

**RIMT UNIVERSITY MANDI GOBINDGARH
PUNJAB**



RIMT

UNIVERSITY

**Course Work & Detailed Syllabus
For
Ph.D Programme (Civil Engineering)**

Syllabi Applicable For Admissions in 2018 Onwards

Course Work for Ph.D Programme (Civil Engineering)

Name of Course		Contact Hours/Week			Credit	Evaluation Scheme (% of Total Marks)					Exam Duration (Hours)
		L	T	P		CWA	LWA	MTE	ETE	Total	
PHDRM 1101	Research Methodology & Statistical Technique	5	0	0	5	16	---	24	60	100	
PHDCA 1102	Computer Applications in Research	3	0	0	3	16	---	24	60	100	
PHDCE 1103 Y*	*Core Subject of the Discipline in which Ph.D degree to be Awarded	5	0	0	5	16	---	24	60	100	
PHD 1104	Mini Project/Term Paper	-	-	-	2	---	---	---	100	100	
Total											

L-- Lecture

T-- Tutorial

P---Practical

CWA Class work Assessment

LWA Lab work Assessment

MTE Mid Term Exam

ETE End Term Exam

Note: For Evaluation scheme see ordinance number 8 “Regulation for Academic Evaluation” RIMT University.

*This course is to be suggested by guide/supervisor in specific domain area of research undertaken by the research candidate. Following is a list of core subjects offered by the civil engineering department. The candidate will select any one from the list.

PHDCE1103 A – INDUSTRIAL AND HAZARDOUS WASTE MANAGEMENT

PHDCE1103 B – CONSTRUCTION AND MAINTENANCE MANAGEMENT

PHDCE1103 C – PAVEMENT MATERIAL CHARACTERIZATION

PHDCE1103 D – ADVANCED STRUCTURAL ANALYSIS

Detailed Syllabus

SUBJECT TITLE: INDUSTRIAL AND HAZARDOUS WASTE MANAGEMENT

SUBJECT CODE: PHDCE1103 A

SEMESTER: I/II

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5	0	0	5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Contents of Syllabus:

Lecture wise break up	No of Lectures :
1 Hazardous Waste Treatment and Disposal: Biological and chemical treatment of hazardous wastes; Solidification and stabilization of wastes; Incineration for the treatment and disposal of hazardous wastes; Land farming; Landfill disposal of hazardous waste; Bioremediation of hazardous waste disposal sites. Sanitary Landfills: Site selection and approval; design, development, operation and closure of landfills, Management of leachate and landfill gases, environmental monitoring of landfill sites.	8
2 Legal Requirements: Municipal solid waste rules; Hazardous waste rules; Biomedical waste rules; E-waste rules; Rules related to recycled plastics, used batteries, flyash, etc.	8
3 Sources and types of industrial wastewater: Environmental impacts, Regulatory requirements, generation rates, characterization, Toxicity and Bioassay tests. Prevention vs Control of Industrial Pollution, Source reduction techniques, Waste Audit Evaluation of pollution prevention options.	5
4 Waste minimization – Equalization, Neutralization, Oil separation, Flotation, Precipitation, Heavy metal Removal, adsorption, Aerobic and anaerobic biological treatment, Sequencing batch reactors, High Rate reactors, Chemical oxidation, Ozonation, Photocatalysis, Wet Air Oxidation, Evaporation, Ion Exchange, Membrane Technologies, Nutrient removal	7
5 Individual and Common Effluent Treatment Plants – Zero effluent discharge systems Wastewater reuse – Disposal of effluent on land – Quantification, characteristics and disposal of Sludge.	4
6 Industrial manufacturing process description, wastewater characteristics, source reduction options and waste treatment flow sheet for Textiles, Tanneries, Pulp and paper, metal finishing, Petrochemical, pharmaceuticals, Sugar and Distilleries, Food Processing, fertilizers, Thermal Power Plants and Industrial Estates, ISO 14000:2003 Waste Audit.	6

Recommended Books:

S. No.	References:
1	“Environmental Engg.” By Howard S. Peavy, Donald R. Rowe & George Tehobanoglous, McGraw Hill, International Edition
2	Arceivala, S. J. and Asolekar, S. R., Wastewater Treatment for Pollution Control, 3rd ed., McGraw-Hill Education (India) Pvt. Ltd.
3	Eckenfelder, W.W., Industrial Water Pollution Control, McGraw Hill
4	Frank Woodard, Industrial waste treatment Handbook, Butterworth Heinemann, New Delhi
5	Industrial Pollution Prevention Handbook, Freeman H.M., McGraw Hill Inc.

Detailed Syllabus

SUBJECT TITLE: CONSTRUCTION AND MAINTENANCE MANAGEMENT

SUBJECT CODE: PHDCE1103 B

SEMESTER: I/II

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5	0	0	5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Contents of Syllabus:

	Lecture wise break up	No of Lectures
1	Construction Planning: Need of construction planning, Constructional Resources, construction team, stages in construction, preparation of construction schedule, Job layout, inspection and quality control.	10
2	General & Material Management: Introduction and characteristics of management, Principle and function of management, Scope, Objective and functions of material management, Procurement and store management, Materials handling management, Inventory control and management. Disposal of Surplus Materials	10
3	SAFETY IN CONSTRUCTION: Causes, classification, cost and measurement of an accident, safety programme for construction, protective equipment, accident report, safety measure: (a) For storage and handling of building materials. (b) Construction of elements of a building (c) In demolition of buildings Safety lacuna in Indian scenario	10
4	Maintenance Management : Definition, Organization structure, work force for Maintenance, Communication needs, Building inspections, Maintenance budget and estimates, Property inspections and reports, Specification for maintenance jobs, Health and safety in maintenance, Quality in Maintenance, maintenance Manual and their importance.	10
5	Investigation and diagnosis for Repair of structures: Basic Approach to investigations, Physical inspection, Material Tests, Non destructive testing for diagnosis, Estimation of actual, loads and environmental effects, Study of design and construction practices used in original construction, Retrospective analysis, and Confirmation and repair steps.	10
6	Building Defects and Remedial Measures : 6.1 Nature, types of problems, their causes, remedial measures and special treatment for building elements. –Foundation, - Basements – D.P.C. - Walls - Wall finishes – Chimney, stacks and shafts –Columns and beams – Roof and roof terraces – Floor and floor finishes – Joinery work – Decorative/decorative finishes –Services – Materials – Dampness	10

Recommended Books:

Sr No	References
1	Construction Planning equipment and Methods by RL Peuripo Tata McGraw Hill.
2	Mangement Machines and Methods in Civil Engineering-John,Christan, John Wiley and Sons.
3	Maintenance of Buildings A.C. Panchadari New age international (P) limited Publishers
4	Common Defects in Buildings -H.J.Eidridge, Her Majesty's Stationery Office, London
5	Appraising building defects : Properties on stability and hygro-thermal performances, Geoffrey K.Cook Dr. A John Hinks Longman Scientific & Technical.
6	Maintenace and Repair of Buildings and their internal environment B.D.HUTCHINSON. J.Barton. N.Ellis
7	IVOR H. Seeley, Building Technology Mac Millian

Detailed Syllabus

SUBJECT TITLE: PAVEMENT MATERIAL CHARACTERIZATION

SUBJECT CODE: PHDCE1103 C

SEMESTER: I/II

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5	0	0	5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Contents of Syllabus:

Lecture Wise Break Up:		No. of Lectures:
1	Subgrade Soil Characterization: Properties of subgrade, soils, A critical look at the Different laboratory and in-situ procedures for evaluating the mechanical properties of soils viz. GI, CBR & Plate Load test, Field compaction and control, Modulus of subgrade reaction.	12
2	Aggregate: Introduction, Desirable properties of road aggregates, Tests for Road aggregates	12
3	Bituminous materials: Introduction, Types of Bituminous materials, Requirements of bitumen, Tests on Bitumen, Cutback Bitumen, Bituminous Emulsion, Bituminous paving mixes, Design by Marshall Method and Modified Hubbard-Field method	12
4	Cement and Cement Concrete Mix Characterization: Types of cements and basic cement properties, Special cements; Quality tests on cement; Tests on cement concrete including compressive strength, flexural strength, modulus of elasticity and fatigue properties; Introduction to advanced concretes like self compacted concrete, Light weight concrete, Roller Compacted Concrete for pavement application; Role of different admixtures in cement concrete performance; Joint filers for Jointed Plain Cement Concrete Pavements and their characterization; Nano technology applications in cement concrete.	12
5	Soil Stabilization: Introduction, Mechanics of soil stabilization, stabilization with admixtures like cement, lime, fly ash, bitumen, stabilization using soft aggregates, stabilization of Black Cotton soils, stabilization of desert sand, Introduction to Geotextiles application.	12

Recommended Books:

S. No.	References:
1	Atkins, N. Harold, Highway Materials, Soils and Concretes, Fourth Edition, 2002, Prentice-Hall.
2	Kerbs Robert D. and Richard D. Walker, Highway Materials, McGraw-Hill, 1971.
3	Relevant IRC and IS Codes of Practices (Separate List will be given).
4	Highway Engineering, S.K. Khanna – C.E.G. JUSTO

Detailed Syllabus

SUBJECT TITLE: ADVANCED STRUCTURAL ANALYSIS

SUBJECT CODE: PHDCE1103 D

SEMESTER: I/II

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5	0	0	5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Contents of Syllabus:

Lecture Wise Break Up		No. of Lectures
1	Stiffness Matrix Method: Basis of stiffness method, Influence coefficients, Kinematic indeterminacy, Degree of freedom, Action displacement relationship, Matrix approach to stiffness method, Transformation of axes system, Formation of load vectors, Elastic supports, Support displacements, Application of stiffness matrix method to various type of structures e.g. Continuous beams, Trusses, Frames and grids, partially discontinuous structures, Temperature effects,	20
2	Flexibility Matrix Method: Compatibility equations, Flexibility coefficients, Application of complimentary energy principles, Basis of the method, Application of flexibility matrix method to various types of structures, Analysis of pin jointed trusses, Rigid frames.	20
3	Finite Element Method: Introduction to finite element method, Theory of elasticity, Coordinate systems, Rotation of axes, Shape functions, Elements stiffness matrix and load vector, Triangular element in plane stress and strain, Numerical integration, Isoparametric elements, Rectangular elements in flexure, Triangular element, Rectangular element in plane stress and bending combined, Computer programming concepts.	20

Recommended Books:

S.No.	References
1	Matrix Analysis of Framed Structures by Gere and Weaver.
2	Analysis of Indeterminate Structures by C.K. Wang
3	Advance Structural Analysis by A.K.Jain.
4	Introduction to Finite Element Method by C.S.Desai and John F. Abel