: Principles and Practice", Pearson Education India, 2016.

Web References

1. ETHICS FUNDAMENTALS AND APPROACHES TO ETHICS https://www.eolss.net/Sample-Chapters/C14/E1-37-01-00.pdf
2. A Framework for Making Ethical Decisions https://www.brown.edu/academics/science-and-technology-studies/framework-making-ethical-decisions
3. Five Basic Approaches to Ethical Decision- http://faculty.winthrop.edu/meelerd/docs/rolos/5_Ethical_Approaches.pdf

Online Resources

1. https://youtu.be/CsaTslhSDI
2. https://m.youtube.com/watch?feature=youtu.be&v=IIKvV8_T95M
3. https://m.youtube.com/watch?feature=youtu.be&v=e80BbX05D7Y
4. https://m.youtube.com/watch?v=dT_D68RJ5T8&feature=youtu.be
5. https://m.youtube.com/watch?v=7sLLEdBgYYY&feature=youtu.be

Any other information

Pedagogy for the course

Icebreaker. 1) Participate in 'Join Hands Movement'. Individual identification of social issues.2) Each Individual chooses one particular social issue which they would like to address. 3) Class to be divided in teams for the entire semester. All activities to be done in teams and the grades, credit points will be captured in the leader board in the class room.4) Theory to introduce the participant Slam book to be used for capturing individual learning points and observations.

Activity and Project Details

Unit 1-

- **Practical:** Research on the social cause each group will work for.
- Class discussion- Good and Bad Writing. Common errors, punctuation rules, use of words.
- Lucid Writing: (Theory and Discussion) encourage the students to go through the links given about Catherine Morris and Joanie Mcmahon's writing techniques.
- Practical: Plan and design an E Magazine. Apply and assimilate the knowledge

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

Signature
(Prepared by Concerned Faculty/HOD)

gathered from Sem-1 till date. Share objective & guideline. All members to contribute an article to the magazine, trainer to evaluate the content.

- Create the magazine
- SATORI – (Discussion) Participants share the personal take away acquired from GD, writing and reading skills activities captured in their handbook. Share the most important learning points from the activities done so far and how that learning has brought a change.
- Practical -Use of electronic media to Launch an E Magazine.
- Revisit your resume Include your recent achievements in your resume.

Unit 2-

- Practical: Each group will form an NGO. Create Vision, Mission, Value statement, tagline and Design a logo.
- Theory and Video-Introduction to basic presentation skills & ORAI app
- Practical: Prepare and publish the Second episode of the E Magazine.
- Speed Reading Practice session
- SATORI – (Discussion) Join the dots- Participants to connect their learning gathered from Research and NGO Design and share most important learning points.

Unit 3-

- Discussion :Ad campaign- Brain storming session- Students to discuss and explore the means of articulating and amplifying the social issue their NGOs are working for
- Practical Followed by Presentation: Team Falcon Practical to identify individual personality traits with Belbin's 8 team player styles .
- Practical and presentation: Similar personality types to form groups (3) Groups present their traits.
- Practical: Prepare and publish the third episode of the E Magazine.
- SATORI – (Discussion) join the dots with participants personal life- Participants share the personal take away acquired from working in teams, GD, learning about presentations, presenting their NGOs Share the most important learning points from the activities done so far. Participants talk about the changes they perceive in themselves

Unit 4-

- Video and Discussion-Ten minutes of your time – a short film on diversity. Play the video (link to be attached in the FG)-
- Discuss key take away of the film. Theory to connect the key take away of the film to the concept of empathy.
- Practical and discussion-Touch the target (Blind man) ;Film: "The fish and I''

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

Signature
(Prepared by Concerned Faculty/HOD)

by Babak Habibifar" (1.37mins)

- Practical-Groups to create a story – 10 minutes of a person's life affected by the social issue groups are working on. Narrate the story in first person. Feedbacks to be shared by the other groups.
- Practical: Research on a book, incident or film based on the topic of your respective NGO
- PPT, Theory, discussion - Session on Diversity & Inclusion- Different forms of Diversity in our society.
- PPT, Theory, discussion -Session on Diversity & Inclusion- Different forms of Diversity in our society.
- Practical: Teams to video record interviews of people from diverse groups (Ask 5 questions). Share the recordings in FB
- PPT, Theory, Practical and discussion
- Discussion on TCS values, Respect for Individual and Integrity.
- Practical-Prepare and publish the final episode of the E Magazine.
- SATORI – (Discussion) Participants share the personal take away acquired from working in teams, GD, learning about presentations and understanding diversity inclusion.

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

Unit 1

- Quiz- 60 Minutes
- Group Practical – As a group, they will work on the social issue identified by them. Research, read and generate a report based on the findings. (Apply the learning and recap from the session)

Unit 2

- Quiz 60 minutes
- Groups to present their NGOs. Apply the learning gathered from practical

Signature
(Prepared by Concerned Faculty/HOD)

session 1 from Unit 2. Presentation to be recorded by the groups. feedback from the audience/ Professor

- Group to come back and share their findings from the recording. Post work- individual write up to be written and evaluated for the E- magazine

Unit 3

- Quiz 60 minutes
- Design a skit- a) write the script articulating the message of their respective NGOs. Read out the script. (Skit time-5 minutes). Feedback of Theory.
- Promote the play through a social media and gather your audience. Enact the play. Capture the numbers of likes and reviews. Theory to assign grades to individual team.

Unit 4

- Quiz 60 minutes
- Write a review in a blog on the topics they are covering in their research. Theory will give grades to each team.
- Debate on the topic of diversity with an angle of ethics, morality and respect for individual (In the presence of an external moderator). Groups will be graded by the professor.
- Prepared speech- Every student will narrate the challenges faced by a member of a diverse group in 4 minutes (speech in first person).
- **Project- Organize an event to generate awareness and get support for a cause**
  1) Each team to look for an NGO/ social group in the city which is working on the issue their college group is supporting. 2) Spend a day with the NGO/ social group to understand exactly how they work and the challenges they face. 3) Render voluntary service to the group for one day 4) Invite the NGO/ social group to address their university students for couple of hours. Plan the entire event, decide a suitable venue in the university, gather audience, invite faculty members etc. (they need to get their plan ratified their professor). Outcome-- Host an interactive session with the NGO spokesperson 5) The groups to present their experience of a day with the NGO and inspire students to work for the cause.

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech. Computer Science and Business Systems				**Semester :** II	
Course/Module : Environmental Sciences				**Module Code:** 702CI0C005	
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)**
2	0	0	0	Marks Scaled to 50	---

Pre-requisite: Chemistry and Physics

Course Objectives

The students will study basic components of the environment and various types of pollution affecting the environment. They will also study how to differentiate various types of waste and ways to manage these wastes. In addition, the students will learn the impact studies associated with the environment and social issues, and methods to manage them. They will also be acquainted with various legal aspects associated with the environment and study the roles of various stakeholders associated with the environment.

Course Outcomes

After completion of the course, students would be able to

1. discuss various types of environmental Pollution, natural resources and its misuse,
2. demonstrate a plan for water management, promotion of recycle and reuse, generation of less waste, avoiding electricity waste,
3. demonstrate a slogan, poster and plan activities for environmental protection and social issues.

Detailed Syllabus:

Unit	**Description**	**Duration**
1.	Introduction to Environment and its components: Natural Resources and it Misuse leading to Environmental degradation. Role of Ecology in Environmental Degradation and Protection. Major industrial and other environmental disasters Environmental pollution- Types, Causes, Effects, Reduction methodology.	08
2.	Introduction to waste generation, Methods to Reduce, Reuse and Recycle of Waste Importance of 3R's, Promotion of 3R's - Methods Solid wastes, Industrial Waste, Bio-Medical Waste and Hazardous waste management – Types, Storage, Transportation, Treatment	08

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

Signature
(Prepared by Concerned Faculty/HOD)

	Disposal. C&D and E-waste – Concept, methods for reduction, management Campaigning for waste reduction and management.	
3.	Concept of EIA and SIA, significance, methodology, report drafting. Environmental Management System, ISO 14000 EMS certification	05
4.	Environmental Protection, Social Issues, Disaster Management Social Issues and Environment International Conventions, Summits and Protocols Generation of less waste and avoiding electricity waste. Environmental management for construction Projects	05
5.	Role of the Government in managing the environmental activities in all sectors. Organisational set up at the Central and state level to manage the environment. Role of judiciary in managing the environment. Role of Citizens, Role of NGOs/ Environmental Activists. Major Laws Air (P&C.P.) Act, Water (P & C.P) Act. Environment Protection Act EPA 1986. Wild life Protection Act etc., PIL	04
	Total	**30**

Text Books

1. Benny Joseph, "Environmental Studies", The McGraw-Hill Companies, 2017
2. Gerard Kiely, "Environmental Engineering", Tata McGraw-Hill Education, 2007.

Reference Books

1. P. Aarne Vesilind, Susan M. Morgan, "Introduction to Environmental Engineering", Thomas/Brook/Cole, 2004.
2. Mackenzie Davis, David Cornwell, "Introduction to Environmental Engineering", McGraw-Hill Companies, 2017.

Any other information

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

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)