TATA CONSULTANCY SERVICES
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B.E. /B.Tech in Computer Science & Business Systems

Semester 2

TCS

Computer Science & Business Systems

Semester 2 Curriculum

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Semester 2

LINEAR ALGEBRA

Introduction to Matrices and Determinants; Solution of Linear Equations; Cramer's rule; Inverse of a Matrix.

Vectors and linear combinations; Rank of a matrix; Gaussian elimination; LU Decomposition; Solving Systems of Linear Equations using the tools of Matrices.

Vector space; Dimension; Basis; Orthogonality; Projections; Gram-Schmidt orthogonalization and QR decomposition.

Eigenvalues and Eigenvectors; Positive definite matrices; Linear transformations; Hermitian and unitary matrices;

Singular value decomposition and Principal component analysis (Non-credit and optional); Introduction to their applications in Image Processing and Machine Learning (one or two classes).

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

Text Books:

1. *Higher Engineering Mathematics*, B. S. Grewal, Khanna Publishers.

Reference Books:

1. *Advanced Engineering Mathematics*, (Seventh Edition), Peter V. O'Neil, Cengage Learning.
2. *Advanced Engineering Mathematics*, (Second Edition), Michael. D. Greenberg, Pearson.
3. *Introduction to linear algebra*, (Fifth Edition), Gilbert Strang, Wellesley-Cambridge Press.
4. *Applied Mathematics* (Vol. I & II), P. N. Wartikar & J. N. Wartikar, Pune Vidyarthi Griha Prakashan.
5. *Digital Image Processing*, R C Gonzalez and R E Woods, Pearson.
6. https://machinelearningmastery.com/introduction-matrices-machine-learning/

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STATISTICAL METHODS + Lab

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

Linear Statistical Models: Scatter diagram. Linear regression and correlation. Least squares method. Rank correlation. Standard multiple regression models with emphasis on detection of collinearity, outliers, non-normality and autocorrelation, Validation of model assumptions. Multiple correlation, Analysis of variance (one way, two way with as well as without interaction)

Estimation: Point estimation, criteria for good estimates (un-biasedness, consistency), Methods of estimation including maximum likelihood estimation.

Test of hypothesis: Concept & formulation, Type I and Type II errors, Neyman Pearson lemma, Procedures of testing

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.

Basics of Time Series Analysis & Forecasting: Stationary, ARIMA Models: Identification, Estimation and Forecasting.

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

Text Books:

1. *Probability and Statistics for Engineers* (4th Edition), I.R. Miller, J.E. Freund and R. Johnson.
2. *Fundamentals of Statistics* (Vol. I & Vol. II), A. Goon, M. Gupta and B.Dasgupta.
3. *The Analysis of Time Series: An Introduction*, Chris Chatfield.

Reference Books:

1. *Introduction to Linear Regression Analysis,* D.C. Montgomery &E.Peck
2. *Introduction to the Theory of Statistics*, A.M. Mood, F.A. Graybill& D.C. Boes.
3. *Applied Regression Analysis*, N. Draper & H. Smith
4. *Hands-on Programming with R*,- Garrett Grolemund

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5. *R for Everyone: Advanced Analytics and Graphics*, Jared P. Lander

Data Source:

- www.rbi.org.in

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DATA STRUCTURES AND ALGORITHMS (PCC-CS301) + Lab

Basic Terminologies and Introduction to Algorithm & Data Organisation: 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

Linear Data Structure: Array, Stack, Queue, Linked-list and its types, Various Representations, Operations & Applications of Linear Data Structures

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 & Applications of Non-Linear Data Structures

Searching and Sorting on Various Data Structures: Sequential Search, Binary Search, Comparison Trees, Breadth First Search, Depth First Search Insertion Sort, Selection Sort, Shell Sort, Divide and Conquer Sort, Merge Sort, Quick Sort, Heapsort, Introduction to Hashing

File: Organisation (Sequential, Direct, Indexed Sequential, Hashed) and various types of accessing schemes.

Graph: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

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

Text Books:

1. *Fundamentals of Data Structures*, E. Horowitz, S. Sahni, S. A-Freed, Universities Press.
2. *Data Structures and Algorithms*, A. V. Aho, J. E. Hopperoft, J. D. UIlman, Pearson.

Reference Books:

1. *The Art of Computer Programming: Volume 1: Fundamental Algorithms*, Donald E. Knuth.
2. *Introduction to Algorithms, Thomas*, H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, The MIT Press.

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3. *Open Data Structures: An Introduction (Open Paths to Enriched Learning)*, (Thirty First Edition), Pat Morin, UBC Press.

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PRINCIPLES OF ELECTRONICS ENGINEERING + Lab

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.

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.

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

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

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

Digital Electronics Fundamentals: Difference between analog and digital signals, Logic ICs, half and full adder/subtractor, multiplexers, demultiplexers, flip-flops, shift registers, counters.

Laboratory

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

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Semester II

PRINCIPLES OF ELECTRONICS ENGINEERING + Lab (continued)

Text Books:

1. *Microelectronics Circuits*, Adel S. Sedra and Kenneth Carless Smith, Oxford University Press.
2. *Millman's Integrated Electronics*, Jacob Millman, Christos Halkias, Chetan Parikh, McGraw Hill Education.
3. *Digital Logic & Computer Design*, M. Morris Mano, Pearson

Reference Books:

1. *Electronic Devices and Circuit Theory*, Robert L. Boylestad, Louis Nashelsky.
2. *Solid State Electronic Devices*, 6th Edition, Ben Streetman, Sanjay Banerjee
3. *Electronic Principle*, Albert Paul Malvino.
4. *Electronics Circuits:Discrete & Integrated*, D Schilling C Belove T Apelewicz R Saccardi.
5. *Microelectronics*, Jacob Millman, Arvin Grabel.
6. *Electronics Devices & Circuits*, S. Salivahanan, N. Suresh Kumar, A. Vallavaraj
7. *Electronic Devices & Circuit Theory*, 11th Edition, Robert L. Boylestad, Louis Nashelsky.

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FUNDAMENTALS OF ECONOMICS

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 Firm Under Perfect Competition*; *Monopoly and Monopolistic Competition*

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

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.

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Semester II

BUSINESS COMMUNICATION & VALUE SCIENCE – II

TEACHING SCHEME:	EXAMINATION SCHEME:	CREDITS ALLOTTED:
Theory: 3 Hrs./Week	Semester Examination: 50 marks	4
Practical: 7 Hrs. / Week	Continuous Assessment: Yes	
Lab: 7 Hrs. / Week	Term Work: 50 marks	

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Course ID:

1.6 (Year 1 Semester 2)

	Leadership Oriented Learning (LOL)	

Nature of Course	Behavioral
Pre requisites	Basic Knowledge of English (verbal and written) Completion of all units from Semester 1

Course Objectives:

1	Develop effective writing, reading, presentation and group discussion skills.
2	Help students identify personality traits and evolve as a better team player.
3	Introduce them to key concepts of a) Morality b) Behavior and beliefs c) Diversity & Inclusion

Course Outcomes:

Upon completion of the course, students shall have ability to:

C2.6.1	Understand tools of structured written communication	[U]
C2.6.2	Use tools of structured written communication	[AP]
C2.6.3	Use electronic/social media to share concepts and ideas	[AP]
C2.6.4	Develop materials to create an identity for an organization dedicated to a social cause	[C]
C2.6.5	Understand the basics of presentation	[U]
C2.6.6	Apply effective techniques to make presentations.	[AP]
C2.6.7	Assess presentations based on given criteria	[E]
C2.6.8	Understand tools for quick reading.	[U]
C2.6.9	Apply the basic concept of speed reading, skimming and scanning.	[AP]
C2.6.10	Identify individual personality types and role in a team.	[U]
C2.6.11	Recognize the concepts of outward behavior and internal behavior	[AP]

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C2.6.12	Understand the basic concepts of Morality and Diversity	[U]
C2.6.13	Create communication material to share concepts and ideas	[C]
C2.6.14	Argue on a topic based on morality and diversity	[E]
C2.6.15	Articulate opinions on a topic with the objective of influencing others	[C]
C2.6.16	Organize an event to generate awareness and get support for a cause	[C]

Course Contents:

- **Identification of common errors in written communication and ways of rectification**
- **Understanding speed reading techniques – Skimming and Scanning**
- **Application of reading and writing skills**
- **Analyzing personality traits and team player style**
- **Understanding the concepts of Morality, Diversity and Inclusion**
- **Application of these concepts**
- **Creation of communication material**
- **Experiencing diversity and organizing events to support inclusion**
- **Assignment – Assimilation of concepts and present them effectively**

Total Hours:	**61**

Text Books:

	There are no prescribed texts for Semester 2 – there will be handouts and reference links shared.

Reference Books:

1	Guiding Souls : Dialogues on the purpose of life; Dr. A.P.J Abdul Kalam ;Publishing Year-2005; Co-author--Arun Tiwari
2	The Family and the Nation; Dr. A.P.J Abdul Kalam; Publishing year: 2015; Co-author: Acharya Mahapragya
3	The Scientific India: A twenty First Century Guide to the World around Us; Dr. A.P.J Abdul Kalam; Publishing year: 2011; Co-author- Y.S.Rajan
4	Forge Your Future: Candid, Forthright, Inspiring ; Dr. A.P.J Abdul Kalam; Publishing year: 2014
5	Abundance: The Future is Better Than You Think; Peter H. Diamandis and Steven Kotler; Published: 21 Feb, 2012; Publisher: Free Press
6	Start With Why: How Great Leaders Inspire Everyone to Take Action; Simon Sinek; Published: 6 October 2011; Publisher: Penguin

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7	Advertising & IMC: Principles and Practice; Sandra Moriarty, Nancy D. Mitchell, William D. Wells; Published: 15 June 2016; Publisher: Pearson Education India
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

Assessment Methods & Levels (based on Bloom's Taxonomy)

Formative assessment (Max. Marks:20)

Course Outcome	Bloom's Level	Assessment Component	Marks
C1.6.1	Understand	Immersion (interview)	5
C1.6.2	Understand	Create CV	4
C1.6.3	Apply	Group Assignment- Form an NGO	5
C1.6.4	Understand	Group activities	3
C1.6.5	Create	Create and present a street play to articulate and amplify the social cause.	3

Summative Assessment based on End Semester Project

Bloom's Level		
Understand		50
Apply		

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Analyze	Written Assessment, project and group discussion	

Lesson Plan

Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
1			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.	Group discussion, Practical	60 Minutes
1	Understand tools of structured written communication	Understand	Research on the social cause each group will work for.	Practical (practical)	90 Minutes
1	Use tools of structured written communication	Understand	Class discussion- Good and Bad Writing. Common errors, punctuation rules, use of words.	PPT, Theory and Practical	90 Minutes
			Group Practical – As a group, they will work on the social		

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
1			issue identified by them. Research, read and generate a report based on the findings. (Apply the learning and recap from the session)	Formative evaluation	70 Minutes
1	Create communication material to share concepts and ideas	Create	**Practical:** Plan and design an E Magazine. Apply and assimilate the knowledge gathered from Sem-1 till date. Share objective & guideline. All members to contribute an article to the magazine, trainer to evaluate the content.	Practical (Practical)	120 Minutes
1	Understand tools for Lucid writing	Understand	Lucid Writing: Encourage the students to go through the links given about Catherine Morris and Joanie Mcmahon's writing techniques.	Theory and Discussion	30 mins
1	Create communication material to share concepts and ideas	Create	Create the magazine	Practical (Lab)	90 Minutes
1		Understand	SATORI – 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.	Theory/Discussion	60 Minutes

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
1	Use electronic/social media to share concepts and ideas	Apply	Launching an E Magazine.	Practical (Lab)	120 Minutes
1			**Quiz Time**	Summative Evaluation for Unit	60 Minutes
Unit 2					
2	Develop materials to create an identity for an organization dedicated to a social cause	Create	Each group will form an NGO. Create Vision, Mission, Value statement, tagline and Design a logo.	Practical and Practical	90 Minutes
2	Understand the basics of presentation	Understand	Introduction to basic presentation skills & ORAI app	Theory and video	60 Minutes
2	Apply effective techniques to make presentations.	Apply	Groups to present their NGOs. Apply the learning gathered from session 2. Presentation to be recorded by the groups. feedback from the audience/ Professor	Formative evaluation	60 Minutes
2	Assess presentation based on given criteria	Evaluate	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	Sharing of learning, written Practical and formative evaluation	60 Minutes & 60 Minutes
2	Create communication material to	Create	Prepare and publish the Second episode of the E Magazine.		

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
	share concepts and ideas Use electronic/social media to share concepts and ideas	Apply		Practical (Lab)	120 minutes
2	Understand the tools for speed reading. Apply the basic concepts of speed reading, skimming and scanning.	Understand Apply	Speed Reading session: Introduction to skimming and scanning; practice the same.	Theory and Practical	30 Minutes
2		Understand	SATORI – Join the dots- Participants to connect their learning gathered from AIP Unit-2 with their existing curriculum	Share the most important learning points	60 Minutes
2			**Quiz Time**	Summative Evaluation for Unit	60 Minutes
Unit 3					
3	Develop materials to create an identity for an organization dedicated to a social cause	Create	Ad campaign- Brain storming session- Students to discuss and explore the means of articulating and amplifying the social issue their NGOs are	Discussion	60 Minutes

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
			working for.		
3	Create communication material to share concepts and ideas.	Create	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.	Practical based learning. Formative evaluation by Theory	a) 30 Minutes b) 60 Minutes
3	Use electronic/social media to share concepts and ideas	Apply Apply	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.	Practical based learning Formative Evaluation	Lab Time: 90 Minutes Class Time:60 Minutes
3	Identify individual personality types and role in a team.	Understand	(1) Theory to find out from the participants their views, observations and experiences of working in a team(2) Intro of Dr. Meredith Belbin and his research on team work and how individuals contribute.	Discussion and Theory	60 Minutes
3	Identify individual personality types and role in a team.	Understand	Cont. (3) Belbin's 8 Team Roles and Lindgren's Big 5 personality traits.(4) Belbin's 8 team player styles	Practical based learning followed by a presentation	40 Minutes
3	Identify individual personality	Understand	(1) Team Falcon Practical to identify individual personality	Practical based learning followed by	(1 &2) 40

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
	types and role in a team.		traits with Belbin's 8 team player styles	a presentation.	Minutes
3	Recognize the concepts of outward behavior and internal behavior	Understand	(2) Similar personality types to form groups (3) Groups present their traits.	Presentation	(3) 60 minutes
3	Create communication material to share concepts and ideas. Use the electronic/social media to share concepts and ideas	Create Apply	Prepare and publish the third episode of the E Magazine.	Practical	60 Minutes
3		Understand Understand	SATORI – (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	60 Minutes
3			**Quiz Time**	Summative Evaluation for Unit	60 Minutes
Unit 4					
4	Understand the basic concepts of Morality and	Understand	Ten minutes of your time – a short film on diversity. Play the video (link to be attached	Video & discussion	30

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
	Diversity		in the FG)		Minutes
4	Understand the basic concepts of Morality and Diversity	Understand	Discuss key take away of the film. Theory to connect the key take away of the film to the concept of empathy.	Practical	30 Minutes
4	Understand the basic concepts of Morality and Diversity	Understand	Touch the target (Blind man) - Debriefing of the Practical. Film: "The fish and I'' by Babak Habibifar" (1.37mins)	Practical and discussion	60 Minutes
4	Create communication material to share concepts.	Create	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, sharing and Practical	120 Minutes
4	Understand the basic concepts of Morality and Diversity	Understand	Research on a book, incident or film based on the topic of your respective NGO	Research and written Practical	120 Minutes
4	Create communication material to share concepts.	Create	Write a review in a blog on the topics they are covering in their research. Theory will give grades to each team.	Written Practical and Formative Evaluation	60 Minutes
4	Understand the basic concepts	Understand	Session on Diversity & Inclusion- Different forms of	PPT, Theory, discussion	60 Minutes

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
	of Morality and Diversity		Diversity in our society.		
4	Create communication material to share concepts.	Create	Teams to video record interviews of people from diverse groups (Ask 5 questions). Share the recordings in FB	Practical	120 Minutes
4	Argue on a topic based on morality and diversity	Evaluate	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.	Practical and formative evaluation	60 Minutes
4	Articulate opinions on a topic with the objective of influencing others	Create	Prepared speech- Every student will narrate the challenges faced by a member of a diverse group in 4 minutes (speech in first person). Theory to give feedback to each student.	Practical and formative Evaluation	90 Minutes
4	Understand the basic concepts of Morality and Diversity	Understand	Discussion on TCS values, Respect for Individual and Integrity.	PPT, Theory, Practical and discussion	60 Minutes
4	Create communication material to share concepts and ideas. Use the electronic/social	Create Apply	Prepare and publish the final episode of the E Magazine.	Practical	120 Minutes

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
	media to share concepts and ideas				
4		Understand	SATORI –Participants share the personal take away acquired from working in teams, GD, learning about presentations and understanding diversity inclusion.	Discussion	60 Minutes
4	Use tools of structured written communication	Apply	**Revisit your resume** Include your recent achievements in your resume.	Submit it to the Professor	Lab time-30 Minutes
4			**Quiz Time**	Summative Evaluation for Unit	60 Minutes
4	Organize an event to generate awareness and get support for a cause	Create	**Project-** 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,	Field work: Formative Evaluation	7 Hours

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
			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.		
TOTAL					**61 hours**
	Assessment	Understand	Written Assessment of 20 marks		
		Create	Project of 20 marks (E-Magazine 4 editions)		
		Analyze, Create	Focus Group Discussion 10 marks		

ENVIRONMENTAL SCIENCES (Non-Credit)

(To be Finalised by Respective Institute)