Faculty of Engineering & Technology
P.K.University
Shivpuri (MP)

Department of Civil Engineering

Evaluation Scheme & Syllabus for
B.Tech. Fourth Year- VII & VIII Semester

(Effective from session 2025-26)

EVALUATION SCHEME

B.TECH. CIVIL ENGINEERING

STUDY AND EVALUATIONS CHEME FOR B.TECH Civil Engineering

YEAR4th/SEMESTER-7th

SUBJECT CODE	SUBJECTSNAME	STUDYSCHEME Periods/Week			Credits	MARKSINEVALUATIONSCHEME						Total Marks of Internal &External
						INTERNALASSESSMENT			EXTERNALASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
UENTECE701	Entrepreneurship Development	3	0	0	3	30	-	30	70	-	70	100
UBRIDCE702	Bridge Engineering	3	0	0	3	30	-	30	70	-	70	100
UOPENCE703	Open Channel Flow	3	0	0	3	30	-	30	70	-	70	100
UDESICE704	Design of Steel Structures	3	0	0	3	30	-	30	70	-	70	100
UWATECE705	Water Resources Engineering	3	0	0	3	30		30	70	-	70	100
UMINOCE706	Minor Project	0	0	2	1	-	25	25	-	25	25	50
UINDUCE707	Industrial Training	0	0	2	1	-	25	25	-	25	25	50
Total		15	0	4	17	150	50	200	350	50	400	600

Department of Civil Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
IV Year VII Semester

UENVICE701
ENTREPRENEURSHIP DEVELOPMENT

L	T	P
3	0	0

UNIT- I

Entrepreneurship- definition.growth of small scale industries in developing countries and their positions vis-a-vis large industries; role of small scale industries in the national economy; characteristics and types of small scale industries; demand based and resources based ancillaries and sub-control types.

Government policy for small scale industry; stages in starting a small scale industry. **5 2**

UNIT -II

Project identification- assessment of viability, formulation, evaluation, financing, field-study and collection of information, preparation of project report, demand analysis, material balance and output methods, benefit cost analysis, discounted cash flow, internal rate of return andnet present value methods. **8**

UNIT -III

Accountancy- Preparation of balance sheets and assessment of economic viability, decision making, expected costs, planning and production control, quality control, marketing, industrial relations, sales and purchases, advertisement, wages and incentive, inventory control, preparationof financial reports, accounts and stores studies. **9**

UNIT -IV

Project Planning and control:

The financial functions cost of capital approach in project planning and control. Economic evaluation, risk analysis, capital expenditures, policies and practices in public enterprises. Profit planning and programming, planning cash flow, capital expenditure and operations. Control offinancial flows, control and communication. **9**

UNIT -V

Laws concerning entrepreneur viz, partnership laws, business ownership, sales and income taxesand workman compensation act.

Role of various national and state agencies which render assistance to small scale industrie.s **5 2**

Text / Reference Books:

1. Forbat, John, “Entrepreneurship” New AgeInternational.
2. Havinal, Veerbhadrappa, “Management and Entrepreneurship” New AgeInternational
3. Joseph, L. Massod, “Essential of Management", Prentice Hall ofIndia.

Department of Civil Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
IV Year VII Semester

UBRIDCE702
BRIDGE ENGINEERING

L	T	P
3	0	0

Unit-1

Site selection, various types of bridges and their suitability, loads, forces and IRC bridge loading and permissible stresses, Design of RC bridges under concentrated loads using effective width and Pigeauds Method,

Unit – 2

Courbon's method of load distribution. Detail design of Reinforced Concretes lab culvert

Unit – 3

T-beam bridge,b oxculverts,

Unit – 4

Design elements of plate girder, economical section anddesign.

Unit – 5

Design of piers, pier caps and Abutments, different types of bearings &its design

Text Books :

1. Essentials of Bridge Engineering by D J Victor
2. Limit State Design of Steel Structures by S K Duggal
3. Design of steel Structures by Ramchandra
4. Bridge Engineering by S.Ponnusway
5. Principles & Practices of Bridge Engineering by S.P.Bindra
6. Bridge Engineering (An integrated Treatise) by V.V.S

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(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
IV Year VII Semester

UOPENCE703
OPEN CHANNEL FLOW

L	T	P
3	0	0

Unit-I
Introduction: Basic concepts of free surface flows, velocity and pressure distribution, Mass, energy and momentum principle for prismatic and non-prismatic channels, Review of Uniform flow: Standard equations, hydraulically efficient channel sections, compound sections,
Energy
depthrelations:Conceptofspecificenergy,specificforce,criticalflow,criticaldepth,hydraulicexponents, andchannel transitions.

Unit – II
Gradually Varied Flow (GVF): Equation of gradually varied flow and it limitations, flow classification and surface profiles, Control sections, Computation methods and analysis: Integration of varied flow equation by analytical, graphical and advanced numerical methods, Transitions of subcritical and supercritical flow, flow in curved channel

Unit – III
Rapidly Varied Flow (RVF): Characteristics of rapidly varied flow, Classical hydraulic jump, Evaluation of the jump elements in rectangular and non-rectangular channels on horizontal and sloping beds, Hydraulic jump in gradually and suddenly expanding channels, submerged hydraulic jump, rolling and sky jump, use of jump as an energy dissipater, Flow measurement: by sharp crested and broad crested weirs, critical depth flumes, sluice gate, Free over fall.
Rapidly varied unsteady flow: Equation of motion for unsteady flow, "Celerity" of the gravity wave, deep and shallow water waves, open channel positive and negative surge.

Unit-IV
Spatially Varied Flow (SVF): Basic principles, Differential SVF equations for increasing and decreasing discharge, Classifications and solutions, Numerical methods for profile computation, Flow over side-weir and Bottom-rack.

Unit – V
Flow in channel of non-linear alignment and non-prismatic channel sections, Design considerations for sub critical and super critical flows, Design of culvert.

References:

- Chow, V.T., Open channel Hydraulics, McGraw HillInternational
- Henderson, F.M., Open Channel Flow, McGraw HillInternational
- Subramanya, K., Flow in Open Channels, Tata McGrawHill
- RangaRaju, K.G., Flow through open channels,T.M.H.
- M. HanifChaudhry, Open Channel Flow,PHI

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(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
IV Year VII Semester
UDESICE704
DESIGN OF STEEL STRUCTURES

L	T	P
3	0	0

Unit - 1General Consideration: Introduction, Advantages of Steel as a Structural. Material, Disadvantages of Steel as a Structural Material, Structural Steel, Stress-Strain Curve for Mild Steel, Rolled Steel Sections, Convention for Member Axes, Loads, Dead Load, Live Loads, Environmental Loads, Seismic Forces, Snow and Rain Loads, Erection Loads, Basis for Design, Design Philosophies, Local Buckling of Plate Elements.
Introduction to Limit State Design: Introduction, Limit States for Steel Design, Limit States of Strength, Limit States of Serviceability, Actions (Loads), Probabilistic Basis for Design, DesignCriteria

Unit -2Simple Connections-–Riveted, Bolted and Pinned Connections: Introduction, Riveted Connections, Patterns of Riveted Joints, Bolted Connections, Types of Bolts, Types of Bolted Joints, Load Transfer Mechanism, Failure of Bolted Joints, Specification for Bolted Joints, Bearing-Type Connections, Prying Action, Tensile Strength of Plate, Efficiency of the Joint, Combined Shear and Tension, Slip-Critical Connections, Combined Shear and Tension for Slip-Critical Connections, Working Load Design, Design of eccentric bolted connections.
Simple Welded Connections: Introduction, Types, Symbols, Welding Process, Weld Defects, Inspection of Welds, Assumptions in the Analysis of Welded Joints, Design of Groove Welds, Design of Fillet Welds, Fillet Weld Applied to the Edge of A Plate Or Section, Fillet Weld for Truss Members, Design of Intermittent Fillet Welds, Plug and Slot Welds, Stresses Due To Individual Forces, Combination of Stresses, Failure of Welds, Distortion of Welded Parts, Fillet Weld Vs Butt Weld, Welded Jointed Vs Bolted and Riveted Joints, Design of eccentric welded connections, Working Load Design.

Unit – 3Tension Members: Introduction, Types of Tension Members, Net Sectional Area, Effective Net Area, Types of Failure, Design Strength of Tension Members, Slenderness Ratio (λ), Displacement, Design of Tension Member, Lug Angles, Splices, Gusset Plate, Working Load Design.

Unit – 4Compression Members: Introduction, Effective Length, Slenderness Ratio (λ), Types of Sections, Types of Buckling, Classification of Cross Sections, Column Formula, Design Strength, Design of Axially Loaded Compression Members, Built-Up Columns (Latticed Columns), Lacing, Batten, Compression Member Composed of Two Components Back-to-Back, Splices, Design of Column Bases.

Unit -5 Beams: Introduction, Types of Sections, Behaviour of Beam in Flexure, Section Classification, Lateral Stability of Beams, Lateral-Torsional Buckling, Bending Strength of Beams, Laterally Supported Beams, Laterally Unsupported Beams, Shear Strength of Beams, Web Buckling, Bearing Strength, Web Crippling, Deflection, Design Procedure of Rolled Beams, Built-Up Beams (Plated Beams), Purlins, Beam Bearing Plates, Effect of Holes in Beam, Introduction to Plate Girder , Introduction to Gantry Girder.

Department of Civil Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
IV Year VII Semester
UWATECE705: WATER RESOURCES ENGINEERING

L	T	P
3	0	0

UNIT – I Hydrology : Hydrologic Cycle. Water Budget Equation, Hydrologic system, Precipitation : Types, measurements and analysis, error in estimation, missing data, consistency of rainfall records, Intensity during frequency (IDF) and probabilitic maximum Precipitation (PMP) curves. Evaporation and consumptive use: Process affecting factors, estimation and measurement techniques. Infiltration : Process affecting factors, measurement and estimation, Infiltration Indices.

UNIT – II Surface Runoff: Components and factors affecting runoff, methods of estimation of runoff volume and peak runoff, rating curve, Rainfall – runoff relationships Hydrograph analysis: components, factors affecting hydrographs, base flow separation, Direct Runoff Hydrograph, Unit Hydrograph: Theory and assumptions. Derivation of Unit Hydrograph, Synthetic Unit Hydrograph Introduction to computer models for rainfall runoff analysis. Irrigation: Developments in India, Necessity and types Advantages & disadvantages of irrigation. Functions of water in plant growth, Methods of Irrigation, Water requirement of crops.Irrigation frequency, Irrigation efficiencies, Principal crops and crop season, crop rotation. Canal irrigation: Classes and alignment, Parts of a canal system, Commanded area, curves in channels, channel losses.

UNIT – III Sediment Transportation: Suspended and Bed load and its estimation Irrigation channels: Types: lined and unlined, silt theories: Kennedy's and Lacey's Design procedure for irrigation channels, Longitudinal cross section, Schedule of area statistics and channel dimensions, use of Garret's Diagrams in channel design, cross sections of an Irrigation channel, Computer programs for design of channels Lining of Irrigation Canals: Advantages and types, factors for selection of a particular type, design of lined channels, cross section of lined channels, Economics of canal lining. Water Logging: Definition, effects, causes and anti-water logging measures, Drainage of water logged land, Types of drains open and closed, spacing of closed drains.

UNIT – IV Regulation and control of canal system: Purpose, Types of canal regulation works and their functional aspects Irrigation Outlets: Requirements, types, non-modular, semi-module and rigid module, selection criterion River Training: Objective and need, classification of rivers, and river training works, meandering, stages, methods of river training, bank protection, Methods for measurement of discharge.

UNIT – V Ground Water Hydrology: Zones of underground water, Aquifers and their types, important terms, Determination of discharge through unconfined and confined aquifers with steady flow conditions, Interference among wells, determination of aquifer constants, Well loss and specific capacity, efficiency of a well, types of water wells, bored and open wells, specific yield of a well, Relative merits of well and canal irrigation, type of tube wells, well surrounding and well development, Suitable site selection for a tube well, Types of open wells, Methods of lifting water. Infiltration galleries.

Text Book

1. Irrigation Engg. and Hydraulic Structures by S.K. Garg, Khanna Publishers.

2. Irrigation and water Power engineering by B.C. Punmia, Laxmi Publications.

3. Engineering Hydrology by K. Subramanya, TMH.

4. Irrigation Water Power and Water Resource Engg. byK.R. Arrora.

5. Water resource engineering by Ralph A. Wurbs& Wesley P. James, Pearson Publication.

Department of Civil Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
IV Year VII Semester

UMINOCE706
MINOR PROJRCT

L	T	P
3	0	0

This project course may be in continuation of Project allotted in the beginning of the VIII semester. Here, the students are supposed to do the detailed work as scheduled in the last semester. Finally, he/she will be required to submit the detailed project report on which viva-voice examination will be conducted by a committee having at least one external examiner.

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Department of Civil Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
IV Year VII Semester

UINDUCE708: INDUSTRIAL TRAINING

Students shall carryout industrial training as a part of their curriculum after the completion of their 3rd year for 6 WEEKS/ 45 DAYS. After this their performance shall be evaluated during 7th semester by SUBMITTING TRAINING REPORT & CERTIFICATE, taking viva of each and every student.

EVALUATION SCHEME

B.TECH CIVIL ENGINEERING

STUDY AND EVALUATION SCHEME FOR B.TECH CIVIL ENGINEERING

SEMESTER-VIII

SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	Marks In Evaluation Scheme						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
UNONCCE801	Non-Conventional Energy Resources	3	0	0	3	30	-	30	70	-	70	100
UCOMPCE802	Computer Aided Design	3	1	-	4	30	-	30	70	-	70	100
URIVECE803	River Engineering	3	1	0	4	30	-	30	70	-	70	100
UTRANCE804	Transportation Engineering	3	0	-	3	30	-	30	70	-	70	100
UMAJOCE805	Major Project	-	0	12	7		100	100		200	200	300
Total		12	2	12	21	120	100	220	280	200	480	700

Department of Civil Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
IV Year VIII Semester

UNONCCE801

NON-CONVENTIONAL ENERGY RESOURCES

L	T	P
3	0	0

Unit-IIntroduction: Various non-conventional energy resources- Introduction, availability, classification, relative merits and demerits.
Solar Cells: Theory of solar cells.Solar cell materials, solar cell array, solar cell power plant, limitations.

UNIT-IISolar Thermal Energy: Solar radiation, flat plate collectors and their materials, applications and performance, focusing of collectors and their materials, applications and performance; solar thermal power plants,thermal energy storage for solar heating and cooling, limitations.

UNIT-III Geothermal Energy: Resources of geothermal energy, thermodynamics of geo-thermal energy conversion-electrical conversion, non-electrical conversion, environmental considerations.
Magneto-hydrodynamics (MHD): Principle of working of MHD Power plant, performance and limitations.
Fuel Cells: Principle of working of various types of fuel cells and their working, performance and limitations.

UNIT-IV Thermo-electrical and thermionic Conversions: Principle of working, performance and limitations.
Wind Energy: Wind power and its sources, site selection, criterion, momentum theory, classification of rotors, concentrations and augments, wind characteristics. performance and limitations of energy conversion systems.

NIT-V Bio-mass: Availability of bio-mass and its conversion theory
cean Thermal Energy Conversion (OTEC): Availability, theory and working principle,

Performance and limitations of energy.
Availability, theory and working principle, performance and limitations.
Wave and Tidal Wave: Principle of working, performance and limitations. Waste Recycling Plants.

Text/References Books:

- Raja etal, "Introduction to Non-Conventional Energy Resources" ScitechPublications.
- John Twideu and Tony Weir, "Renewal Energy Resources" BSPPublications,2006.
- M.V.R. KoteswaraRao, "Energy Resources: Conventional & Non-Conventional " BSPPublications,2006.
- D.S. Chauhan,"Non-conventional Energy Resources" New AgeInternational.
- C.S. Solanki, " Renewal energy technologies: A Practical guide for beginners" PHI Learning.

Department of Civil Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
IV Year VIII Semester

UCOMPCE802
COMPUTER AIDED DESIGN

L	T	P
3	1	-

UNIT –1

Elements of Computer Aided Design and its advantages over conventional design.
Hardware required for CAD works.

UNIT – 2
Principles of software design, concept of modular programming, debugging and testing.

UNIT – 3
Computer applications in analysis and design of Civil Engineering systems.

UNIT - 4
Use of software packages in the area of Structural, Geotechnical, and Environmental fields.

UNIT – 5
Expert system, their development and applications, Introduction to Neural Networks.

Reference:

1. Computer Aided Design – S. Rajiv, Narosa Publication

2. A.I. and Expert System – Robert L. Lerine & / Lane E. Drang, McGraw Hill

3. "Neural Computing: Waserman, vonnostrand.

4. Auto Cadd 2013 Dummes Bill Fane

5.Cad Frame & Architechture by Pieter Van Der Wolf

Department of Civil Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
IV Year VIII Semester

URIVECE803
RIVER ENGINEERING

L	T	P
3	1	0

Unit -I

Introduction, classification of Rivers, Mechanics of alluvial rivers including channel and flood plain features, Sediment transport and budgets, River morphology and various classification schemes. 8

Unit –II

Behaviour of Rivers: Introduction, River Channel patterns, Straight river channels, causes, characteristics and shapes of meanders and control, cutoff, Braided Rivers, Bed forms, Instability of rivers, Hydraulic geometry, Delta formationandcontrol.

Unit-III

Mechanics of Alluvial Rivers, Rivers and restoration structures, Socio-cultural influences and ethics of stream restoration.

Unit-IV

Bio-engineering Techniques, Classification review, Natural Channel Design Analysis, Time Series, Analysis of flow, Sediment and channelgeometrydata.

Unit-V

River Training and Protection Works: Introduction, Classification of River Training, Types of training works, Protection for Bridges with reduced waterway, Design of Guide Band, embankment and spurs/dampners and other river/ floodprotectionworks.

Textbook:

1. River Behaviour Management and Training (Vol. I & II), CBI&P, NewDelhi.
2. Irrigation & Water Power Engineering- B. C. Punmia and Pande B. B.Lal.
3. River Engineering by MargeretPeterson

Department of CivilEngineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
IV Year VIII Semester

UTRANCE804
TRANSPORTATION ENGINEERING

L	T	P
3	0	-

UNIT –I Introduction, Permanent Way and Components:
History and administrative setup of Indian Railways; Rails, Type of rails, rail gauges, permanent way formation,– functions, requirements, sections in embankment and cutting (single/double track), electrified tracks, locomotives, wheel and axle arrangement, coning of wheels, defect in rails, rail fastenings, Fish plates, spikes, chairs, keys, bearing plates. sleepers, Timber, steel, cast iron, concrete and prestressed concrete sleepers, sleeper density, ballast: material,specifications.

UNIT-II Track Geometrics, Turnouts and Crossings, Stations and Yards:
Railway alignment, vertical alignment – gradients and grade effects, horizontal alignment – horizontal curves, super-elevation, concepts of cant excess and deficiency, safe permissible speed, transition curves, widening of gauges and track clearances, points and crossings – terminologies, types of turnouts, design of turnouts, types of crossings, design of crossings. Different types of stations and Yards: classification and functioning.

UNIT –IIISignalling and Interlocking, Urban Railways:
Classification of Signals, method of train working, absolute block system, Centralized train control system, ATS, interlocking of track, principle of interlocking, types of interlocking, high speed track – track requirement, speed limitations, high speed technologies, Urban railway-railway system in urban areas.

UNIT – 4 Introduction to Airport Engineering:
Air craft characteristics affecting airport planning & design, selection of site for an airport. Airports - layout and orientation, Runway and taxiway design consideration and geometric design. Airport drainage management, Zoning laws, Visual aids and air traffic control, Runway lighting, Runway operation Helipads, hangers, service equipment.

UNIT – 5 Water Transport:
Harbours and ports, Types of Harbours; Harbours - layouts, shipping lanes, anchoring, location identification; Littoral transport with erosion and deposition; sounding methods; Dry and Wet docks, components and operational Tidal data and analyses.
Inland waterways: advantages and disadvantages; Development in India. Inland water operation.

Text Books
1. A Text Book of Railway Engineering by S. P. Arora&S.C.Saxena
2.Railway Engineering by M. M.Aggrawal.

Department of Civil Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
IV Year VIII Semester

L	T	P
-	0	12

UMAJOCE805
MAJOR PROJECT

This project course may be in continuation of Project allotted in the beginning of the VIII semester. Here, the students are supposed to do the detailed work as scheduled in the last semester. Finally, he/she will be required to submit the detailed project report on which viva-voice examination will be conducted by a committee having at least one external examiner.