

# MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

**Total Credits= 16**

Semester-VII (B. Tech Civil Engg.)		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BCIES1-701	Design of Concrete Structures-II	3	0	0	40	60	100	3
BCIES1-702	Professional Practice & Law	3	0	0	40	60	100	3
<b>Departmental Elective-VI (Select any one)</b>		2	0	0	40	60	100	2
BCIED1-711	Irrigation Engineering-II							
BCIED1-712	Air & Noise Pollution and Control							
BCIED1-713	Geotechnical Design							
<b>Departmental Elective-VII (Select any one)</b>		2	0	0	40	60	100	2
BCIED1-721	Prestressed Concrete							
BCIED1-722	Solid & Hazardous Waste Management							
BCIED1-723	Repair & Rehabilitation of Structures							
BCIES1-703	Project-I	0	0	6	60	40	100	3
BCIES1-704	Software Lab	0	0	2	60	40	100	1
BCIES1-705	Training-III*	0	0	0	60	40	100	2
BMNCC0-006	Essence of Indian Knowledge Tradition (Mandatory Course)	2	0	0	100	---	100	0
<b>Total</b>		-	-	-	<b>440</b>	<b>360</b>	<b>800</b>	<b>16</b>

\*Internship will be imparted at the end of 6<sup>th</sup> semester as per AICTE Internship Policy.

**MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH**

**Total Credits= 15**

Semester-VIII (B. Tech Civil Engg.)		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BCIES1-801	Transportation Engineering-II	3	0	0	40	60	100	3
<b>Departmental Elective-VIII (Select any one)</b>								
BCIED1-811	Design of Steel Structures-II							
BCIED1-812	Port & Harbour Engineering	3	0	0	40	60	100	3
BCIED1-813	Environmental Impact Assessment and Life Cycle Analyses							
<b>Departmental Elective-IX (Select any one)</b>								
BCIED1-821	Engineering Hydrology							
BCIED1-822	Bridge Engineering	2	0	0	40	60	100	2
BCIED1-823	Soil Reinforcing Techniques							
BCIED1-824	Industrial Structures							
XXXXX	Open Elective*	3	0	0	40	60	100	3
BCIES1-802	Advance Inspection & Testing Lab	0	0	2	60	40	100	1
BCIES1-803	Project-II	0	0	6	60	40	100	3
<b>Total</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>280</b>	<b>320</b>	<b>600</b>	<b>15</b>

**\*Open Elective Subjects may also be chosen from the list of Open Electives-I, II and III offered by other departments of university.**

**Overall Marks / Credits**

<b>Semester</b>	<b>Marks</b>	<b>Credits</b>
1 <sup>st</sup>	800	19
2 <sup>nd</sup>	900	20
3 <sup>rd</sup>	1200	25
4 <sup>th</sup>	1500	26
5 <sup>th</sup>	1100	25
6 <sup>th</sup>	900	21
7 <sup>th</sup>	700	16
8 <sup>th</sup>	600	15
<b>Total</b>	<b>7700</b>	<b>167</b>

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# MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

<b>DESIGN OF CONCRETE STRUCTURES-II</b>		
<b>Subject Code: BCIES1-701</b>	<b>L T P C</b>	<b>Duration: 45 hrs.</b>
	3 0 0 3	
<b>Course Objectives: -----</b>		
<b>Course Outcomes: -----</b>		
<b>Note: Indian Standards-IS 456, IS 3370 and Design Aid SP-16 are permitted in examination.</b>		
<b>UNIT-I (12 Hours)</b>		
<b>Design of Foundations</b> – Concept, Application, Types, Components of Footing, Design of Isolated Footing (Square, Rectangular), Combined Footing (Rectangular, Trapezoidal & Strap footing) and Raft Foundation.		
<b>Design of Stairs:</b> Introduction, Elements of Stairs-Tread, Rise, Flight, Landing, Types of Stairs, Design and Reinforcement detail of Stairs.		
<b>UNIT-II (11 Hours)</b>		
<b>Design of Compression Members:</b> Classifications (According to Shape, Length and loading conditions), Assumptions, Guidelines as per Indian Standards, Behavior of Compression Members, Short Compression Members under Axial Load with Uni-axial and Bi-axial Bending, Design of Slender (Long) Columns.		
<b>UNIT-III (11 Hours)</b>		
<b>Design of Beams (Continuous and Curved):</b> Definition, Behavior, Design of Continuous beams and Curved beams, Reinforcement detailing.		
<b>Design of Retaining Walls:</b> Classification, Elements-Stem, Base, Heel, Toe, Behavior and design of Cantilever and Counter fort type retaining wall.		
<b>UNIT-IV (11 Hours)</b>		
<b>Design of Domes:</b> Types, Components, Design of Spherical and Conical Dome.		
<b>Water Tanks:</b> Introduction, Types & uses of Underground water tanks, ground water tanks, Design of Circular and Rectangular water tanks resting on ground.		
<b>Recommended Text Books / Reference Books:</b>		
1. N. Subramanian, 'Design of Reinforced Concrete Structures', Oxford University Press.		
2. Pillai & Menon, 'Reinforced Concrete Design', Tata McGraw Hill Education.		
3. P.C. Varghese, 'Limit State Design of Reinforced Concrete', Prentice Hall of India Pvt. Ltd.		
4. Raju N. Krishna 'Reinforced Concrete Elements'.		
5. Mallick and Rangasamy, 'Reinforced Concrete', Oxford-IBH.		

<b>PROFESSIONAL PRACTICE &amp; LAW</b>		
<b>Subject Code: BCIES1-702</b>	<b>L T P C</b>	<b>Duration: 45 hrs.</b>
	3 0 0 3	
<b>Course Objectives: -----</b>		
<b>Course Outcomes: -----</b>		

# MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

## UNIT-I (13 Hours)

**Estimating:** Different types of estimates, methods of estimating and scheduling quantities for the following works: Building, irrigation works, road works, canal works, sanitary and water supply works, roofs, R.C.C. work.

**Analysis of Rates:** Schedule of rates (As per CSR Punjab-2016), Analysis of rates: earth work, brick masonry, stone masonry, cement concrete, RCC work, plastering, flooring, white washing, painting, road work.

## UNIT-II (11 Hours)

**Specifications:** Detailed specifications of the following: earth work in foundation, lean concrete in foundation, cement concrete, RCC, brick work, plastering, painting, C.C. floor, mosaic floor, white washing, distempering, varnishing, painting, doors and windows, DPC, centering and shuttering, cement mortar, brick ballast and sand.

## UNIT-III (11 Hours)

**Valuation:** Gross income, net income, outgoing, scrap value, salvage value, obsolescence, annuity, capitalized value, year's purchase, sinking fund, depreciation, book value, valuation of building, determination of depreciation, method of valuation, life of various items of works, different types of lease, fixation of rates, plinth area required for residential & commercial building, Arbitration.

## UNIT-IV (10 Hours)

**Accounts Procedures:** Regular and work charged establishment, pay bill, ACR, classifications of works, contract, tender, tender notice, earnest money, security money, arranging contract, power of accepting tender, daily labour, muster roll, classification of contracts, penalty, measurement book, account procedures of stores, stock accounting, Introduction to forms and bills, Advance payment, hand receipt, refund of security money, cash book, imprest, deposit works, temporary advances, treasury challan, inventory, administrative approval, competent authority, building bye laws.

### Recommended Text Books / Reference Books:

1. Estimating & Costing in Civil Engineering: Theory & Practice by B.N. Dutta, UBS Publishers Distributors Ltd.
2. Estimation and Costing in Civil Engineering, by Birdie, G.S., Dhanpat Rai Publishing Co. Ltd, New Delhi, 2011.
3. Estimation, Costing, Specifications and Valuation in Civil Engineering, Chakraborti M, National Half-tone Co. Calcutta
4. Estimating and Costing for Building & Civil Engineering Works by P.L. Bhasin.
5. Standard Schedule of rates and standard data book by Public Works Department.
6. National building code of India.
7. I.S. 1200 (Parts I to XXV – 1974/method of measurement of building and Civil Engineering works – B.I.S.

# MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

IRRIGATION ENGINEERING-II		
<b>Subject Code: BCIED1-711</b>	<b>L T P C</b>	<b>Duration: 30 hrs.</b>
	2 0 0 2	
<b>Course Objectives: -----</b>		
<b>Course Outcomes: -----</b>		
<b>UNIT-I (08 Hours)</b>		
<b>Head Works:</b> Types of head works, Functions and investigations of a diversion head work: component parts of a diversion head work and their design considerations.		
<b>Theories of Seepage:</b> Seepage force and exit gradient, assumptions and salient features of Bligh's Creep theory, Limitations of Bligh's Creep theory, salient features of Lane's weighted Creep theory and Khosla's theory, Comparison of Bligh's Creep theory and Khosla's theory, Determination of uplift pressures and floor thickness.		
<b>UNIT-II (07 Hours)</b>		
<b>Design of Weirs:</b> Weirs versus barrage, types of weirs, main components of weir, hydraulic jump and seepage flow. Design of barrage or weir.		
<b>Spillways:</b> Components of spillways, types of gates for spillway crests, profiles neglecting velocity of approach, profile taking velocity of approach into account, upstream lip and approach ramp, advantages of gated spillways.		
<b>UNIT-III (08 Hours)</b>		
<b>Canal Regulators:</b> Off-take alignment, cross-regulators – their functions and design, Distributory head regulators, their design, canal escape.		
<b>Canal Falls:</b> Necessity and location, types of falls, selection of type of falls, Principles of design, Design of Sarda type, straight glacis and Inglis or baffle wall falls.		
<b>UNIT-IV (07 Hours)</b>		
<b>Cross-Drainage works:</b> Definitions, choice of type, Aqueducts, siphon aqueducts, super passages, canal siphons and level crossing.		
<b>Canal Outlets:</b> Classifications, criteria for outlet behaviors, flexibility, proportionality, sensitivity, sensitiveness, etc. details and design of non-modular and modular outlets.		
<b>Recommended Text Books / Reference Books:</b>		
1. Irrigation Engg. & Hydraulic Structure by Santosh Kumar Garg, Khanna Publishers		
2. Design of Irrigation Structures by R.K. Sharma, Oxford IBH Publications.		
3. Irrigation Engg. & Hydraulics Structures by S.R. Sahasrabudhe, Katson Publishing		
4. Irrigation Practice and Design Vol. I to VII by K.B. Khushlani. Oxford IBH Pub		
5. P.N. Modi; Irrigation with Resources and with Power Engineering, Standard Book House		
6. Irrigation Engg. Vol. I & II by Ivan E. Houk, John Wiley and sons.		

# MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

AIR & NOISE POLLUTION AND CONTROL		
<b>Subject Code: BCIED1-712</b>	<b>L T P C</b>	<b>Duration: 30 hrs.</b>
	2 0 0 2	
<b>Course Objectives: -----</b>		
<b>Course Outcomes: -----</b>		
<b>UNIT-I (08 Hours)</b>		
<b>Air Pollution:</b> Composition and structure of atmosphere, global implications of air Pollution, Classification of air pollutants: Particulates, hydrocarbon, Carbon monoxide, Oxides of sulphur, Oxides of nitrogen and photo chemical oxidants. Indoor air pollution, Effects of air pollutants on humans, animals, property and plants.		
<b>Air Pollution Chemistry:</b> Meteorological aspects of air pollution dispersion; temperature lapse rate and stability, wind velocity and turbulence, plume behaviour, dispersion of air pollutants, the Gaussian Plume Model, stack height and dispersion.		
<b>UNIT-II (07 Hours)</b>		
<b>Air Sampling &amp; Measurement:</b> Ambient air quality and standards, air sampling and measurements; ambient air sampling, Collection of gaseous air pollutants, collection of particulate air pollutants, stack sampling, Control devices for particulate contaminants: gravitational settling chambers, cyclone separators, wet collectors, fabric filters (Bag-house filter), electrostatic precipitators (ESP).		
<b>UNIT-III (07 Hours)</b>		
<b>Control of Gaseous Contaminants:</b> Absorption, Adsorption, Condensation and Combustion, Control of sulphur oxides, nitrogen oxides, carbon monoxide, and hydro carbons, automotive emission control, catalytic convertor, Euro-I, Euro-II and Euro-III specifications, Indian specifications.		
<b>UNIT-IV (08 Hours)</b>		
<b>Noise Pollution:</b> Basics of acoustics and specification of sound; sound power, sound intensity and sound pressure levels; plane, point and line sources, multiple sources; outdoor and indoor noise propagation; psycho-acoustics and noise criteria, effects of noise on health, annoyance rating schemes; special noise environments: Infra-sound, ultrasound, impulsive sound and sonic boom; noise standards and limit values; noise instrumentation and monitoring procedure, Noise indices.		
<b>Recommended Text Books / Reference Books:</b>		
1. Peavy, Rowe and Tchobanoglous: Environmental Engineering.		
2. Environmental Engineering (Vol. II) by S.K. Garg, Khanna Publishers, Delhi		
3. Martin Crawford: Air Pollution Control Theory.		
4. Warkand Warner: Air Pollution: Its Origin and Control.		
5. Rao and Rao: Air Pollution Control Engineering.		
6. K Kant and R. Kant, "Air Pollution and Control Engineering", Khanna Publishers House.		
7. Environmental Pollution Control Engineering-CS Rao, Wiley Eastern Ltd., New Delhi,		
8. Environmental Noise Pollution – PE Cunniff, McGraw Hill		

9. Nevers: Air Pollution Control Engineering.			
10. M. P. Poonia and S C Sharma,” Environmental Engineering, Khanna Publishing House.			
<b>GEOTECHNICAL DESIGN</b>			
<b>Subject Code: BCIED1-713</b>	<b>L</b>	<b>T</b>	<b>P C</b>
	2	0	0 2
<b>Duration: 30 hrs.</b>			
<b>Course Objectives: -----</b>			
<b>Course Outcomes: -----</b>			
<b>UNIT-I (08 Hours)</b>			
<b>Sheet Piles:</b> Introduction, sheet pile structures, free cantilever sheet pile walls, cantilever sheet pile, depth of embedment of cantilever walls in sandy soils, depth of embedment of cantilever walls in cohesive soils, anchored bulkhead: free-earth support method, depth of embedment of anchored sheet piles in granular soils, design charts for anchored bulkheads in sand, moment reduction for anchored sheet pile walls, anchorage of bulkheads.			
<b>UNIT-II (07 Hours)</b>			
<b>Braced Cuts and Cofferdams:</b> Lateral earth pressure distribution on braced-cuts, stability of braced cuts in saturated clay, Bjerrum and Eide method of analysis, piping failures in sand cuts, arching action of soil and its application, coffer dams.			
<b>UNIT-III (07 Hours)</b>			
<b>Drilled Pier Foundations:</b> Introduction, types of drilled piers, load transfer mechanism, vertical bearing capacity of drilled piers, the general bearing capacity equation for the base resistance, bearing capacity equations for cohesive soil and granular soil, ultimate skin resistance of cohesive cohesion-less soil and gravelly sands, ultimate side and total resistance in rock, estimation of settlements of drilled piers at working loads, uplift capacity of drilled piers, lateral bearing capacity of drilled piers.			
<b>UNIT-IV (08 Hours)</b>			
<b>Well Foundations:</b> Forces acting on wells, components of well foundation, bearing capacity, settlement and lateral resistance, tilts and shifts design and construction, types of caissons, advantages and disadvantages of each type of caisson, forces acting on the caissons and design of caissons.			
<b>Recommended Text Books / Reference Books:</b>			
<ol style="list-style-type: none"> <li>1. J.E. Bowles – Foundation Design &amp; Analysis, McGraw-Hill Edition 1995.</li> <li>2. Ground improvement techniques by P. Purushottam Raj, Laxmi Publication.</li> <li>3. F. S. Fang Handbook of Foundation Engg. CBS Pub., 1985.</li> </ol>			



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<b>PRESTRESSED CONCRETE</b>		
<b>Subject Code: BCIED1-721</b>	<b>L T P C</b>	<b>Duration: 30 hrs.</b>
	2 0 0 2	
<b>Course Objectives: -----</b>		
<b>Course Outcomes: -----</b>		
<b>Note: IS 1343 Code of Practice is permitted in the examination.</b>		
<b>UNIT-I (06 Hours)</b>		
<b>Materials for Pre-stressed Concrete and Pre-stressing Systems:</b> High strength concrete and high tensile steel, tensioning devices, pre-tensioning systems, post tensioning systems.		
<b>UNIT-II (09 Hours)</b>		
<b>Analysis of Pre-stress and Bending Stresses:</b> Analysis of pre-stress, resultant stresses at a sector, pressure line or thrust line and internal resisting couple, concept of load balancing, losses of pre-stress, deflection of beams.		
<b>UNIT-III (08 Hours)</b>		
<b>Strength of Pre-Stressed Concrete Sections in Flexure, Shear and Torsion:</b> Types of flexural failure, strain compatibility method, IS: 1343 code procedure, design for limit state of shear and torsion.		
<b>UNIT-IV (07 Hours)</b>		
<b>Design of Pre-Stressed Concrete Beams and Slabs:</b> Transfer of prestress in pre tensioned and post tensioned members, design of anchorage zone reinforcement, End zone, design of simple beams, cable profiles.		
<b>Recommended Text Books / Reference Books:</b>		
1. N. Krishna Raju, Prestressed concrete, Tata McGraw Hill		
2. T.Y. Lin, Ned H. Burns, Design of Prestressed Concrete Structures, John Wiley & Sons.		
3. P. Dayaratnam, Prestressed Concrete, Oxford & IBH		
4. R. Rajagopalan, Prestressed Concrete.		
5. Code of Practice for Prestressed Concrete (IS 1343 : 2012)		

<b>SOLID &amp; HAZARDOUS WASTE MANAGEMENT</b>		
<b>Subject Code: BCIED1-722</b>	<b>L T P C</b>	<b>Duration: 30 hrs.</b>
	2 0 0 2	
<b>Course Objectives: -----</b>		
<b>Course Outcomes: -----</b>		
<b>UNIT-I (09 Hours)</b>		
<b>Sources and Composition of Municipal:</b> Solid Waste Introduction, Sources of solid waste, types & classification of solid waste, Composition of solid waste and its determination, Types of		

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<p>materials recovered from MSW.</p> <p><b>Properties of Municipal Solid Wastes:</b> Physical properties of Municipal Solid Waste, Chemical properties of Municipal Solid Waste, Biological properties of Municipal Solid Waste, Transformation of Municipal Solid Waste.</p>
<b>UNIT-II (06 Hours)</b>
<p><b>Solid Waste Generation and Collection:</b> Quantities of Solid Waste, Measurements and methods to measure solid waste quantities, Solid waste generation and collection, Factors affecting solid waste generation rate, Quantities of materials recovered from MSW.</p>
<b>UNIT-III (06 Hours)</b>
<p><b>Handling, Separation and Storage of Solid Waste:</b> Handling and separation of solid waste At site, Material separation by pick in, screens, float and separator magnets and electromechanical separator and other latest devices for material separation, Waste handling and separation at Commercial and industrial facilities, Storage of solid waste at the sources.</p>
<b>UNIT-IV (09 Hours)</b>
<p><b>Processing of Solid Waste:</b> Processing of solid waste at residence e.g. Storage, conveying, compacting, Shredding, pulping, granulating etc., Processing of solid waste (Size &amp; volume reduction)</p> <p><b>Disposal &amp; Treatment of Solid Waste:</b> Combustion and energy recovery of municipal solid waste, effects of combustion, Sanitary landfill: Classification, planning, landfill processes, landfill design, landfill operation &amp; bioreactors, Compositing, Incineration, Pyrolysis &amp; gasification, Landfill leachate &amp; gas management.</p>
<p><b>Recommended Text Books / Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Environmental Engineering (Vol. II) by S.K. Garg, Khanna Publishers, Delhi.</li> <li>2. Vesilind P.A., Worrell W. and Reinhart D.R., "Solid Waste Engineering", Thomson Books.</li> <li>3. Bhide A.D. and Sundaresan B.B., "Solid Waste Management, Collection, Processing and Disposal", Nagpur.</li> <li>4. Tchobanoglous G., Theisen H. and Vigil S.A., "Integrated Solid Waste Management", McGraw-Hill International editions.</li> <li>5. "Manual on Municipal Solid Waste Management", CPHEEO, Ministry of Urban Development, Government of India.</li> <li>6. Management and Handling Rules for: municipal solid waste, biomedical waste, hazardous waste and radioactive wastes, Government of India Publications.</li> </ol>

<b>REPAIR &amp; REHABILITATION OF STRUCTURES</b>			
<b>Subject Code: BCIED1-723</b>	<b>L T P C</b>	<b>Duration: 30 hrs.</b>	
	2 0 0 2		
<b>Course Objectives: -----</b>			
<b>Course Outcomes: -----</b>			
<b>UNIT-I (06 Hours)</b>			
<b>Maintenance and Repair Strategies:</b> Definitions: Maintenance, Repair and Rehabilitation. Facets			

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of Maintenance, Importance of Maintenance and Daily, Weekly, Monthly, Yearly Routine Maintenance, Various aspects of Inspection, stages of inspection, Assessment procedure for Evaluating a damaged Structure, Causes of deterioration.

### UNIT-II (09 Hours)

**Materials for Repair:** Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, Ferro cement, Fibre reinforced concrete.

**Strength & Durability of Concrete:** Quality assurance for Concrete: Strength, Durability and thermal properties, Cracks: Different types, Causes, Effects due to climate, Temperature, Sustained elevated temperature, Corrosion - Effects of cover thickness.

### UNIT-III (09 Hours)

**Techniques for Repair and Protection Methods:** Non-destructive Testing Techniques, Epoxy injection, Shoring, Underpinning, Corrosion protection techniques: Corrosion inhibitors, Corrosion resistant steels, Coatings to reinforcement, Cathodic protection.

**Demolition Techniques:** Engineered demolition methods and Case studies.

### UNIT-IV (06 Hours)

**Repair, Rehabilitation and Retrofitting of Structures:** Evaluation of root causes, Under pinning & shoring some simple systems of rehabilitation of structures; Guniting, shotcreting, Non-destructive testing system; Use of external plates, carbon fibre wrapping and carbon composites in repairs. Strengthening of Structural elements, Repair of structures distressed due to corrosion, fire, Leakage, earthquake.

#### **Recommended Books/References:**

1. A.C. Panchdari, 'Maintenance of Buildings', New Age International (P) Limited Publishers.
2. Gambhir M.L., "Concrete Technology", McGraw Hill, 2013.
3. Ravishankar K., Krishnamoorthy T.S, "Structural Health Monitoring, Repair and Rehabilitation of Concrete Structures", Allied Publishers, 2004.
4. R. Chudley, 'Building Finishes, Fittings and Domestic Services', Longman Technical Services.
5. G. Szechy, D. SC; 'Foundation Failures', Concrete Publications Limited, 14 Dartmouth Street, London.
6. CPWD and Indian Buildings Congress, Hand book on Seismic Retrofit of Buildings, Narosa Publishers, 2008.
7. W.H. Ransom, 'Building Failures: Diagnosis and Avoidance', New Age Publications (P) Ltd.

<b>PROJECT-I</b>			
<b>Subject Code: BCIES1-703</b>	<b>L T P C</b>	<b>Duration: 90 hrs.</b>	
	0 0 6 3		
<b>Course Objectives: -----</b>			
<b>Course Outcomes: -----</b>			

## MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

### PROJECT WORK:

Students are required to work on practical projects in the field of Civil Engineering (Project work, seminar and internship in industry or at appropriate work place). The students have to work for 6 hrs per week with his / her supervisor(s).

SOFTWARE LAB				
Subject Code: BCIES1-704	L	T	P C	Duration: 30 hrs.
	0	0	2 1	
Course Objectives: -----				
Course Outcomes: -----				
Student can choose anyone software according to their choice.				
1. STAAD-PRO				
2. E-TAB				
3. ARC VIEW GIS				
4. MX ROAD				
5. PLAXIS				
6. PRIMA VERA				

ESSENCE OF INDIAN KNOWLEDGE TRADITION				
Subject Code: BMNCC0-006	L	T	P C	Duration: 30 Hrs.
	2	0	0 0	
Course Objectives: -----				
Course Outcomes: -----				
<b>UNIT – I</b>				
<b>Introduction to Indian Philosophy:</b> Basics of Indian Philosophy, culture, civilization, culture and heritage, general characteristics of culture, importance of culture in human literature, Indian culture, Ancient Indian, Medieval India, Modern India.				
<b>Indian Philosophy &amp; Literature:</b> Vedas Upanishads, schools of Vedanta, and other religion Philosophical Literature. Philosophical Ideas the role of Sanskrit, significance of scriptures to current society, Indian Philosophies, literature of south India.				
<b>UNIT – II</b>				
<b>Religion and Philosophy:</b> Religion and Philosophy in ancient India, Religion and Philosophy in Medieval India, Religious Reform Movements in Modern India (selected movements only)				
<b>UNIT – III</b>				
<b>Indian Fine Arts &amp; Its Philosophy(Art, Technology &amp; Engineering):</b> Indian Painting, Indian handicrafts, Music, divisions of Indian classic music, modern Indian music, Dance and Drama, Indian Architecture (ancient, medieval and modern), Science and Technology in Indian, development of science in ancient, medieval and modern Indian.				
<b>UNIT – IV</b>				

**Education System in India:** Education in ancient, medieval and modern India, aims of education, subjects, languages, Science and Scientists of Ancient India, Scientists of Medieval India, Scientists of Modern India. The role Gurukulas in Education System, Value based Education.

**RECOMMENDED BOOKS:**

1. Kapil Kapoor, "Text and Interpretation: The India Tradition", ISBN: 81246033375, 2005
2. "Science in Samskrit", Samskrita Bharti Publisher, ISBN-13:978-8187276333,2007
3. NCERT, "Position paper on Arts, Music, Dance and Theatre", ISBN 81-7450-494-X, 2006
4. S. Narain, "Examination in Ancient India", Arya Book Depot, 1993
5. Satya Prakash, "Founders of Sciences in Ancient India", Vijay Kumar Publisher, 1989
6. M.Hiriyanna, "Essentials of Indian Philosophy", Motilal Banarsidass Publishers, ISBN-13: 978-8120810990,2014
7. Chatterjee. S & Dutta "An Introduction to Indian Philosophy".

MRSPTU

8<sup>th</sup>  
**SEMESTER**

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# MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

TRANSPORTATION ENGINEERING-II		
<b>Subject Code: BCIES1-801</b>	<b>L T P C</b>	<b>Duration: 45 hrs.</b>
	3 0 0 3	
<b>Course Objectives: -----</b>		
<b>Course Outcomes: -----</b>		
<b>UNIT-I (12 Hours)</b>		
<b>Railway Track:</b> Rail gauge, alignment, engineering surveys, track stresses, rails, sleepers, ballast, formation, track fittings and fastenings, rail joints and welding of rails, creep of rails, track drainage, track maintenance, high speed tracks.		
<b>Geometric Design of Track:</b> Curves and super-elevation, gradients, points and crossings, track junctions and simple track layouts, level crossing.		
<b>UNIT-II (11 Hours)</b>		
<b>Railway Stations &amp; Yards:</b> Classification & layout of stations, Marshalling yard, Locomotive yard, equipment at railway stations & yards.		
<b>Signaling and Interlocking:</b> Objectives, classification of signals, types of signals in stations and yards, principles of interlocking.		
<b>UNIT-III (11 Hours)</b>		
<b>Airport Planning:</b> Aircraft characteristics, airport site selection, airport classification, general layout of an airport, approach zones and turning zones.		
<b>Runway Orientation and Design:</b> Head wind, cross wind, wind rose diagram, basic runway length, corrections, geometric design elements, runway configuration.		
<b>UNIT-IV (11 Hours)</b>		
<b>Taxiway and Aircraft Parking:</b> Aircraft parking system, main taxiway, exit taxiway, separation clearance, holding aprons.		
<b>Visual Aids:</b> Marking and lighting of runway and taxiway, landing direction indicator, and wind direction indicator, IFR/VFR.		
<b>Recommended Text Books / Reference Books:</b>		
1. S. Chandra and M Aggarwal, 'Railway Engineering', Oxford University Press, New Delhi.		
2. S.C. Saxena and S.P. Arora, 'A Textbook of Railway Engineering', Dhanpat Rai and Sons.		
3. J.S. Mundrey, 'Railway Track Engineering', McGraw Hill Publishing Co, New Delhi		
4. S.K. Khanna, M.G. Arora and S.S. Jain, 'Airport Planning and Design', Nem Chand & Bros.		
5. R. Horenjeff, and F. McKelvey, 'Planning and Design of Airports', McGraw Hill Company.		

# MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

<b>DESIGN OF STEEL STRUCTURES-II</b>			
<b>Subject Code: BCIED1-811</b>	<b>L T P C</b>	<b>Duration: 45 hrs.</b>	
3 0 0 3			
<b>Course Objectives: -----</b>			
<b>Course Outcomes: -----</b>			
<b>Note: IS 800:2007, General construction in Steel-Code of practice is permitted in examination.</b>			
<b>UNIT-I (12 Hours)</b>			
<b>Plastic Analysis:</b> Introduction, flexural behavior, shape factor, plastic moment capacity of beams, Design of Beams.			
<b>Plate Girder:</b> Elements of a plate girder, economical depth, IS recommendations, design of a plate girder, curtailment of flanges, various types of stiffeners using bolts and welds.			
<b>UNIT-II (11 Hours)</b>			
<b>Foot Bridge:</b> Elements of Foot Bridge, types, moving load behavior, Design of steel foot bridge with welded joints.			
<b>UNIT-III (11 Hours)</b>			
<b>Industrial Buildings:</b> Introduction, Terminology, types & uses, types of load, Design of elements of industrial buildings: Gantry girder, Column bracket using weld.			
<b>UNIT-IV (11 Hours)</b>			
<b>Railway Bridge:</b> Design of single track Railway Bridge with lattice girders having parallel chords (for B.G.)- Stringer, Cross girder, Main girders with welded joints, Portal sway bracings, rollers bearing.			
<b>Recommended Text Books / Reference Books:</b>			
1. S.K. Duggal, 'Limit State Design of Steel Structures'.			
2. N. Subramanian, 'Design of Steel Structures'.			
3. Ram Chandra, 'Design of Steel Structures', Vol. 2.			
4. L.S. Negi, 'Design of Steel Structures'.			
5. S.S. Bhavikatti, 'Design of Steel Structures (by limit state method as per IS: 800-2007).			
6. IS 800: 2007 (General Construction in Steel-Code of Practice)			
7. SP: 6(1) (Handbook for Structural Engineers-Structural Steel Sections).			

<b>PORT &amp; HARBOUR ENGINEERING</b>			
<b>Subject Code: BCIED1-812</b>	<b>L T P C</b>	<b>Duration: 45 hrs.</b>	
3 0 0 3			
<b>Course Objectives: -----</b>			
<b>Course Outcomes: -----</b>			



## MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

### UNIT-I (11 Hours)

**General:** History, Advantages and disadvantages of water transportation, Modern trends in water transportation, Elements of water transportation, Historical development in India.

**Natural Phenomena:** Tides, Wind, Water waves, Currents phenomena, Characteristics and effects on marine structures, Littoral drift.

### UNIT-II (12 Hours)

**Marine Structures:** General design aspects, Breakwaters - function, types general design principles, Wharves, Quays, Jetties, Piers, Pier heads, Dolphin, Fenders, Mooring Accessories.

**Harbours:** Classification of harbours, Selection of site and planning of harbours, Ship characteristics, Characteristics of good harbour, Size of harbour.

### UNIT-III (11 Hours)

**Docks and Repair Facilities:** Harbour docks, Wet docks, Repair docks, Lift docks, Floating docks, Slipways.

**Port Facilities:** Port building facilities, Transit sheds, Warehouses, Cargo handling facility, Services for shipping terminals, Inland port facilities planning.

### UNIT-IV (11 Hours)

**Dredging:** General, Classification of dredging works, Types of dredgers, Uses of dredged material, Execution of dredging work.

**Navigation Aids:** Necessity, Types of navigation aids, Requirement of signals, Fixed and floating navigation aids.

#### **Recommended Text Books / Reference Books:**

1. S. P. Bindra, 'A Course in Docks and Harbour Engineering', Dhanpat Rai & Sons, New Delhi.
2. R. Srinivasan and S. C. Rangwala, 'Harbour, Dock and Tunnel Engineering', Charotar Publishing House, Anand.
3. Alonzo Quinn, 'Design and Construction of Ports and Marine Structure', McGraw Hill Book Company, New York.

### ENVIRONMENTAL IMPACT ASSESSMENT & LIFE CYCLE ANALYSES

**Subject Code: BCIED1-813**

**L T P C**

**Duration: 45 hrs.**

3 0 0 3

**Course Objectives: -----**

**Course Outcomes: -----**

### UNIT-I (12 Hours)

**Evolution of EIA Concepts:** Methodologies – Screening- Scoping- Base line studies- Mitigation – Matrices - Check List.

### UNIT-II (11 Hours)

**Elements of Life Cycle Assessment:** Life Cycle Costing, Eco Labelling, Design for the Environment, Environmental Audit- Life cycle Assessment, International Environmental Standards

### UNIT-III (11 Hours)

# MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

<p><b>Assessment of Impacts:</b> Air, Water, Soil, Noise, Biological, Green energy and green process management in Pharmaceutical, Construction, Textiles, Petroleum Refineries, Iron and Steel.</p>
<p><b>UNIT-IV (11 Hours)</b></p>
<p><b>Documentation of EIA:</b> Environmental management Plan- Post Project monitoring- Environmental Management System EMS – case studies in EIA.</p>
<p><b>Recommended Text Books / Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Integrated Environmental Modeling - Pollutant Transport, Fate and Risk in the Environment, Ramaswami A., Milford J.B., Small M. J., John Wiley &amp; Sons.</li> <li>2. Principles of Geographical Information Systems, Burrough P.A. and McDonnell, R.A., Oxford University Press 1998.</li> <li>3. Dynamics of Environmental Bioprocesses Modeling and Simulation Snape J.B., Dunn I.J., Ingham J and Prenosil J.E., VCH, Weinheim 1995.</li> <li>4. Activated Sludge Models ASM1, ASM2, ASM2d and ASM3, Henze M., IWA Publ. 2000</li> <li>5. Surface Water Quality Modeling, Chapra S.C., McGraw-Hill Inc. 1997</li> </ol>

ENGINEERING HYDROLOGY					
<b>Subject Code:</b> BCIED1-821	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Duration:</b> 30 hrs.
	2	0	0	2	
<b>Course Objectives:</b> -----					
<b>Course Outcomes:</b> -----					
<b>UNIT-I (09 Hours)</b>					
<p><b>Introduction:</b> Hydrologic cycle, History of hydrology, water budget equation, World Water balance, applications in engineering sources of data.</p> <p><b>Precipitation:</b> Forms of Precipitation, characteristics of precipitation in India, measurement of precipitation, Rain Gauge Network, Mean Precipitation over an Area, Depth-Area-Duration Relationships, Maximum Intensity / Depth-Duration-Frequency Relationship, Probable Maximum Precipitation (PMP), Rainfall Data in India.</p>					
<b>UNIT-II (07 Hours)</b>					
<p><b>Abstractions from precipitation:</b> Evaporation process, Evaporimeters, Analytical methods of Evaporation Estimation, Reservoir Evaporation and Methods for its Reduction, Evapo-transpiration, Interception, Depression storage.</p> <p><b>Infiltration:</b> Definition, Infiltration capacity, measurement of infiltration, Modelling infiltration capacity, Classification of Infiltration capacities, Infiltration Indices.</p>					
<b>UNIT-III (09 Hours)</b>					
<p><b>Runoff:</b> Run-off volume, SCS-CN method of estimating runoff volume, flow-duration curve, flow-mass curve, hydrograph, factors affecting run-off hydrograph, components of hydrograph. (5)</p> <p><b>Hydrographs:</b> Base flow separation, effective rainfall, unit hydrograph, S-curve hydrograph, Snyder's synthetic unit hydrograph, surface water resources of India.</p>					

# MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

## UNIT-IV (05 Hours)

**Peak flows:** Estimation of peak flow-rational formula, use of unit hydrograph, frequency analysis, Gumbel's method, design flood and its hydrograph.

**Recommended Text Books / Reference Books:**

1. Engineering Hydrology - J.Nemec, Prentice Hall
2. Engineering Hydrology by Stanley Buttlar, John. Wiley
3. Ground Water Hydrology by TODD, John. Wiley
4. Engineering for Dams Vol. II & III by Creager Justin & Hinds. John. Wiley
5. Hydrology by. S.K.Garg, Khanna Publications.
6. Hydrology Principles, Analysis and Design by. Raghunath, H M, New Age Int.

## BRIDGE ENGINEERING

**Subject Code: BCIED1-822**

**L T P C**

**Duration: 30 hrs.**

2 0 0 2

**Course Objectives:** -----

**Course Outcomes:** -----

### UNIT-I (08 Hours)

**Introduction:** Definition and components of a bridge, Classification of bridges, Choice of a bridge type, Investigation for bridges, Selection of bridge site, design discharge for river bridge, linear waterway, economical span, vertical clearance, scour depth, afflux.

**Standard Specifications for Road Bridges:** IRC Bridge Codes, Width of carriageway, Dead load, I.R.C. standard live loads, Impact effect, Wind load, Longitudinal forces, Centrifugal forces, Horizontal forces due to water current, Buoyancy effect, Earth pressure, Deformation stresses, Erection stresses, Temperature effects, and Seismic forces.

### UNIT-II (08 Hours)

**Reinforced Concrete Bridges:** Types of RCC bridges; Culverts - Box Culvert, Pipe Culvert, Solid slab bridge, T-beam girder bridges, Hollow girder bridges, Balanced cantilever bridges, Continuous girder bridges, Rigid frame bridges, Arch bridges, Prestressed concrete bridges.

**Steel Bridges:** Types of Steel bridges; Beam bridges, Plate girder bridges, Box girder bridges, Truss bridges, Arch bridges, Cantilever bridges, Cable stayed bridges, Suspension bridges.

### UNIT-III (07 Hours)

**Sub-structure and Foundation:** Piers and abutments, materials for piers and abutments, Types of foundations; Shallow, Pile, and Well foundations. Relative merits of piles and well foundations, Pneumatic Caissons, Box Caissons.

**Bearings:** Importance of Bearings, Different types of bearings, Expansion Bearings, Fixed Bearings, Elastomeric Bearings.

### UNIT-IV (07 Hours)

**Joints & Appurtenances:** Expansion joints, Wearing Course, Approach Slab, Footpath, Handrails.

**Construction and Maintenance of Bridges:** Methods of construction of concrete and steel bridges. Formwork and false work for concrete bridges, Causes of Bridge failures, Inspection and maintenance, Bridge Management System.

- Recommended Text Books / Reference Books:**
1. Johnson, Victor, 'Essentials of Bridge Engineering', Oxford University Press.
  2. C.H. Khadilkar, 'A Text book of Bridge Construction', Allied Publishers.
  3. S.C. Rangwala, 'Bridge Engineering', Charotar Publishing House Pvt. Ltd.
  4. V.K. Raina, 'Concrete Bridges Handbook, Shroff Publishers and Distributors.
  5. S. Ponnuswamy, 'Bridge Engineering', McGraw Hill Education.

SOIL REINFORCING TECHNIQUES					
Subject Code: BCIED1-823	L	T	P	C	Duration: 30 hrs.
	2	0	0	2	
Course Objectives: -----					
Course Outcomes: -----					
<b>UNIT-I (07 Hours)</b>					
<b>Reinforced Earth Retaining Wall:</b> Principles, concepts and mechanism of reinforced earth – design consideration of reinforced earth retaining wall.					
<b>UNIT-II (08 Hours)</b>					
<b>Geo-membrane:</b> Physical, mechanical, chemical, biological, thermal and identification properties. <b>Designing with Geo-membranes:</b> Liquid containment liners, covers for reservoirs, canal liners, landfill liners, caps & closures, underground storage tanks etc.					
<b>UNIT-III (08 Hours)</b>					
<b>Geotextile:</b> Physical, mechanical, hydraulic, endurance and degradation properties, designing with geotextiles, geotextile functions and mechanisms, designing for separation, designing for reinforcement, designing for stabilization, designing for filtration, designing for drainage, designing for multi functions.					
<b>UNIT-IV (07 Hours)</b>					
<b>Geogrid:</b> Physical, mechanical, endurance and environmental properties, designing for geogrid reinforcement <b>Geonets:</b> Physical, mechanical, hydraulic, endurance and environmental properties, designing for geonet drainage <b>Geo-composites:</b> Geo-composites for separation, reinforcement, filtration, drainage, liquid, vapour barriers.					
<b>Recommended Text Books / Reference Books:</b>					
<ol style="list-style-type: none"> <li>1. Hausman, M. R. (1990). "Engineering Principles of Ground Modification" McGraw-Hills</li> <li>2. Moseley, M.P. (1193), "Ground Improvement" Chapman and Hall.</li> <li>3. Koener, R.M. (2012), "Designing with Geo-synthetics, Vol.1 &amp; 2, Xlibriss Corporation.</li> <li>4. Rao, G.V. and Raju, G.V.S.S. (1995) "Engineering with Geo-synthetics", TMH.</li> </ol>					

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5. Purushothama Raj, P. (2014). "Ground Improvement Techniques". Laxmi Publishers.

<b>INDUSTRIAL STRUCTURES</b>					
<b>Subject Code: BCIED1-824</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Duration: 30 hrs.</b>
	2	0	0	2	
<b>Course Objectives: -----</b>					
<b>Course Outcomes: -----</b>					
<b>UNIT-I (04 Hours)</b>					
<b>Introduction:</b> Role of Design Engineer, properties of structural steel, merits and demerits of structural steel over reinforced concrete structures.					
<b>UNIT-II (10 Hours)</b>					
<b>Steel Structure Design:</b> Design of tension members, compression members, and flexure members and beam-columns junctions, adopting Codal provisions of IS: 800 components & its terminology, load estimation, choice of sections, analysis and design for gantry girders. Industrial structures with steel trusses and portal frames. Typical configuration with various elements, load assessment (dead load, live load, wind load and earthquake load).					
<b>UNIT-III (10 Hours)</b>					
<b>Industrial Design:</b> Different roofing and cladding alternatives and their design, types of purlins and their design, analysis and design of a trusses and portal frames, design of base plate, pedestal and footing considering both hinged and fixed support conditions, design of bracing and preparation of construction drawings.					
<b>UNIT-IV (06 Hours)</b>					
<b>Welded Connections:</b> Advantages of welding, fundamentals and methods of welding, types of joints, welding symbols and inspection of welding, Codal provisions, and design of typical welded connections. Bolted connections, Types of bolts, Codal provisions, design of typical bolted connections.					
<b>Recommended Text Books / Reference Books:</b>					
1. Design of Steel Structures - by Bresler & Lin.					
2. Theory of Modern Steel Structures - by Linton Grinter.					
3. Design of Steel Structures - by P. Dayaratnam.					
4. Reinforced Concrete Structural Elements (behavior, analysis & design) by P. Purushothoman.					
5. Practical Design of Reinforced Concrete by Russell S. Fling.					
6. Design of Reinforced Concrete Structures by Ashok Kumar Gupta.					
7. Structural Condition assessment by Robert T. Ratay.					
8. Repairs and rehabilitation of concrete structures by P. I. Modi & C. N. Patel, PHI Publication.					

# MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

<b>ADVANCED INSPECTION &amp; TESTING LAB</b>			
<b>Subject Code: BCIES1-802</b>	<b>L T P C</b>	<b>Duration: 30 hrs.</b>	
	0 0 2 1		
<b>Course Objectives: -----</b>			
<b>Course Outcomes: -----</b>			
<b>Laboratory Experiments:</b>			
1. Rebound Hammer Test			
2. Ultrasonic Pulse Velocity Test			
3. Reinforced Bar Locator Test			
4. Cut and Pull Out (CAPO) Test			
5. Fifth Wheel Bump Integrator Test			
6. Benkelman Beam Deflection Test			
7. Vehicular Speed Radar Test			
8. Bitumen Extraction Test			
9. Standard Penetration Test (SPT)			
<b>Recommended Books / Manuals:</b>			
1. M.L. Gambhir, 'Building and Construction Materials: Testing and Quality Control', TMH.			
2. Concrete Lab Manual by NITTTTR Chandigarh.			
3. Concrete Technology, Theory and Practice by M.S. Shetty, S. Chand & Company.			
4. Khanna S.K. and Justo, C.E.G. "Highway Material & Pavement Testing", Nem Chand.			
<b>PROJECT-II</b>			
<b>Subject Code: BCIES1-803</b>	<b>L T P C</b>	<b>Duration: 90 hrs.</b>	
	0 0 6 3		
<b>Course Objectives: -----</b>			
<b>Course Outcomes: -----</b>			
<b>PROJECT WORK:</b>			
Students are required to work on practical projects in the field of Civil Engineering (Project work, seminar and internship in industry or at appropriate work place) (May be continued from VII Semester, Project work, seminar and internship in industry or at appropriate work place). The students have to work for 6 hrs per week with his / her supervisor(s).			