



(U/S 2(f) and 12B of the UGC Act 1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH
Faculty of Engineering and Applied Sciences
Department of Civil Engineering
Program: M.Tech Transportation Engineering

Program Outcomes:

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, Simulation tools, modern techniques and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Independently carry out research /investigation and development work to solve practical problems related to Transportation Engineering.

PO3: Design & Development of solutions: To design and develop a system to meet desired needs within social areas such as economics, environmental, and ethics.

PO4: Conduct investigations of complex problems: To work upon unfamiliar problems through investigative studies and research and contribute to the development of technological knowledge and intellectual property.

PO5: Modern tool Usage: Apply appropriate methodology and modern engineering/IT tools to meet the international standards in the area of Transportation Engineering.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Acquire integrity and ethics of research to execute projects efficiently.

PO9: Individual and Team Work: Recognize the need for lifelong learning & research independently, with a high level of enthusiasm, commitment and accuracy to improve knowledge and competence continuously

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Observe and examine critically the outcomes of one's actions and make corrective measures subsequently, and learn from mistakes without depending on external feedback.

PO12: Life-long learning: Design one system for Civil Engineering efficient system and make project report for its concept to implementation based on Transportation Techniques.

Semester 1

Course Code: MTTE 101

Title of Course: Numerical Methods And Applied Statistics

L	T	P	C
4	0	0	4

Course Outcomes: After completion of the course, students should be able to

CO1: Apply the different numerical techniques to transportation engineering related problems

CO2: Understand applications of probability theory

CO3: Use regression and correlation analysis to process transportation data

CO/PO mapping (S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	S	S	S	M	S	S	S	W	S	M	W	S
CO2	S	S	S	M	S	S	S	W	S	M	W	S
CO3	S	S	S	M	S	S	S	W	S	M	W	S

Course Content:**UNIT I**

Linear system – Gaussian elimination and Gauss – Jordan methods – matrix inversion – Gauss seidel method – Nonlinear equations – Regula-falsi and Newton- Raphson methods – interpolation – Newton's and Lagrange's interpolation

UNIT II

Linear Programming – Graphical and Simplex methods – Measures of central tendency, dispersion, skewness and Kurtosis – Probability – conditional probability – Bayes' theorem

Random variable – two dimensional random variables – standard probability distributions – Binomial Poisson and normal distributions - moment generating function

UNIT III

Sampling distributions – confidence interval estimation of population parameters – testing of hypotheses – Large sample tests for mean and proportion – t-test, F-test and Chi-square test – curve fitting-method of least squares

UNIT IV

Regression and correlation – rank correlation – multiple and partial correlation – analysis of variance-one way and two way classifications – experimental design – Latin square design – Time series analysis.

Recommended Books

1. Bowker and Liberman, Engineering Statistics, Prentice-Hall, 1972.
2. Venkatraman, M.K., Numerical Methods in Science and Engineering, National Publisher Company.

Course Code: MTTE 102

Title of Course : Highway Traffic Analysis And Design

L	T	P	C
2	1	0	3

Course Outcomes: After completion of the course, students should be able to

CO1: Understand the concept of traffic analysis

CO2: Conduct traffic surveys

CO3: Design links and intersections

CO4: Build safety aspects in designing

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO' S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	S	S	M	M	M	S	S	S	S	M	W	S
CO2	S	S	M	M	M	S	S	S	S	M	W	S
CO3	S	S	M	M	M	S	S	S	S	M	W	S
CO4	S	S	M	M	M	S	S	S	S	M	W	S

Course Content:

UNIT I

Elements of Traffic Engineering - road user, vehicle and road way. Vehicle characteristics –IRC standards - Design speed, volume. Highway capacity and levels of service - capacity of urban and rural roads - PCU concept and its limitations - Road user facilities – Parking facilities - Cycle tracks and cycleways - Pedestrian facilities

UNIT II

Traffic volume studies, origin destination studies, speed studies, travel time and delay studies, Parking studies, Accident studies.

UNIT III

Elements of design - Alignment - Cross sectional elements - Stopping and passing sight distance. Horizontal curves - Vertical curves. Design problems – Hill Roads.

UNIT IV

Traffic regulation and control - Signs and markings - Traffic System Management - Design of at-grade intersections – Principles of design – Channelisation - Design of rotaries - Traffic signals - pre-timed and traffic actuated. Design of signal setting - phase diagrams, timing diagram – Signal co-ordination.

UNIT V

Grade separated intersections - Geometric elements for divided and access controlled highways and expressways – Road furniture - Street lighting. Traffic Safety – Principles and Practices – Road Safety Audit.

Recommended Books

1. ITE Hand Book, Highway Engineering Hand Book, McGraw - Hill.
2. AASHTO A Policy on Geometric Design of Highway and Streets
3. R. J. Salter and N. B. Hounsel, Highway Traffic Analysis and Design, Macmillan Press Ltd, 1996.

Course Code: MTTE 103

Title of Course : Pavement Analysis and Design

L	T	P	C
2	1	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1: Knowledge regarding the stresses, strains and deflections in rigid and flexible pavements; traffic loading; and material characterization.

CO2: Design methodologies for both rigid and flexible pavements

CO3: Understand the structural and functions failure and the evaluation of pavements

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	S	S	M	S	M	W	S
CO2	S	S	S	M	M	S	S	M	S	M	W	S
CO3	S	S	S	M	M	S	S	M	S	M	W	S

Course Content:

UNIT 1

Introduction: Types and component parts of pavements, Factors affecting design and performance of pavements. Highway and airport pavements, functions of pavement

Components

UNIT II

Pavement Design Factors: Design wheel load, strength characteristics of pavement materials, climatic variations, traffic - load equivalence factors and equivalent wheel loads, aircraft loading, gear configuration and tyre pressure. Drainage – Estimation of flow, surface drainage, sub-surface drainage systems, design of sub-surface drainage structures

Flexible Pavement Design: Empirical, semi-empirical and theoretical approaches, design of highway and airport pavements by IRC, AASHTO Methods, applications of pavement design software

UNIT IV

Rigid Pavement Design: Types of joints and their functions, joint spacing; design of CC pavement for roads, highways and airports as per IRC, AASHTO, design of joints. Design of continuously reinforced concrete pavements. Reliability; Use of software for rigid pavement design

UNIT V

Pavement Management: Pavement failures, maintenance of highways, structural and functional condition evaluation of pavements, pavement management system.

Recommended Books

1. Yoder and Witczak, Principles of Pavement Design, John Wiley and Sons
2. Yang. H. Huang, Pavement Analysis and Design, Second Edition, Prentice Hall Inc.
3. Rajib B. Mallick and Tahar El-Korchi, Pavement Engineering – Principles and Practice, CRC Press (Taylor and Francis Group)
4. W.Ronald Hudson, Ralph Haas and Zeniswki ,Modern Pavement Management, McGraw Hill and Co
5. Relevant IRC Codes

Course Code: MTTE 104
Title of Course : Transportation Systems

L	T	P	C
4	0	0	4

Course Outcomes: After completion of the course, students should be able to:

- CO1: Understand different transport plans and policies
- CO2: Characterize different modes of transport and their impact
- CO3: Define and differentiate various urban transportation systems

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	S	S	W	S	S	W	S
CO2	S	S	S	M	M	S	S	W	S	S	W	S
CO3	S	S	S	M	M	S	S	W	S	S	W	S

Course Content:

UNIT 1

Historical development of transport in India - 20 year Road Plans, National Transport Policy Recommendations, IRC, CRRI, Vision 2021, NHDP, PMGSY. Characteristics of different modes of transport and their integration and interactions - impact on environment.

UNIT II

Planning of railway - Passenger and goods terminals - layout - passenger facilities – traffic control. Airport Planning, requirements and components. Design of runway and taxiway - Apron -parking configuration - terminal requirements - Airport marking and lighting - Air traffic control.

UNIT 1II

Planning of Harbours and ports - cargo handling - Containerization - Navigation aids – Inland waterways - Pipeline transportation.

UNIT 1V

Urban transportation systems - Mass rapid transit system - Light rail transit - Personal rapid transit, guided way systems, cabin taxi, dual mode bus - Para transit systems – Demand responsive system - Intermediate public transport.

Recommended Books

1. Paquette, R.J., et al, Transportation Engineering Planning and Design, John Wiley & Sons, New York, 1982.
2. Alan Black, Urban Mass Transportation Planning, McGraw-Hill, 1995.

Course Code: MTTE 105

Title of Course : Intelligent Transportation Systems

L	T	P	C
3	1	0	4

Course Outcomes: After completion of the course, students should be able to:

CO1: Understand the sensor and communication technologies.

CO2: Apply the various ITS methodologies

CO3: Define the significance of ITS under Indian conditions

CO/PO mapping

(S/M/W indicates strength of correlation)

S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	M	S	W	S	M	W	S
CO2	S	S	S	M	M	M	S	W	S	M	W	S
CO3	S	S	S	M	M	M	S	W	S	M	W	S
CO4	S	S	S	M	M	M	S	W	S	M	W	S

Course Content:

UNIT I

Introduction to Intelligent Transportation Systems (ITS) – Definition of ITS and Identification of ITS Objectives, Historical Background, Benefits of ITS - ITS Data collection techniques – Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Geographic Information Systems (GIS), video data collection. Geographic Information Systems (GIS), video data collection.

UNIT II

Telecommunications in ITS – Importance of telecommunications in the ITS system, Information Management, Traffic Management Centres (TMC). Vehicle – Road side communication – Vehicle Positioning System

UNIT 1II

ITS functional areas – Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), Commercial Vehicle Operations (CVO), Advanced Vehicle Control Systems (AVCS), Advanced Public Transportation Systems (APTS), Advanced Rural Transportation Systems (ARTS).

UNIT 1V

ITS User Needs and Services – Travel and Traffic management, Public Transportation Management, Electronic Payment, Commercial Vehicle Operations, Emergency Management, Advanced Vehicle safety systems, Information Management. Automated Highway Systems - Vehicles in Platoons – Integration of Automated Highway Systems. ITS Programs in the World – Overview of ITS implementations in developed countries, ITS in developing countries.

Recommended Books

1. ITS Hand Book 2000: Recommendations for World Road Association (PIARC) by Kan Paul Chen, John Miles.
2. Sussman, J. M., Perspective on ITS, Artech House Publishers, 2005.
3. National ITS Architecture Documentation, US Department of Transportation, 2007 (CD-ROM).

Course Code: MTTE 106
Title of Course :Pavement Materials

L	T	P	C
3	1	0	4

Course Outcomes: After completion of the course, students should be able to:

CO1: Understand the properties and the various test for the subgrade soil, road aggregates and the bitumen.

CO2: Bituminous Mix design and will understand the fatigue behaviors of bituminous mixes

CO3: Perform superpave mix design and design the mix for the CC pavement and will know about the fillers in joints

CO/PO mapping

(S/M/W indicates strength of correlation)

S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	S	S	W	S	W	W	S
CO2	S	S	S	M	M	S	S	W	S	W	W	S
CO3	S	S	S	M	M	S	S	W	S	W	W	S
CO4	S	S	S	M	M	S	S	W	S	W	W	S

Course Content:

UNIT 1

Subgrade soil - Soil composition and structure - Soil classification for engineering purposes-
 Origin, Classification, requirements, properties and tests on road aggregates

UNIT II

Origin, preparation, properties and tests, constitution of bituminous road binders,
 requirements - Bituminous Emulsions and Cutbacks: Preparation, characteristics, uses and tests

Bituminous Mixes: Mechanical properties - Resilient modulus, dynamic modulus and fatigue characteristics of bituminous mixes.

UNIT 1II

Weathering and Durability of Bituminous Materials and Mixes - Performance based Bitumen Specifications – Superpave mix design method

UNIT 1V

Cement Concrete for Pavement Construction: Requirements, design of mix for CC pavement, joint filler and sealer materials.

Recommended Books

1. RRL, DSIR, Bituminous Materials in Road Construction, HMSO Publication, 1955
2. IS and IRC Publications on relevant topic.

Course Code: DBSS-101

Title of the Course: Soft Skills-I

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO1: To groom students to be Resilient and to be better equipped to cope with the unfamiliar circumstances, to manage disappointments and deal with conflicts.

CO2: To enable the students to connect and work with others to achieve a set task.

CO3: The course will train the students to gain Leadership skills and be a Leader who can assess and identify the strengths within the team and utilize the diverse skills of the group to achieve the set objectives

CO4. To cause a basic awareness about the significance of soft skills in professional and interpersonal communications and facilitate an all-round development of personality

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
COs	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	W	S	M	M	W	M	S	S	M	S
CO2	M	M	M	S	S	M	W	S	S	S	S	S
CO3	M	M	M	M	S	S	M	M	S	S	S	S
CO4	S	M	M	W	S	W	M	M	S	S	S	S

Unit	Course Outlines	Hour(s)
Unit-I	Introduction to Communication Skills in English A) The Importance of Communication and the Process of communication-Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context. B) Everyday Conversations. C) Barriers to Communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional Barriers.	8
Unit-II	Team Work & Leadership Skills A) Broader Meaning of a Leader, Traits of a Leader. A Leader's Commitment to Mission and Vision of an Organisation. Managers versus Leaders. B) Developing Leadership Skills. Addressing Ethics in Leadership Skills.	8
Unit-III	Written English Communication A) Progression of thoughts and ideas. B) Structure of Paragraph and Essay. C) Formal and Informal Letter Writing D) Corporate Communication	8
Unit-IV	Etiquettes & Manners – Social & Business	8

	A) Communication Etiquettes B) Principles of Trust C) Disability Etiquettes D) Gadget Etiquettes	
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Reference Books:

1. Klaus, Peggy (2009).The Hard Truth about Soft Skills. Harper Collins Publishers.
2. Fleming, Kerrie (2016).The Leader's Guide to Emotional Agility. Pearson Education Limited.
3. Riggio&Sherylle J, Tan (2014). Leader Interpersonal and Influence Skills. Routledge.
4. Rutherford, J. Andrea (2000). Basic Communication Skills for Technology. Pearson Education.
5. Kumar, Sanjay (2011). Communication Skills. Oxford University Press.
6. Robbins, Stephen.P (2013).Organizational Behaviour. Pearson.
7. Gill, Hasson (2011). Brilliant Communication Skills.Pearson.
8. Ramesh, GopalaSwamy (2013).The Ace of Soft Skills: Attitude, Communication and Etiquette for Success. Pearson.

Course Code: MTTE 201

Title of Course :Road Transport Management And Economics

L	T	P	C
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1: Knowledge about the concepts of economics

CO2: Understand basic concepts of economic analysis

CO3: Understand depreciation and its application

CO4: Able to know basic application of economics

CO/PO mapping

(S/M/W indicates strength of correlation)

S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	M	S	W	S	M	W	S
CO2	S	S	S	M	M	M	S	W	S	M	W	S
CO3	S	S	S	M	M	M	S	W	S	M	W	S
CO4	S	S	S	M	M	M	S	W	S	M	W	S

Course Content:

UNIT I

Motor Vehicles Act - statutory provision for road transport and connected organisations. Route scheduling, Freight transport, Vehicle scheduling, Optimum fleet size, Headway control strategies, Crew scheduling.

UNIT II

Depots and Terminals - Principles and types of layout, Depot location, Twin depot concept, Crew facilities. Design of parking facilities – Bus terminal, bus stops and bus bays

Transportation costs - Supply and demand - elasticity of demand; Supply of transport services - Economics of traffic congestion - Pricing policy. Vehicle operating costs – Fuel costs - Maintenance and spares - Depreciation - Crew costs - Value of travel time savings -Accident costs.

UNIT III

Economic analysis of projects - Methods of evaluation - Cost-benefit ratio, first year rate of return, net present value, and internal-rate of return methods; Indirect costs and benefits of transport projects.

UNIT IV

Financing of road projects - methods – Private Public Partnership (PPP) - Toll collection - Economic viability of Build-Operate-Transfer Schemes – Risk Analysis - Case Studies

Recommended Books

1. Winfrey, Economic analysis for Highways, International Textbook Company, Pennsylvania, 1969.
2. CRRI, Road User Cost Study in India, New Delhi, 1982
3. IRC, Manual on Economic Evaluation of Highway Projects in India, SP30, 2007

Course Code: MTTE 202

Title of Course : Transportation Planning

L	T	P	C
2	1	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1: Understand urban activity system and travel patterns

CO2: knowledge about the four stage travel demand modeling

CO3: Able to know about classical methods of urban transportation planning.

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	S	S	M	S	M	W	S
CO2	S	S	S	M	M	S	S	M	S	M	W	S
CO3	S	S	S	M	M	S	S	W	S	M	W	S

Course Content:

UNIT I

Urban Transportation Planning - Goals and objectives - Hierarchical levels of transportation planning - Forecast - Implementation - Constraints. UTP survey - Inventory of land use

UNIT II

Trip generation - Trip classification - productions and attractions - Multiple regression models - Category analysis - Trip production models - Trip distribution models - Linear programming approach.

UNIT III

Modal split models - Behavioural models - Probabilistic models - Utility functions – logit models - Two stage model. Traffic assignment - Assignment methods - Route-choice behaviour - Network analysis.

UNIT IV

Land use and its interaction - Lowry derivative models - Quick response techniques - Non-Transport solutions for transport problems. Characteristics of urban structure. Town planning concepts.

UNIT V

Preparation of alternative plans - Evaluation techniques - Plan implementation - Monitoring-Financing of Project – Case studies

Recommended Books

1. Hutchinson, B.G., Principles of Urban Transport Systems Planning, Scripta, McGraw-Hill, New York, 1974.
2. Khisty C.J., Transportation Engineering - An Introduction, Prentice Hall, India, 2002.

Course Code: MTTE 203

Title of Course : CAD in Transportation Engineering

L	T	P	C
2	1	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1: Knowledge about the role of graphic communication in the engineering design processes

CO2: Able to use CAD software to generate a computer model and technical drawing

CO3 : Understand and demonstrate dimensioning concepts and techniques

CO/PO mapping

(S/M/W indicates strength of correlation)

S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	M	S	W	S	M	W	S
CO2	S	S	S	M	M	M	S	W	S	M	W	S
CO3	S	S	S	M	M	M	S	W	S	M	W	S

Course Content:

UNIT I

Transportation Software – Mx Road, REI heads, HDM4, TRIPS, MIGRAN GIS and Remote

Sensing Packages – ArcGIS, Geo-Concept, GRAM++, ENVI, ERDAS

Imagine

UNIT II

Computer Aided Drafting - DBMS concepts - Civil Engineering Databases – Data entry & Reports. Spreadsheet concepts – Worksheet calculations in Civil Eng, - Regression & Matrix Inversion.

UNIT III

Development of C programs to solve problems using numerical techniques

- a. Roots of an equation using Newton – Raphson method.
- b. Solution of linear simultaneous equations using Gauss elimination.
- c. Matrix inversion using Gauss Jordan method
- d. Linear regression line of given points.

Recommended Books

1. Rajaraman, V., Computer Oriented Numerical Methods, Prentice – Hall of India, 1995
2. Chapra S.C., and Canale R.P., Numerical Methods for Engineers, McGraw – Hill, 2004
3. Software Manuals

Course Code :MTTE 204

Title of Course : Traffic and Pavement Engineering Laboratory

L	T	P	C
0	0	2	1

Course Outcomes: After completion of the course, students should be able to:

CO1: Knowledge about the tests and bituminous mix design

CO2: Traffic studies in the field and also analyse the field data

CO3: Useful for controlling pollution from various transportation systems.

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	S	S	W	S	M	W	S
CO2	S	S	S	M	M	S	S	W	S	M	W	S
CO3	S	S	S	M	M	S	S	W	S	M	W	S

Course Content:

Traffic Surveys: Volume count, Speed study, Parking study, Intersection turning movements, Speed and Delay study, Moving observer survey, Traffic noise measurement, Vehicle emission testing, Road lighting, User perception surveys, Road side and house hold interviews

Tests on sub grade soil, aggregates, bitumen, modified binders - Soil stabilization - Pavement evaluation.

Mix Design: Granular Sub-base, Bituminous – DBM, SDBC, BC, etc., Cement concrete.

Mini project report based on field and laboratory studies and data collected

Course Code: MTTE 205
Title of Course : Theory of Traffic Flow

L	T	P	C
3	0	0	3

COURSE OUTCOMES: After the completion of the course students should be

CO1: Apply the flow theories to field situations such as toll booths, diversion measures etc.

CO2: Understand various car following theories

CO3: Apply the concepts of vehicle arrivals to field situations such as exit ramps, entry ramps etc by queuing theory

CO4: Application of GIS techniques in Traffic Engineering

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO' S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	S	S	S	M	M	M	S	W	S	M	W	S
CO2	S	S	S	M	M	M	S	W	S	M	W	S
CO3	S	S	S	M	M		S	W	S	M	W	S

Course Content:

UNIT I

Traffic stream parameters - Fundamental diagram of volume-speed-density surface. Discrete and continuous probability distributions. Merging manoeuvres - critical gaps and their distribution.

UNIT II

Macroscopic models - Heat flow and fluid flow analogies - Shock waves and bottleneck control approach.

Microscopic models - Application of queuing theory - regular, random and Erlang arrival and service time distributions - Waiting time in single channel queues and extension to multiple channels.

UNIT III

Linear and non-linear car following models - Determination of car following variables - Acceleration noise.

UNIT IV

Geographical Information System – Global Positioning System – Intelligent Transportation Systems - Area Traffic Control – Automatic Toll Collection – Smart Cards – Collision Detection System.

Recommended Books

1. Drew, D.R., Traffic Flow Theory and Control, McGraw Hill., 1978.
2. TRB, Traffic Flow Theory - A Monograph, SR165, 1975.
3. Burrough P.A. and Rachel A. McDonell, Principles of Geographical Information Systems, Oxford Publication, 2004.

Course Code: MTTE 206

Title of Course : Geographical Information and Remote Sensing

L	T	P	C
3	0	0	3

Course Outcomes: After completion of the course, students should be able to:

CO1 :Analyze the principles and components of photogrammetry and remote sensing

CO2 : Describe the process of data acquisition of satellite images and their characteristics

CO3 : Compute an image visually and digitally with digital image processing techniques

CO4 : Explain the concepts and fundamentals of GIS

CO5 :Compute knowledge of remote sensing and GIS in different Civil Engineering applications

CO/PO mapping

(S/M/W indicates strength of correlation)

S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	S	S	W	S	M	W	S
CO2	S	S	S	M	M	S	S	W	S	M	W	S
CO3	S	S	S	M	M	S	S	M	S	M	W	S
CO4	S	S	S	M	M	S	S	M	S	M	W	S
CO5	S	S	S	M	M	S	S	M	S	M	W	S

Course Content:

UNIT I

GIS Definition – Map and map analysis – Automated cartography – History and development of GIS – Hardware requirement – Type of data – Spatial and non-spatial data – Data structure – Vector and raster – Files and data formats – Data compression.

Spatial analysis – Data retrieval – Query – Overlay – Vector data analysis – Raster data analysis – Modelling in GIS – Digital Elevation Model – DTM – Types of output data –

Output devices – Sources of errors – Types of errors – Elimination – Accuracies - The Global Positioning system and its applications

UNIT II

Concepts and foundations of remote sensing - electromagnetic spectrum - EMR interaction with atmosphere, water vapour, ozone - Basic principles of photogrammetry – Spectral Signature and Spectral Signature curves - Remote sensing platforms and sensors

UNIT III

Satellite system parameters, sensor parameters, earth resources and meteorological satellites, microwave sensors, Data Acquisition and interpretation - Visual Image Interpretation – Visual Image Interpretation Equipment - Digital Image Processing – Classification

Applications in Survey, mapping and monitoring of land use/land cover - Transportation planning - Infrastructure development - Natural resources management - Urban Planning, Environment - Coastal Zone Management – Air Quality - Development of Resources Information Systems

Recommended Books

1. Burrough P.A. and Rachel A. McDonell, Principles of Geographical Information Systems, Oxford Publication, 2004
2. C.P. Lo and Albert K. W. Yeung, Concepts and Techniques of Geographical Information Systems, Prentice- Hall India, 2006
3. Thomas. M. Lillesand and Ralph. W. Kiefer, Remote Sensing and Image Interpretation, John Wiley and Sons, 2003.

Course Code : MTTE 207

Title of Course :Transportation Systems, Analysis and Modelling

L	T	P	C
2	1	0	3

Course Outcomes: After completion of the course, students should be able to

CO1. Knowledge of mathematics, computer science, economics, urban planning, and engineering

CO2. Understand the concept of transportation interaction

CO 3. Evaluation and analysis of transportation system

CO 4. Understand about the intelligent transportation system

CO/PO mapping

(S/M/W indicates strength of correlation)

S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	S	M	M	S	S	W	S	M	W	S
CO2	S	M	S	M	M	M	S	W	S	M	S	S
CO3	S	S	S	M	M	M	S	W	S	M	W	S
CO4	S	S	S	M	M	S	S	W	S	M	S	S

Course Content:

- Systems modeling-
- definitions; Transport models,
- Model building kit, Mathematical modeling and its calibration,
- Data collection and application of models ;
- Land use and transportation interaction ;
- Future forecasts using models ;
- Evaluation and analysis of transportation systems

Essential Reading:

P.H. Wright, N.J. Ashford, R.J. Stammer, Transportation Engineering: Planning and Design, 4th Edition, December 1997

Principles of Highway Engineering and Traffic Analysis, John Wiley & Sons, 3rd Ed., 2004.

Supplementary Reading:

M.D. Meyer and E.J. Miller, Urban Transportation Planning. Urban Transportation Planning: A Decision-Oriented Approach, 2nd edition, Hill, 2002. B.G. Hutchinson, Urban Transportation Planning, Mc. Graw Hill, 1974

Course Code : MTTE 208

Title of Course : Highway and Airport Pavement Materials

L	T	P	C
2	1	0	3

Course Outcomes: After completion of the course, students should be able to

CO1: Knowledge about the materials used for pavement of highways and airports

CO2: Analyse and designing of highway and airport

CO3: Understand the mixes for various kinds of roads

CO4: Knowledge about conventional and non conventional materials

CO/PO mapping

(S/M/W indicates strength of correlation)

S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	M	S	W	S	M	W	S
CO2	S	S	S	M	M	M	S	W	S	M	W	S
CO3	S	S	S	M	M	M	S	S	S	M	M	S
CO4	S	S	S	M	M	M	S	S	S	M	M	S

Course Content:

- Conventional aggregates and their evaluation,
- Bituminous binders- Properties, testing and applications;
- Bituminous mixes- Design, testing and evaluation;
- Materials for cement concrete and semi-rigid pavements,
- Design of mixes for stabilized roads ;
- Non-conventional and new pavement materials- their application and limitations.

Essential Reading:

Atkins & Harold, Highway Materials, Soils and Concretes, Prentice Hall – Pearson,4th Ed.,2003

Y.Richard Kim, Modeling of Asphalt Concrete, 2008, McGraw Hill Professional.

Supplementary Reading:

Relevant IRC, ASTM, AASHTO and other Codes, Manuals and Specifications

P.G. Lavin, Asphalt Pavements, Taylor and Francis, 1stEd.2007

Course Code: DBES-100

Title of the Course: Environmental Studies

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO1: Articulate the interdisciplinary context of environmental issues.

CO2: Identify and justify key stakeholders in humanities and social sciences that need to be a part of sustainable solutions.

CO3: Formulate an action plan for sustainable alternatives that integrate science, humanist, and social perspectives.

CO4: Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems.

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	S	W	W	S	M	S	M
CO2	S	S	M	M	S	M	M	W	W	S	M	S
CO3	S	M	S	M	S	W	S	M	S	W	S	S
CO4	S	S	M	W	S	S	W	W	S	M	S	M

Unit	Course Outlines	Hour(s)
1	<p>The Multidisciplinary Nature of Environmental Studies Definition, scope and importance Need for public awareness. Natural Resources Renewable and Non-renewable Resources:</p> <ul style="list-style-type: none"> Natural resources and associated problems. <ul style="list-style-type: none"> (a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. 	8

	<p>(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.</p> <p>(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, Case studies.</p> <p>(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.</p> <p>(f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.</p> <ul style="list-style-type: none"> • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles. 	
2	<p>Ecosystems</p> <ul style="list-style-type: none"> • Concept of an ecosystem. • Structure and function of an ecosystem. • Producers, consumers and decomposers. • Energy flow in the ecosystem. • Ecological succession. • Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: <p>(a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) Unit</p> <p>Biodiversity and Its Conservation</p> <ul style="list-style-type: none"> • Introduction, definition: genetic, species and ecosystem diversity. • Biogeographical classification of India. • Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. • Biodiversity at global, National and local levels. • India as a mega-diversity nation. • Hot-spots of biodiversity. • Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. • Endangered and endemic species of India. • Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity 	10

3	<p>Environmental Pollution</p> <ul style="list-style-type: none"> • Definition • Causes, effects and control measures of <p>(a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards</p> <ul style="list-style-type: none"> • Solid waste management: Causes, effects and control measures of urban and industrial wastes. • Role of an individual in prevention of pollution. • Pollution case studies. • Disaster management: Floods, earthquake, cyclone and landslides. <p>Social Issues and the Environment</p> <ul style="list-style-type: none"> • From unsustainable to sustainable development. • Urban problems related to energy. • Water conservation, rain water harvesting, watershed management. • Resettlement and rehabilitation of people; its problems and concerns. Case studies. • Environmental ethics: Issues and possible solutions. • Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. • Wasteland reclamation. • Consumerism and waste products. • Environment Protection Act. • Air (Prevention and Control of Pollution) Act. • Water (Prevention and Control of Pollution) Act. • Wildlife Protection Act. • Forest Conservation Act. • Issues involved in enforcement of environmental legislation. • Public awareness. Common UGC Syllabus for Environmental Studies <p>xiii</p>	12
4	<p>Human Population and the Environment</p> <ul style="list-style-type: none"> • Population growth, variation among nations. • Population explosion—Family Welfare Programme. • Environment and human health. • Human rights. • Value education. • HIV/AIDS. • Women and Child Welfare. • Role of Information Technology in environment and human health. • Case Studies. <p>Field Work</p> <ul style="list-style-type: none"> • Visit to a local area to document environmental assets—river/forest/grassland/hill/mountain. • Visit to a local polluted site—Urban/Rural/Industrial/Agricultural. 	15

	<ul style="list-style-type: none">• Study of common plants, insects, birds.• Study of simple ecosystems—pond, river, hill slopes, etc.• (Field work equal to 5 lecture hours)	
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Total -45

Recommended Books

1. “ Environmental Science” by Miller T G.
2. “ Introduction to Environmental Engineering and Science” by Gilbert M Masters.
3. “ The Biodiversity of India” by Bharucha Erach.
4. “ Essentials of Ecology” by Townsend C and Michael Begon.
5. <https://nptel.ac.in/courses/122102006/>
6. https://swayam.gov.in/nd2_cec19_bt03/preview
7. <https://www.pdfdrive.com/environmental-science-e12033451.html>

Course Code: MTTE 301

Title of Course: Seminar

L	T	P	C
0	0	4	2

Course Outcomes:

CO1: Defines the subject and determines the contents

CO2: carry out academic and scientific research in related fields, using quantitative methods

CO3: develop problem-solving skills

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	S	M	W	M	W	S	S
CO2	S	S	S	S	S	S	S	W	M	W	S	S
CO3	S	S	S	S	S	S	M	W	M	W	S	S

Content:

This is an unstructured open-ended course where under the overall supervision of a faculty member of his discipline. Each student must submit a seminar report as a culmination of his Endeavour and investigation. The course will aim to evaluate student's actual ability to use the fundamentals of knowledge and to meet new unknown situations as demonstrated by the students' interaction with the teachers

Course Code : MTTE 302

Title of Course: Project

L	T	P	C
0	0	12	6

Course Outcomes:

CO1: use statistical techniques to model and solve real-life problems

CO2: Relates the causes and outcomes of the subject

CO3: analyse the results of a research

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	S	M	W	M	W	S	S
CO2	S	S	S	S	S	S	S	W	M	W	S	S
CO3	S	S	S	S	S	S	M	W	M	W	S	S

A student can work on the following types of Projects:

- 1. Lab Oriented Projects:** These include projects involving Laboratory investigation or Laboratory development in the students' discipline or interdisciplinary areas. It must co-terminate with a project report.
- 2. Study Oriented Projects:** These include projects which are oriented towards readings from published literature or books about new frontiers of development or analysis of available data base. It must co-terminate with a project report.
- 3. Computer Oriented Projects:** These are intended to impart practical training to students in the areas of computer software and hardware. The projects would be student-oriented, individually supervised by a project guide. It must co-terminate with a project report.
- 4. Projects on Organizational Aspects:** These involve projects related to thrust areas where students are expected to get involved with planning, organization, and execution of new ideas and concepts. It must co-terminate with a project report.

Course Code: MTTE 303

Title of Course : Ground Improvement Techniques

L	T	P	C
3	1	0	4

Course Outcomes:After completion of the course, students should be able to:

CO1: Understand the fundamental concepts of ground improvement techniques

CO2: Understand the concepts of chemical compaction, grouting and other miscellaneous methods

CO3: Knowledge about the modification or ground required for construction of civil engineering structures

CO4: Analyze and design the technique for ground improvement

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	M	M	W	M	W	S	M	S	S
CO2	S	S	S	M	S	W	M	W	S	M	S	S
CO3	S	S	S	M	S	W	M	W	S	M	S	S
CO4	S	S	S	M	S	W	M	W	S	M	S	S

Course Content:

UNIT I

Introduction: Engineering properties of soft – weak and compressible deposits – problem associated with weak deposit – Requirements of ground improvements – introduction to engineering ground modification, need and objectives.

UNIT II

Soil Stabilization: Science of soil stabilization – Mechanical modification – Hydraulic modification – Dewatering systems – Chemical modification – Modification by admixtures like lime, Cement, Bitumen etc. – Grouting – Deep jet mixing methods

UNIT III

Recent Ground improvement techniques: stabilization using industrial waste – modification by inclusion and confinement – soil nailing – stone column – compaction piles – dynamic

compaction – prefabricated vertical drains – preloading – electro – osmosis – soil freezing
vacuum consolidation – deep explosion – dry powdered polymers - enzymes

Soil reinforcement: Historical background, RCC – Vidalean concept of reinforced earth –
Mechanisms – Types of reinforcements – Soil – Reinforcement – Interaction studies –
Internal & External stability criteria – Design Principles of steep reinforced soil slopes –
pavements – Embankments on soft soils.

UNIT IV

Geo-Synthetics: Geo-synthetic clay liner – Construction details – Geo Synthetic Materials –
Functions – Property characterization – Testing Methods for Geo – Synthetics – Recent research
and Developments. Control of Improvement – Field Instrumentation – design and analysis for
bearing capacity and settlement of improved deposits.

Recommended Books

1. Hausmann, M.R., Engineering Principles of Ground Modification, McGraw – Hill International Editions, 1990.
2. Purushotham Raj, Ground Improvement Techniques, Laxmi Publications, New Delhi
3. Sharma.S.K., Principles, Practice and Design of Highway Engineering, S.Chand& Co. New Delhi,1985.
4. Jones C. J. F. P, Earth Reinforcement and Soil Structures, Butterworths, London.

Course Code: MTTE-304

Title of Course : Bridge Engineering

L	T	P	C
3	1	0	4

Course Outcomes: After completion of the course, students should be able to:

CO1: Sub-surface investigations for bridge construction

CO2: To perform design of various slab type reinforced concrete bridges

CO3: To perform design of bridges sub-structures, bearings and joints

CO4: Knowledge of quality control and maintenance aspects of bridges

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	M	M	W	M	W	S	M	S	S
CO2	S	S	S	M	S	W	M	W	S	M	S	S
CO3	S	S	S	M	S	W	M	W	S	M	S	S
CO4	S	S	S	M	S	W	M	W	S	M	S	S

Course Content:

UNIT I

Components of Bridges – Classification – Importance of Bridges – Investigation for Bridges – Selection of Bridge site – Economical span – Location of piers and abutments – Subsoil exploration – Scour depth – Traffic projection – Choice of bridge type

UNIT II

Specification of road bridges – width of carriageway – loads to be considered – dead load –IRC standard live load – Impact effect

UNIT III

General design considerations – Design of culvert – Foot bridge - slab bridge – T-beam bridge– Pre-stressed concrete bridge – Box Culvert-Fly over bridges

Recommended Books

1. Ponnuswamy, S., Bridge Engineering, Tata McGraw - Hill, New Delhi, 1997
2. Victor, D.J., Essentials of Bridge Engineering, Oxford & IBH Publishers Co., New Delhi, 1980.
3. N. Rajagopalan, Bridge Superstructure, Narosa Publishing House, New Delhi, 2006.

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Course Code: MTTE-305

Title of Course : Transport Economics

L	T	P	C
3	1	0	4

Course Outcomes:After completion of the course, students should be able to:

CO1: Able to apply the concepts and tools of microeconomics

CO2: Understand the basic concepts of economic analysis

CO3: Knowledge about depreciation and its application

CO4: Able to know about the basic application of economics

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	M	M	W	M	W	S	M	S	S
CO2	S	S	S	M	S	W	M	W	S	M	S	S
CO3	S	S	S	M	S	W	M	W	S	M	S	S
CO4	S	S	S	M	S	W	M	W	S	M	S	S

Course Content:

Economic significance of transport, Demand for transport – influencing factors, temporal and spatial variations, elasticity of demand, Supply of transport Costs – Long – term and short – term Costs, fixed and variable costs, and marginal costs, Pricing of services, Road User Costs, Evaluation of transport projects – Cost – benefit ratio, first year rate of return, net present value and internal – rate of return methods, Indirect Costs and benefits of transport projects, Project ownership and financing, Highway finance and Taxation.

Course Code: MTTE 306

Title of Course : Highway Construction Practice

L	T	P	C
3	1	0	4

Course Outcomes: After completion of the course, students should be able to:

CO1: Knowledge about embankment construction, different types of pavement constructions and also the process of recycling of pavement materials.

CO2: Designing of roads for hilly, swampy and desert areas

CO3 : Deploy labor and machinery in road construction effectively

CO/PO mapping

(S/M/W indicates strength of correlation)

S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	M	S	W	S	M	W	S
CO2	S	S	S	M	M	M	S	W	S	M	W	S
CO3	S	S	S	M	M	M	S	W	S	M	W	S

Course Content:

UNIT I

Embankment Construction: Formation cutting in Soil and hard rock, Preparation of Subgrade, Ground improvement, Retaining and Breast walls on hill roads, Granular and Stabilized, Sub – bases / bases, Water Bound Macadam (WBM), Wet Mix Macadam (WMM), Cement treated bases, Dry Lean Concrete(DLC).

UNIT II

Bituminous Constructions: Types of Bituminous Constructions, Interface Treatments, Bituminous Surfacing and wearing Courses for roads and bridge deck slabs, Selection of wearing Course under different Climatic and Traffic conditions, IRC specifications, Construction techniques and Quality Control.

UNIT III

Concrete road construction: Test on Concrete mixes, Construction equipments, Method of construction of joints in concrete pavements, Quality Control in Construction of Concrete pavements, Construction of Continuously reinforced, Prestressed, Steel Fibre Reinforced (SFRC) Pavements, IRC, MORT&H, ACI Specifications, AASHTO Specifications, Recycled pavements, Non – Conventional Pavements, Overlay Construction.

UNIT IV

Hill Roads Construction: Stability of Slopes, Landslides – Causes and Control measures, Construction of Bituminous and Cement Concrete roads at high altitudes, Hill road drainage, Construction and maintenance problems and remedial measures.

Course Code: DBSS-102

Title of the Course: Soft Skills-II

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO1: The course will skill the student to learn Effective Communication, writing skills in English and Listening Skills.

CO2: to address various challenges of communication as well as behavioral skills faced by individual at work place and organizations.

CO3: This course will help the student gain Emotional maturity and Emotional health.

CO4: to enhance the employability of the students.

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	M	M	W	M	S	S	M
CO2	M	S	M	M	S	S	M	W	S	S	S	S
CO3	M	M	M	M	M	S	S	M	M	S	S	S
CO4	S	S	M	S	W	S	W	M	M	S	S	S

Unit	Course Outlines	Hour(s)
Unit-I	<p>Introduction to Non-verbal Communication Skills in English</p> <p>A) Non- Verbal Communication and Body Language. Basic Elements of Body Language, Kinesics.</p> <p>B) Basic Listening Skills: Becoming an Active Listener</p> <p>C) Basic Writing Skills: Fundamentals of Grammar, Letter Writing & Paragraph Writing</p>	6
Unit-II	<p>Management Skills</p> <p>A) Time Management – Program Evaluation Review Technique (PERT), The Pareto Principle, The Law of the Three, The Important Versus the Urgent.</p> <p>B) Anger Management – What is Anger, Effects of Anger, Types of Anger, 1-2-3 Turtle Rule, Anger Management.</p> <p>C) Stress Management- Signs & Symptoms, Sources of Stress, Practicing the 4 A's.</p> <p>D)</p>	6
Unit-III	<p>Social & Organisational Well-Being</p> <p>A) Emotional Intelligence- Traits, Self-Awareness, Self-Regulation, Motivation, Empathy, EQ vs. IQ, Spiritual Intelligence, Whole Brain Training (IQ+EQ+SQ= 3Q).</p> <p>B) Business Dress and Dining Etiquette – Why a Dress Code, Business and Casual Dress Code, Table Manners.</p> <p>C) Netiquette- What is Netiquette, Why Netiquette, Netiquette</p>	10

	Norms, E-Mail Etiquette.	
Unit-IV	Interview Skills, Presentation Skills & Group Discussion A)Curriculum Vitae and Resume Writing, Do's and Don'ts of an Interview B) Planning and Structuring your Presentation. Techniques of Delivering a Presentation like a Pro. C) Group Discussion- Do's & Don'ts of a GD. How to Ace a GD.	10

Total-32

Reference Books:

1. Klaus, Peggy (2009).The Hard Truth about Soft Skills. Harper Collins Publishers.
2. Fleming, Kerrie (2016).The Leader's Guide to Emotional Agility. Pearson Education Limited.
3. Butterfield, Jeff (2010).Problem Solving& Decision Making, Course Technology.Cengage Learning.
4. Pellerin, Charles. J. (2009). How NASA Builds Teams: Mission Critical Soft Skills for Scientists, Engineers, and Project Teams. John Wiley & Sons. Inc.
5. Riggio&Sherylle J, Tan (2014). Leader Interpersonal and Influence Skills. Routledge.
6. Rutherford, J. Andrea (2000). Basic Communication Skills for Technology. Pearson Education.

Course Code: DBMTE 401

Title of Course: Dissertation

L	T	P	C
0	0	32	16

Course outcomes:

CO1: plan, and engage in, an independent and sustained critical investigation and evaluation of a research area

CO2: understand and apply ethical standards of conduct in the collection and evaluation of data and other resources

CO3: communicate research concepts and contexts clearly and effectively both in writing and orally

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	S	S	S	M	W	W	M	W	S	S
CO2	S	M	S	S	S	M	W	W	M	W	S	S
CO3	S	M	S	S	S	M	W	W	M	W	S	S

Dissertation:

- (a) A student enrolled for M.Tech. degree shall have to work on a Dissertation. The Dissertation work involves in-depth study and critical review of the topic and the creation of new knowledge in the area either through development of new techniques, instruments, experimental facility and new experimental findings and/or theoretical and fundamental insight or by reinterpretation of the existing facts to propound new theory.
- (b) A PG student shall normally carry out his dissertation in the Institute. However, he may be allowed to carry it out in other organizations provided he/she has completed all courses except dissertation.

Unfair means and Plagiarism

- (a) In case a student is found lifting of some other's work(s) and inserting it in his/her project, seminar and dissertation etc. without proper acknowledgement, credit and reference or plagiarizing the dissertation /project report etc., such penal action shall be taken by the Institute as may be necessary to uphold the sanctity, integrity and the credibility of the Institute.

All the students are required to follow the PG Ordinances & Regulations of the Institute