ShriShankaracharya Technical Campus,

ShriShankaracharya Group of Institutions

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekanand Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. 1st Semester Civil Engineering (specialization in Transpiration Engineering)

S. No.	Board of Study	Subject Code	Subject	Periods Per Week			Scheme of Examination			Total Marks	Credit L+(T+P)/2
							Theory / Practical				
				L	T	P	ESE	CT	TA		
1	Civil Engg.	CE230101	Geometric Design	3	1	-	100	20	20	140	4
2	Civil Engg.	CE230102	Traffic Analysis	3	1	-	100	20	20	140	4
3	Civil Engg.	CE230103	Highway Construction and Material	3	1	-	100	20	20	140	4
4	Civil Engg.	CE230104	Sustainable Transportation	3	1	-	100	20	20	140	4
5	Refer Table –I		Elective- I	3	1	-	100	20	20	140	4
6	Civil Engg.	CE230191	Advanced Transportation Lab-I	-	-	10	75		75	150	5
7	Civil Engg.	CE230192	Traffic survey and Analysis Lab	-	-	10	75		75	150	5
Total				**15**	**5**	**20**	**650**	**100**	**250**	**1000**	**30**

L- Lecture, **T-Tutorial**

P-Practical, **CT- Class Test**

ELECTIVE I			
S. No.	**Board of Study**	**Subject Code**	**Subject**
1	Civil Engg.	CE230121	Project Management
2	Civil Engg.	CE230122	Probability and Statistics
3	Civil Engg.	CE230123	Transportation Economics
4	Civil Engg.	CE230124	Environmental Impact Assessment

Note (1) – **1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a Particular academic session .**

Note (2) – **Choice of elective course once made for an examination cannot be changed in future examinations.**

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. 1st Semester Civil Engineering (specialization in Transpiration Engineering)

Subject Code	GEOMETRIC DESIGN	L = 3	T = 0	P = 0	Credits = 4
CE230101	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
To develop an understanding of the principles of geometric design in the context of transportation planning and traffic design. To understand the design criteria for geometric design of highways. To develop the capability to design highways.	On successful completion of the course, the student will be able to: **CO1:-** Develop an understanding of the principles of geometric design in the context of transportation planning and traffic design. **CO2:-** Understand the design criteria for geometric design of highways. **CO3:-** Develop the capability to design highways, and utilize the state of the art tools for this process. **CO4:-** Understand the design criteria for design of horizontal curve in highways. **CO5:-** Understand the design criteria for design of vertical curve in highways.

UNIT–I HIGHWAY ALIGNMENT **CO1**

Highway Alignment: Requirements, factors controlling alignment, Obligatory points, Engineering Surveys for Highway location, Route selection, steps in new project, Highway Classifications. Cross Sectional Element: Pavement Surface Characteristics, Factors affecting skid resistance.

[8Hrs]

UNIT – II Pavement Unevenness **CO2**

Pavement Unevenness, Camber, Providing camber in the field, Width of carriageway, Design Vehicle, Medians, Kerbs, Road Margins, Right of Way, Typical Cross Sections of Roads. Super elevation: Requirement of super elevation, Limits and attainment of super elevation in the field.

[8Hrs]

UNIT – III SIGHT DISTANCES **CO3**

Sight Distances: Introduction, Stopping Sight Distance, Reaction Time, Analysis of Stopping distance, Overtaking Sight distance, Analysis of Overtaking Sight distance, Effect of grade on sight distances, Overtaking zone, Intermediate sight distance, Sight distance at intersections.

[8Hrs]

Subject Code	GEOMETRIC DESIGN	L = 3	T = 0	P = 0	Credits = 4
CE230101	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

UNIT – IV HIGHWAY ALIGNMENT **CO4**

Highway Alignment: General, Design speed, Horizontal curves, super elevation, Analysis of super elevation, Super elevation design, Attainment of super elevation, Widening of pavement on horizontal curves, Methods of introducing extra widening, Horizontal Transition curves, Different types of Transition curves, length of transition curve, setting out of transition curve, Set-back distance on Horizontal curves, Curve Resistance. **[8Hrs]**

UNIT – V **CO5** Vertical Alignment: General, Gradients, Compensation in gradient on horizontal curves, Vertical curves, Summit curve, Length of summit curve, Valley Curve, Length of valley curve. Relevant IRC standards for Urban and Rural roads. **[8Hrs]**

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	Highway Engg	S.K.Khanna & C.E.G. Justo	Seventh	Nem Chand Bros., Roorkee

ReferenceBooks:

S. No.	Title	Authors	Edition	Publisher
1	Principles of Transportation Engineering	Chakroborty & Das	Second	Prentice Hall, India
2	Principles and Practice of Highway Engg	L.R.Kadiyali	Fourth	Khanna Publishers, Delhi

Subject Code	TRAFFIC ANALYSIS	L = 3	T = 1	P = 0	Credits =4
CE230102	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
The objective is to make the students to understand and conceptualize the basic features of traffic which helps us for designing purpose.	On successful completion of the course, the student will be able to: **CO1:-**to understand the components of traffic system **CO2:-**to study traffic data analysis **CO3:-**to learn about traffic characteristics. **CO4:-**to study about highway capacity and analysis. **CO5:-**to study about traffic control devices and environmental condition

UNIT I COMPONENT OF TRAFFIC SYSTEM **CO1**

Introduction, Human-vehicle-environment system, Characteristics of road users; Characteristics Of vehicles; Characteristics of highways, friction. **[8Hrs]**

UNIT – II TRAFFIC DATA ANALYSIS **CO2**

Traffic study components, types of data, Volume studies; Speed studies, Travel time and delay Studies, Intersection studies, pedestrian studies; Parking studies, accident studies. **[8Hrs]**

UNIT – III TRAFFIC CHARACTERISTIC **CO3**

Microscopic and macroscopic flow characteristics; Time headways, temporal, spatial and flow patterns; Interrupted and un-interrupted traffic; Microscopic and macroscopic speed characteristics; Vehicular speed trajectories; Speed characteristics- mathematical distributions; Speed and travel time variations; travel time and delay studies; Microscopic and macroscopic density characteristics; distance headway characteristics; Car-following theories; Density measurement techniques; density contour maps.

[8Hrs]

Subject Code	TRAFFIC ANALYSIS	L = 3	T = 1	P = 0	Credits =4
CE230102	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

UNIT – IV HIGHWAY CAPACITY AND ACCIDENTS ANALYSIS CO4

Highway Capacity and Level of Service; freeway and multi-lane analysis; freeway weaving sections. Accident characteristics – road – driver – vehicle; Accident recording and analysis; Highway safety improvement program; Safety audit. **[8Hrs]**

UNIT –V TRAFFIC CONTROL DEVICES AND ENVIRONMENTAL CONSIDERATION

CO5

Introduction about the signs, markings, signal and warrants; Signal phasing and development of phase plans; fixed and vehicle activated signals; Webster method; ARRB method; Drew method; IRC method, Signal coordination; Area traffic control Air pollution; kinds of pollutants, air pollution standards; Measures of air quality, modeling and control; Measurement of sound levels, acceptable limits; Prediction of noise levels, traffic noise control. **[8Hrs]**

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	Traffic Engineering and Transport planning	Dr. L. R. Kadiyali	Ninth	Khanna Publishers,
2	Traffic Engineering Hand Book	Institute of Transportation Engineers	Fourth	Prentice Hall

ReferenceBooks:

S. No.	Title	Authors	Edition	Publisher
1	Transportation Engineering: An Introduction	Kent Lall	Third	Prentice Hall
2	Principles of Transportation Engineering	ChakrobortyPartha, Das Animesh	first	PHI Learning Pvt. Ltd.
3	Traffic Flow Fundamentals	May, A.D.	first	Prentice Hall

ShriShankaracharya Technical Campus,

ShriShankaracharya Group of Institutions

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekanand Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. 1st Semester Civil Engineering (specialization in Transpiration Engineering)

Subject Code	Highway Construction and Material	L = 3	T = 1	P = 0	Credits = 4
CE230103	ESE	CT	TA	Total	ESE Duration
	100	20	20	40	3 Hours

Course Objective	Course Outcomes
This course will enable students to 1. Understand the basic construction materials and their suitability as road materials. 2. Analyse the aggregates and design aggregate gradation for construction of pavement layers. 3. Characterize the binder material for bituminous roads and provide an optimum bituminous mix design. 4. understand mix design using different materials for various components of a CC pavement.	After studying this course, students will be able to: 1. Identify and select based on their characteristics the basic construction materials for road construction. 2. Design aggregate gradation for construction of pavement layers keeping in mind the density and strength parameters. 3. Characterize the binder material for bituminous roads and provide an optimum bituminous mix design. 4. Provide mix design procedure and the base layer for a CC pavement

UNIT I: PAVEMENT MATERIALS **CO-1**

Aggregates- requirements, properties and testing used in granular layers and bituminous layers, concept of size and gradation-design gradation, aggregate blending to meet specification. Cement grades, chemical composition, testing, admixtures, fibers, properties and testing of pavement quality concrete, high performance concrete. Bitumen and Tar-origin, preparation, properties and chemical constitution of bituminous road binders. Bituminous emulsions and cutback-preparation, characteristics uses and tests, mechanism of stripping, adhesion failure. Bituminous mixes: preparation, design and testing. **[8Hrs]**

UNIT II: PAVEMENT CONSTRUCTION **CO-2**

Subgrade - Significance and functions, evaluation of soil strength, CBR and plate load test, earth work grading, preparation of subgrade, quality control test, subgrade stabilization. Flexible pavements - specification of materials, construction method and field control checks for various types of flexible pavements, super pave concept, new materials like polymer modified bitumen, geo synthetics. Rigid pavements - specification and method of construction, quality control tests, construction of various types of joints. **[8Hrs]**

UNIT III: DESIGN OF FLEXIBLE PAVEMENTS **CO-3**

Factors affecting design and performance - Stresses and deflection in homogenous masses, Burmister"s 2 layer, 3 layer and multi-layer theories , wheel load stresses, ESWL, pavement behavior under transient traffic loads problems on above. CBR method, principle, advantages and application, testing as per IRC, AASHTO, and asphalt institute, problems on above. **[8Hrs]**

		October 2020	1.00	Applicable for AY 2020-21 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	

Subject Code	Highway Construction and Material	L = 3	T = 1	P = 0	Credits = 4
CE230103	ESE	CT	TA	Total	ESE Duration
	100	20	20	40	3 Hours

UNIT IV: DESIGN OF RIGID PAVEMENTS **CO-4**

Factors affecting design and performance, types of stresses ,causes and factors affecting stresses, EWL, Westergaard‟s analysis, Bradbury‟s coefficient, wheel load stresses, warping- frictional- combined stresses, problems on above.IRC design chart, design of longitudinal, contraction and expansion joints, and design of slabs.

[8Hrs]

UNIT V: PAVEMENT EVALUATION AND MAINTENANCE **CO-5**

Failures in pavements- methods of measurement of skid resistance, unevenness, ruts and cracks. Pavement surface condition evaluation by physical measurements methods and their application, Calculation of IRI values - maintenance strategies evaluation by non-destructive tests- Benkelman beam method, overlay design. Pavement performance prediction concepts and models, recycling of pavements, pavement serviceability concepts, maintenance measures- short term and long term. **[8Hrs]**

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	"Highway Material"	Alkins and Harold	Fourth	Prentice Hall, Pearson, 2003
2	"Highway Material"	Kerbs and Walkes,	Eighth	McGraw Hill Book Co.2007
3	“Highway Engineering”-	Khanna and Justo	Tenth	Nem Chand,

ReferenceBooks:

S. No.	Title	Authors	Edition	Publisher
1	IRC 37-2001"Guidelines for the Design of flexible Pavements" The Indian road congress			
2	“Hot Mix Asphalt Materials, mixture design and construction”	Freddy L Roberts, Prithvi S Kandhal et al	second	National Asphalt Pavement Association Research and Education Foundation, Maryland, USA

ShriShankaracharya Technical Campus,

ShriShankaracharya Group of Institutions

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekanand Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. 1st Semester Civil Engineering (specialization in Transpiration Engineering)

Subject Code	Sustainable Transportation	L = 3	T = 1	P = 0	Credits = 4
CE230104	ESE	CT	TA	Total	ESE Duration
	100	20	20	40	3 Hours

Course Objective	Course Outcomes
This course will enable students to 1. To Understand the basic of sustainable transportation to ensure that environmental and social activity which effects transportations. 2. To Understand the transportation activity which effect the economic considerations.	After studying this course, students will be able to: 1. To Understand the sustainability in transport. 2. To Understand the Pricing and costing in transportation. 3. To Understand the planning of sustainability. 4. To understand the sustainable policies. 5. To understand the technologies used in sustainable transportation.

UNIT – I PROBLEM OF SUSTAINABILITY IN TRANSPORT **CO1**

Energy use in transport sector; Transport and climate change; Greenhouse gas emissions, urban air quality, Congestion and sustainability

UNIT II : PRICING TRANSPORTATION: **CO2**

Full cost of transportation, pricing and taxation

UNIT III: PLANNING FOR SUSTAINABILITY: **CO3**

Urban form, Indicator based planning, land use transportation integration

UNIT IV: SUSTAINABLE POLICIES: **CO4**

Continuum of Policies, speed and speed limit policies, national policies, sustainable travel demand management; public awareness

UNIT V: SUSTAINABLE TECHNOLOGY: **CO5**

Telecommuting, Information and Communication technologies, E-commerce, Alternative Cleaner Fuels, vehicle technologies, fuel cells, Intelligent Transport Systems Mobility Management policies, Supporting Bicycling, Creating pedestrian friendly facilities, encouraging Public Transportation

Subject Code	Sustainable Transportation	L = 3	T = 1	P = 0	Credits = 4
CE230104	ESE	CT	TA	Total	ESE Duration
	100	20	20	40	3 Hours

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	Introduction to Sustainable Transportation	Preston L. Schiller, Eric C. Brunn and Jeffrey R. Kenworthy.	-	Policy, Planning and Implementation, 2010.
2	Sustainable Transport: Planning for Walking and Cycling in Urban Environments	Tolley R.	-	CRC Press, 2003

ReferenceBooks:

S. No.	Title	Authors	Edition	Publisher
1	Transport: Definitions and Responses	Black, W. R	-	Conference Proceedings 37. Washington, D.C., National Research Council, 2005

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. 1st Semester Civil Engineering (specialization in Transpiration Engineering)

Subject Code	Project Management	L = 3	T = 1	P = 0	Credits = 4
CE230121	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
This course will enable students to 1. To Understand the basic of Project Managements which effects transportations. 2. To Understand Value Engineering, Safety and Project scheduling in construction industries.	After studying this course, students will be able to: 1. To Understand the system approach. 2. To Understand the Importance of construction cost and value engineering. 3. To Understand the Importance of contract management safety in construction industry. 4. To understand the project scheduling. 5. To understand the human resource management.

UNIT I: SYSTEM APPROACH **CO1**

A systems approach, systems theory and concepts, Organization, Management Functions, Overview of Management Objectives, Tools and techniques, Project Management-Processes and Organizational Structures-Team Management- Project Manager as a team Leader- Leadership Qualities, PMIS.

UNIT II: CONSTRUCTION COST AND VALUE ENGINEERING: **CO2**

Types of Estimates, Implementation of Cost Controls, Project Cost Forecasting, Cost Optimization and Resources planning-Value Engineering, techniques for project selection, Break-Even Analysis, Cost Modeling, Energy Modeling, Life Cycle Cost Approach

UNIT III: CONTRACT MANAGEMENT SAFETY IN CONSTRUCTION INDUSTRY **CO3**

Tendering and Contracting, Laws of Contracts, Sub Contracts, Potential Problems, Post Contract Problems, Documents Conditions, Arbitration, and Special Features of International Contracts. quality Management and safety in construction industry- quality control by statistical methods, sampling plan, control charts, ISO 14000, Safety Measures, safety programs, safety awareness and implementation of safety plan- compensation.

UNIT IV: PROJECT SCHEDULING AND ANALYSIS METHODS **CO4**

CPM, PERT, Linear programming, queuing concept, simulation, bidding models, game theory.

Subject Code	Project Management	L = 3	T = 1	P = 0	Credits = 4
CE230121	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

UNIT V: HUMAN RESOURCE MANAGEMENT AND CONSTRUCTION MANAGEMENT PRACTICES **CO5**

Man Power planning-training, motivation, industrial relations, welfare measures, MIS-Components and structure-personal management. Resource management and inventory-Basic concepts, labour requirements & productivity, non-productivities, site productivity, equipment and material management, inventory control. Construction management practices-implementation of procedures and practices-internationals experiences- case studies, Examples.

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	Project Management	S. Choudhary	-	Tata McGraw Hill Publishing Co. Ltd.
2	Construction Management Practices	UK Raina	-	Tata McGraw Hill Publishing Co. Ltd.

ReferenceBooks:

S. No.	Title	Authors	Edition	Publisher
1	Project Management	Herold Kerzner	-	CBS Publishers and Distributors

Subject Code	Probability and Statistics	L = 3	T = 1	P = 0	Credits = 4
CE230122	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
This course will enable students to 1. To understand the basic of Probability and Statistics and their uses.	After studying this course, students will be able to: 1. To Understand about the Random Variables. 2. To Understand about the Special distributions. 3. To Understand about the BivariteRandom Variables. 4. To Understand about Theory of estimations. 5. To Understand about the hypothesis Variables.

UNIT I: RANDOM VARIABLE **CO1**

Distribution functions, probability mass function and probability density function, moments and moment generating functions.

UNIT II: SPECIAL DISTRIBUTIONS: **CO2**

Binomial, poisson, negative binomial, Geometric, Hyper geometric. Uniform, Exponential, Gamma, Beta, Weibull, Normal, Lognormal, Pearsons. 06 Chebyshevs inequality, law of large numbers, central limit theorem

UNIT III: BIVARITE RANDOM VARIABlES **CO3**

Statistical independence, joint, marginal, conditional distribution, product moment, correlation, regression, function of random variables and their probability distribution. Random sampling with replacement and without replacement, sampling distribution on samples from normal population: normal, t, 2 χ, F Distribution.

UNIT IV: THEORY OF ESTIMATION **CO4**

Basic concepts of estimation, point estimation, methods of estimation, methods of moments, method of maximum likelihood, un biasedness, minimum variance estimation, internal estimation.

Subject Code	Probability and Statistics	L = 3	T = 1	P = 0	Credits = 4
CE230122	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

UNIT V: TESTING OF HYPOTHESIS **CO5**

Null and alternative hypothesis, type I and II errors, 9 power function, methods of finding tests, likelihood ratio test, neyman pearson lemma, uniformly most powerful tests, some results based on normal population

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	A introduction of Probability and Statistics	VK Rohtagi & A.K. Md. E Salah	-	VK Rohtagi Publishing Co. Ltd.
2	Modern Mathematical Statistics	EJ Dudewicz & S. N. Mishra	-	Tata McGraw Hill Publishing Co. Ltd.

ReferenceBooks:

S. No.	Title	Authors	Edition	Publisher
1	A introduction of Probability and Statistics	J S Milton	-	CBS Publishers and Distributors

Subject Code	Transportation Economics	L = 3	T = 1	P = 0	Credits = 4
CE230123	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
Transportation economics, deals with the study of the allocation of transportation resources in order to meet the needs of a society.	On successful completion of the course, the student will be able to: **CO1:-**To Prepare valuation of road of roads and also apply sensitivity analysis **CO2:-**To learn vehicle operating cost **CO3:-**To study supply and demand concepts **CO4:-**explain the concepts about the transportation pricing **CO5:-** to study BOT concepts

UNIT I: ECONOMIC EVALUATION **CO1**

Need for economic evaluation of urban transport projects-Principles of economic analysis- Methods of economic evaluation-comparison of various methods-application of simulation modeling in evolving suitable evaluation techniques-sensitivity analysis. **[8Hrs]**

UNIT II: MODELING OF ROAD USERCOSTS **CO2**

Components of vehicle operating cost – Factors affecting vehicle operating cost – Value of Travel Time Saving - Accident Cost – Concept of Route Switching Mechanism. - Ripple effects in developing new infrastructure – Simulation Modeling exercise. **[8Hrs]**

UNIT III: TRANSPORT DEMAND SUPPLYCONCEPT **CO3**

Transport demand and supply concepts - Status of transport demand supply in metropolitan cities – Demand and Supply equilibrium - Subsidy in Transport demand – Supply augmentation and saturation consideration- simulation modeling of transport demand and supply for sustainability. **[8Hrs]**

UNIT IV: TRANSPORTPRICING **CO4**

Transport costs – Elasticity of demand – Average cost and Marginal cost pricing – Market Pricing and Market Segmentation – Second best pricing – Pricing Policy – Congestion Pricing – Public and Private Transport Pricing – Price Co-ordination. **[8Hrs]**

Subject Code	Transportation Economics	L = 3	T = 1	P = 0	Credits = 4
CE230123	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

UNIT V: FINANCING TRANSPORT SYSTEM **CO5**

Characteristics of Transportation Infrastructure – Trends in Transportation Infrastructure – Investment Needs, Options and Budgetary Support in Transport Sector – Existing Financing Practices – Principles of Build, Operate and Transfer (BOT) –BOT variants and its applicability– Special Purpose Vehicles- Alternative Financial resources. **[8Hrs]**

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	TransportationEngineering–AnIntroduction	JohnKhistyC, KentLallB,	3rd Edition	1. PrenticeHall of India, New Delhi
2	Economic Evaluation of Transport Projects, NewDelhi.	Indian Roads Congress Standards	-	-

ReferenceBooks:

S. No.	Title	Authors	Edition	Publisher
1	Hand Book of Highway Engineering, , New York	Robert F Baker	1st	Van Nostrand Reinhold Company
2	Proceeding of national seminar on infra-structure developments	The Institution of Engineers India	-	-

ShriShankaracharya Technical Campus,

ShriShankaracharya Group of Institutions

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekanand Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. 1st Semester Civil Engineering (specialization in Transpiration Engineering)

Subject Code	Environmental Impact Assessment (EIA)	L = 3	T = 1	P = 0	Credits = 4
CE230124	ESE	CT	TA	Total	ESE Duration
	100	20	30	140	3 Hours

Course Objective	Course Outcomes
1. EIA allows determination of the potential impacts of development on environmental quality, social well-being and regional economies. 2. The course provides an overview of the legislative framework of EIA and explains the EIA process, providing examples of techniques used in impact assessment relating to topics including soils, ecology and landscape.	On successful completion of the course, the student will be able to: **CO1:**-To study laws related to EIA **CO2:**-prepare EIA reports. **CO3:**-To learn emission standard of air, water and soil and effects of pollution **CO4:**-explain the concepts about the Environmental Impact Assesment (EIA). **CO5:**- to study mitigative measures andpolicies related to EIA

UNIT I: ENVIRONMENTAL STANDARDS IN URBAN AND EIA **CO1**

Laws concerned with protection of the environment such as environmental protection Act, Air and Noise pollution Act, Motor Vehicle Act, Town and Country Planning Act, Development Control Regulation, Coastal Regulation Zone. **[8Hrs]**

UNIT II: MEASUREMENT AND POLLUTION PREDICTION **CO2**

Measurement of Air and Noise Pollution, Land Acquisition, Rehabilitation, Collection, Compilation and Presentation of Pollution and Impact Data, Measuring Impact Before construction, at the time of construction and after construction, Prediction Modeling and validation. **[8Hrs]**

UNIT III: ENVIRONMENTAL QUALITY ANDMANAGEMENT **CO3**

Importance of EIA, Environmental Appraisal, EIA Statement, Vehicle and Traffic Noise, Ambient Noise Level, Heath Effects, Vibration – Damage to building, Exhaust Emission – Pollutant, Health effects, Air Pollution, Urban Ambient Air Quality Standards, Effects on Human being, Vegetation and Animals. **[8Hrs]**

UNIT IV: ENVIRONMENTAL MAINTENANCE AND LEGALSYSTEMS **CO4**

Impact of Traffic on environment- Network pattern, Urban growth indicators of environmental Quality, Energy use, Fuel Economy in Transportation, Energy Efficiency strategies **[8Hrs]**

Subject Code	Environmental Impact Assessment (EIA)	L = 3	T = 1	P = 0	Credits = 4
CE230124	ESE	CT	TA	Total	ESE Duration
	100	20	30	140	3 Hours

UNIT V: MITIGATIVE MEASURES AND POLICIES **CO5**

Mitigative Measures for Air and Noise Pollution Policies and Strategies, Involvement of Stakeholders, Public Participation, Institutional Arrangements. **[8Hrs]**

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	Environmental Impact Assessment	Larry W Canter	1st	McGraw Hill Publishers
2	Environmental Strategies Handbook	RaoV.Kolluru ;	1st	McGraw Hill Publishers

Reference Books:

S. No.	Title	Authors	Edition	Publisher
1	Transport Policy and Environment	David Banister	2nd	E&FN Spain
2	the Impact of Environmental Assessment – A Review of World Bank	World Bank	-	-

Subject Code	Advanced Transportation–I Lab	L = 0	T = 0	P = 10	Credits = 5
CE230191	ESE	CT	TA	Total	ESE Duration
	075	-	75	150	3 Hours

Experiments to be performed (Minimum 10 experiments to be performed)

1. Determination of crushing value of aggregates.
2. Study of Gradation of Aggregates
3. Determination of different shapes of aggregate
4. Determination of abrasion value by Los Angle’s Machine.
5. Determination of abrasion value by Deval’s Abrasion Machine.
6. Determination of Impact Value of aggregates.
7. Determination of Specific Gravity and Water Absorption of aggregate.
8. Determination of Penetration Value of Bitumen.
9. Study of Marshal Stability Test.
10. Study of Benkelman Beam.
11. Determination of Angularity number of aggregate.
12. Overlay design using Benkelman beam.

Equipment/Machines/Instruments/Tools/Software Required:

1. Ring and Ball Apparatus
2. Standard Penetrometer
3. Los Angles Abrasion Machine
4. Deval’s Abrasion Machine
5. Ductility Testing Machine
6. Tar Viscometer
7. Sieve Shaker
8. Standard I.S. Sieves for Fine and Coarse Aggregate
9. Length Gauge
10. Thickness Gauge
11. Crushing Value Cylinder and Mould with Plunger
12. Aggregate Impact Testing Machine
13. Flash and Fine Point Apparatus
14. Benkelman Beam
15. Hot Air Oven
16. Water Bath
17. Marshall Stability Machine and with Mould
18. Proving Ring and Dial Gauge
19. Weighing Balance up to 10 kg capacity

Subject Code	Advanced Transportation–I Lab	L = 0	T = 0	P = 10	Credits = 5
CE230191	ESE	CT	TA	Total	ESE Duration
	075	-	75	150	3 Hours

Recommended Books:

1. Highway Engineering – Justo &Khanna (Khanna Publishers)
2. Highway Engineering Manual – Justo &Khanna (Khanna Publishers

Subject Code	Traffic Survey and Analysis Lab	L = 0	T = 0	P = 10	Credits = 5
CE230192	ESE	CT	TA	Total	ESE Duration
	075	-	75	150	3 Hours

Experiments to be performed (Minimum 10 experiments to be performed)

1. Traffic volume study using videography technique.
2. Traffic volume study by Mechanical counters
3. Traffic speed study using videography technique.
4. Speed study by Radar Gun
5. Speed study by endoscope
6. Determination of Reaction time of Driver
7. Traffic study by automatic counter and classifier.
8. Parking study
9. Accident Investigation study
10. Study for Improvement of an Accident Prone location
11. Traffic noise measurement.
12. Vehicle emission testing
13. Road side and house hold interviews Tests on sub grade soil
14. Road lighting
15. User perception surveys

Equipment/Machines/Instruments/Tools/Software Required:

1. Camcorder
2. Video Camera
3. Optimus Yellow ,Optimus Green Apparatus for Noise Measurement.
4. VETS-7000NT(Vehicle Emission Testing System)
5. Radar gun for Speed Study
6. Endoscope for Speed Study
7. Stop watch
8. Speed Gun
9. Sound Level Meter

Recommended Books:

1. Highway Engineering – Justo &Khanna (Khanna Publishers)
2. Highway Engineering Manual – Justo &Khanna (Khanna Publishers