

**PARUL UNIVERSITY - FACULTY OF ENGINEERING & TECHNOLOGY**  
**TEACHING SCHEME & EXAMINATION SCHEME**  
**M.TECH. CIVIL - TRANSPORTATION ENGINEERING**  
**ACADEMIC YEAR 2015-16**

**SEMESTER-I**

Subject Code	Subject	Teaching Scheme (Hrs/Week)				Examination Scheme				Total
		L	T	P	C	External		Internal		
						TH (E)	PRA (V)	Mid-Sem (M)	P.A. (I)	
03200101	RESEARCH METHODOLOGY	1	2	0	3	--	60	--	40	100
03211101	TRAFFIC ENGINEERING	3	0	2	4	60	30	40	20	150
03211102	URBAN TRANSPORTATION PLANNING	3	2	0	5	60	30	40	20	150
03211103	HIGHWAY MATERIALS AND CONSTRUCTION	3	0	2	4	60	30	40	20	150
03211104	GEOMETRIC DESIGN OF HIGHWAY	3	0	0	3	60	--	40	--	100
	<b>ELECTIVE 1</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	60	--	40	--	100
03211130	AIRPORT ENGINEERING									
03211131	BRIDGE & TUNNEL ENGINEERING									
03211132	DECISION MODELS IN MANAGEMENT									
	TOTAL	16	04	04	22	300	150	200	100	750

**SEMESTER-II**

Subject Code	Subject	Teaching Scheme (Hrs/Week)				Examination Scheme				Total
		L	T	P	C	External		Internal		
						TH (E)	PRA (V)	Mid-Sem (M)	P.A. (I)	
03200151	SEMINAR	0	0	2	1	--	--	--	50	50
03211151	ADVANCE TRAFFIC ENGINEERING	3	0	2	4	60	30	40	20	150
03211152	PAVEMENT DESIGN & EVALUATION	3	0	2	4	60	30	40	20	150
03211153	ECONOMIC EVALUATION OF HIGHWAY PROJECTS	3	0	0	3	60	30	40	20	150
03211154	TRANSPORTATION SOFTWARE LABORATORY	0	0	4	2	--	60	--	40	100
	<b>ELECTIVE 2</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>5</b>	60	30	40	20	150
03211180	DOCKS, HARBOUR & PORT ENGINEERING									
03211181	RAILWAY INFRASTRUCTURE PLANNING & DESIGN									
03211182	ROAD SAFETY ENGINEERING									
	TOTAL	12	4	10	19	240	180	160	170	750

**PARUL UNIVERSITY - FACULTY OF ENGINEERING & TECHNOLOGY**  
**TEACHING SCHEME & EXAMINATION SCHEME**  
**M.TECH. CIVIL - TRANSPORTATION ENGINEERING**  
**ACADEMIC YEAR 2015-16**

**SEMESTER-III**

Subject Code	Subject	Teaching Scheme (Hrs/Week)				Examination Scheme				
		L	T	P	C	External		Internal		Total
						TH (E)	PRA (V)	Mid-Sem (M)	P.A. (I)	
03200201	LITERATURE REVIEW	--	--	7	7	--	50	--	50	100
03200202	DISSERTATION PHASE-I	--	--	14	14	--	150	--	50	200
	TOTAL	--	--	21	21	--	200	--	100	300

**SEMESTER-IV**

Subject Code	Subject	Teaching Scheme (Hrs/Week)				Examination Scheme				
		L	T	P	C	External		Internal		Total
						TH (E)	PRA (V)	Mid-Sem (M)	P.A. (I)	
03200251	MID REVIEW	--	--	7	7	--	50	--	50	100
03200252	DISSERTATION PHASE- II	--	--	14	14	--	150	--	50	200
	TOTAL	--	--	21	21	--	200	--	100	300

# PARUL UNIVERSITY - FACULTY OF ENGINEERING & TECHNOLOGY

Department of Applied Science & Humanities

SYLLABUS FOR 1st Sem MTech PROGRAMME (ALL BRANCHES)

Research Methodology (03200101)

**Type of Course:** MTech

**Prerequisite:** Knowledge of Electronics and Communication Systems and Technologies. Basic Computer Skills Fundamental Knowledge of Area of Interest in relevant discipline.

**Rationale:** The objective of the course is intended to develop the research skills in a systematic manner which will impart the ability to select appropriate research methodology, experimental design, follow professional ethics and academic integrity, and develop oral and written presentation skills.

**Teaching and Examination Scheme:**

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
L	T	P		External		Internal			
				Theory	Practical	Theory	*C.E.	Practical	
1	0	2	2	0	60	0	20	20	100

L-Lectures; T-Tutorial; P-Practical; C.E.-Continuous Evaluation

**Contents:**

Sr.	Topic	Weightage	Teaching Hrs.
1	<p><b>How to Start Research:</b></p> <p>Find what is expected of the you Identify specific requirements for evaluation/review and what constitutes completion of your work Decide which sources you will need: Differentiate between journals, conferences, books, magazines and their Quality ,Understand how to establish their quality and authenticity Finding Information How to conduct effective searches, How to find relevant papers related to your area of research, How to capture critical information Identify main ideas in scholarly literature Understand and identify the bias, theoretical position and evidence produced Write notes to organize your ideas Compare ideas and concepts from different papers Ethical Issues related to Research Plagiarism, Intellectual Property rights, Copyrights, Patent References Understand the importance of distinguishing your work from others work and acknowledging such references, Learn international standards of referencing</p>	30%	4
2	<p><b>Focus to Problem &amp; Understand the Direction of Research:</b> Identify Problem and Methods to Solve it Analyze the question, Identify key areas in your field, Determine the nature and extension of papers that you should read Identify the gaps Learn to Critique existing knowledge and how to find the gap Formulate the Problem Statement Understand what should be the key aspects of your problem statement Examples of effective and ineffective Titles Validation Identify problem and experimental/theoretical data for comparison with your model, learn how to extrapolate/scale data for validation, Find what is acceptable level of error and justification thereof</p>	40%	6
3	<p><b>Publishing Research:</b> Writing your Assignment Identify the key features of any written work, Structure your assignment, Build your argument Recognize the importance of emphasizing your point ,Distinguish between your point and the evidence available, Acknowledge the evidence Review and finalize your work Know and follow the Process of reviewing and proof reading your work Use feedback to improve your work</p>	25%	4

4	<b>Showcasing the Research:</b> Delivering Your Presentation Check the logistics of your presentation Identify the key message of your presentation, Understand the expectations and what will be the key review points Develop the structure of your presentation Understand the key components of an oral presentation, Know the usual structure of a good presentation Putting together the support material Identify all the material you need to carry as supporting material Get feedback on oral presentation Prepare for delivery of your Oral presentation, Rehearse and time your presentation	10%	2
---	--	-----	---

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

**Reference Books:**

1. Research Methodology: Methods and Techniques (TextBook)  
C.R. Kothari; New Age Publishers
2. Research Methodology (TextBook)  
R.Paneerselvam; PHI Learning Private Limited; 8

**Useful Links:**

<http://thomsonreuters.com>  
<http://www.elsevier.com/online-tools/scopus>  
<http://computationalengineering.mit.edu/research/methodology>  
<https://www.ieee.org/index.html>  
<http://www.asce.org/>  
<http://www.asme.org/>

**Course Outcome:**

After Learning the course the students shall be able to:

Upon completion of the subject, students will be able to:

1. Understand and Describe importance of research.
2. Classify and select appropriate resources for Research.
3. Analyze the contents of literature and identify further scope.
4. Formulate a Research Problem.
5. Develop effective written and oral Presentation skills.

**List of Tutorial:**

1. Understand the Impact factor and H factor.
1. IMPACT FACTOR
2. AREA OF INTEREST
2. Identify 5 good research papers based on I and H factor of your area of interest in relevant discipline.
3. Write critical review of each paper and summary of strength and gaps of above referred papers.
3. REVIEW PAPER
4. AREA OF RESEARCH
4. Narrowing the area of research through systematic analysis and Find out the research gap.
5. Write briefly on how the Problem statement is identified. Identify the future scope in the area of research.
5. IDENTIFICATION OF PROBLEM STATEMENT
6. METHODS TO VALIDATE RESEARCH PROBLEM
6. Describe the various methods for validating the research problem from the papers referred.
7. Write a paper on the Literature Review conducted.
7. LITERATURE REVIEW
8. PRESENTATION OF PROBLEM
8. Presentation of Problem formulation and Literature Review

# PARUL UNIVERSITY - FACULTY OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

SYLLABUS FOR 1st Sem MTech PROGRAMME

Traffic Engineering (03211101)

**Type of Course:** MTech

**Prerequisite:** Knowledge of Transportation Engineering up to B.E./B.Tech. Level.

**Rationale:** The objective of the course of Traffic Engineering is to provide safety to the road users and regulating traffic flow on the roads. It is necessary to understand the traffic flow parameters for a Traffic Engineer. Traffic Engineer should understand the basic of design of signals, intersection, capacity and level of service to provide safe, efficient and economic transportation of goods and passengers. It is important to know the methods of traffic survey and various traffic control devices. Accidents in urban area increase rapidly. It is necessary to educate the students about the prevention of accidents. The traffic engineer should know about the Environmental impact of a traffic flow and its remedial measures.

**Teaching and Examination Scheme:**

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
L	T	P		External		Internal			
				Theory	Practical	Theory	*C.E.	Practical	
3	0	2	4	60	30	20	20	20	150

L-Lectures; T-Tutorial; P-Practical; C.E.-Continuous Evaluation

**Contents:**

Sr.	Topic	Weightage	Teaching Hrs.
1	<b>Introduction:</b> Human-vehicle-environment system, Characteristics of road users; Characteristics of vehicles; Characteristics of highways, Fundamental variables of traffic flow and their interrelationship, headway - measurement techniques and analysis	15%	7
2	<b>Traffic Surveys:</b> Volume studies; Speed studies; Travel time and Delay studies; Intersection studies, Pedestrian studies; Parking studies.	25%	12
3	<b>Highway Capacity Analysis:</b> Highway Capacity and Level of Service; Measurement Techniques, HCM Methods, Design hourly volumes and speed, its uses	13%	6
4	<b>Merging – Diverging Flow,:</b> Merging – Diverging Flow, Weaving Flow, Length Calculations.	6%	3
5	<b>Traffic control devices:</b> Introduction about the Signs, Markings, Signal and their warrants; Signal Cycle Time Calculations, Fixed and vehicle actuated signals, Rotary	14%	7

	<b>Road Accidents Analysis:</b>		
6	Accident characteristics—road, driver, vehicle; Accident recording and analysis; Highway safety improvement program; Safety audit.	14%	7
	<b>Environmental Considerations:</b>		
7	Air pollution; kinds of pollutants, air pollution standards; Measures of air quality and control; Measurement of sound levels, acceptable limits; Prediction of noise levels, traffic noise control	13%	6

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

**Reference Books:**

1. Principles of Transportation Engineering  
Chakroborty Partha, Das Animesh
2. Traffic Engineering and Transportation Planning (TextBook)  
L.R. Kadiyali; Khanna Publishers
3. Principles of Traffic and Highway Engineering (TextBook)  
Nicholas J. Garber, Lester A. Hoel, Nicholas J. Garber, Lester A. Hoel
4. Traffic Engineering Design: Principles and Practice (TextBook)  
Mike Slinn, Paul Matthews, Peter Guest, Butterworth Heinemann
5. Transport Planning and Traffic Engineering (TextBook)  
Coleman A. O 'Flaherty, Butterworth-Heinemann
6. Traffic Engineering Hand Book by Institute of Transportation Engineers (TextBook)  
; Prentice Hall; 4th Edition

**Course Outcome:**

After Learning the course the students shall be able to:

1. Understand the basic characteristics of traffic stream.
2. Conduct traffic survey and interpretation of the data.
3. Measure the Highway Capacity and Level of Service.
4. Design traffic signal.
5. Recognize accident and environment related terms

**List of Practical:**

1. Volume studies:
2. Speed studies
3. Journey time and delay studies
4. Parking surveys

# PARUL UNIVERSITY - FACULTY OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

SYLLABUS FOR 1st Sem MTech PROGRAMME (ALL BRANCHES)

Urban Transportation Planning (03211102)

**Type of Course:** MTech

**Prerequisite:** Knowledge of Urban Transportation system up to B.E. Level.

**Rationale:** Urban Transportation planning is most important area in the field of transportation. Looking to the present scenario, suitable transportation planning is the backbone of the urbanization. Urbanization is going on at alarming rate in developing countries like India. After studying the subject, the student will be able to understand the importance of the transportation and systematic planning in urban area. The subject covers various types of transportation systems and its characteristics. It is important to carry out thorough study of travel demand and fulfillment. The subject is useful for estimating Trip Generation, Trip Distribution, Modal Split and Trip Assignments. Land use planning models and their suitability should be studied for designing of suitable transportation systems.

**Teaching and Examination Scheme:**

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
L	T	P		External		Internal			
				Theory	Practical	Theory	*C.E.	Practical	
3	2	0	5	60	30	20	20	20	150

L-Lectures; T-Tutorial; P-Practical; C.E.-Continuous Evaluation

**Contents:**

Sr.	Topic	Weightage	Teaching Hrs.
1	<b>Introduction:</b> Introduction to transportation systems planning based on systems approach, various modes of transportation and comparisons, urban transportation system planning process	13%	7
2	<b>Transportation surveys:</b> Transportation surveys, O-D survey, methodology and analysis.	9%	5
3	<b>Urban Mass transportation Systems:</b> Urban transit problems, travel demand, types of transit systems, public, private, para-transit transport, mass and rapid transit systems, including BRTS, Metro	13%	6
4	<b>Travel demand modeling::</b> Trip generation, trip distribution, modal split analysis, trip assignment techniques, and various models, transportation impact study	41%	18
5	<b>Land use planning models:</b> Land use planning models and their suitability, Transportation impacts study methodologies	15%	6
6	<b>Urban goods movement:</b> Urban goods movement, framework and case studies.	9%	5

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

**Reference Books:**

1. Principles of urban transportation system planning (TextBook)  
B.G.Hutchinson; McGraw- Hill
2. Metropolitan Transportation Planning (TextBook)  
W.Dickey
3. Land use Transportation System (TextBook)  
J.Ortuzer and L.G. Willumsen
4. Urban Transit : Operations, Planning and Economics (TextBook)  
Vukan R. Vuchic; Wiley Sons
5. Public Transport by Peter White (TextBook)  
; UCL Press

**Course Outcome:**

After Learning the course the students shall be able to:

1. Understand the concepts of Transportation planning process, various modes, transit systems and their suitability.
2. Apply sequential travel demand forecasting process
3. Understand the concept land use planning

**List of Tutorial:**

1. Trip generation
2. Trip distribution
3. Modal split analysis.
4. Trip assignment
5. Land use planning model (Lowery and Garin Lowery model).
6. Computer application for solving the above mentioned problems.



# PARUL UNIVERSITY - FACULTY OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

SYLLABUS FOR 1st Sem MTech PROGRAMME (ALL BRANCHES)

Highway Materials And Construction (03211103)

**Type of Course:** MTech

**Prerequisite:** Knowledge of Civil Engineering up to B.E./B.Tech level.

**Rationale:** The course provides introductory knowledge about material used in construction of highway, their properties, tests performed and methods for construction of various layers of pavement

**Teaching and Examination Scheme:**

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
L	T	P		External		Internal			
				Theory	Practical	Theory	*C.E.	Practical	
3	0	2	4	60	30	20	20	20	150

L-Lectures; T-Tutorial; P-Practical; C.E.-Continuous Evaluation

**Contents:**

Sr.	Topic	Weightage	Teaching Hrs.
1	<b>Soil:</b> Properties, Classification, Compaction and Consolidation methods, Application and interpretation of Test Results, use of Geotextile materials.	9%	5
2	<b>Soil Stabilization:</b> Methods, Principles, Test Significance, Design of Soil – Stabilized Mix, Quality Control tests.	6%	3
3	<b>Aggregate:</b> Aggregates Types, Tests, Desired Properties, Aggregate Blending Methods to meet specification.	11%	5
4	<b>Bituminous Materials:</b> Bituminous Materials – Types, Laboratory Tests, Properties, interpretation of Test Results	11%	5
5	<b>Cement Concrete:</b> Cement grades, chemical composition, testing, admixtures, fibers, properties and testing of pavement quality concrete, concrete mix design methods, high performance concrete.	9%	4
6	<b>Mix Designs:</b> Various mix designs for Bituminous concrete and Cement concrete	22%	9
7	<b>Highway Construction:</b> Materials and Technical specifications, Plants and equipments, construction procedure and quality control tests and their frequencies for various courses such as WMM, WBM, BM, LBM, DBM, MSS, BC, PMC and Cement concrete pavement	27%	14
8	<b>Highway Drainage:</b> Surface and Subsurface Drainage; design and approaches	5%	3

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

**Reference Books:**

- Highway Engineering (TextBook)  
S. K. Khanna, C.E.G. Justo

2. Specifications for Road and Bridge Works, Ministry of Road Transport and Highways., Fifth Edition, Indian Roads Congress (TextBook)  
; New Delhi
3. Principles of Traffic and Highway Engineering  
Nicholas J. Garber, Lester A. Hoel, Nicholas J. Garber, Lester A. Hoel
4. Principles of Transportation Engineering (TextBook)  
Chakroborty Partha, Das Animesh

**Course Outcome:**

After Learning the course the students shall be able to:

1. Characterize the pavement materials including soil, aggregate, asphalt, cement, asphalt mixtures.
2. Choose appropriate stabilization technique for pavement applications.
3. Determine the proportions of ingredients required for the mix design of bituminous mix.
4. Understand the importance of Highway drainage
5. Distinguish the different techniques used for construction of various pavement layers

**List of Practical:**

1. Tests on Soils
2. Tests on Aggregate
3. Tests on Bitumen
4. Tests on Bituminous Mixes

# PARUL UNIVERSITY - FACULTY OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

SYLLABUS FOR 1st Sem MTech PROGRAMME (ALL BRANCHES)

Geometric Design Of Highway (03211104)

**Type of Course:** MTech

**Prerequisite:** Knowledge of Civil Engineering up to B.E./B.Tech level

**Rationale:** The course provides Geometric design transportation facilities, route layout and selection.

**Teaching and Examination Scheme:**

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
L	T	P		External		Internal			
				Theory	Practical	Theory	*C.E.	Practical	
3	0	0	3	60	-	20	20	-	100

L-Lectures; T-Tutorial; P-Practical; C.E.-Continuous Evaluation

**Contents:**

Sr.	Topic	Weightage	Teaching Hrs.
1	<b>Geometric Design: General:</b> Geometric design provisions for various transportation facilities as per AASHTO, IRC and other guidelines, Discussion of controls governing geometric design, route layout and selection.	15%	7
2	<b>Elements of design:</b> Sight distances, horizontal alignment, transition curves, super – elevation and side friction.	20%	10
3	<b>Vertical alignment:</b> Grades, crest and sag curves. Highway cross – sectional elements and their design for rural highways, Urban streets and hill roads.	20%	10
4	<b>At grade intersections:</b> Sight distance consideration and principles of design, Channelization, mini roundabouts, layout of roundabouts, Inter – Changes – major and minor interchanges, entrance and exit ramps, acceleration and deceleration lanes, Bicycle and pedestrian facility design, Parking layout and design, Terminal layout and design.	45%	21

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

**Reference Books:**

1. Traffic Engineering and Transportation Planning (TextBook)  
L.R. Kadiyali; Khanna Publishers
2. Traffic Engineering Design: Principles and Practice (TextBook)  
Mike Slinn, Paul Matthews, Peter Guest, Butterworth Heinemann
3. Principles of Highway Engineering and Traffic Analysis (TextBook)  
Fred L. Mannering, Scott S. Washburn, Walter P. Kilaresk

4. Highway Traffic Analysis and Design (TextBook)  
by R.J Salter and N.B Hounsell

**Course Outcome:**

After Learning the course the students shall be able to:

1. Design the longitudinal and cross Sectional elements of a highway.
2. Design the intersections, interchanges
3. Design the facilities for bicyclists and pedestrians.
4. Design parking facilities.
5. Design street lighting systems.

# PARUL UNIVERSITY - FACULTY OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

SYLLABUS FOR 1st Sem MTech PROGRAMME (ALL BRANCHES)

Airport Engineering (03211130)

**Type of Course:** MTech

**Prerequisite:** Knowledge of Airport Engineering up to B.E.Level.

**Rationale:** Transportation contributes to the economical, industrial, social cultural development of any country. The adequacy of transportation system of a country indicates its economic social development. Airport Engineering is most important area in the field of transportation. To enable the students to study the various elements pertaining to air transportation. After studying the subject, the student will be able to understand the importance of the Air transport characteristics, Airport classification- planning, Runway Design.

**Teaching and Examination Scheme:**

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
L	T	P		External		Internal			
				Theory	Practical	Theory	*C.E.	Practical	
3	0	0	3	60	-	20	20	-	100

L-Lectures; T-Tutorial; P-Practical; C.E.-Continuous Evaluation

**Contents:**

Sr.	Topic	Weightage	Teaching Hrs.
1	<b>Aircraft components:</b> Parts, their function, aircraft characteristics their influence on airport planning.	5%	3
2	<b>Airport planning:</b> Topographical geographical features, existing airport in vicinity, air traffic characteristics, development of new airports, factors affecting airport site selection	15%	7
3	<b>Airport obstructions:</b> Zoning laws, classification of obstructions, imaginary surfaces, approach zones, turning zones.	5%	3
4	<b>Airport layout:</b> Runway orientation, wind rose diagrams, basic runway length, corrections for runway length, airport classification, geometric design, airport capacity, runway configuration, taxiway design, geometric standards, exit taxiways, holding aprons, location of terminal buildings, aircraft hangers parking.	15%	7
5	<b>Airport marking:</b> Lighting, lighting of runways, taxiway, approach other areas.	10%	5

6	<b>Terminal area &amp; airport layout:</b> Terminal area, planning of terminal buildings, apron: size of gate position, number of gate position, aircraft parking system, hanger, general planning considerations blast considerations.	15%	7
7	<b>Air traffic control:</b> Air traffic control aids, en-route aids, ling aids	5%	2
8	<b>Airport drainage:</b> Requirement of airport drainage, design data, surface drainage design.	10%	5
9	<b>Airport airside capacity:</b> Airport airside capacity delay: runway capacity delays, practical hourly capacity, practical annual capacity, computation of runway system, runway gate capacity, taxiway capacity	10%	5
10	<b>Air traffic forecasting:</b> Air traffic forecasting in aviation: forecasting methods, forecasting requirement applications	10%	5

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

**Reference Books:**

1. A Text Book on Airports (TextBook)  
S. E. Sehgal and K. L.Bhanot; S. Chand and Co. Ltd
2. Airport Engineering (TextBook)  
G. V. Rao; Tata Mc-Graw Hill India Publishing House
3. Airport Engineering: Planning, Design and Development of 21st Century (TextBook)  
Norman J. Ashford, Saleh Mumayiz, Paul H. Wright
4. Airport Planning and Design (TextBook)  
S.K. Khanna, M.G. Arora, and S.S. Jain
5. Planning and Design of Airports (TextBook)  
R. Horenjeff and F McKelvey

**Course Outcome:**

After Learning the course the students shall be able to:

1. Understand the concepts of airport planning process, various Aircraft components and its function.
2. Know the Importance of Airport marking lighting of runways.
3. Understand the concept of Airport, airside capacity delay, runway capacity delays, practical hourly capacity, computation of runway system, runway gate capacity, taxiway capacity

# PARUL UNIVERSITY - FACULTY OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

SYLLABUS FOR 1st Sem MTech PROGRAMME

Bridge & Tunnel Engineering (03211131)

**Type of Course:** MTech

**Prerequisite:** Knowledge of Bridge and Tunnel Engineering up to B.E. Level.

**Rationale:** Bridge and Tunnel are one of most important area in the field of transportation. In a country like India which has most versatile topography this subject immerges as more important. After studying the subject, the student will be able to understand the importance of the bridge, construction of tunnel, and there various properties. The subject covers various types of bridge and tunnel systems and its characteristics.

**Teaching and Examination Scheme:**

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
L	T	P		External		Internal			
				Theory	Practical	Theory	*C.E.	Practical	
3	0	0	3	60	-	20	20	-	100

L-Lectures; T-Tutorial; P-Practical; C.E.-Continuous Evaluation

**Contents:**

Sr.	Topic	Weightage	Teaching Hrs.
1	<b>Bridge: General:</b> 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	12%	6
2	<b>Specification:</b> Specification of road bridges, width of carriageway, loads to be considered, dead load, IRC standard live load, Impact effect	10%	5
3	<b>Bridge Design:</b> General design considerations, Design of culvert, Foot bridge - slab bridge, T-beam bridge, Pre-stressed concrete bridge, Box Culvert-Fly over bridges	8%	8
4	<b>Evaluation of Substructures:</b> Pier and abutments caps, Design of pier, Abutments, Type of foundations	8%	8
5	<b>Importance of Bearings:</b> Importance, Bearings for slab bridges, Bearings for girder bridges, Electrometric bearing, Joints, Expansion joints; Construction and Maintenance of bridges, Lessons from bridge failures	5%	5

6	<b>Tunnel: General:</b> Tunnel: Necessity and Purpose, Advantages and economics, Classification, selection of tunnel, tunnel approach, Geological and geotechnical investigation- during planning, designing and construction stage.	5%	5
7	<b>Tunnel Surveying:</b> Setting out the central line on ground, Transferring Center line to inside of tunnel, Adjustment of meeting points of tunnels, Tunnel alignment and grades	4%	4
8	<b>Design of tunnel:</b> Design of shape and size of tunnel, vertical shaft	6%	5
9	<b>Methods of tunneling:</b> Methods of tunneling in soft ground, firm ground and running ground	10%	10
10	<b>New Austrian Tunnelling Method:</b> Basic Principal of NATM, Details of NATM at Loktak, Shotcreting and Grouting process	8%	7
11	<b>Lining and grouting::</b> Purpose, objective, type and material used for lining, Sequence of lining work	8%	7
12	<b>Tunnel Ventilation:</b> Tunnel Ventilation, Dust Control, and lighting: Objective of Ventilation, Natural and Mechanical methods of ventilation, methods of dust control, Lighting- types, spacing. Lighting after construction.	6%	5
13	<b>Safety:</b> Precaution in Tunneling: Safety Program, Medical and other facilities, Electrical installation of lighting, Causes of accidents and preventive measures.	5%	4
14	<b>Tunnel Drainage:</b> Pre-drainage, De-watering of ground water, Permanent drainage, Handling unexpected sources of water.	5%	4

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

**Reference Books:**

1. Essentials of Bridge Engineering  
D.J. Victor; Oxford & IBH Publishers Co.
2. Bridge Engineering  
Ponnu Swamy; Tata McGraw - Hill
3. Bridge Superstructure  
N. Rajagopalan; Narosa Publishing House
4. Transportation Engineering Vol I  
V.H. Vazirani & S.P. Chandola,
5. Tunnel Engineering  
Subhas Saxsena; Dhanpatrai & Sons



**Course Outcome:**

After Learning the course the students shall be able to:

1. Understand the characteristics of bridge and tunnel.
2. Understand construction process and sequence of operations in Bridge and Tunnel Construction.
3. Learn various bylaws in Bridge and tunnel construction.

# PARUL UNIVERSITY - FACULTY OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

SYLLABUS FOR 1st Sem MTech PROGRAMME

Decision Models In Management (03211132)

**Type of Course:** MTech

**Prerequisite:**

**Rationale:** The course is basics of making management decisions. The study of the course is important to understand the Quantitative methods for making any management decisions. The formulation of the linear and non linear problems is studied in the course, which may be useful to the student in the research work. It also includes understanding of basics of Queuing theory and models. The principles of transportation problems, their formulation are covered in the study. Various Optimization techniques are also included for the study. It is necessary to solve the various integer programming, dynamic programming, network models etc.

**Teaching and Examination Scheme:**

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
L	T	P		External		Internal			
				Theory	Practical	Theory	*C.E.	Practical	
3	0	0	3	60	-	20	20	-	100

L-Lectures; T-Tutorial; P-Practical; C.E.-Continuous Evaluation

**Contents:**

Sr.	Topic	Weightage	Teaching Hrs.
1	<b>Introduction:</b> Quantitative methods for management decisions. Operation research. Decision environment, Decision making processes.	5%	3
2	<b>Linear programming:</b> Linear programming problems, graphical solution, Simplex method, duality, post optimality analysis; Primal and dual solution approaches; Sensitivity analysis, Unconstrained and constrained optimization, Kuhn- Tucker theory; Quadratic programming applications.	25%	18
3	<b>Transportation problems:</b> Transportation and transshipment problems	15%	5
4	<b>Assignment Problems:</b> Various problems based of Traffic assignment	15%	5
5	<b>Queuing theory,:</b> Theory, Queuing Models, Markov decision processes; Applications to inventory management and Replacement processes.	15%	5
6	<b>Discrete event simulation:</b> Generation of random variables, simulation processes and languages.	5%	2

7	<b>Network models:</b> Shortest path method, maximum flow. Minimum spanning tree problem.	15%	5
8	<b>Integer programming:</b> Integer programming, goal programming, dynamic programming. Decision theory. Role of knowledge; Deterministic and probabilistic situation, Single and multiple person decision making.	5%	2

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

**Reference Books:**

1. Engineering Optimisation - Theory & Practice  
S.S. Rao; New Age International Publishers
2. Foundations of optimization  
Philips Deightler; Prentice Hall of India.
3. Linear Programming and Network Flows  
S.Bazzarra, J.J.Jarvis and H.D.Sherali; John Wiley
4. Operations Research: An Introduction  
A.Taha; MacMillan
5. Computer Assisted Decision Models  
Kapoor; Tata McGraw-Hill,

**Course Outcome:**

After Learning the course the students shall be able to:

1. Understand the concepts of quantitative methods for management decision and subsequently their applications in transportation engineering.
2. Use shortest path method