



||Jai Sri Gurudev ||

Sri Adichunchanagiri Shikshana Trust ®



SJB Institute of Technology
(Affiliated to VTU, Accredited by NAAC with 'A' Grade, Approved by AICTE- New Delhi, Accredited by NBA)
No. 67, BGS Health & Education City, Dr. Vishnuvardhana Road, Kengeri, Bangalore-560060.



Department of Civil Engineering

Course Outcomes and CO-PO-PSO Articulation Matrix - Batch 2017-21

Semester-I/II

Subject: Elements of civil engineering and mechanics										Subject Code:17CV13/24					
Course Outcomes															
CO1	Understand various fields of Civil Engineering, Importance of Infrastructural Development & its significances														
CO2	Determine the resultant of given force systems and analyzing bodies with rough surface of contact														
CO3	Compute the reactive forces in beams & the effects that develop as a result of the external loads														
CO4	Locate the Centroid & compute Moment of Inertia of Regular & Built-up Sections														
CO5	Categorize the various types of motion of bodies and illustrating through numerical problems														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2														
CO2	3	3													
CO3	3	3													
CO4	3	3													
CO5	2	2													
Average	2.6	2.75													

Semester-III

Subject: Engineering Mathematics-III										Subject Code:17MAT31					
Course Outcomes															
CO1	Know the use of periodic signals and Fourier series to analyze circuits and systems communication.														
CO2	Explain the general linear system theory for continuous - time signals and digital signal processing using the Fourier transform and z-transform.														
CO3	Employ appropriate numerical methods to solve algebraic and transcendental equations.														
CO4	Apply Green's theorem, Divergence theorem and Stokes theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.														
CO5	Determine the extremals of functional and solve the simple problems for calculus of variations. Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2													
CO2	3	2													
CO3	3	2													
CO4	3	2													
CO5	3	2													
Average	3	2													

Subject: Strength of Materials												Subject Code: 17CV32				
Course Outcomes																
CO1	Understand the strength and behavior of various structural elements for the applied forces. (Compression, tension, shear, bending and torsion)															
CO2	Evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure concepts															
CO3	Maximize or minimize the sections of the material for the applied loads (bending, shear stress and torsion)															
CO4	Interpret the basic concept of vertical structural elements (columns and struts).															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2												2			
CO2		2											2			
CO3			2										2			
CO4	2		1										2			
Average	2	2	1.5										2			

Subject: Fluid Mechanics										Subject Code: 17CV33					
Course Outcomes															
CO1	Understand fundamental properties of fluids and fluid Continuum														
CO2	Evaluate the applied pressure on the material due to applied due to static conditions of fluids (including practical applications).														
CO3	Apply principles of mathematics to represent kinematic concepts related to fluid flow														
CO4	Formulate the flow equation based on the Bernoulli's principle														
CO5	Determine the discharge through pipes and over notches and weirs														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	2													2	
CO2	2	1												2	
CO3		2												1	
CO4		2												2	
CO5	2	2	1									1		2	
Average	2	1.75	1									1		1.8	


Subject: Basic Surveying										Subject Code: 17CV34						
Course Outcomes																
CO1	Understanding fundamental principles of Geodetics															
CO2	Evaluate linear and angular dimensions applied to basic surveying problems.															
CO3	Capture geodetic data to process and perform analysis for survey problems															
CO4	Analyze the obtained spatial data and compute areas and volumes.															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2											1	2	2		
CO2	2	2												2		
CO3	2			2										1		
CO4	2	2					3	1					1	1		
Average	2	2		2			3	1				1	1.5	1.5		

Subject: Engineering Geology										Subject Code: 17CV35					
Course Outcomes															
CO1	Apply the knowledge of geology and its role in Civil Engineering														
CO2	Utilization of earth's materials such as mineral, rocks and water in civil engineering practices.														
CO3	Analyze the natural disasters and their mitigation.														
CO4	Identify various structural features and geological tools in ground water exploration														
CO5	Select the appropriate building materials for construction														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	2												1		
CO2	2					1	1						1	1	
CO3	2												1		
CO4	2						1							1	
CO5	2														
Average	2					1	1						1	1	

Subject: Building Material and Construction										Subject Code:17CV36					
Course Outcomes															
CO1	Develop knowledge of material science and behavior of various building materials used in construction.														
CO2	Identify the construction materials required for the assigned work.														
CO3	Provide procedural knowledge of the simple testing methods of cement, lime and concrete etc.														
CO4	Adopt suitable repair and maintenance work to enhance durability of buildings.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	2												2		
CO2	2						1						2	1	
CO3	2												1		
CO4	2											1		1	
Average	2						1					1	1.66	1	

Subject: Building Material Laboratory										Subject Code: 17CVL37					
Course Outcomes															
CO1	Apply the basic knowledge of Engineering and Mathematics to study the behavior of building materials under the action of tension, compression, bending, shear and torsion.														
CO2	Estimate the hardness and impact strength of various metals such as mild steel, aluminum, copper and brass.														
CO3	Evaluate the physical properties of aggregates and their impact on construction Industry.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2		1				2	3				2		
CO2	2	2		1				2	3				2		
CO3	2	2		1				2	3				2		
Average	2	2		1				2	3				2		

Subject: Surveying Laboratory												Subject Code: 17CVL38				
Course Outcomes																
CO1	Apply the basic principles of engineering surveying for linear and angular measurements.															
CO2	Comprehend effectively field procedures required for a professional surveyor.															
CO3	Choose the techniques, skills and conventional surveying instruments necessary for engineering practice.															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2	1			1	1							1	1		
CO2	2	1			1	1							1	1		
CO3	2	1			2	1							2	2		
Average	2	1			1.33	1							1.33	1.33		


 Head of Department
 Department of Civil Engineering
 S J B Institute of Technology
 Uttarahalli Road, Kengeri
 Bengaluru-560 060.

Semester-IV

Subject: Engineering Mathematics-IV										Subject Code:17MAT41					
Course Outcomes															
CO1	Solve first and second ordinary differential equations arising in flow problems using single step and multistep numerical methods.														
CO2	Solve problems of quantum mechanics employing Bessel's function relating to cylindrical polar coordinate systems and Legendre's polynomials relating to spherical polar coordinate systems														
CO3	Understand the analyticity, potential fields, residues and poles of complex potentials in field theory and electromagnetic theory Describe conformal and bilinear transformation arising in aero foil theory fluid flow visualization and image processing														
CO4	Solve problems on probability distributions relating to digital signal processing, determine joint probability distributions and stochastic matrix connected with multivariate correlation problems for feasible random events														
CO5	Draw the validity of the hypothesis proposed for the given sampling distribution in accepting or rejecting the hypothesis, define transition probability matrix of a Markov chain and solve problems related to discrete parameter random process.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2													
CO2	3	2													
CO3	3	2													
CO4	3	2													
CO5	3	2													
Average	3	2													

Subject: Analysis of Determinate Structures										Subject Code:17CV42					
Course Outcomes															
CO1	Determine the forces in determinate trusses by method of joints and sections.														
CO2	Solve for the deflection of cantilever, simply supported and overhanging beams by different methods														
CO3	Apply the energy principles and energy theorems to determine the deflections of trusses and bent frames.														
CO4	Determine the stress resultants in arches and cables.														
CO5	Construct Influence Line Diagram for the moving loads.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3											2		
CO2	3	3											2		
CO3	3	3											2		
CO4	3	3											2		
CO5	3	3											2		
Average	3	3											2		

Subject: Applied Hydraulics												Subject Code: 17CV43			
Course Outcomes															
CO1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters														
CO2	Design the open channels of various cross sections including economical channel sections														
CO3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation,														
CO4	Compute water surface profiles at different conditions														
CO5	Design turbines for the given data, and to know their operation characteristics under different operating conditions														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2												2	
CO2	2	2	2											2	
CO3	2	2												2	
CO4	2	2												2	
CO5	2	2	2											2	
Average	2	2	2											2	

Subject: Concrete Technology										Subject Code:17CV44						
Course Outcomes																
CO1	Understand material characteristics and their influence on microstructure of concrete.															
CO2	Distinguish concrete behavior based on its fresh and hardened properties.															
CO3	Design of different types of concrete mixes for required fresh and hardened properties using professional codes.															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2	2											2			
CO2	2	2											2			
CO3	2	2	2	2				2					2			
Average	2	2	2	2				2					2			

Subject: Basic Geotechnical Engineering										Subject Code:17CV45					
Course Outcomes															
CO1	Identify the type of soil based on physical properties														
CO2	Evaluate the engineering properties of soil in terms of shear and compressibility														
CO3	Compute the effective stresses of the soil strata														
CO4	Interpret the effect of hydraulic conductivity of the soils.														
CO5	Predict the failure behaviour of soils														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2												2		
CO2	2	2											2		
CO3	3	2											2		
CO4	2			2									2		
CO5			2										2		
Average	2.25	2	2	2									2		

Subject: Advanced surveying										Subject Code:17CV46					
Course Outcomes															
CO1	Apply the knowledge of geometric principles to arrive at surveying problems														
CO2	Analyze the geo-spatial data obtained using modern surveying instruments and apply the same to appropriate engineering problems.														
CO3	Interpretation of data to analyze the survey problems with the use of electronic instruments;														
CO4	Design and implement the different types of curves for deviating type of alignments.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2											1	2	
CO2	2	2											1	2	
CO3	2	2											1	2	
CO4	2	2	2										1	2	
Average	2	2	2										1	2	

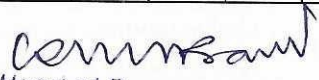
Subject: Fluid Mechanics and Hydraulic Machines Laboratory										Subject Code:17CVL47					
Course Outcomes															
CO1	Develop procedure for standardization of experiments.														
CO2	Calibrate flow discharge measuring devices used in pipes, channels and tanks.														
CO3	Determine fluid and flow properties.														
CO4	Characterize laminar and turbulent flows.														
CO5	Test the performance of pumps and turbines														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2		2					1			1		2	
CO2	2	2	2	2					1			1		2	
CO3			1	2								1			
CO4	2	2	2	2	1	2			1			1			
CO5	2	2		2					1		1	1			
Average	2	2	1.66	2	1	2			1		1	1		2	

Subject: Engineering Geology Laboratory										Subject Code:17CVL48					
Course Outcomes															
CO1	Identify the minerals and rocks and utilize them effectively in civil engineering practices														
CO2	Understand and interpret the geological conditions of the area for the implementation of civil engineering projects.														
CO3	Interpret subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods.														
CO4	Understand the techniques of drawing the curves of electrical resistivity data and its interpretation for geotechnical and aquifer boundaries.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1		2	2	2	2	1	1	1					2		
CO2	2	2	2	2	2	1	2	2					2		
CO3	2	2	2	2	2		1	1					2		
CO4				2	2		2						2		
Average	2	2	2	2	2	1	1.5	1.33					2		

Semester-V

Subject: Design of RC Structural Elements												Subject Code:17CV51			
Course Outcomes															
CO1	Apply the design philosophies and principles of the codal provisions														
CO2	Analyze and design of the beam elements for flexure, shear and torsion.														
CO3	Analyze and Design of the Slab and staircase using the knowledge of codal provisions														
CO4	Design of the Column and Footing using the design principles														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	1	1					3				1	2		
CO2	2	3	3					3				2	2		
CO3	3	2	3					3				2	2		
CO4	3	2	3					3				2	2		
Average	2.8	2	2.5					3				1.8	2		

Subject: Analysis of Indeterminate Structures										Subject Code:17CV52					
Course Outcomes															
CO1	Determine the support moments of indeterminate beams and rigid frames using slope deflection method.														
CO2	Determine the support moments of indeterminate beams and rigid frames with non-sway and sway using moment distribution method.														
CO3	Construct bending moment and shear force diagrams for continuous beams and rigid frames by Kani's method.														
CO4	Construct bending moment and shear force diagrams for continuous beams and rigid frames by system flexibility method.														
CO5	Analyze continuous beams, rigid frames and plane trusses by system stiffness method.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3											2		
CO2	3	3											2		
CO3	3	3											2		
CO4	3	3											2		
CO5	3	3											2		
Average	3	3											2		


Head of Department
Department of Civil Engineering
SJB Institute of Technology
Uttarahalli Road, Kengeri
Bengaluru-560 060.

Subject: Applied Geotechnical Engineering										Subject Code:17CV53					
Course Outcomes															
CO1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects														
CO2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils														
CO3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures														
CO4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure														
CO5	Capable of estimating load carrying capacity of single and group of piles														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2											1	2	
CO2	3	1											1	2	
CO3	2	1											1	2	
CO4	3	3											1	2	
CO5	3	3											1	2	
Average	2.6	2.5											1	2	

Subject: Computer Aided Building Drawing										Subject Code:17CV54					
Course Outcomes															
CO1	Gain a broad understanding of planning and designing of buildings														
CO2	Prepare, read and interpret the drawings in a professional set up														
CO3	Know the procedure of submission of drawings and develop working and submission drawings for buildings														
CO4	Plan and design a residential or public building as per the given requirements														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1				3							2	2	1	
CO2	1				3	1	1	1				2	2	1	
CO3	1				3							2	2	1	
CO4	1				3	1	1	1				2	2	1	
Average	1				3	1	1	1				2	2	1	

Subject: Railways, Harbors, Tunneling and Airport										Subject Code: 17CV552					
Course Outcomes															
CO1	Develop layout plans for Airport, Harbor, Railway, Dock along with visual and navigational aids.														
CO2	Design of geometric aspects for railway system, runways and taxiway.														
CO3	Characterize & estimate the material quantity required for laying a railway track.														
CO4	Summarize various methods of tunneling, tunnel lining, drainage and environmental consideration.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3				1		2							2	
CO2	3	2	3			2								2	

CO3	3									1			2	
CO4	2				2		2			2	1		2	
Average	2.75	2	3		1.5	2	2			1.5	1		2	

Subject: Traffic Engineering										Subject Code: 17CV561					
Course Outcomes															
CO1	Understand the fundamental components of traffic engineering and identify basic traffic variable relationships.														
CO2	Conduct different types of traffic surveys and analysis of collected data using statistical approach.														
CO3	Illustrate the intersection capacity and analysis of signalized intersection.														
CO4	Evaluate traffic impacts on environment and traffic safety measures														
CO5	Recommend suitable traffic management and demand management measures														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3													3	
CO2	2	2												2	
CO3	3	2	2					1				1		3	
CO4	2					2	2					1		2	
CO5	2					1						1		2	
Average	2	2	2			1.5	2	1				1		2.4	

Subject: Geotechnical Engineering Lab										Subject Code:17CVL57					
Course Outcomes															
CO1	Physical and index properties of the soil														
CO2	Classify based on index properties and field identification														
CO3	To determine OMC and MDD, plan and assess field compaction program														
CO4	Shear strength and consolidation parameters to assess strength and deformation characteristics														
CO5	In-situ shear strength characteristics (SPT- Demonstration)														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3			2	1	3	3	1		2	3	2	
CO2	3	2	2			1	1	3	3	1		2	3	2	
CO3	3	2	3					3	3			2	3	2	
CO4	3	2	3					3	3			3	2	1	
CO5	3	2	3					2	2			3	2	1	
Average	3	2	3			1.5	1	2.2	2	1		2.5	2.5	2	

Subject: Concrete and Highway Material Lab										Subject Code:17CVL58									
Course Outcomes																			
CO1		Determine quality and suitability of cement in construction work																	
CO2		Design appropriate concrete mix and determine workability and strength of concrete																	
CO3		Test the road aggregates and bitumen for their suitability as road material																	
CO4		Evaluate the soil suitability as a pavement subgrade soil																	
CO-PO-PSO Mapping																			

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3					1	1	1						1	
CO2	3					1	1	1						1	
CO3	3		1			1	1	1						1	
CO4	3					1	1	1						1	
Average	3		1			1	1	1						1	

Semester-VI

Subject: Construction Management and Entrepreneurship										Subject Code:17CV61					
Course Outcomes															
CO1	Outline the construction management process														
CO2	Assess various issues that are encountered by every professional in discharging professional duties														
CO3	Identifying the professional obligation effectively with global outlook														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1				1			1	1		1	1		2	
CO2	1	1												2	
CO3	1													2	
Average	1	1			1			1	1		2	1		2	
								1	1		1.5	1		2	

Subject: Design of Steel Structural Elements										Subject Code:17CV62						
Course Outcomes																
CO1	Explain the basic concepts of design of steel structures and plastic analysis															
CO2	Design of bolted and welded connections															
CO3	Design of steel members subjected to axial load															
CO4	Analyze and design of steel members under flexure															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	3	3	3					3				3	3			
CO2	3	3	3					3				3	3			
CO3	3	3	3					3				3	3			
CO4	3	3	3					3				3	3			
Average	3	3	3					3				3	3			

Subject: Highway Engineering		Subject Code: 17CV63
Course Outcomes		
CO1	Understand the importance and characteristics of road transport systems and propose alignment based on planning principles and surveys.	
CO2	Apply aspects of road geometrics and suitably design road geometric elements and drainage systems.	
CO3	Evaluate engineering properties of the material and provide suitable guidelines for pavement construction.	
CO4	Analyse the highway economics and impart the knowledge on highway economics.	
CO-PO-PSO Mapping		

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2													2	
CO2	2	3	2					1						3	
CO3	2	2												2	
CO4	2	1						1						2	
Average	2	2	2					1						2	

Subject: Water Supply & Treatment Engineering										Subject Code:17CV64					
Course Outcomes															
CO1	Analyze the variation of water demand and to estimate water requirement for a community at the end of design period														
CO2	Identify the sources of water supply and to apply proper sampling techniques for the analysis of water														
CO3	Apply drinking water quality standards and to illustrate qualitative analysis of water.														
CO4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards														
CO5	Design proper conveyance systems for raw and treated water														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2												2	
CO2	2	2												2	
CO3	2	2				1	1					1		2	
CO4	2	2				1	1							2	
CO5	2	2				1	1							2	
Average	2	2				1	1					1		2	

Subject: Solid Waste Management										Subject Code:17CV651					
Course Outcomes															
CO1	Analyze existing solid waste management system and to identify their drawbacks.														
CO2	Evaluate different elements of solid waste management system.														
CO3	Suggest suitable scientific methods for solid waste management elements.														
CO4	Design suitable processing system and evaluate disposal sites.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	2				1	1					1		2	
CO2	1	2			1	1	1					1		2	
CO3	1	1				1	1					1		2	
CO4	1	2				2	1					1		2	
Average	1	1.75			1	1.25	1					1		2	

Subject: Matrix Methods of Structural Analysis		Subject Code:17CV652
Course Outcomes		
CO1	Evaluate the structural systems and apply the concepts of flexibility and stiffness matrices for simple problems.	
CO2	Identify, formulate and solve engineering problems with respect to flexibility matrices as applied to continuous beams, frames and trusses.	

CO3	Identify, formulate and solve engineering problems with respect to stiffness matrices as applied to continuous beams, frames and trusses.														
CO4	Identify, formulate and solve engineering problems with respect to direct stiffness method as applied to continuous beams, frames and trusses.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3											2		
CO2	3	3											2		
CO3	3	3											2		
CO4	3	3											2		
Average	3	3											2		

Subject: Alternate Building materials										Subject Code:17CV653					
Course Outcomes															
CO1	Discuss concept of Energy in building materials														
CO2	Describe the elements of structural masonry														
CO3	Classify alternate building materials and technology														
CO4	Interact the available machineries for production of Alternate building materials.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2				1	1						2		
CO2	3	2				1	1						2		
CO3	3	2				1	1						2		
CO4	3	2				1	1						2		
Average	3	2				1	1						2		

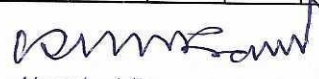
Subject: Water Resource Management										Subject Code:17CV661					
Course Outcomes															
CO1	Judge surface and groundwater resources														
CO2	Address the issues of water resources management														
CO3	Describe the legal framework of water policy														
CO4	Classify the methods of water harvesting practices.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2		1	2	2						1		1	
CO2	1	2		1	2	2						2		1	
CO3	1	2		1	2	2						2		2	
CO4	1	1		1	1	1						2		2	
Average	1	2		1	2	2						2		2	

Subject: Numerical Methods and Applications		Subject Code:17CV663
Course Outcomes		
CO1	Clear perception of the power of numerical techniques, ideas.	
CO2	Demonstrate the applications of these techniques to problems drawn from industry, management and other engineering fields	
CO3	Acquire the necessary basic concepts of a few numerical methods	
CO4	Analyze and solving numerically different kinds of problems	

CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1											2		
CO2	3	3	2	1									2	2	
CO3	3	3										1	2		
CO4	3	3	2	2									2	2	
Average	3	2.5	2	1.5								1	2	2	

Subject: Software Application Lab										Subject Code:17CVL67					
Course Outcomes															
CO1	Use of software skills in a professional setup to automate the work and thereby reduce cycle time for completion of work.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	2		3			2	2		3	3	2		
Average	3	2	2		3			2	2		3	3	2		

Subject: Extensive survey project										Subject Code:17CVL68					
Course Outcomes															
CO1	Apply surveying knowledge and tools effectively for the project														
CO2	Understand and apply task, environmental goals, responsibility, task forces, working in teams towards common goals, technical knowledge improvement														
CO3	Application of individual effectiveness, skills in team and or goal setting, time management, communication and presentation skills														
CO4	Professional, Etiquettes at work place, meetings and general														
CO5	Establishing trust-based relationships in teams and organizational environment														
CO6	Orientation towards conflicts in team and organizational environment, understandings, sources of conflicts, resolutions and techniques														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2				2	2	2						2	2	
CO2	2	2			2	2	2						2	2	
CO3	2				2	2	2			2	2	1	2	2	
CO4	2				2	2	2						2	2	
CO5	2				2	2	2						2	2	
CO6	2				2	2	2						2	2	
Average	2	2			2	2	2			2	2	1	2	2	


 Head of Department
 Department of Civil Engineering
 S J B Institute of Technology
 Uttarahalli Road, Kengeri
 Bengaluru-560 060.

Semester-VII

Subject: Municipal and Industrial wastewater Engineering										Subject Code:17CV71						
Course Outcomes																
CO1	Design municipal and industrial sewage treatment plant															
CO2	Estimate the degree and type of treatment for disposal. Recycle and reuse techniques															
CO3	Analyze wastewater characteristics															
CO4	Recognize the common physical, chemical, and biological unit operations encountered in treatment process															
CO5	Communicate with stake holders' sewage and industrial effluents															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	3	2	3	2		2	2							2		
CO2	2	2	2	2		2	2							2		
CO3	2	2		2		2	2							2		
CO4		2	3	1		1	2					1		2		
CO5						2	2	2		1		2		2		
Average	2.3	2.0	2.6	1.7		1.8	2	2		1		1.5		2		

Subject: Design of RCC and Steel Structures											Subject Code:17CV72				
Course Outcomes															
CO1	Apply basic knowledge of limit state method and design RC structures such as combined footing and retaining wall.														
CO2	Adopt codal provisions, professional ethics and design water tanks and portal frames.														
CO3	Evaluate the forces acting on steel roof trusses and design by following the codal procedure.														
CO4	Analyse and design steel structures such as plate and gantry girder carrying moving loads.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2	3					3				1	2		
CO2	2	3	3					3				2	2		
CO3	2	2	3					3				2	2		
CO4	2	2	3					3				1	2		
Average	2	2.25	3					3				1.5	2		

Subject: Hydrology and Irrigation Engineering										Subject Code:17CV73					
Course Outcomes															
CO1	Understand the importance of hydrology and its components.														
CO2	Describe forms of precipitation, its measurement and analyse the precipitation data precipitation losses														
CO3	Estimate runoff and develop unit hydrographs.														
CO4	Discuss the benefits of Irrigation and its different methods and evaluate the quantity of irrigation water and frequency of irrigation for various crops														
CO5	Estimate canal capacity, design the canal and compute the reservoir capacity														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1						2	3	2				2		1	
CO2	2	2	1			1	2					1		1	

CO3	2	2	1			2	2					1		1	
CO4	2	2	2	1		2	2	1							
CO5	3	3	2	1		1	2					1		2	
Average	2.25	2.25	1.5	1		1.6	2.2	1.5				1.2		2	
														1.4	

Subject: Ground Water & Hydraulics											Subject Code:17CV742				
Course Outcomes															
CO1	Find the characteristics of Aquifers														
CO2	Estimate the quantity of groundwater by various methods														
CO3	Locate the zones of groundwater resources														
CO4	Select suitable method to augment groundwater storage														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3					2	2					2		2	
CO2	2						2					2		2	
CO3	3	2			2	2	3					2		2	
CO4	2	2				2	2					2		2	
Average	3	2			2	2	2					2		2	

Subject: Design concept of Building services										Subject Code:17CV743					
Course Outcomes															
CO1	Describe the basics of house plumbing and waste water collection and disposal.														
CO2	Discuss the basics of Heat Ventilation and Air Conditioning.														
CO3	Describe the issues with respect to quantity of water, rain water harvesting and roof top harvesting.														
CO4	Identify requirements of thermal comfort in buildings														
CO5	Explain the various types of engineering services.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2				2	2					1	2		
CO2	2	2				2	2					1	2		
CO3	2	2				2	2					1	2		
CO4	2	2				2	2					1	2		
CO5	1	2				2	2					1	2		
Average	2	2				2	2					1	2		

Subject: Urban Transportation and Planning										Subject Code:17CV751					
Course Outcomes															
CO1	Identify urban transport problems. Design, conduct and administrate surveys to provide data required for Urban Transport Planning														
CO2	Estimate urban travel demand to develop trip generation models and trip distribution rate for various land use characteristics														
CO3	Plan urban transport networks based on modal choice and identify urban transport corridors														
CO4	Validate the developed model for long term transportation plan														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3					1								2	

CO2	3	1				1			1					2	
CO3	3	1				1			1					2	
CO4	1					1			1					2	
Average	2.5	1				1			1					2	

Subject: Rehabilitation and Retrofitting of Structures										Subject Code:17CV753					
Course Outcomes															
CO1	Understand the cause of deterioration of concrete structures														
CO2	Assess the damage of different types of structures and recommend the necessary solution														
CO3	Summarize the principles of repair and rehabilitation of structures														
CO4	Recognize ideal material for different repair and retrofitting technique														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2											2		
CO2	2	2	3			1		1					2		
CO3	2	2	2			1		1					2		
CO4	2	2	2								1		2		
Average	2	2	2.33			1		1			1		2		

Subject: Environmental Engineering Lab										Subject Code:17CVL76					
Course Outcomes															
CO1	Acquire capability to conduct experiments and estimate the concentration of different parameters														
CO2	Compare the result with standards and discuss based on the purpose of analysis														
CO3	Determine type of treatment degree of treatment for water and wastewater.														
CO4	Identify the parameter to be analysed for student project work in environmental stream														
CO5															
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	1	2			2		2	2				3	
CO2	2	2				2	2	2	1	2				3	
CO3	2	2	2	2		2	2	2		1				3	
CO4	2	2	2	2	2	2	2	2	2			3		2	
CO5												3		2	
Average	2.2	2	1.6	2	2	2	2	2	1.6	1.6		3		2.7	

Subject: Computer Aided Detailing of Structures										Subject Code:17CVL77					
Course Outcomes															
CO1	Acquire proficiency in software skills														
CO2	Outline the principles as per codal provision														
CO3	Develop detailed working drawing of RC and Steel structures														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2					1	2	3				2	3	1	
CO2	3	3	3					3				2	3	1	
CO3	3	3	3					3				2	3	1	
Average	2.66	3	3			1	2	3				2	3	1	

Subject: Project Phase I										Subject Code:17CVP78						
Course Outcomes																
CO1	Apply Surveying knowledge and tools effectively for projects															
CO2	Understanding Task environment, Goals, responsibilities, Task focus, working in Teams towards common goals, Organizational performance expectations, technical and behavioral competencies.															
CO3	Application of individual effectiveness skills in team and organizational context, goal setting, time management, communication, and presentation skills.															
CO4	Professional etiquettes at workplace, meeting and general															
CO5	Establishing trust-based relationships in teams & organizational environment															
CO6	Orientation towards conflicts in team and organizational environment, Understanding sources of conflicts, Conflict resolution styles and techniques															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2				2	2	2					2	2	2		
CO2	2	2			2	2	2					2	2	2		
CO3	2				2	2	2					2	2	2		
CO4	2					2	2	2		2	2	1	2	2		
CO5	2					2	2	2				2	2	2		
CO6	2					2	2	2				2	2	2		
Average	2	2			2	2	2	2		2	2	1.8	2	2		


 Head of Department
 Department of Civil Engineering
 S J B Institute of Technology
 Uttarahalli Road, Kengeri
 Bengaluru-560 060.

Semester-VIII

Subject: Quantity Surveying and Contracts Management										Subject Code:17CV81					
Course Outcomes															
CO1	Estimate the quantities of different items of work for roads and buildings														
CO2	Develop specifications for Civil Engineering works and prepare rate analysis														
CO3	Interpret contract documents of domestic and international construction works														
CO4	Develop valuation reports of buildings														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	2			1	1	1			2			1	
CO2	3		3			1		2			2	1		1	
CO3	2	2				1		2			2	1		1	
CO4	2	2	3			1		2			2	1		1	
Average	2.5	1.5	2.25			1	1	1.75			2	1		1	

Subject: Design of Pre-Stressed Concrete Elements										Subject Code:17CV82					
Course Outcomes															
CO1	Identify the suitable materials, methods, and systems of prestressing.														
CO2	Analyse the stresses, losses, and deflections in the pre-stressed beams.														
CO3	Analyse and design the pre-stressed concrete members for Flexure and Shear Strength.														
CO4	Analyse and design the Composite section for Flexure and Shear Strength.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2											2		
CO2	3	3	2					2					2		
CO3	2	3	3					3					2		
CO4	2	3	3					2					2		
Average	2.25	2.75	2.67					2.33					2		

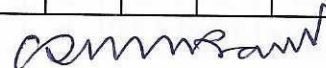
Subject: Hydraulic Structures										Subject Code:17CV832					
Course Outcomes															
CO1	Analyse the stability of gravity dams and design the dam														
CO2	Estimate the quantity of seepage through earth dams														
CO3	Design spillways and aprons for various diversion works														
CO4	Select a particular type of canal regulation works for canal works														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	1		2					1		2	1	
CO2	2	2	2	1			1				1		2	1	
CO3	2	2	1									1	2		
CO4	2	2	2			2						1			
Average	2.75	2.75	2	1		2	1				1	1	2	1	


 Head of Department
 Department of Civil Engineering
 S J B Institute of Technology
 Uttarahalli Road, Kengeri
 Bengaluru-560 060.

Subject: Pavement Design										Subject Code:17CV833					
Course Outcomes															
CO1	Systematically generate and compile required data for design of pavement (Highway & Airfield)														
CO2	Analyze stress, strain and deflection by Boussinesq's, Burmister's and Westergaard's theory.														
CO3	Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001														
CO4	Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1							2						2	
CO2				3										2	
CO3			3											2	
CO4		1				2		1	1					2	
Average	1	1	3	3		2		1.5	1					2	

Subject: Internship										Subject Code:17CV84						
Course Outcomes																
CO1	Assess interests and abilities in their field of study															
CO2	Learn to appreciate work and its function in the economy															
CO3	Develop communication, interpersonal and other critical skills															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2	2			2	2	2	2	2	2		2	2			
CO2	2	2			2	2	2	2	2	2		2	2			
CO3	2	2			2	2	2	2	2	2		2	2			
Average	2	2			2	2	2	2	2	2		2	2			

Subject: Project Phase II												Subject Code: 17CVP85				
Course Outcomes																
CO1	Formulate the project objective by detailed literature review															
CO2	Conduct the experimental/analytical work to achieve the objectives															
CO3	Prepare the detailed report based on the experimental/analytical work															
CO4	Communicate and present the project at different platforms															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2	3		1	1								3	3		
CO2				3	2								3	3		
CO3	2	2	2	2	3		1			3			3	3		
CO4	2	2	2	2	3		1			3			3	3		
Average	2	2.33	2	2	2.25								3	3		


 Head of Department
 Department of Civil Engineering
 S J B Institute of Technology
 Uttarahalli Road, Kengeri
 Bengaluru-560 060.

Subject: Seminar										Subject Code:17CVS86						
Course Outcomes																
CO1	Work in actual working environment and utilize technical resources															
CO2	Find appropriate sources that can be summarised, give oral presentations related to the work and integrated into multimedia presentation															
CO3	Engage in independent learning															
CO4	Be aware of importance of access to data, knowledge and results of engineering studies															
CO5	Demonstrate the ability to assess and report															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2					2	2	2				2	2	2		
CO2	2					2	2	2				2	2	2		
CO3	2					2	2	2				2	2	2		
CO4	2					2	2	2				2	2	2		
CO5	2					2	2	2				2	2	2		
Average	2					2	2	2				2	2	2		


 Head of Department
 Department of Civil Engineering
 S J B Institute of Technology
 Uttarahalli Road, Kengeri
 Bengaluru-560 060.