# VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

# B.E. in Civil Engineering

#### Scheme of Teaching and Examinations2022

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2023-24)

**III SEMESTER Teaching Hours /Week** Examination Department (TD) and Question Paper Setting Board (PSB) Practical/ Drawing Theory Lecture Tutorial Course Teaching .⊆ SEE Marks Total Marks Marks Credits SI. Course SDA Duration i hours **Course Title** Code No E S Ρ L Т BCV301 Strength of Materials 3 0 3 PCC TD: CV PSB: CV 0 03 50 50 100 1 2 IPCC BCV302 **Engineering Survey** TD: CV PSB: CV 3 2 4 0 03 50 50 100 TD- Geology/CV IPCC BCV303 **Engineering Geology** 3 2 3 0 03 50 50 100 4 PSB-Geology/CV PCC Water Supply and Waste water **BCV304** TD: CV PSB: CV 0 03 3 0 50 50 100 3 4 Engineering Computer Aided Building Planning and PCCL BCV305 TD: CV PSB: CV 5 0 0 2 03 50 50 100 1 Drawing PSB: CV 6 ESC BCV306x ESC/ETC/PLC 3 0 0 03 50 50 100 3 7 UHV Social Connect and Responsibility Any Department 0 0 2 01 100 100 1 BSCK307 ---If the course is a Theory 01 AEC/ 1 Ability Enhancement Course/Skill Enhancement 0 8 BCV358x 50 50 100 1 Course - III If a course is a laboratory SEC 02 0 0 2 National Service Scheme (NSS) NSS coordinator BNSK359 **Physical Education** Physical Education (PE) (Sports and **BPEK359** 0 9 MC 0 2 100 100 0 ---Director Athletics) Yoga Teacher BYOK359 Yoga Total 550 350 900 20 PCC: Professional Core Course, PCCL: Professional Core Course laboratory, UHV: Universal Human Value Course, MC: Mandatory Course (Non-credit), AEC: Ability Enhancement Course, SEC: Skill Enhancement Course, L: Lecture, T: Tutorial, P: Practical S= SDA: Skill Development Activity, CIE: Continuous Internal Evaluation, SEE:

Semester End Evaluation. K: This letter in the course code indicates common to all the stream of Engineering. ESC: Engineering Science Course, ETC: Emerging Technology Course, PLC: Programming Language Course

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	Engineering S	Science Course (ESC/ETC/F	PLC)
BCV306A	Rural, Urban Planning and Architecture	BCV306C	Sustainable Design Concept for Building Services
BCV306B	Geospatial Techniques in Practice	BCV306D	Fire Safety in Buildings
	Ability E	inhancement Course – III	
BCV358A	Data analytics with Excel - IBM	BCV358C	Problem Solving with PYTHON
BCV358B	Smart Urban Infrastructure	BCV358D	Personality Development for Civil Engineers

**Professional Core Course (IPCC):** Refers to Professional Core Course Theory Integrated with practicals of the same course. Credit for IPCC can be 04 and its Teaching– Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./ B. Tech.) 2022-23 may please be referred.

**National Service Scheme /Physical Education/Yoga:** All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first Week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the Degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of Degree.

	VARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI												
			B.	E. in Civil Engineeri	ng		•••						
			Scheme of T	eaching and Exami	nations	2022							
			Outcome Based Education	(OBE) and Choice E	Based Ci	redit S	ystem (C	CBCS)					
			(Effective fro	om the academic ye	ear 2023	3-24)							
IV SEN	IESTER								1				
						Teaching	Hours /Wee	ek –		Exam	ination		
SI. No	Cou Cou	irse and rse Code	Course Title	Teaching epartment (T and Question Paper Setting Board (PSB)	Theory Lecture	Tutorial	Practical/ Drawing	Self -Study	Juration in hours	CIE Marks	SEE Marks	otal Marks	Credits
				<u> </u>	L	т	Р	S		_		F	
1	PCC	BCV401	Analysis of Structures	TD: CV PSB: CV	3	0	0		03	50	50	100	3
2	IPCC	BCV402	Fluid Mechanics and Hydraulics	TD: CV PSB: CV	3	0	2		03	50	50	100	4
3	IPCC	BCV403	Transportation Engineering	TD: CV PSB: CV	3	0	2		03	50	50	100	4
4	PCCL	BCV404	Building Materials Testing Lab	TD: CV PSB: CV	0	0	2		03	50	50	100	1
5	ESC	BCV405x	ESC/ETC/PLC		3	0	0		03	50	50	100	3
				TD and PSB.	If the course is Theory			eory	01				
6	AEC/		Ability Enhancement Course/Skill	Concerned	1 0 0				50		50	100	1
0	SEC	BCV450X	Enhancement Course- IV	department	If the course is a lab				50		50	100	Т
					0	0	2		02				
7	BSC	BBOK407	Biology For Engineers	TD / PSB: BT, CHE,	3	0	0		03	50	50	100	3
8	UHV	BUHK408	Universal human values course	Any Department	1	0	0		01	50	50	100	1
		BNSK459	National Service Scheme (NSS)	NSS coordinator									
9	MC	BPEK459	Physical Education (PE) (Sports and Athletics)	Physical Education Director	0	0	2			100		100	0
		BYOK459	Yoga	Yoga Teacher									
									Total	500	400	900	20
PCC: Enhai Seme	PCC: Professional Core Course, PCCL: Professional Core Course laboratory, UHV: Universal Human Value Course, MC: Mandatory Course (Non-credit), AEC: Ability Enhancement Course, SEC: Skill Enhancement Course, L: Lecture, T: Tutorial, P: Practical S= SDA: Skill Development Activity, CIE: Continuous Internal Evaluation, SEE: Semester End Evaluation, K: This letter in the course code indicates common to all the stream of engineering												

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Ability Enhancement Course / Skill Enhancement Course - IV **Finance for Professionals** BCV456C Electronic Waste Management - Issues and Challenges BCV456A GIS with Quantum GIS BCV456D **Technical Writing Skills** BCV456B Engineering Science Course (ESC/ETC/PLC) **Concreting Techniques & Practices** Building Information Modelling in Civil Engineering BCV405A BCV405C Construction Equipment, Plants and Machinery Watershed Management BCV405B BCV405D Professional Core Course (IPCC): Refers to Professional Core Course Theory Integrated with practical of the same course. Credit for IPCC can be 04 and its Teaching-Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./B.Tech.) 2022-23 National Service Scheme /Physical Education/Yoga: All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first Week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the Degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses is mandatory for the award of Degree.

#### 22.07.2023

#### VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

# B.E. in Civil Engineering

Scheme of Teaching and Examinations2022

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2023-24)

V SEIVIESTER	V SEME	STER
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				<u> </u>		Т	eaching	Hours /Wee	ek	Examination				
SI. No	Co	ourse and urse Code	Course Title	Teaching epartment (TD and Question Paper Setting Board (PSB)	Teaching apartment (TE and Question Paper Setting Board (PSB)		Lecture Tutorial Practical/ Drawing		Self -Study	Duration in hours	CIE Marks	SEE Marks	otal Marks	Credits
				ă		L	т	Р	S		-		F	
1	HSMS	BCV501	Construction Management and Entrepreneurship	TD: CV PSB:	TD: CV PSB: CV			0		03	50	50	100	3
2	IPCC	BCV502	Geotechnical Engineering	TD: CV PSB:	CV	3		2		03	50	50	100	4
3	IPCC	BCV503	Concrete Technology	TD: CV PSB:	CV	3	0	2		03	50	50	100	4
4	PCCL	BCV504	Environmental Engineering Lab	TD: CV PSB:	CV	0	0	2		03	50	50	100	1
5	PEC	BCV515x	Professional Elective Course	TD: CV PSB:	CV	3	0	0		03	50	50	100	3
6	PROJ	BCV586	Mini Project/Extensive Survey Project	TD: CV PSB:	CV	0	0	4		03	100		100	2
7	AEC	BRMK557	Research Methodology and IPR			2	2	0		02	50	50	100	3
8	MC	BESK508	Environmental Studies	TD: CV PS	B: CV	2	0	0		02	50	50	100	2
		BNSK559	National Service Scheme (NSS)	NSS coordi	nator									
9	MC	BPEK559	Physical Education (PE) (Sports and Athletics)	Physical Edu Directo	ication or	0	0	2			100		100	0
		BYOK559	Yoga	Yoga Tea	cher									
										Total	500	300	800	22
			Pr	ofessional Elec	tive Cour	rse								
BCV5	15A	Numerical N	Aethods in Civil Engineering		BCV51	.5C	Solic	d Waste I	Managen	nent				
BCV5	15B	Occupationa	al Safety and Health Monitoring		BCV51	.5D	Rem	ote Sens	ing and (	GIS				
PCC:	Professio	nal Core Cours	e, PCCL: Professional Core Course laboratory,	, <b>UHV</b> : Univer	sal Hum	an Value	Cours	e, <b>MC</b> : M	landatory	/ Course	(Non-cre	dit), <b>AEC</b> :	Ability	
Enha	ncement	Course, <b>SEC</b> : S	kill Enhancement Course, L: Lecture, T: Tutor	ial, <b>P</b> : Practica	al S= SDA	<b>\</b> : Skill De	evelop	ment Act	ivity, CIE	: Continu	ous Inter	rnal Evalua	ation, SEI	E:
Seme	Semester End Evaluation. K: The letter in the course code indicates common to al the stream of Engineering. PROJ: Project /Mini Project. PEC: Professional Elective													
Cours	se													

Professional Core Course (IPCC): Refers to Professional Core Course Theory Integrated with practicals of the same course. Credit for IPCC can be 04 and its Teaching-

Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./B.Tech.) 2022-23

**National Service Scheme /Physical Education/Yoga:** All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first Week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the Degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of Degree.

**Mini-project work:** Mini Project is a laboratory-oriented/hands on course that will provide a platform to students to enhance their practical knowledge and skills by the development of small systems/applications etc. Based on the ability/abilities of the student/s and recommendations of the mentor, a single discipline or a multidisciplinary Mini- project can be assigned to an individual student or to a group having not more than 4 students.

#### **CIE procedure for Mini-project:**

(i) Single discipline: The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two faculty members of the Department, one of them being the Guide. The CIE marks awarded for the Mini-project work shall be based on the evaluation of the project report, project presentation skill, and question and answer session in the ratio of 50:25:25. The marks awarded for the project report shall be the same for all the batches mates.

(ii) Interdisciplinary: Continuous Internal Evaluation shall be group-wise at the college level with the participation of all the guides of the project.

The CIE marks awarded for the Mini-project, shall be based on the evaluation of the project report, project presentation skill, and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

#### No SEE component for Mini-Project.

**Professional Elective Courses (PEC):** A professional elective (PEC) course is intended to enhance the depth and breadth of educational experience in the Engineering and Technology curriculum. Multidisciplinary courses that are added supplement the latest trend and advanced technology in the selected stream of Engineering. Each group will provide an option to select one course. The minimum number of students' strengths for offering a professional elective is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.

#### 22.07.2023

# VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

# B.E. in Civil Engineering

# Scheme of Teaching and Examinations2022

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2023-24)

VI S	SEMESTER
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				2		1	Teaching	Hours /Wee	k		Exam	ination		
SI. No	Cou Cou	urse and rse Code	Course Title	Teaching Department (TD and Question Paper Setting Roard (PSR)	Teaching Department (T and Question Paper Setting Board (PSB)		н Tutorial	Drawing	v Self -Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	Credits
1	IPCC	BCV601	Design of RCC Structures			3	0	2		03	50	50	100	4
2	РСС	BCV602	Irrigation Engineering and Hydraulic Structures			3	2	0		03	50	50	100	4
3	PEC	BCV613x	Professional Elective Course		3	0	0		03	50	50	100	3	
4	OEC	BCV654x	Open Elective Course			3	0	0		03	50	50	100	3
5	PROJ	BCV685	Major Project Phase I			0	0	4		03	100		100	2
6	PCCL	BCVL606	Software Application Lab			0	0	2		03	50	50	100	1
7						If the cou	urse is o	ffered as a	Theory					
	AFC/SDC	BCV657x	Ability Enhancement Course/Skill Development			1	0 0			01	50	50	100	1
	, (20,000	DEVUSIX	Course V			If course	e is offe	e is offered as a practical		01	50	50	100	-
				NCC as and		0	0	2						
		BNSK658	National Service Scheme (NSS)		nator									
8	MC	BPEK658	Physical Education (PE) (Sports and Athletics)	Physical Edu Directo	ication or	0	0	2			100		100	0
		BYOK658	Yoga	Yoga Tead	cher									
										Total	500	300	800	18
			Pro	fessional Elect	tive Cour	rse								
BCV6	13A	Design of B	Bridges		BCV61	3C	Appli	ed Geot	echnical	Enginee	ring			
BCV6	13B	Design of f	ormwork and scaffolding		BCV61	3D	Desig	n and Co	nstructio	n of High	way Pave	ements		
				Open Elective	Course	<u> </u>						_		
BCV65	4A	Water conser	vation and Rainwater Harvesting		BCV	654C	Integr	ated Wast	e Manage	ement for a	a Smart C	ity		
BCV65	4B	Geographic Ir	Iformation Systems		BCV	654D	Sustai	nable Dev	elopment	Goals				

Ability Enhancement Course / Skill Enhancement Course-V											
BCV657A	Structural Health Monitoring Using Sensors	BCV657C	Data Analytics for Civil Engineers								
BCV657B	Quality Control and Quality Assurance	BCV657D	AI and Analytics for Structural Health Monitoring								
PCC: Professional Core Course PCCL: Professional Core Course Jaboratory, UHV: Universal Human Value Course, MC: Mandatory Course (Non-credit), AFC: Ability											

Enhancement Course, SEC: Skill Enhancement Course, L: Lecture, T: Tutorial, P: Practical S= SDA: Skill Development Activity, CIE: Continuous Internal Evaluation, SEE: Semester End Evaluation. K : The letter in the course code indicates common to all the stream of Engineering. PROJ: Project /Mini Project. PEC: Professional Elective Course. PROJ: Project Phase -I, OEC: Open Elective Course

**Professional Core Course (IPCC):** Refers to Professional Core Course Theory Integrated with practicals of the same course. Credit for IPCC can be 04 and its Teaching– Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./B.Tech.) 2022-23

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**Professional Elective Courses (PEC):** A professional elective (PEC) course is intended to enhance the depth and breadth of educational experience in the Engineering and Technology curriculum. Multidisciplinary courses that are added supplement the latest trend and advanced technology in the selected stream of Engineering. Each group will provide an option to select one course. The minimum number of students' strengths for offering professional electives is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.

#### **Open Elective Courses:**

Students belonging to a particular stream of Engineering and Technology are not entitled to the open electives offered by their parent Department. However, they can opt for an elective offered by other Departments, provided they satisfy the prerequisite condition if any. Registration to open electives shall be documented under the guidance of the Program Coordinator/ Advisor/Mentor. The minimum numbers of students' strength for offering Open Elective Course is 10. However, this condition shall not be applicable to class where the admission to the program is less than 10.

**Project Phase-I**: Students have to discuss with the mentor /guide and with their help he/she has to complete the literature survey and prepare the report and finally define the problem statement for the project work.

#### VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

# B.E. in Civil Engineering

# Scheme of Teaching and Examinations2022

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2023-24)

VII SEN	/IESTER (Sw	appable VII and V	/III SEMESTER)											
				â		1	Teaching	Hours /Wee	k		Exam	ination	1	
SI. No	Cou Cou	urse and Irse Code	Course Title	Teaching Department (Tt and Question Paper Setting Board (PSB) Board (PSB) Lecture Lecture Lecture Self -Study Drawing Self -Study CIE Marks SEE Marks						Total Marks	Credits			
				<u> </u>		L	т	Р	S				-	
1	IPCC	BCV701	Design of Steel Structures			3	3         0         2         03         50         50         100							4
2	IPCC	BCV702	Estimation and Contract Management			3	2	0		03	50	50	100	4
3	PCC	BCV703	Prestressed Concrete			3	2         0         03         50         50         100         4							4
4	PEC	BCV714x	Professional Elective Course			3	3 0 0 03 50 50 100							
5	OEC	BCV755x	Open Elective Course		3	0	0		01	50	50	100	3	
6	PROJ	BCV786	Major Project Phase-II			0	0	12		03	100	100	200	6
											400	300	700	24
			Pro	ofessional Elec	ctive Cou	rse								
BCV71	4A	Intelligent	Transport Systems		BCV7140	C	Gro	und Imp	rovemen	nt and R	einforced	d Earth		
BCV71	4B	Precast M	embers - Systems & Construction		BCV714	D	Des	ign and I	Executio	on of Pile	e Founda	ations		
BCV71	4E	Earthquak	re Resistant Structures		BCV714	F	Retr	ofitting	and Reh	abilitati	on of Str	uctures		
				Open Elective	e Course									
BCV75	5A	Road Safet	y Engineering		BCV755	C	Ener	gy Effici	ency, Ac	oustics A	nd Dayli	ghting In	Building	
BCV75	5B	Conservati	on Of Natural Resources		BCV755	D	Inte	grated B	uilding	Services				
PCC:	Profession	nal Core Cou	rse, PCCL: Professional Core Course laboratory,	, <b>PEC</b> : Profes	ssional E	lective C	Course,	OEC: Op	en Electi	ve Cours	e PR: Pro	ject Work	, <b>L:</b> Lectu	re, <b>T</b> :
Tutor	ial, <b>P</b> : Pra	ctical <b>S= SDA</b>	: Skill Development Activity, CIE: Continuous In	ternal Evalu	ation, <b>SE</b>	E: Seme	ster Er	id Evalua	tion. <b>TD-</b>	Teaching	g Departr	nent, <b>PSB</b>	: Paper Se	etting
depar	tment, <b>O</b>	EC: Open Ele	ctive Course, PEC: Professional Elective Course.	PROJ: Proje	ect work									
Note:	Note: VII and VIII semesters of IV years of the program													
<b>(1)</b> In	stitutions	s can swap tl	ne VII and VIII Semester Schemes of Teaching	g and Exami	inations	to acco	mmoda	ate resea	rch inte	rnships/	industry	internship	os after t	he VI

semester.

(2) Credits earned for the courses of VII and VIII Semester Scheme of Teaching and Examinations shall be counted against the corresponding semesters whether the VII or VIII semesters is completed during the beginning of the IV year or the later part of IV years of the program.

**Professional Elective Courses (PEC):** A professional elective (PEC) course is intended to enhance the depth and breadth of educational experience in the Engineering and Technology curriculum. Multidisciplinary courses that are added supplement the latest trend and advanced technology in the selected stream of Engineering. Each group will provide an option to select one course. The minimum number of students' strengths for offering professional electives is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.

#### **Open Elective Courses:**

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PROJECT WORK (21CVP75): The objective of the Project work is

(i) To encourage independent learning and the innovative attitude of the students.

(ii) To develop interactive attitude, communication skills, organization, time management, and presentation skills.

(iii) To impart flexibility and adaptability.

(iv) To inspire team working.

(v) To expand intellectual capacity, credibility, judgment and intuition.

(vi) To adhere to punctuality, setting and meeting deadlines.

(vii) To install responsibilities to oneself and others.

(viii) To train students to present the topic of project work in a seminar without any fear, face the audience confidently, enhance communication skills, involve in group discussion to present and exchange ideas.

#### **CIE procedure for Project Work:**

(1) Single discipline: The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of whom shall be the Guide.

The CIE marks awarded for the project work, shall be based on the evaluation of the project work Report, project presentation skill, and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

(2) Interdisciplinary: Continuous Internal Evaluation shall be group-wise at the college level with the participation of all guides of the college. Participation of external guide/s, if any, is desirable. The CIE marks awarded for the project work, shall be based on the evaluation of project work Report, project presentation skill, and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

**SEE procedure for Project Work:** SEE for project work will be conducted by the two examiners appointed by the University. The SEE marks awarded for the project work shall be based on the evaluation of project work Report, project presentation skill, and question and answer session in the ratio 50:25:25.

			VISVESVARAYA TEC B.E	HNOLOGIC	AL UNIN	/ERSITY ng	', BELA	GAVI						
			Scheme of Te	eaching and	d Exami	nations	2022							
			Outcome Based Education (	(OBE) and (	Choice B	ased C	redit S	ystem (C	BCS)					
			(Effective fro	m the acac	demic ye	ar 2023	3-24)							
VIIISEN	/IESTER (Sw	appable VII and V	III SEMESTER)						-					
				<u> </u>		Teaching	Hours /Wee	k	Examination					
SI. No	Cou Cou	urse and rse Code	Course Title	Teaching epartment (T and Question Paper Setting	Board (PSB	Theory Lecture	Tutorial	Practical/ Drawing	Self -Study	Duration in hours	CIE Marks	SEE Marks	Fotal Marks	Credits
				٥		L	т	Р	S					
1	PEC	BCV801x	Professional Elective (Online Courses)			3	0	0		03	50	50	100	3
2	OEC	BCV802x	Open Elective (Online Courses)			3	0	0		01	50	50	100	3
3	INT	BCV803	Internship (Industry/Research) (14 - 20 Weeks)		0	0	12		03	100	100	200	10	
											200	200	400	16
			Professional	Elective Cou	ırse (Onli	ne cours	es)							•
BCV80	1A	Deep Excava	tion and Tunnels – L&T		BCV8010	2	Projec	ct manag	ement ar	nd financ	e			
BCV80	1B	Pre-engineer	red Buildings		BCV8010	)	Metro	o and Sea	ports En	gineering	5			
8CV80	1E	Advanced R0	CC Structures		BCV801F		Advar	nced Con	crete Teo	chnology				
			Open Ele	ective Courses	Online Co	ourses)	_							
BCV80	2A 25	Energy Cons	ervation in Buildings		BCV8020		Greer	Building	S					
BCA80	2B	Occupationa	Il Health and Safety	<b>.</b>	BCV802L	)	Integr	ated Buil	ding Ser	vices			<u> </u>	
L: Lec	ture, T: I	utorial, <b>P</b> : Pra	ictical <b>S= SDA</b> : Skill Development Activity, <b>CIE</b> : (	Continuous	Internal	Evaluati	on, SEE	: Semest	er End E	valuation	i. <b>TD-</b> Tea	ching Dep	partment	, PSB:
Paper	Setting of	department,	<b>OEC</b> : Open Elective Course, <b>PEC</b> : Professional	Elective Co	urse. <b>PF</b>	ROJ: Pro	oject w	ork, <b>INT</b> :	Industry	/ Internsł	nip / Rese	earch Inte	ernship /	Rural
Interr	nship													
Note	VII and V	/III semesters	of IV years of the program											
Swap	ping Facil	ity												
• Ir	stitutions	s can swap VII	and VIII Semester Scheme of Teaching and Exa	aminations t	o accom	modate	resear	ch intern	ships/ ir	ndustry ii	nternship	s/Rural Ir	nternship	after

the VI semester.

• Credits earned for the courses of VII and VIII Semester Scheme of Teaching and Examinations shall be counted against the corresponding semesters whether VII or VIII semester is completed during the beginning of IV year or later part of IV year of the program.

#### **Elucidation:**

At the beginning of IV years of the program i.e., after VI semester, VII semester classwork and VIII semester **Research Internship /Industrial Internship / Rural Internship** shall be permitted to be operated simultaneously by the University so that students have ample opportunity for an internship. In other words, a good percentage of the class shall attend VII semester classwork and a similar percentage of others shall attend to Research Internship or Industrial Internship or Rural Internship.

Research/Industrial /Rural Internship shall be carried out at an Industry, NGO, MSME, Innovation center, Incubation center, Start-up, center of Excellence (CoE), Study Centre established in the parent institute and /or at reputed research organizations/institutes.

The mandatory Research internship /Industry internship / Rural Internship is for 14 to 20 Weeks. The internship shall be considered as a head of passing and shall be considered for the award of a Degree. Those, who do not take up/complete the internship shall be declared to fail and shall have to complete it during the subsequent University examination after satisfying the internship requirements.

**Research internship:** A research internship is intended to offer the flavor of current research going on in the research field. It helps students get familiarized with the field and imparts the skill required for carrying out research.

**Industry internship:** Is an extended period of work experience undertaken by students to supplement their Degree for professional development. It also helps them learn to overcome unexpected obstacles and successfully navigate organizations, perspectives, and cultures. Dealing with contingencies helps students recognize, appreciate, and adapt to organizational realities by tempering their knowledge with practical constraints.

**Rural Internship:** Rural development internship is an initiative of Unnat Bharat Abhiyan Cell, RGIT in association with AICTE to involve students of all departments studying in different academic years for exploring various opportunities in techno-social fields, to connect and work with Rural India for their upliftment.

The faculty coordinator or mentor has to monitor the student's internship progress and interact with them to guide for the successful completion of the internship.

The students are permitted to carry out the internship anywhere in India or abroad. University shall not bear any expenses incurred in respect of the internship.

With the consent of the internal guide and Principal of the Institution, students shall be allowed to carry out the internship at their hometown (within or outside the state or abroad), provided favorable facilities are available for the internship and the student remains regularly in contact with the internal guide. University shall not bear any cost involved in carrying out the internship by students. However, students can receive any financial assistance extended by the organization.

Professional Elective /Open Elective Course: These are ONLINE courses suggested by the respective Board of Studies. Details of these courses shall be made available for students on the VTU web portal.

Please note: If any clarifications / suggestions please email to sbhvtuso@yahoo.com

STRENGTH OF N	MATERIALS	Semester	III
Course Code	BCV301	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3+0+0+0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3 Hrs.
Examination type (SEE)	Theory		

Course Learning objectives: This course will enable students to

- Understand the simple stresses, strains, and compound stresses in various structural components.
- Understand the bending moments and shear forces in different types of beams under various loading conditions
- Know the bending stress, shear stress, and torsional stress in beams and shafts with different cross sections
- Understand the deflection in beams and the stability of columns under different loading conditions.
- Understand the behaviour and strength of structural elements subjected to compound stresses and stresses in thin and thick cylinders.

# **Teaching-Learning Process (General Instructions)**

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

- Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills.
- 2. Arrange field visits to give brief information about the water and wastewater treatment plant.
- 3. Encourage collaborative (Group Learning) Learning in the class.
- 4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking and enhance the knowledge of treatment processes.
- 5. Adopt Problem Based Learning (PBL), which fosters students, Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
- 6. Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills

#### Module-1

22.07.2023

Simple Stresses and Strains: Introduction, Properties of Materials, Stress, Strain, Hooke's law, Poisson's Ratio, Stress – Strain Diagram for structural steel, Principles of superposition, Total elongation of tapering bars of circular and rectangular cross sections. Composite section, Volumetric strain, expression for volumetric strain, Elastic constants, relationship among elastic constants. Thermal stresses and strains, Compound bars subjected to thermal stresses, state of simple shear. (L1, L2, L3)

# Module-2

**Bending moment and shear force diagrams in beams:** Introduction to types of beams, supports and loadings. Definition of shear force and bending moment, sign convention, Relationship between loading, shear force and bending moment, Shear force and bending moment equations, development of Shear Force Diagram(SFD) and Bending Moment Diagram (BMD) with salient values for cantilever, simply supported and overhanging beams for point loads, UDL (Uniformly Distributed Load), UVL (Uniformly Varying Load), Couple and their combinations

# Module-3

**Bending and Shear Stresses in Beams:** Introduction, pure bending theory, Assumptions, derivation of bending equation, modulus of rupture, section modulus, flexural rigidity. Expression for transverse shear stress in beams, Bending and shear stress distribution diagrams for circular, rectangular, 'I', and 'T' sections.

**Torsion in Circular Shaft:** Introduction, pure torsion, Assumptions, derivation of torsion equation for circular shafts, torsional rigidity and polar modulus Power transmitted by a shaft.

(L1, L2, L3)

(L1, L2, L3)

#### Module-4

**Deflection of Beams:** Definition of slope, Deflection and curvature, Sign conventions, Derivation of moment- curvature equation. Double integration method and Macaulay's method: Slope and deflection for standard loading cases and for determinate prismatic beams subjected to point loads, UDL, UVL and couple.

Columns and Struts: Introduction, short and long columns. Euler's theory; Assumptions, Derivation for Euler's Buckling load for different end conditions, Limitations of Euler's theory. Rankine-Gordon's formula for columns. (L1,L2,L3)

#### **Module-5**

# **Compound Stresses:**

Introduction, state of stress at a point, General two dimensional stress system, Principal stresses and principal planes. Mohr's circle of stresses

# Thin and Thick Cylinders:

Introduction, Thin cylinders subjected to internal pressure; Hoop stresses, Longitudinal stress and change in volume. Thick cylinders subjected to both internal and external pressure; Lame's equation, radial and hoop stress distribution. (L1,L2,L3)

#### **Course outcome (Course Skill Set)**

At the end of the course, the student will be able to:

- 1. Evaluate the simple stresses, strains and compound stresses
- 2. Calculate the Bending moments, shear force and draw BMD, SFD for various types of beams and loadings
- 3. Analyse the bending stress, shear stress and torsional stress in beams and shafts with different cross sections
- 4. Evaluate the deflection in beams and determine the stability of the columns.
- 5. Evaluate the behaviour and strength of structural elements under the action of compound stresses and stresses in thin and thick cylinders.

#### Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). The student is declared as a pass in the course if he/she secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

# **Continuous Internal Evaluation:**

- There are 25 marks for the CIE's Assignment component and 25 for the Internal Assessment Test component.
- Each test shall be conducted for 25 marks. The first test will be administered after 40-50% of the coverage of the syllabus, and the second test will be administered after 85-90% of the coverage of the syllabus. The average of the two tests shall be scaled down to 25 marks
- Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the course shall be planned. The schedule for assignments shall be planned properly by the course teacher. The teacher should not conduct two assignments at the end of the semester if two assignments are planned. Each assignment shall be conducted for 25 marks. (If two assignments are conducted then the sum of the two assignments shall be scaled down to 25 marks)
- The final CIE marks of the course out of 50 will be the sum of the scale-down marks of tests and assignment/s marks.

# Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

# Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored shall be proportionally reduced to 50 marks

# Suggested Learning Resources:

# **Text Books**

- B.C Punmia Ashok Jain, Arun Jain, "Strength of Materials", Laxmi 2018-22 Publications, 10th Edition-2018
- R K Bansal, "A Textbook of Strength of Materials", 4th Edition, Laxmi Publications, 2010
- S.S. Rattan "Strength of Materials" McGraw Hill Education (India) Pvt. Ltd., 2nd Edition (Sixth reprint 2013).
- Vazirani, V N, Ratwani M M. and S K Duggal "Analysis of Structures Vol. I", 17th Edition, Khanna Publishers, New Delhi.
- R.K. Rajput, "Strength of materials" S. Chand Publishing (6th Edition)
- S S Bhavikatti, "Strength of Materials" Vikas Publishing (5th Edition)
- B.S. Basavarajaiah, P. Mahadevappa "Strength of Materials" in SI Units, University Press (India) Pvt. Ltd., 3rd Edition,2010

# Web links and Video Lectures (e-Resources):

1.Strength of Materials web course by IIT Roorkee https://nptel.ac.in/courses/112107146/

2.Strength of Materials video course by IIT Kharagpur https://nptel.ac.in/courses/105105108/

3.Strength of Materials video course by IIT Roorkee <a href="https://nptel.ac.in/courses/112107147/18">https://nptel.ac.in/courses/112107147/18</a>

4.All contents organized <u>http://www.nptelvideos.in/2012/11/strengthof-materials-prof.html</u>

# Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Quiz (To assist in GATE Preparations)
- Demonstrations in Lab
- Virtual Lab Experiments

	Mapping of Course Outcomes and Program specific outcomes to Program Outcomes															
Course					Pro	ogram	outc	omes					Program Specific Outcomes			
outcomes	РО	PO	PO	PO	PO	PO	PO	PO	PO	PO	РО	РО	PSO	PSO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
CO1																
CO2																
CO3																
<b>CO4</b>																
CO5																
Total																
Average																
Level 0	Level 0: Not Mapped, 1: Low Mapped, 2: Moderately Mapped 3: Highly Mapped															

#### CO & PSO - PO Mapping (Individual Teacher has to fill)

**Note**: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.

Engineerin	g Survey	Semester	3
Course Code	BCV302	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory + 8-10 Lab slots	Total Marks	100
Credits	04	Exam Hours	3
Examination nature (SEE)	Theory		

Course Learning objectives: This course will enable students to

- Ability to understand principles of both traditional and modern surveying applying knowledge of mathematics.
- Ability to handle surveying equipment's and software tools to carry out field surveying, plottopographical Drawings and construction drawing
- Ability to use Total station for data capture, data storage, data transfer.
- Ability to prepare construction drawing and setting out

# **Teaching-Learning Process (General Instructions)**

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

- 1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills.
- 2. Arrange field visits to give brief information about the water and wastewater treatment plant.
- 3. Encourage collaborative (Group Learning) Learning in the class.
- 4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking and enhance the knowledge of treatment processes.
- 5. Adopt Problem Based Learning (PBL), which fosters students, Analytical skills, develop thinking skills suchas the ability to evaluate, generalize, and analyze information rather than simply recall it.
- **6.** Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills.

#### **MODULE-1**

**Engineering surveying** – Definition & importance of surveying for Civil Engineers. Surveying types- Control survey, Topographical surveying, Construction Survey, Cadastral survey, Hydrographic survey and Underground Survey. Surveying through the ages- Chain surveying, Compass surveying and Plane Table Surveying (concepts and limitations only).

Measurement of Distance- Various types of tapes, Laser distance meter, Distance measuring wheel, Electronic Distance measurement, GPS. L1,L2,L3

#### **MODULE-2**

**Vertical Control-** Concepts of various types of Datum – Mean Sea level, Bench marks – Temporary and Permanent.

Levelling- Terms used in levelling, Setting up of Dumpy level. Differential levelling by plane of collimation method using Dumpy level.

**Theodolite Surveying** – Terms used in Theodolite surveying. Setting up a Theodolite. Measurement of horizontal and vertical angles with Theodolite.

**Total Station Surveying** – Features, parts, accessories and advantages of Total Station. Surveying with total station – Measurement of Horizontal angle, vertical angle, distance, slope, vertical distance, multiple angles with Total station. Using Total station for Area measurement and Volume calculation. L1,L2,L3

#### **MODULE-3**

**Contours -** Definition, terms used, characteristics of contours and applications of contours in civil engineering practice. Contouring using level, theodolite and total station. Plotting of contours in CAD. **Longitudinal and cross sectioning** – Definition, importance of L/S & C/S. L/S & C/S using level, theodolite and Total station. Plotting of L/S & C/S in CAD.

Coordinate survey with Total station - Measurement of coordinates using total station. Creating Job files, importance of back sight data, coordinate data recording. Data transferring, data refinement and plotting in CAD. L1,L2,L3

**MODULE-4** 

**Curves** –Types of Curves- Application of curves in civil engineering. Setting out of Horizontal curve by Theodolite (Rankine's method) and using Total Station. Components of Compound, Reverse curve. Transition Curve and Combined curve. Various types of vertical curves and its applications.

**Areas and Volumes**- Methods of determining areas by trapezoidal and Simpsons' rule. Measurement of volume by prismoidal and trapezoidal formula. Earthwork volume calculations from spot levels and from contour maps; Earthwork calculation in Embankments.

Construction Surveying - Setting out works using Total Station, Setting out buildings by Centre line method. L1, L2, L3, L4

#### **MODULE-5**

**GPS Surveying** – Introduction. Overview of GPS system- space, control and user segments. Reference co- ordinate systems. Absolute and Differential positioning with GPS. Gagan system in India. Types of GPS Receivers. Engineering survey using Differential GPS.

**Surveying with Drone** – Introduction, applications and advantages. Features of photogrammetric mapping method. Drone surveying requirements- Drone platform, Flight planning software, Sensor DGPS equipment and Image processing software. Types of drones and sensors. Process of drone surveying – flight planning, DGPS markers, capturing images, post processing of images using photogrammetry software and output maps.

Application and uses of Remote sensing and GIS in engineering surveying. L1, L2, L3, L4

PRA	CTICAL COMPONENT OF IPCC
SI.NO	Experiments
1	Use of Various types of tapes, Laser distance meter, Distance measuring wheel.
2	Differential levelling by Dumpy level by plane of collimation method
3	Measurement of horizontal and vertical angles by Theodolite. Method of repetition
4	Setting out simple curve using Rankine's method using Theodolite
5	Setting out central line of a small residential building.
6	Setting up of Total station. Features and components of Total station
7	Measurement of Distance, slope, vertical distance, horizontal and vertical angles using Total station
8	Coordinate measurement with Total station
9	Longitudinal sectioning and cross sectioning using Total station
10	Contouring and plotting with Total station
11	Demonstration of Equipment's used for chain, compass and plane table surveying
10	Visit to railway station/ large construction site to understand the importance of datum and
12	benchmark.

#### Course outcomes (Course Skill Set):

At the end of the course, the student will be able to:

- Summarize various types of surveying and carry out distance measurement using various equipment's
- Illustrate the use and applications of levelling and theodolite
- Plot contours, longitudinal and cross sections for construction projects.
- Set curves for construction works and carry out estimation of areas and volumes.
- Demonstrate the necessary skills to carry out GPS and DRONE Surveying

#### Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### CIE for the theory component of the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.

- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks)**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

# CIE for the practical component of the IPCC

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test (duration 02/03 hours) after completion of all the experiments shall be conducted for 50 marks and scaled down to 10 marks.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC. **SEE for IPCC**

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored by the student shall be proportionally scaled down to 50 Marks

# The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

# Suggested Learning Resources:

Books

- 1. Punmia BC, & Jain Ashok Kumar. (2016). Surveying (17th ed., Vol. 1). Laxmi Publications.
- 2. Dr. K.R. Arora. (2019). Surveying (17th ed., Vol. 1). Standard Book House.
- 3. Charles D. Ghilani. (2012) (13<sup>th</sup> ed.). Prentice Hall

Web links and Video Lectures (e-Resources):

- 1. <u>https://enterprise.dji.com/surveying/land-surveying</u>
- 2. <u>https://www.gps.gov/applications/survey/</u>
- 3. <u>https://www.constructionplacements.com/total-station-in-surveying-types-uses-and-applications/</u>
- 4. <u>https://www.youtube.com/watch?v=bbs5AEPstl4</u>
- 5. <u>https://www.youtube.com/watch?v=KHI4TEeexuM&list=PLLy\_2iUCG87DwNVc3Mz1yYlRA42jSQ1t</u> <u>B&index=28</u>
- 6. <u>https://www.youtube.com/watch?v=Iu9vrE48\_I4&list=PLLy\_2iUCG87DwNVc3Mz1yYIRA42jSQ1tB</u> <u>&index=30</u>
- 7. <u>https://www.youtube.com/watch?v=RXUi2cX4CkU</u>
- 8. <u>https://www.youtube.com/watch?v=SVa66v008So</u>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- 1. Hand on use of various surveying instruments
- 2. Surveying Civil engineering block and plotting with instruments of student's choice
- 3. Setting out a single bedroom house plan in field

Mapping of Course Outcomes and Program specific outcomes to Program Outcomes																
Course	Program outcomes Program Outcom								am Sp omes	im Specific nes						
outcomes	PO	PO	Р	Р	Р	Р	Р	Р	Р	PO	PO	РО	PSO	PSO	PSO	PSO
	1	2	O3	O4	05	06	07	08	09	10	11	12	1	2	3	4
CO1																
CO2																
CO3																
CO4																
CO5																
Total																
Average																
Level 0: Not Mapped,1: Low Mapped,2: Moderately Mapped3: Highly Mapped					L											

<u>CO & PSO - PO Mapping (Individual Teacher has to fill)</u>

**Note**: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.

ENGINEE	Semester	3	
Course Code	BCV303	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory + 8-10 Lab slots	Total Marks	100
Credits	04	Exam Hours	
Examination nature (SEE)	Theory		

#### **Course objectives:**

- 1. To inculcate the importance of earth's interior and application of Geology in civil engineering in Geo Hazard mitigation and management
- 2. To create awareness among Civil engineers regarding the resources of earth
- 3. To provide knowledge on dynamic Geology and its importance in modifying the physical character of rocks which cause rocks suitable or unsuitable in different civil engineering projects such as Dams, bridges, tunnels and highways.
- 4. To educate the ground water management regarding diversified geological formations, . To highlight the concept of rain water harvesting.
- 5. To understand the application of Remote Sensing and GIS, Natural disaster and management and environmental awareness. To understand the subsurface using geospatial data
- 6. To provide decision support on the nature of the basic raw materials used in construction. To provide decision support on Lithological characters and subsurface conditions
- 7. To describe various geological maps and interpretation of geological data for mining and subsurface investigations.

#### **Teaching-Learning Process (General Instructions)**

These are sample Strategies; that teachers can use to accelerate the attainment of the various course outcomes.

- Chalk and Talk method.
- Show Video/animation films to explain earth dyanamics and influence of geology in prime civil • constructions
- Encourage collaborative (Group Learning) Learning in the class
- Ask at least three HOTS (Higher order Thinking) questions in the class, which promotes critical thinking.
- Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking process such as the ability to evaluate, generalize, and analyse information rather than simply recall it.
- Topics will be introduced in a multiple representation.
- Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
- Discuss how every concept can be applied to the real world and when that's possible, it helps improve • the students' understanding.

	MOI	DULE-1		7 hrs				
Introduction, the scope of earth science in Engineering.								
Earth's interr	Earth's internal structure and composition, internal dynamics and Plate tectonics, Earthquakes							
- types, cause	- types, causes, so-seismic lines, seismic zonation, seismic proof structures. Volcanic eruption -							
types, causes	types, causes. Landslides-causes types, preventive measures; Tsunami – causes, consequences,							
mitigation. Cy	clones - causes and m	anagement.				-		
		-						
	Ν	MODULE-2	5 h	rs				
Earth Materi	als in Construction							
Minerals -Industrial, rock-forming and ore minerals. Physical properties, composition.								
Rocks Types, structure/Texture, mineral composition occurrence, properties.								
Decorative	(facing/nolishing)	railway	hallast	rocks	for masonry	work		

7hrs

monumental/architecture, Dressing of stones, Requirement of good building stones. **MODULE-3** 

2

# Earth Surface process and Resources

Weathering, type, causes, soil insitu, drifted soil, soil profile, soil mineralogy, structure, types of soil, Black cotton soil v/s Lateritic soil; effects of weathering on monumental rocks. Soil Horizon, Soil Classification by Grain Size.

#### MODULE-4 7 hrs

# Surface and sub investigation for deep foundation

Dip and strike, and outcrop problems(numerical problem geometrical/ simple trigonometry based), Borehole data(and problems), Faults, folds, unconformity, joints, types, recognition and their significance in Civil engineering projects like tunnel project, dam project, Reservoir site,.

# MODULE-5 5 hrs

# Modern Tools and geophysical methods

Rocks as aquifers, water-bearing properties igneous, sedimentary and metamorphic rocks , coefficient of permeability, factors affecting permeability, Electrical Resistivity meter, depth of water table, (numerical problems), seismic studies.

**PRACTICAL COMPONENT OF IPCC (May cover all / major modules)** 

Sl.NO	Experiments 8 hrs
1	Identification of common minerals based on Physical Properties
2	Identification of rocks used in building construction based on Physical properties
3	Solving Geological maps for suitability for aqua duct
4	Geological maps with inclined beds, suitability for tunnels/ Dams
5	Geological maps with folds, in tunnels/ Dams
6	Geological maps with unconformity , in tunnel/dam project
7	Geological maps with faults in Dams/tunnels project
8	One Day Nearest Field Visit Investigation.
Course	outcomes (Course Skill Set):

At the end of the course the student will be able to:

- Apply geological knowledge in different civil engineering practice.
- Acquire knowledge on durability and competence of foundation rocks, and will be able to use the best building materials.
- Students will become competent enough for the safety, stability, economy and life of the structures that they construct
- Able to solve various issues related to ground water exploration, build up dams, bridges, tunnels which are often confronted with ground water problems
- Students will become Intelligent enough to apply GIS, GPS and remote sensing as a latest tool in different civil engineering for safe and solid construction.

### Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for

the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### CIE for the theory component of the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25 marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 220B4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.
- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks)**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

#### CIE for the practical component of the IPCC

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test (duration 02/03 hours) after completion of all the experiments shall be conducted for 50 marks and scaled down to 10 marks.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

#### **SEE for IPCC**

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored by the student shall be proportionally scaled down to 50 Marks

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

Note: Subject to be taught by Geologist with qualification M. Sc Geology/MPhil/ Ph. D in Geology

#### Suggested Learning Resources: Books

- 1. Engineering Geology, by Parthasarathy et al, Wiley publications
- 2. A textbook of Engineering Geology by ChennaKesavulu, Mac Millan India Ltd
- 3. Principle of Engineering Geology, by K.M. Bangar, Standard publishers
- 4. Physical and Engineering Geology, by S.K. Garg, Khanna publishers
- 5. Principles of Engineering Geology, by KVGK Gokhale, BS Publications

# **Reference Books**

- 1. Introduction to Environmental Geology by Edward A Keller, Pearson publications.
- 2. Engineering Geology and Rock Mechanics B. P. Verma, Khanna publishers
- 3. Principles of Engineering Geology and Geotechnics, Krynine and Judd, CBS Publications

Web links and Video Lectures (e-Resources):

- <u>https://www.youtube.com/watch?v=aTVDiRtRook&list=PLDF5162B475DD915F</u>
- <u>https://www.youtube.com/watch?v=EBiLLJAxBuU&index=2&list=PLDF5162B475DD915F</u>
- <u>https://www.youtube.com/watch?v=sTY-ao4RZck&list=PLDF5162B475DD915F&index=3</u>
- <u>https://nptel.ac.in/courses</u>
- <u>https://youtu.be/fvoYHzAhvVM</u>
- <u>https://youtu.be/aTVDiRtRook</u>
- <u>https://serc.carleton.edu/NAGTWorkshops/hazards/events/12262004.html?serc\_source=</u> recommendation
- <u>https://serc.carleton.edu/NAGTWorkshops/visualization/examples/CBezanson.html?sercsource=recommendation</u>
- https://serc.carleton.edu/NAGTWorkshops/coursedesign/goalsdb/14712.html
- https://www.earthsciweek.org/classroom-activities
- NPTEL materials

#### Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Field Visits
- Quiz/Assignments/Open book test to develop skills
- Encourage collaborative learning in the class
- Demonstration of Geological models and animations
- Hands on experiments with Rock and Minerals

WATER SUPPLY AND WASTEWATER ENGINEERING   Semester					
Course Code	BCV304	CIE Marks	50		
Teaching Hours/Week (L: T:P: S)	3+0+0+0	SEE Marks	50		
Total Hours of Pedagogy	40	Total Marks	100		
Credits	03	Exam Hours			
Examination type (SEE)	Theory				

**Course Learning objectives:** This Course will enable the students to

1. Analyze the variation of water demand and to estimate water requirement for a community.

- 2. Study drinking water quality standards and to illustrate qualitative analysis of water.
- 3. Analysis of physical and chemical characteristics of water and wastewater.
- 4.Understand and design of different unit operations and unit process involved in water and wastewater treatment process
- 5. Design various oxidation processes.

# **Teaching-Learning Process (General Instructions)**

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

- 1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills.
- 2. Arrange field visits to give brief information about the water and wastewater treatment plant.
- 3. Encourage collaborative (Group Learning) Learning in the class.
- 4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking and enhance the knowledge of treatment processes.
- 5. Adopt Problem Based Learning (PBL), which fosters students, Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
- 6. Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills

#### Module-1

**Introduction:** Water: Need for protected water supply, Demand of Water: Types of water demands - domestic demand, industrial, institutional and commercial demand, public use and fire demand estimation, factors affecting per capita demand, Variations in demand of water, Peak factor.

Design period and factors governing design period. Methods of population forecasting and numerical problems. Physico chemical characteristics of water Sampling. L1, L2, L3

#### Module-2

**Water Treatment:** Objectives, Unit flow diagrams – Significance of each unit, Aeration process Limitations and types.

**Sedimentation** - Theory, settling tanks, types and design with numerical, Coagulation and flocculation, types of coagulants.

Filtration: Mechanism, theory of filtration, types of filters: slow sand, rapid sand and pressure filters. Operation and cleaning. Design of slow and rapid sand filter without under drainage system, Numerical. L1, L2,

#### Module-3

**Disinfection**: Methods of disinfection with merits and demerits. Breakpoint chlorination, Softening: Lime soda and Zeolite process.

**Wastewater: Introduction**: Need for sanitation, methods of sewage disposal, types of sewerage systems, Treatment of municipal waste water: Waste water characteristics sampling, significance and techniques, physical, chemical and biological characteristics, Numerical on BOD.

#### Module-4

**Treatment Process:** flow diagram for municipal waste water Treatment unit operations and process Screens: types, disposal. Grit chamber, oil and grease removal. Primary and secondary settling tanks, **Suspended growth system** - conventional activated sludge process and its modifications, numerical.

#### L1,L2 ,L3

L1, L2

#### Module-5

Attached growth system – Trickling filter, numerical on Trickling filters, bio-towers and rotating biological contactors. Principle of stabilization ponds, oxidation ditch. Sludge digesters (aerobic and anaerobic), Equalization. Thickeners and drying beds.

#### L1, L2, L3

# **Course outcome (Course Skill Set)**

At the end of the course, the student will be able to:

- 1. Estimate the average and peak water demand for a community.
- 2. Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
- 3. Design the different units of water treatment plant.
- 4. Design the various units of wastewater treatment plant.
- 5. Design of various AOPs and low cost treatment units.

# Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). The student is declared as a pass in the course if he/she secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### **Continuous Internal Evaluation:**

- There are 25 marks for the CIE's Assignment component and 25 for the Internal Assessment Test component.
- Each test shall be conducted for 25 marks. The first test will be administered after 40-50% of the coverage of the syllabus, and the second test will be administered after 85-90% of the coverage of the syllabus. The average of the two tests shall be scaled down to 25 marks
- Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the course shall be planned. The schedule for assignments shall be planned properly by the course teacher. The teacher should not conduct two assignments at the end of the semester if two assignments are planned. Each assignment

shall be conducted for 25 marks. (If two assignments are conducted then the sum of the two assignments shall be scaled down to 25 marks)

• The final CIE marks of the course out of 50 will be the sum of the scale-down marks of tests and assignment/s marks.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

# Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- Marks scored shall be proportionally reduced to 50 marks

# Suggested Learning Resources:

# Text books

- Howard S. Peavy, Donald R. Rowe, George T, "Environmental Engineering" Tata McGra Hill, New York, Indian Edition, 2013
- S. K. Garg, Environmental Engineering Volume-I, Water supply Engineering M/s Khanna Publishers, New Delhi2010
- B.C. Punmia and Ashok Jain, Environmental Engineering I-Water Supply Engineering, Laxmi Publications (P) Ltd., New Delhi2010.
- B C Punmia, "Environmental Engineering volume-II", Laxmi Publications 2nd, 2016
- Karia G.L., and Christian R.A, "Wastewater Treatment Concepts and Design Approach", Prentice Hall of India Pvt. Ltd., New Delhi. 3rd, Edition, 2017
- S.K.Garg, "Environmental Engineering vol-II, Water supply Engineering", Khanna Publishers, New Delhi, 28th edition and 2017
- CPHEEO Manual on water supply and treatment engineering, Ministry of Urban Development, Government of India, New Delhi.
- Mark.J Hammer, Water & Waste Water Technology, John Wiley & Sons Inc., New York,2008

Web links and Video Lectures (e-Resources):

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Lecture 01: Background and Course Introduction https://youtu.be/yDnrv-oGSBc
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- Lecture 02: Water Sources and Availability <u>https://youtu.be/K4Vty0cmybI</u>
- Lecture 03: Water Uses https://youtu.be/9H7dPkWOsjA

Lecture 05: Urban water services and water supply systems https://youtu.be/bCKm9KkcQtw

- Lecture 07: Components of Water Demand <u>https://youtu.be/mVmErXpIp64</u>
- Lecture 08: Fluctuations in Water Demand https://youtu.be/qXUwy5OnX90

Lecture 11: Water Sources and Collection of Water https://youtu.be/TvEGgZw1El4

Lecture 12: Surface Water Intakes <u>https://youtu.be/GcQOyAdG5OM</u>

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Lecture 13: Surface Water Intakes Systems https://youtu.be/r10Jtm_SXz4
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Lecture 14: Groundwater Intake https://youtu.be/Zo1p7uRDEmM

Lecture 15: Well Interferences, Well losses and Efficiency <u>https://youtu.be/dRU5M\_WICU0</u> Lecture 16: Raw water Conveyance and Pumping <u>https://youtu.be/iQwEoEhujTc</u>

- Lecture 17: Practice Problems https://youtu.be/e5bduQiz5NY Lecture 18 : Raw Water Storage <a href="https://youtu.be/WZII7kWoUjE">https://youtu.be/WZII7kWoUjE</a>
- Lecture 19 : Treated Water Storage <a href="https://youtu.be/BuZ48afjd04">https://youtu.be/BuZ48afjd04</a>

Lecture 04: Water Supply Key Issues and Concerns https://youtu.be/JueYGPbsflw

Lecture 06: Urban water services and water supply systems https://youtu.be/s0hy0ZIM1bA

Lecture 09: "Concept of Design Period and Design Population Need to Forecast Population Population Forecasting Methods <u>https://youtu.be/QyLdA\_qhUog</u> Lecture 10: Demand Forecasting and Design Capacities <u>https://youtu.be/rKTwjvx7E8A</u>

Lecture 20 : Placement, Design and Construction of Storage Reservoirs <u>https://youtu.be/nQCZbXaBb1o</u>

Lecture 21 : Practice Problems on Reservoir Capacity Estimation https://youtu.be/6VuHxD3t9kw

Lecture 24 : Philosophy of Water Treatment <u>https://youtu.be/6I-eBqE7Hew</u>
Lecture 25 : Water Treatment Units Screening and Aeration
https://youtu.be/QsWp_HIZqPs
Lecture 26 : Water Treatment Units Sedimentation <a href="https://youtu.be/T1M4Ecjwq70">https://youtu.be/T1M4Ecjwq70</a>
Lecture 27 : Practice Problems On Sedimentation <a href="https://youtu.be/Zlh2mpOjIMU">https://youtu.be/Zlh2mpOjIMU</a>
Lecture 28: Coagulation and Flocculation: Theory https://youtu.be/aAo2bBaF0yU
Lecture 29: Coagulation and Flocculation: Selection and Application <a href="https://youtu.be/44p0lN31ogo">https://youtu.be/44p0lN31ogo</a>
Lecture 30: Coagulation and Flocculation: Design Operation and Process Control https://youtu.be/v0TDfCz_jLU
Lecture 31: Filtration Theory and Slow Sand Filters <u>https://youtu.be/nuJQe9F_2zI</u>
Lecture 32: Rapid Sand Filter: Filter Media and Components <u>https://youtu.be/3gw3sKcuQIY</u>
Lecture 33: Rapid Sand Filters and Pressure Filters https://youtu.be/PEX_0DebrSQ
Lecture 34: Practice Problems Coagulation Flocculation and Filtration <u>https://youtu.be/73jxsBCDuq4</u>
Lecture 35: Disinfection Basic https://youtu.be/d4UG9Xivuik
Lecture 36: Chlorination https://youtu.be/L3eSkeOU3jY
Activity Based Learning (Suggested Activities in Class)/ Practical Based learning
<ul> <li>Activity Based Learning (Suggested Activities in Class)/ Practical Based learning</li> </ul>
http://nptel.ac.in
https://swayam.gov.in
• https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham

Mapping of Course Outcomes and Program specific outcomes to Program Outcomes																
Course	Program outcomes										Program Specific Outcomes					
outcomes	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	РО	PSO	PSO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
CO1																
CO2																
CO3																
CO4																
CO5																
Total																
Average																
Level 0: Not Mapped,         1: Low Mapped,         2: Moderately Mapped         3: Highly Mapped																

# <u>CO & PSO - PO Mapping</u> (Individual Teacher has to fill)

**Note**: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.

(	COMPUTER AIDED BUILDI	NG PLANNING AND DRAWING	Semester	3		
Cours	Course Code BCV305 CIE Marks					
Teach	ing Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks	50		
Credit	S	01	Exam Hours	100		
Exami	nation type (SEE)	practical				
Cours	e objectives:	ton Aidad Enginaguing Drowings wing	o coftwore			
• •	Jain skin set to prepare Compt	net Alded Engineering Drawings using				
• (	Understanding the details of co	nstruction of different building elements	S	.1		
• `	Visualize the completed form of	t the building and the intricacies of con-	struction based or	n the		
6	engineering drawings					
• (	Get familiarization of practices	used in Industry.				
SI.NO		Experiments				
1	<b>Drawing Basics:</b> Selection	of scales for various drawings, thickness	s of lines, dimensi	ioning,		
	abbreviations and conventio	nal representations as per IS:962.				
	<b>Drawing Tools:</b> Lines Circ	le, Arc, Poly line, Multiline, Polygon,	Rectangle, Spline	e, Ellipse,		
2	Modify tools: Erase, Copy,	Mirror, Offset, Array, Move, Rotate,	Scale, Stretch, I	Lengthen,		
	Trim, Extend, Break, Chamf	er and Fillet,				
2	Using Toxt: Single line toxt	Multiling taxt Spalling Edit taxt				
3	Using Text. Single line text	, Multillie text, Spelling, Edit text				
1	Special Features: View to	ools, Layers concept, Dimension tool	s, Hatching, Cus	stomizing		
4	Toolbars, Working with mul	tiple drawings.				
	Drawings of Different Buil	ding Elements: Refer NBC before prac	tice			
	a> Footing/ Foundation -	- Foundation dimension for Isolated, co	ombined footing,	Standard		
_	dimension and cross se	ection of footing				
5	b> Size stone Masonry –	Size of single and double bond stone, Se	ections at wall for	indation		
	c> Brick Masonry – Size	of standard Burnt Brick, Solid Ceme	nt Block, Hollov	v Cement		
	block. Other bricks use	ed in current practice	,			
	Principles of planning, Pla	nning regulations and building bye-la	ws. factors affe	cting site		
6	selection Functional planni	of residential and public buildings of	lesign aspects for	different		
0	public buildings Recommer	ig of residential and public buildings, c	iesign uspeets for	uniterent		
	Draw a building plan for	single and double had room accomm	nodation for a c	rivon cito		
7	dimension Students have to	as through Duilding Due Lowe and reg	ulationa	given site		
	Dranara the centre line drav	go unough Bunding Bye Laws and leg	a hadraam hava			
8	Prepare the centre line drav	ving for marking the single and doubl	e bedroom nouse	e as in in		
	exercise 6					
9	Prepare a complete sanction	plan for the exercise 6 as per the bye la	w. Also study the			
	requirements to plan Resider	ntial Building, School building, Hospita	I Building, Office	es		
10	Drawing of plan with electri	cal, plumbing and sanitary services usin	g CAD software			
11	Drawing standard sections for	or Lintel and chajja, RCC Slabs, Colum	ns and beams.			
12	Drawing different types of s	taircases – Dog legged, Open well – pla	n and section			

#### Course outcomes (Course Skill Set):

At the end of the course the student will be able to:

- Prepare, read and interpret the drawings in a professional set up.
- Know the procedures of submission of drawings and Develop working and submission drawings for building.
- Plan of residential or public building as per the given requirements..

# Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

# **Continuous Internal Evaluation (CIE)**:

CIE marks for the practical course are **50 Marks**.

The split-up of CIE marks for record/ journal and test are in the ratio **60:40**.

- Each experiment is to be evaluated for conduction with an observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments are designed by the faculty who is handling the laboratory session and are made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to **30 marks** (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct a test of 100 marks after the completion of all the experiments listed in the syllabus.
- In a test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The marks scored shall be scaled down to **20 marks** (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

# Semester End Evaluation (SEE):

- SEE marks for the practical course are 50 Marks.
- SEE shall be conducted jointly by the two examiners of the same institute, examiners are appointed by the Head of the Institute.
- The examination schedule and names of examiners are informed to the university before the conduction of the examination. These practical examinations are to be conducted

between the schedule mentioned in the academic calendar of the University.

- All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. **OR** based on the course requirement evaluation rubrics shall be decided jointly by examiners.
- Students can pick one question (experiment) from the questions lot prepared by the examiners jointly.
- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.

General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)

Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero.

The minimum duration of SEE is 02 hours

#### Suggested Learning Resources:

- MG Shah, CM Kale, SY Patki, "Building drawing with an integrated approach to Built Environment Drawing", Tata McGraw Hill Publishing co. Ltd, New Delhi.
- Gurucharan Singh, "Building Construction", Standard Publishers, & distributors, New Delhi.
- Malik RS and a Meo GS, "Civil Engineering Drawing", Asian Publishers/Computech Publication Pvt Ltd

Course CodeBCV306ACIE Marks50Teaching Hours/Week (L: T:P: S)3:0:0SEE Marks50Total Hours of Pedagogy40Total Marks100Credits03Exam Hours03							
Teaching Hours/Week (L: T:P: S)3:0:0SEE Marks50Total Hours of Pedagogy40Total Marks100Credits03Exam Hours03							
Total Hours of Pedagogy40Total Marks100Credits03Exam Hours03							
Credits 03 Exam Hours 03							
Examination type (SEE) Theory							
<ul> <li>Course objectives: <ul> <li>To make the student understand about the past and present architecture of different parts of the world</li> <li>Rural and urban planning and growth and circulation of patterns and effect of increase in urbanization</li> <li>The basic planning required for urban and rural centres with respect to physical and social aspects</li> <li>Student s to visit the different place of architecture monuments to understand the concept</li> <li>To understand different types of architecture and planning</li> </ul> </li> <li>Teaching-Learning Process (General Instructions) <ul> <li>The architecture of India has to be understood and few exercises must be given.</li> <li>Student has to visit different cities to understand architecture and planning concepts</li> </ul> </li> </ul>							
<ol> <li>Online courses to understand the basics</li> <li>YouTube videos</li> <li>Power point presentations</li> </ol>							
Module-1							
engineer. Essential principles and qualities of architecture with examples Factors of architecture: Mass, Form, Colour, Solids, and Voids, Uniformity, Balance and Symmetry, Painting with examples.							
Module-2							
Architectural influence of the following: Association, Tradition, Climate, Materials, Topography, Religion social customs and aspiration of time. Architectural characteristics of the following architecture with examples. 1. Egyptian, 2. Greek, 3. Roman, 4. Buddhist, 5. Hindu, 6. Jain, 7. Chalukyan, 8. Modern architecture Factors that have influence present day Modern Architecture, Aesthetic difference between the past and present Architecture. Students are advised for a technical tour related Architecture and town planning to gain additional knowledge in this subject							
Module-3							
Human settlements, Rural and urban pattern of growth, Factors that promote growth and development of Rural and urban areas Ancient Town Planning in India: Principles of town planning and circulation pattern with examples							
Module-4							
Module-4 Industrialisation: Impact on town planning, Urbanisation causes, its effect on town and cities, remedial measures both in urban and rural planning Circulation pattern in cities: Urban roads and streets, their fuctional classification, traffic survey data and its use in town planning Module-5							

Contemporary objectives and methods of planning of town: Development plans for cities, objectives and stages involved in their preparation and implementation, space standards for planning.

#### Course outcome (Course Skill Set)

At the end of the course, the student will be able to :

- 1. Understand importance of architecture in rural and urban planning
- 2. Understand Influence of architecture
- 3. Design infrastructure for rural and urban region
- 4. Plan and design rural and urban roads

# **Assessment Details (both CIE and SEE)**

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### **Continuous Internal Evaluation:**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

#### Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored shall be proportionally reduced to 50 marks

#### Suggested Learning Resources:

#### Books

- 1. History of Architecture Fletcher
- 2. Urban pattern Galliaon
- 3. Indian architecture Vol. I & II Perey Brown
- 4. Principle of town and country planning Lewis Keeble
- 5. Urbanization and Urban Syatems in India, Ramachandran R, Oxford University Press, New Delhi.
- 6. Town planning Rangwala, Charothar Publication

#### Web links and Video Lectures (e-Resources):

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

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Geospatial Te	Semester	3	
Course Code	BCV306B	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory		

#### **Course objectives:**

- Introduce the concept of various geospatial technologies used in the industry
- Help to acquire basic idea about the processing and mapping with modern surveying equipment.
- Elaborate proven concepts, business practices and applications of geospatial technology.
- Explain learners understand how geospatial concepts are leveraged in handling real world business challenges of engineering and construction industry.

#### **Teaching-Learning Process (General Instructions)**

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

- 1. The online courses available should be shared with students
- 2. YouTube videos
- 3. Power point presentations
- 4. Visit to Survey of India office to collect more information

#### Module-1

**Need of Geospatial technology in Industry:** Geospatial in Day to Day Life, Spatial thinking, Evolution of location technology and importance of geography and maps. Need for spatial information, Terminologies, logic, language and formats of spatial technology. Location perspective of construction industry, Overview of Geospatial technology in tenders, Design and execution and Construction lifecycle management. Fundamentals and components of Geospatial Engineering, Surveying and Conventional survey equipment Vs Modern surveying equipment Components. Digital Land Surveying Needs.

#### Module-2

**Total Station and Global Navigation Satellite System (GNSS):** Basics of Surveying, Introduction to Survey and Mapping, Geospatial Surveying Equipment, Demo of Total Station Equipment, Setting out and mapping, Advanced geospatial solutions, GNSS Overview of components, working and signal structure of Global navigation System.

#### Module-3

**Geospatial Engineering and technology:** Remote Sensing Technologies, Types of remote sensing, Sensors and its types, Application of sensors & platforms, Image Acquisition, Applications of Remote Sensing. 3D scanning, Principles and the science behind photogrammetry, LiDAR, RADAR and SONAR. Introduction to Platforms and working.

#### Module-4

**Geographical Information System:** Basics of GIS, Vector & Raster data models, Types and components of a Map. Hardware for GIS, DEM and TIN Data products, Attribute Data Types. Basic GIS data conversions, conversions from non-spatial formats to spatial formats. Demo of Conversion of Excel to GIS, Demo of Conversion of CAD TO GIS, Demo of Downloading and Geo-referencing Topo sheets and Raster files.
#### Module-5

**Applications and Future trends of Geospatial Technologies:** Application of GIS - Spatial Analysis, Catchment Area delineation, Overlay Analysis, Cluster Analysis, Hotspot Analysis and View shed Analysis. Future Trends of Geospatial Technologies. Case Study 1 -Benefit Realization - Case Study 2 Advancements in Modern Survey & Mapping Technologies, Advancements in Spatial Analytics – Geo Intelligence, Future Trends, Geospatial Technology - Way Forward.

## Course outcome (Course Skill Set)

At the end of the course, the student will be able to :

- 1. Comprehend different geospatial techniques in the Construction Industry.
- 2. Understand the application of geospatial equipment like Total Station, GNSS, LIDAR, UAV (Drones), etc.,
- 3. Evaluate the various spatial analysis operations by using GIS Environment
- 4. Create a map layout with all essential cartographic elements in GIS Environment.
- 5. Illustrate the various geospatial emerging trends of GIS in Industry.

## Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### **Continuous Internal Evaluation:**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

#### **Semester-End Examination:**

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored shall be proportionally reduced to 50 marks

## Suggested Learning Resources:

Books

• T. P. Kanetkar and S. V. Kulkarni, Surveying and Levelling, Parts 1 & 2, Pune Vidyarthi Griha Prakashan, Pune, 2010, 24th edition.

- James M. Anderson and Edward M. Mikhail, Surveying, Theory and Practice, Seventh Edition, McGraw Hill 2001
- Satheesh Gopi, R. Sathikumar, N. Madhu, Advanced Surveying, Total Station GPS and Remote Sensing Pearson education, 2nd Edition, 2017.
- George Joseph and C. Jeganathan, Fundamentals of Remote Sensing, Third Edition Universities Press (India) Private limited, Hyderabad, 2018
- M. Anij Reddy. Textbook of Remote Sensing and Geographical Information systems. BS Publications, 2012.

## Web links and Video Lectures (e-Resources):

E-learning content on L&T EduTech Platform.

## Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ArcGIS Online Open source
- QGIS Open source
- GPS co-ordinates app Open source
- Total Station Demo
- GNSS Demo

Sustainable Design C	Semester	3			
Course Code	CIE Marks	50			
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50		
Total Hours of Pedagogy	40	Total Marks	100		
Credits	03	Exam Hours	3		
Examination type (SEE)	Theory				

#### **Course objectives:**

- To facilitate learners to understand sustainable building designs and its parameters such as energy and water efficiency, Comfort in buildings, and waste management.
- To expose the learners to shading systems, thermal and visual comfort.
- To impart fundamental knowledge on Life cycle assessment and Green ratings and certifications.

#### **Teaching-Learning Process (General Instructions)**

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

- 1. Videos to teach, providing activities and assignments.
- 2. Power Point presentation during online expert sessions.
- 3. Hands-on software exercises through virtual classrooms.

#### Module-1

**Introduction to Sustainability and Climatology:** Overview of Sustainability – Global energy scenario, carbon footprint and climate action, Net zero in carbon offsetting, Water neutral, Sustainable construction and resource management. Green buildings - Selection of site – preservation and planning, Influence of climate on buildings, Basics of climatology, Earth – Sun relationship, Solar angles and sun path diagram, Design of shading systems.

#### Module-2

**Comfort in Buildings:** Thermal comfort – Basics of Thermodynamics, Convection/radiation heat transfer, Heat gain through various elements of a building, Thermal comfort models and case studies Acoustics – Building acoustics, measures, defects and prevention of sound transmission Indoor Air Quality – Effects, design consideration and integrated approach for IAQ management Visual comfort – Enhancement strategies for Daylighting and Artificial

#### Module-3

**Energy, water efficiency and waste management in buildings:** Energy efficiency – Energy efficiency in building envelope and energy efficient HVAC and Lighting as per Energy conservation building code (ECBC) 2017, Energy simulation, Energy management system – Renewable energy and Energy Audit. Water Efficiency – Planning and design of water management system, Rain water harvesting, Water efficient design and fixtures, Treatment and reuse and Water efficient landscape system.

Waste management – Types of waste and its treatment methods, Construction and demolition waste management, Waste management in residential, commercial buildings, healthcare facilities.

#### Module-4

**Life Cycle Assessment of Buildings and Green project management:** Materials – Green product certifications, features of sustainable building materials and sustainable alternatives for structural, envelope and finishing materials. Low carbon cement, Zero emission bricks and lean construction practices. Life cycle assessment and its types – Modelling and Analysis,

Greenhouse gas emission. Different phases of Green building project management.

Module-5

**Sustainable rating systems:** Green building rating systems- LEED, BREEAM and others, Indian Green building rating systems – IGBC & GRIHA. IGBC criteria for certification -site selection credits, pre-design credits, detailed design credits, pre-construction credits, construction credits.

## Course outcome (Course Skill Set)

At the end of the course, the student will be able to :

- 1. Comprehend sustainable design, climatology, shading system and analyze heat transfer mechanism in buildings.
- 2. Assess the design considerations and parameters for thermal comfort, visual comfort, indoor air quality and acoustics.
- 3. Develop solutions for energy efficiency, water efficiency and waste management in buildings.
- 4. Adopt green project management methodology and evaluate building life cycle assessment.
- 5. Implement green practices during construction and operation phase of the buildings for achieving green rating.

## **Assessment Details (both CIE and SEE)**

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

## **Continuous Internal Evaluation:**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

## Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored shall be proportionally reduced to 50 marks

# Suggested Learning Resources:

Books

- 1. HarharaIyer G, Green Building Fundamentals, Notion Press
- 2. Dr. Adv. HarshulSavla, Green Building: Principles & Practices
- 3. IGBC Green new building rating system version 3.0 Abridged reference guide
- 4. The Sustainable Habitat Handbook (6 Volume Set), GRIHA Version 2019
- 5. National Building Code 2016, Volume 1&2, Bureau of Indian Standards
- 6. Energy Conservation Building Code 2017 (with amendments up to 2020), Bureau of Energy Efficiency

## Web links and Video Lectures (e-Resources):

• E-learning content on L&T EduTech Platform.

## Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ECO NIWAS by Ministry of Power, Free Web tool to practice energy conservation
- Roof top solar energy calculator, Free Web tool to calculate solar power available

Fire Saf	Semester	3		
Course Code	BCV306D	CIE Marks	50	
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50	
Total Hours of Pedagogy	40	Total Marks	100	
Credits	03	Exam Hours	03	
Examination type (SEE)	Theory			

#### **Course objectives:**

- To understand the importance fire safety
- To learn various techniques involved in fire safety
- To design fire resistant buildings using proper materials and methods

#### **Teaching-Learning Process (General Instructions)**

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

- 1. The online courses available should be shared with students
- 2. YouTube videos
- 3. Power point presentations
- 4. Visit to fire stations and understand various fire accidents.

## Module-1

Fire: Introduction, Basic concepts of fire protection, Fire as a process of combustion, planning for fire protection, fire resistance Ventilation and fuel controlled fire, process of combustion: flashover condition, effect of fire on construction material, design of fire resistance steel structure, concrete structure

#### Module-2

Fire safety: urban planning, escape and refuge, internal planning, detection and suppression Introduction to lift design, design of lift system, expected stop and floor of reversal, different cases, simulation, arrangements and escalators

#### Module-3

Introduction to flow system: water supply, constant demand, variable demand and diversity factor, control systems Flow in pipe networks and fixture units, design of water supply distribution system, flow in waste water pipes

#### Module-4

Introduction to HVAC: governing equations to HVAC process, numerical problem on HVAC system, psychometric chart, equation based approach Electrical systems: design of electrical systems, intelligent building, life cycle cost and basics of building maintenance, stages of maintenance management, planning for building maintenance, periodicity of maintenance management, estimation of repair cycle, cost profile of maintenance, lamp replacement, building inspection, planned and Ad-hoc maintenance

## Module-5

Condition survey and health evaluation of buildings, diagnosis of building by visual survey, case studies of visual survey, effect of corrosion and alkali aggregate reaction, sampling and choice of test location Non-destructive testing, core strength test, carbonation and chloride measurement, electrical method of progress measurement Repair, rehabilitation, retrofit, periodicity and economics of condition survey, interpretation of test results

#### Course outcome (Course Skill Set)

At the end of the course, the student will be able to :

- 1. Understand types of fire, combustion process and fire resistance
- 2. Plan for fire safety and design of lifts
- 3. Design flow network in buildings
- 4. Design of electrical systems and maintenance
- 5. Perform health evaluation of buildings and suggest remedies

## **Assessment Details (both CIE and SEE)**

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### **Continuous Internal Evaluation:**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

#### Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored shall be proportionally reduced to 50 marks

#### Suggested Learning Resources:

#### Books

- 1. J A Purkiss, Fire Safety Engineering: Design of Structures, ISBN 13 978-8131220085, Elsevier, 2009
- 2. V K Jain, Fire Safety in Buildings, ISBN-13 978-938980219, New Age International Private Limited; Third edition, 2020
- 3. Fire protection, services and maintenance management of building, NPTEL video lecture, IIT, Delhi
- 4. Bureau of Indian Standards, "HAND BOOK OF FUNCTIONAL REQUIREMENTS OF BUILDINGS, (SP-41 & SP- 32)", BIS 1987 and 1989.
- 5. Markus, T.A. & Morris, E.N., "BUILDING CLIMATE AND ENERGY" Pitman publishing limited. 1980.
- 6. Croome, J.D .& Roberts, B.M., "AIR CONDITIONING AND VENTILATION OF BUILDINGS, VOL-1". Pergamon press.
- 7. Building Services Design T.W.MEVER
- 8. Building Engineering & System Design F.S.MERRIT & J. AMBROSE
- 9. SP-35 (1987): Handbook of Water supply & drainage-BIS
- 10. N.B.C.-2007 BIS

- 11. Concept of building fire safety D.EGAN.
- 12. Design of fire resisting structures H.L. MALHOTRA.

## List of reference materials/books/

- 1. An introduction to fire dynamics -D.DRYSDALE
- 2. Structural fire protection Edt by T.T.LIE
- 3. Elevator technology G.C.BARNEY
- 4. HEATING VENTILATING AND AIR CONDITIONING Analysis and Design Faye C. McQuiston and Jerald D. Parker.
- 5. Building Maintenance Management-R.LEE
- 6. Developments In Building Maintenance -I.EJ. GIBSON

7. Concrete Structures: materials, Maintenance And Repair D.CAMPBELL, ALLEN & H.ROPER

## Web links and Video Lectures (e-Resources):

• • https://archive.nptel.ac.in/courses/105/102/105102176/

## Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

• Assignment students: A case study of fire hazard in building and restoration procedure adopted

# Template for Practical Course and if AEC is a practical Course Annexure-V

	Data analy	tics with Excel	Semester	3						
Course	Code	BCV358A	CIE Marks	50						
Teachi	ng Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks	50						
Credits		Exam Hours	100							
Examination type (SEE) practical										
Course	e objectives:									
<ul> <li>Understand the use of Spreadsheet for data collection and analysis.</li> </ul>										
Evaluate the equations using Excel functions										
Learn the data quality and consistency of data										
SI.NO		Experiments								
1	Introduction to Data Analysis	Using Spreadsheets: Fundamentals of	spreadsheet applicatio	ons, Excel						
	interface, and learn how to nav	rigate around a worksheet and workbook.	,							
2	Using Excel Spreadsheets: P	erform basic spreadsheet tasks, such as	s viewing, entering ar	nd editing						
	data, and moving, copying and	I filling data. Learn about the fundament	als of formulas, and le	earn about						
	the most common functions u	sed by a data analyst. Finally, you will	learn how to reference	ce data in						
	formulas.									
3	Cleaning & Wrangling Data U	Jsing Spreadsheets: Importance of data	quality, how to impor	t file data						
	in to Excel, fundamentals of c	lata privacy, remove duplicate and inacc	curate data, and how t	to remove						
	empty rows in your data									
4	How to deal with inconsisten	cies in your data and how to use the F	lash Fill and Text to	Columns						
	features to help you manipulate	e and standardize your data								
5	Analyzing Data Using Spreads	sheets: Fundamentals of analyzing data us	sing a spreadsheet, and	l learn						
	how to filter and sort data. Lea	rn how to use some of the most useful fu	nctions for a data anal	vst						
6	How to use the VLOOKUP an	d HLOOKUP reference functions. In add	dition, learn how to cr	eate pivot						
	tables in Excel, and use severa	l pivot table features		_						
7	Final Project: In this final mod	lule, you will be introduced to a hands-or	n lab where you will c	omplete a						
	graded assignment for clear	ning and preparing data, and then ar	nalyzing data using	an Excel						
	spreadsheet.									
8	Submission of report for final	assessment								
Course	outcomes (Course Skill Set):									
At the e	end of the course the student will	be able to:								
•	Prepare the data sets and perfor	rm the analysis.								
•	Analyse and perform repetitive	calculations using several functions								
•	Design and apply solutions to verify the data sets									

# Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

# **Continuous Internal Evaluation (CIE):**

CIE marks for the practical course are **50 Marks**.

The split-up of CIE marks for record/ journal and test are in the ratio **60:40**.

- Each experiment is to be evaluated for conduction with an observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments are designed by the faculty who is handling the laboratory session and are made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to **30 marks** (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct a test of 100 marks after the completion of all the experiments listed in the syllabus.
- In a test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The marks scored shall be scaled down to **20 marks** (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

# Semester End Evaluation (SEE):

- SEE marks for the practical course are 50 Marks.
- SEE shall be conducted jointly by the two examiners of the same institute, examiners are appointed by the Head of the Institute.
- The examination schedule and names of examiners are informed to the university before the conduction of the examination. These practical examinations are to be conducted between the schedule mentioned in the academic calendar of the University.
- All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. **OR** based on the course requirement evaluation rubrics shall be decided jointly by examiners.

- Students can pick one question (experiment) from the questions lot prepared by the examiners jointly.
- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.

General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)

Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero.

The minimum duration of SEE is 02 hours

#### Suggested Learning Resources:

- <u>https://www.coursera.org/learn/excel-basics-data-analysis-ibm</u>
- Any online platform with the above course content like YouTube videos and NPTEL courses

Smart Urban	Infrastructure	Semester	3						
Course Code BCV358B CIE Marks 50									
Teaching Hours/Week (L: T:P: S)	SEE Marks	50							
Total Hours of Pedagogy	Total Marks	100							
Credits 01 Exam Hours									
Examination type (SEE)	Theory								
Course objectives: • Knowing about Urban Infrastru • Knowing about Smart Cities Ke • Understand the Transport and • Developing Feasibility Studies • Understand the Global Context	ucture Systems & their Management by Concepts Energy Smart Urban Infrastructure and Se for Smart City Services of Smart Cities	rvices							
<ul> <li>Teaching-Learning Process (General These are sample Strategies, which teac outcomes.</li> <li>1. You Tube videos and online stu</li> <li>2. PPT.</li> <li>3. Assignments and quiz to explore</li> </ul>	Instructions) chers can use to accelerate the attainment ady material re more on smart cities	of the various cou	rse						
	Module-1								
Introduction to Smart Urban Infra	structures and Smart Cities: Introduc	ction to smart of	city, Basic						
concept of developing smart city	, Global standards to create smart c	ity. Different o	conceptual						
approaches to Smart Cities and dis	cussing the pros and cons of each app	roach.							
Smart urban Infrastructure: List of	infrastructure facilities, advantages an	nd disadvantage	2 <b>S</b> .						
	Module-2								
Smart Urban Energy Systems: Introduction to Smart Energy Systems, Government policy and technology. Energy sector to explore some of the most important managerial considerations in the transition phase and operation of Smart Urban Energy Systems.									
	Module-3								
Smart Transportation Technolog transport systems for smart city, opportunities and threads for legar	ies: Introduction to smart transport data collection to arrive at best trans cy urban transportation systems. Man	ation system, port facility. Si agerial consider	Mode of gnificant rations to						

facilitate the transition phase, and operation of Smart Urban Transportation Systems

#### Module-4

Towards Smart Cities: Important factors in the transition phase of legacy cities to Smart cities and their managerial implications.

#### Module-5

Towards Smart Cities: Management of Smart Cities calls for different approaches from conventional urban management approaches. The role of city government in the network of actors who play an important role in management of Smart Cities.

#### Course outcome (Course Skill Set)

At the end of the course the student will be able to:

- 1. Understand the concept of smart city
- 2. Play the role of a civil engineer in providing smart infrastructure
- 3. Design efficient energy system for smart city
- 4. Analyse and design efficient transport system

#### Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### **Continuous internal Examination (CIE)**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

#### Semester End Examinations (SEE)

SEE paper shall be set for 50 questions, each of the 01 marks. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is **01 hour.** The student has to secure a minimum of 35% of the maximum marks meant for SEE.

#### OR

MCQ (Multiple Choice Questions) are preferred for 01 credit courses, however, if course content demands the general question paper pattern that followed for 03 credit course, then

- 1. The question paper will have ten questions. Each question is set for 10 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module may or may not have the sub-questions (with maximum sub-questions of 02, with marks distributions 5+5, 4+6, 3+7).

The students have to answer 5 full questions, selecting one full question from each module. Suggested Learning Resources:

Books

- 1. Infrastructure for Smart Cities, Dr. R P Rathaliya, Shree Hari Publications, 2021
- 2. Building Smart Cities, ISBN-13 978-1032340128, by Carol L. Stimmel, 2022
- 3. Smart Cities for Sustainable Development, Ram Kumar Mishra, Ch Lakshmi Kumari, Sandeep Chachra, P.S. Janaki Krishna, Springer, ISBN-13 978-9811674099, 2022

#### Web links and Video Lectures (e-Resources):

<u>https://www.coursera.org/learn/smart-cities</u>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

•

# TEMPLATE for AEC (if the course is a theory) Annexure-IV

Problem Solvir	g with PYTHON	Semester	3					
Course Code BCV358C CIE Marks								
Teaching Hours/Week (L: T:P: S)	0:2:0:0	SEE Marks	50					
Total Hours of Pedagogy	15	Total Marks	100					
Credits	01	Exam Hours	1					
Examination type (SEE) Theory								
Examination type (SEE)       Theory         Course objectives:       To understand why Python is a useful scripting language for developers.         • To read and write simple Python programs       To learn how to identify Python object types.         • To learn how to write functions and pass arguments in Python.         Teaching-Learning Process (General Instructions)         These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.         1. Black board and PPT.         2. Use of Video/Animation to explain functioning of various concepts.         3. Encourage collaborative (Group Learning) Learning in the class.         4. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.         5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze								
	Module-1							
Introduction to Python: Installing	Python and Python packages, Manag	ing virtual envi	ronments					
with venv module Introduction	to NumPy arrays:Array creation,	indexing, da	ta types,					
broadcasting, copies and views, un	niversal functions, I/O with NumPy							
	Module-2							
Introduction to NumPy and SciPy:NumPy subpackages– linalg, fft, random, polynomials, SciPy subpackages– linalg, fftpack, integrate, interpolate, optimize Introduction to Matplotlib: Plotting 2D graphs with Matplotlib, annotations, legend, saving plots to file, bar and pie charts, line plots.								
	Module-3							
Linear algebra using NumPy and	SciPy:Solving linear simultaneous	equations using	g NumPy					
and SciPy using numpy.linalg a	nd scipy.linalg – solve, inverse, de	eterminant, leas	st square					
solution, Linear algebra using N	umPy and SciPy (continued): Deco	mposition usin	g lu and					
cholesky. Solving eigenvalue pr scipy.linalg – eig, eigvals.	oblems using NumPy and SciPy:U	Jsing numpy.li	nalg and					
	Module-4							

Solving initial value problems for ODE systems using scipy.integrate subpackage – solve\_ivp, RK45, LSODA. Numerical integration of functions using SciPy:Using scipy.integratesubpackage– Definite integral using Gaussian quadrature – quad and quadrature Numerical integration of fixed samples using scipy.integratesubpackage– Trapezoidal rule trapezoid, Simpson's 1/3 rule using Simpson, Romberg integration romb.

## Module-5

Determining roots of equations using SciPyusing scipy.optimizesubpackage– Bisection method bisect, Brent's method brentq, Newton-Raphson method newton. Symbolic computing using SymPy and solving civil engineering problems using SymPy: Introduction, defining symbols, derivatives, integrals, limits, expression evaluation, expression simplification, solving equations, solving differential equations.

## Course outcome (Course Skill Set)

At the end of the course the student will be able to:

- 1. Understand Python syntax and semantics and be fluent in the use of Python flow control and functions.
- 2. Demonstrate proficiency in handling Strings and File Systems.
- 3. Represent compound data using Python lists, tuples, Strings, dictionaries.
- 4. Read and write data from/to files in Python Programs

## Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### **Continuous internal Examination (CIE)**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

# Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

#### Semester End Examinations (SEE)

SEE paper shall be set for 50 questions, each of the 01 marks. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is **01 hour.** The student has to secure a minimum of 35% of the maximum marks meant for SEE.

#### OR

MCQ (Multiple Choice Questions) are preferred for 01 credit courses, however, if course content demands the general question paper pattern that followed for 03 credit course, then

- 1. The question paper will have ten questions. Each question is set for 10 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module may or may not have the sub-questions (with maximum sub-questions of 02, with marks distributions 5+5, 4+6, 3+7).
- 3. The students have to answer 5 full questions, selecting one full question from each module.

#### Suggested Learning Resources: Books

- 1. R. Nageswara Rao, "Core Python Programming", dreamtech
- 2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

# 3. 3. Python Programming, Reema theraja, OXFORD publication

## Web links and Video Lectures (e-Resources):

- NumPy documentation at https://numpy.org/doc/
- SciPy documentation at https://docs.scipy.org/doc/scipy/
- Matplotlib documentation at <u>https://matplotlib.org/stable/users/index</u>
- SymPy documentation at https://docs.sympy.org/latest/index.html.

## Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

• Real world problem solving: Demonstration of projects developed using python language

Personality Developn	Semester	3			
Course Code	BCV358D	CIE Marks	50		
Teaching Hours/Week (L: T:P: S)	1:0:0:0	SEE Marks	50		
Total Hours of Pedagogy	15	Total Marks	100		
Credits	01	Exam Hours	1		
Examination type (SEE)	Theory				

#### **Course objectives:**

- To offer placement focused guidance across interview best practices, formal communication, and business etiquette
- To give learners a comprehensive understanding of job skills and knowledge that are essential for adapting to changes in workplace

#### **Teaching-Learning Process (General Instructions)**

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

**1.** .

#### Module-1

**LSRW and Personality Development:** Importance of LSRW Skills: Art of listening-Listening comprehension – Art of Speaking – Art of Reading – Reading comprehension – Art of Writing – email writing Personality Development: Emotional Intelligence – Self Awareness – Self Management – Personal SWOT – Manners & Etiquette – Positive Attitude – Confidence building Interpersonal Skills: Active Listening – Motivation – Flexibility – Patience – Dependability – Adaptability – Interpersonal & Intrapersonal skills – Body Language

#### Module-2

**NVC, Presentation and Teamwork:** Non – Verbal Communication: Body language – Gestures – Postures – Eye contact – Hand Shake – First impression – Proxemics – Facial Expressions Presentation Skills: 4P's of Presentation – Communicating with Credibility – Audience analysis and Building Rapport – Usage of Figures, diagrams & Charts – Presenting with Confidence – Body Language in Presentation Teamwork: What is a Team - Stages of a Team – Benefits of Team work & Collaboration – Group vs Team – Types of Teams – Roles of

#### Module-3

**Etiquette and Management:** Critical Thinking & Problem Solving: Core Skills – Uses & Importance of Critical Thinking – Principles of Critical Thinking – Facts about Problem Solving – Skills to use in Problem Solving - Problem Solving Process – Barriers to Problem Solving Time Management: Managing your time – Time wasters – Analyzing your Strengths and weakness – Goal Setting – Why Goal Setting is important - SMART Goals – Types of Goals Business Etiquette: Types of Etiquette – Importance of Etiquette – Meeting Etiquette – Office Etiquette – Phone and email Etiquette – Work Place Etiquette

#### Module-4

**Leadership:** Leadership Skills: What makes an effective Leader – Relationship Building – Leader vs Boss – Decision Making Skills – Innovation & Motivation – Dependability Business Writing – How to improve your Business writing skills – Importance of Business writing – how to write effectively – 5C's of Business writing – 4 types of Business writing Conflict Management: Strategies of Conflict Management – Best practices for Conflict Resolution – Stress Management - Learn to say No - Importance of Conflict Management at Work Place

#### Module-5

**V GD, Creativity and Psychometry:** Group Discussion: Types of GD – Attitude & being Proactive – Time management & how to stick to it – Importance of Listening - Do's & Don'ts Creativity & Innovation: What is Creativity – What is Innovation – Difference between Creativity & Innovation – Categories and misconception of Creativity Psychometric Analysis: What is Psychometric Analysis – Cognitive Skills – Importance of Personality Tests – Personality Profiling

#### Course outcome (Course Skill Set)

At the end of the course the student will be able to:

- 1. Use English as a medium of communication in interviews and in any professional working environment proficiently
- 2. Develop necessary skills to Answer common interview questions, express confidence in body language and present with clarity

## Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### **Continuous internal Examination (CIE)**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

# Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

#### Semester End Examinations (SEE)

SEE paper shall be set for 50 questions, each of the 01 marks. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is **01 hour.** The student has to secure a minimum of 35% of the maximum marks meant for SEE.

OR

MCQ (Multiple Choice Questions) are preferred for 01 credit courses, however, if course content demands the general question paper pattern that followed for 03 credit course, then

- 1. The question paper will have ten questions. Each question is set for 10 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module may or may not have the sub-questions (with maximum sub-questions of 02, with marks distributions 5+5, 4+6, 3+7).
- 3. The students have to answer 5 full questions, selecting one full question from each module.

#### Suggested Learning Resources:

Books

- 1. Personality Development And Soft Skills, Barun K Mitra, 2<sup>nd</sup> edition, Oxford University Press, 2016
- 2. Power of Positive thinking, Norman Vincent Peale, ISBN-13 978-0091906382, RHUK, 2016
- 3. Magic of thinking Big, David J Schwartz, ISBN-13 978-1785040474, Vermilion, 2016

#### Web links and Video Lectures (e-Resources):

• NPTEL videos.

#### Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Select a topic and write an essay
- Conduct group discussion

Analysis	of Structures	Semester	IV							
Course Code	BCV401	CIE Marks	50							
Teaching Hours/Week (L: T:P: S)	03	SEE Marks	50							
Total Hours of Pedagogy	3:0:0:0	Total Marks	100							
Ureality     U3     Exam Hours     U3       Examination type (SEE)     Theory / practical /Viva-Vace / Term-work /Others										
• Understand the Different	his course will enable students to Forms of Structural Systems.	,								
<ul> <li>Determine the Strain Energy and Slope and Deflection of Beams, Trusses and Frames.</li> <li>Analyse arches and cable structures.</li> <li>Analyse different types of beams and frames using slope deflection method.</li> <li>Analyse different types of beams and frames using moment distribution method.</li> </ul>										
<b>Teaching-Learning Process</b> ( These are sample Strategies; w	General Instructions) hich teacher can use to accelerate the	attainment of the va	arious							
course outcomes.										
1. Apart from conventional le	cture methods various types of innova	tive teaching techn	iques							
through videos, animation	films may be adopted so that the de	elivered lesson can	progress							
the students in theoretical,	applied and practical skills.									
2. Arrange field visits to give	brief information about the water and	wastewater treatme	nt plant.							
3. Encourage collaborative (C	broup Learning) Learning in the class.									
4. Ask at least three HOTS (	Higher-order Thinking) questions in	the class, which pre-	omotes							
critical thinkingand enhance	te the knowledge of treatment process	es.								
5. Adopt Problem Based Lear	ning (PBL), which fosters students, A	nalytical skills, dev	elop							
thinking skills suchas the	ability to evaluate, generalize, and a	analyze information	rather							
than simply recall it.										
6. Seminars, surprise tests an	d Quizzes may be arranged for studen	nts in respective sul	bjects to							
develop skills										
	Module-1									
Introduction and Analysis of Compatibility conditions, Deg kinematic indeterminacies of s Analysis of determinate tr L1,L2,L3	Plane Trusses: Structural forms, C gree of freedom, Linear and nonlin tructural systems, Types of trusses, usses by method of joints and	Conditions of equili- near analysis, Stat Assumptions in ar d method of se	ibrium, ic and nalysis, ections.							

## Module-2

**DEFLECTION OF BEAMS: Moment area method:** Derivation, Mohr's theorems, sign convention; Application of moment area method to determinate prismatic beams, beams of varying cross section; Use of moment diagram by parts.

**Strain Energy:** Principle of virtual displacements, Principle of virtual forces, Strain energy and complimentary energy, Strain energy due to axial force, bending, shear and torsion (No numerical). Castigliano's theorems, application of Castigliano's theorems to calculate deflection of beams, trusses and frames (No numerical on unit load method).

Module-3

Arches and Cable Structures: Three hinged parabolic arches with supports at the same anddifferent levels. Determination of normal thrust, radial shear and bending moment. Analysis ofcables under point loads and UDL. Length of cables for supports at same and at differentlevels-Stiffeningtrussesforsuspensioncables.L1,L2,L3

Module-4

**Slope Deflection Method:** Introduction, sign convention, development of slope deflection equation; Analysis of continuous beams including settlement of supports; Analysis of orthogonal rigid plane frames including sway frames with kinematic indeterminacy up to 3 L1,L2,L3,L4

#### Module-5

**Moment Distribution Method:** Introduction, Definition of terms, Development of method, Analysis of continuous beams with support yielding, Analysis of orthogonal rigid plane frames including sway frames with kinematic indeterminacy up to 3 L1,L2,L3,L4

## Course outcome (Course Skill Set)

At the end of the course, the student will be able to:

- 1. identify the different forms of structural systems and analyse the trusses.
- 2. Evaluate the slope and deflections in beams, frames and trusses by using moment area method and energy principle.
- 3. Analyse and determine the stress resultants inarches and cables.
- 4. Analyse the indeterminate structures and construct BMD AND SFD using slope deflection methods.
- 5. Analyse the indeterminate structures and construct BMD AND SFD using Moment Distribution Method.

## Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). The student is declared as a pass in the course if he/she secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

## **Continuous Internal Evaluation:**

- There are 25 marks for the CIE's Assignment component and 25 for the Internal Assessment Test component.
- Each test shall be conducted for 25 marks. The first test will be administered after 40-50% of the coverage of the syllabus, and the second test will be administered after 85-90% of the coverage of the syllabus. The average of the two tests shall be scaled down to 25 marks
- Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the course shall be planned. The schedule for assignments shall be planned properly by the course teacher. The teacher should not conduct two assignments at the end of the semester if two assignments are planned. Each assignment shall be conducted for 25 marks. (If two assignments are conducted then the sum of the two assignments shall be scaled down to 25 marks)
- The final CIE marks of the course out of 50 will be the sum of the scale-down marks of tests and assignment/s marks.

# Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

#### Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored shall be proportionally reduced to 50 marks

## Suggested Learning Resources:

#### Books

- 1. Reddy, C.S., Basic Structural Analysis, 3 rd. ed., Tata McGraw-Hill Education Pvt. Ltd., New Delhi, 2011.
- 2. Hibbeler, R.C., Structural Analysis, 9 th edition., Pearson publications., New Delhi, 2012.
- 3. Thandavamoorthy, T.S., Structural Analysis, 6 th edition., Oxford University press., New Delhi, 2015.
- 4. L S Negi and R S Jangid, "Structural Analysis", Tata McGraw-Hill Publishing Company Ltd.
- 5. D S Prakash Rao, "Structural Analysis: A Unified Approach", Universities Press 4
- 6. K.U. Muthu and H. Narendra, "Indeterminate Structural Analysis", IK International Publishing Pvt. Ltd.
- 7. Gupta S P, G S Pundit and R Gupta, "Theory of Structures", Vol II, Tata McGraw Hill Publications company Ltd.
- 8. V N Vazirani and M M Ratwani, "Analysis of Structures", Vol. 2, Khanna Publishers
- 9. Wang C K, "Intermediate Structural Analysis", McGraw Hill, International Students Edition. S. Rajashekhara and G. Sankarasubramanian, "Computational Structural Mechanics", PHI Learning Pvt. Ltd.,
- 10. S S Bhavikatti, structural analysis, vikas publishing house pvt.ltd., new Delhi
- 11. S Ramamrutham and R Narayanan, Theory of structures , Dhanpat Rai Publishing Company.

#### Web links and Video Lectures (e-Resources):

- https://nptel.ac.in/courses/105105166
- <u>https://nptel.ac.in/courses/105105166</u>
- <u>https://nptel.ac.in/courses/105105166</u>
- <u>https://nptel.ac.in/courses/105105109</u>
- <u>https://nptel.ac.in/courses/105105109</u>
- <u>https://nptel.ac.in/courses/105105109</u>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Seminars /Quiz (to assist in GATE preparations)
- Demonstrations in using Softwares
- Self-Study on simple topics
- Simple problems solving by Etabs/Staad pro.

## <u>CO & PSO - PO Mapping</u> (Individual Teacher has to fill)

Mapping of Course Outcomes and Program specific outcomes to Program Outcomes																
Course		Program outcomes													cific	
outcomes	PO	РО	PO	PO	PO	PO	PO	PO	PO	PO	РО	РО	PSO	PSO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
CO1																
CO2																
CO3																
CO4																
CO5																
Total																
Average																
Ι σνοΙ Λ	• Not	Mani	hor	1. I	ow M	lanna	h	2.1	Mode	ratals	7 Man	nod	3. H	iahly N	Iannod	

Level 0: Not Mapped, 1: Low Mapped, 2: Moderately Mapped 3: Highly Mapped

**Note**: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.

FLUID MECHANICS A	Semester	IV							
Course Code	BCV402	CIE Marks	50						
Teaching Hours/Week (L:T:P: S)	3:0:2:0	SEE Marks	50						
Total Hours of Pedagogy	40 + 8-10 Lab slots	Total Marks	100						
Credits	04	Exam Hours	3						
Examination nature (SEE)	Theory/Practical								
Course Learning objectives: This course will enable students to									

- Understand the Fundamentals of properties of fluids, fluid pressure measurement and hydrostatic law
- Learn the Principles of kinematics, hydrodynamics and its applications
- Study the Flow measurements and design of pipes
- Understand the design of open channels and energy concepts
- Understand the Working principles of hydraulic turbines and pumps

## **Teaching-Learning Process (General Instructions)**

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

- 1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills.
- 2. Arrange field visits to give brief information about the water and wastewater treatment plant.
- 3. Encourage collaborative (Group Learning) Learning in the class.
- 4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking and enhance the knowledge of treatment processes.
- 5. Adopt Problem Based Learning (PBL), which fosters students, Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
- 6. Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills.

## **MODULE-1**

Fluids and their properties – compressibility, surface tension, capillarity, Pascal's law, hydrostatic law, fluid pressure measurement using simple and differential manometers, Total pressure and center of pressure on vertical and inclined plane surfaces. L2,L3

#### **MODULE-2**

Kinematics- Types of flow, continuity equation in Cartesian coordinates, velocity potential, stream function, flow nets, Dynamics-Euler's equation of motion, Bernoulli's equation, Application-Venturimeter, Orifice meter, Pitot tube.

## MODULE-3

Classification of orifice and mouthpiece, hydraulic coefficients, discharge over rectangular, triangular and Cipoletti notch, Flow through pipes- major and minor losses, pipes in series and parallel, equivalent pipe, concept of water hammer and surge tanks. L2,L4

## **MODULE-4**

Open channel hydraulics- classification of flow, Most economical channel sections-rectangular, triangular, trapezoidal, circular, Uniform flow, specific energy-rectangular channels, on-uniform flow, hydraulic jump-equation and applications, GVF equation-types. L2,L4

## **MODULE-5**

Momentum equation, impact of jet on stationary and moving curved vanes Turbines-types, Pelton wheel-working proportions, velocity triangles Francis turbine- working proportions, velocity triangles Centrifugal pumps-work done, efficiency, multi-stage pumps. L2,L4

PRACTICA	AL COMPONENT OF IPCC (May cover all / major modules)	
Sl.NO	Experiments	
1	Verification of Bernoulli's equation	L1,L2
2	Calibration of Venturimeter/Orifice meter	L1,L2
3	Determination of hydraulic coefficients of small vertical orifice	L1,L2
4	Calibration of triangular notch	L1,L2
5	Determination of Cd for Cipoletti notch	L1,L2
6	Determination of major losses in pipes	L1,L2
7	Determination of Cd for ogee/broad crested weir	L1,L2
8	Determination of efficiency of jet on flat and curved vanes	L1,L2
9	Determination of Cd of Venturiflume	L1,L2
10	Demo of determination of efficiency of centrifugal pump	L1,L2
11	Demo of determination of efficiency of Francis/Kaplan turbine	L1,L2
12	Demo of determination of efficiency of Pelton wheel	L1,L2
Course	autaamaa (Cauraa Sizill Sat).	

**Course outcomes (Course Skill Set):** At the end of the course, the student will be able to:

- Explain the fundamental properties of fluids and solve problems on fluid pressure and hydrostatics.
- Apply the principles of kinematics and dynamics of fluid flow to solve problems on velocity and pressure.
- Compute the discharge through pipes, notches and weirs.
- Design the turbines and open channels of different sections and to estimate the energy loss in hydraulic jump.
- Able to interpret the experimental results of discharge, efficiency based on the test conducted in the laboratory.

## Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

## CIE for the theory component of the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.
- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks)**.

• The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC. **CIE for the practical component of the IPCC** 

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test (duration 02/03 hours) after completion of all the experiments shall be conducted for 50 marks and scaled down to 10 marks.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.

• The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC. **SEE for IPCC** 

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored by the student shall be proportionally scaled down to 50 Marks

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

#### Suggested Learning Resources: Books:

## Text Books:

- 1. P.N. Modi and S.M. Seth-Hydraulics and Fluid Mechanics, including Hydraulic machines, standard Book House, New Delhi
- 2. K Subramanya- Fluid Mechanics and Hydraulic Machines, Tata McGraw-Hill, New Delhi
- 3. R.K. Bansal- A text book of Fluid Mechanics and Hydraulic Machines- Laxmi Publications, New Delhi
- 4. Victor L. Streeter, Benjamin Wyile E and Keith W. Bedford- Fluid Mechanics, Tata McGraw Hill publishing Co Ltd, New Delhi
- 5. J.F. Douglas. M. Gastric, John Warfield, Lynne Jack Fluid Mechanics, Pearson, Fifth edition.
- 6. K. Subramanya- Fluid Mechanics and Hydraulic Machines, Problems and Solutions, Tata McGrawhill, New Delhi.
- 7. S K SOM and G.Bis was " introduction to Fluid Mechanics and Fluid Machines, Tata Mcg raw Hill, New Delhi.

#### Web links and Video Lectures (e-Resources):

• YouTube Videos

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning:

- Visit to hydro- electric power plant
- Visit to sites to visualise the flow measuring devices, viz., weirs, spillways, etc.

<u></u>	<u>co a 100 - 10 mapping (individual reacter llas to lin)</u>															
	Mapping of Course Outcomes and Program specific outcomes to Program Outcomes															
Course		Program outcomes													cific	
outcomes	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
CO1																
CO2																
CO3																
CO4																
CO5																
Total																
Average																
Level 0	: Not	Map	ped,	1: L	ow N	lappe	ed,	<b>2:</b> I	Mode	rately	v Map	ped	3: H	ighly N	lapped	

## CO & PSO - PO Mapping (Individual Teacher has to fill)

**Note**: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.

TRANSPORTA	Semester								
Course Code	CIE Marks	50							
Teaching Hours/Week (L:T:P: S)	ng Hours/Week (L:T:P: S) 3:0:2:0								
Total Hours of Pedagogy	40 hours Theory + 8-10 Lab slots	Total Marks	100						
Credits	04	Exam Hours							
Examination nature (SEE)	Theory								
<b>Course Learning objectives:</b> This course will enable students to									

- Gain knowledge of different modes of transportation systems and to learn the introductory concepts on Highway Engineering.
- Get insight to different highway materials and pavement design elements of a highway network.
- Realize the significance of road safety by incorporating the concepts of Traffic Engineering.
- Understand to different aspects of geometric elements of railway system and evaluate the material quantity required for track laying
- Gain knowledge about various components of an Airport and its runway design.

## **Teaching-Learning Process (General Instructions)**

These are sample Strategies; which teacher can use to accelerate the attainment of the various

course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques

through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills.

- 2. Arrange field visits to give brief information about the water and wastewater treatment plant.
- 3. Encourage collaborative (Group Learning) Learning in the class.
- 4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinkingand enhance the knowledge of treatment processes.
- 5. Adopt Problem Based Learning (PBL), which fosters students, Analytical skills, develop ability to evaluate, generalize, and analyze information rather than thinking skills such as the simply recall it.
- 6. Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills

## **MODULE-1**

TRANSPORTATION ENGINEERING: Introduction, Different Modes of Transportation, M R Jayakar Committee recommendations, Road Classifications and Road Patterns.

Highway Alignment: Factors affecting highway alignment, Engineering surveys for alignmentconventional and modern methods.

Highway Geometric Design: Factors affecting geometric design of roads, Cross Sectional Elements, Sight distances, Horizontal alignment- Transition curve, superelevation, Extrawidening, Vertical alignment-gradients, summit and valley curves. (No derivations)

Problems on Sight distance, Super elevation, extra widening of curves, Length of transition curve, Length of summit and valley curve. (L1, L2)

## **MODULE-2**

HIGHWAY MATERIALS AND PAVEMENTS: Desirable properties of aggregates, soil subgrade & Bitumen, Application of bituminous emulsion, Desirable properties of Bituminous Mixes

Pavement Design: Factors Controlling design of highway pavements, Pavement types, component parts of pavements and their functions; types of joints used in rigid pavement. Critical stresses in flexible and rigid pavement.

Highway Drainage: Significance and requirements, Surface drainage system and design-Examples, sub surface drainage system, Types of cross drainage structures their choice and location.

Problems on design of Longitudinal drain.

(*L2*, *L3*)

## **MODULE-3**

TRAFFIC ENGINEERING: Objectives and scope of Traffic Engineering. Traffic Characteristics: Road user characteristics, vehicular characteristics – static and dynamic characteristics, Reaction time of driver and PIEV theory, Types of traffic engineering studies-volume, spot speed, speed and delay, parking, accident, origin & destination, objectives of studies and data collection, method of study, analysis. PCU concept, factors affecting and PCU at different locations and applications. Traffic signs, Signal design by IRC method; Types of intersections.

Problems on Spot speed studies, Speed and delay studies, accident studies, Signal design by IRC method. (L2, L3)

#### **MODULE-4**

RAILWAY ENGINEERING: Permanent way and its requirements, Gauges and types, Typical cross sections single and double-line BG track, Coning of wheels and tilting of rails, Rails-Functions-requirements, types and defects of rails. Sleepers and Ballast: Functions, requirements, Track fitting and fasteners, Calculation of quantity of materials required for laying a track, Points & crossings, Railway Station and Yards. Metro train & high speed train- Design factors considered.

Problem on Quantity calculation for laying railway track. Super-elevation (L1, L2)

## **MODULE-5**

AIRPORT ENGINEERING: Layout of an airport with component parts and functions, Site selection for airport, Aircraft characteristics affecting the design and planning of airport, Airport classification, Runway orientation using wind rose with examples.

RUNWAY-Basic runway length-Corrections and examples, Runway geometrics, Taxiway-Factors affecting the layout - geometrics of taxiway-Comparison between Runway and Highway, Design of exit taxiway with examples.

Problems on Runway orientation, Basic Runway length, Exit taxiway design. (L2, L3)

**PRACTICAL COMPONENT OF IPCC** (*May cover all / major modules*)

SI.	Experiments (8-10 Lab slots)								
<u>NU</u>	Tests on Aggregates								
1	a. Crushing Strength Test b. Los Angeles abrasion test c. Impact test								
	d. Shape tests (combined index and angularity number) (L1, L2)								
2	Tests on Bituminous Materials								
	a. Penetration test b. Ductility test c. Softening point test d. Specific gravity test e. Viscosity								
	test by tar viscometer f. Flash and fire point test (L1,								
	L2)								
3	Tests on Soil								
	a. Wet sieve analysis b. CBR Test on soil (L1, L2)								
4	Design of flexible pavement as per IRC 37-2018 (L2, L4)								
5	Design of Rigid pavement as per IRC 58-2015 (L3, L4)								
6	Bituminous Mix Design by Marshall Method (Demonstration only) (L1,								
	L2)								
7	Traffic Engineering studies(L3, L4)								
Cours	se outcomes (Course Skill Set):								
At the	e end of the course, the student will be able to:								
	1. Explain the basic principles of geometric design in the context of transportation								
	2 Select the appropriate payament materials for construction and design the payament as par								
	2. Select the appropriate pavement materials for construction and design the pavement as per standard practices								
	3 Conduct traffic studies and analyse traffic data for practical applications								
	4 Identify the Components parts of Railway Track and design the suitable runway for an								
	Airport.								
	5. Able to interpret the experimental results of highway materials based on laboratory tests								
	and design the pavement as per IRC guidelines.								
Asses	sment Details (both CIE and SEE)								
The w	veightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is								
50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50)									
and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A									
student shall be deemed to have satisfied the academic requirements and earned the credits allotted to									
each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total									
of the	CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.								
CIE f	or the theory component of the IPCC (maximum marks 50)								
• IP	CC means practical portion integrated with the theory of the course.								
• CI	E marks for the theory component are <b>25 marks</b> and that for the practical component is <b>25</b>								
m	arks.								
• 25	marks for the theory component are split into 15 marks for two Internal Assessment Tests								

• 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.

- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks**).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

## CIE for the practical component of the IPCC

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test (duration 02/03 hours) after completion of all the experiments shall be conducted for 50 marks and scaled down to 10 marks.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

# SEE for IPCC

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scoredby the student shall be proportionally scaled down to 50 Marks

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

# Suggested Learning Resources:

Books

- 1. S K Khanna and C E G Justo, "Highway Engineering", Nem Chand Bros, Roorkee.
- 2. L R Kadiyali, "Highway Engineering", Khanna Publishers, New Delhi.
- 3. "A Text Book of Railway Engineering" by S C Saxena and S P Arora
- 4. "Airport Engineering" by S C Rangwala
- 5. "Airport Planning and Design" by Khanna Arora and Jain, Nem Chand Bros, Roorke.
- 6. "Roads, Railways, Bridges, Tunnels and Harbour Dock Engineering by B L Gupta, Amit Gupta.
- 7. S K Khanna, C E G Justo and A Veeraragavan, "Highway Materials Testing Laboratory Manual", Nem Chand Bros, Roorkee.

## Web links and Video Lectures (e-Resources):

- 1. https://nptel.ac.in/courses/105101087
- 2. <u>https://onlinemanuals.txdot.gov/txdotmanuals/rdw/horizontal\_alignment.htm#BGBHGEGC</u>
- 3. <u>www.civil.iitb.ac.in/tvm/1111\_nptel/567\_Grade/plain/plain.html</u>
- 4. <u>https://www.pavementinteractive.org/</u>
- 5. <u>https://www.eng.auburn.edu/research/centers/ncat/research/other-publications.html</u>
- 6. <u>https://nptel.ac.in/courses/105/106/105106203/</u>
- 7. <u>https://nptel.ac.in/courses/105/101/105101008</u>
- 8. https://nptel.ac.in/courses/105/104/105104098
- 9. <u>https://www.classcentral.com/course/edx-intro-to-traffic-flow-modeling-and-intelligenttransport-systems-12728</u>
- 10. https://www.aai.aero/
- 11. <u>https://www.faa.gov/</u>
- 12. https://www.icao.int

## Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

• Visit to a road construction project

## CO & PSO - PO Mapping (Individual Teacher has to fill)

Mapping of Course Outcomes and Program specific outcomes to Program Outcomes																
Course	Program outcomes												Program Specific Outcomes			
outcomes	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
CO1																
CO2																
CO3																
CO4																
CO5																
Total																
Average																
Level 0: Not Mapped, 1: Low Mapped, 2: Moderately Mapped 3: Highly Mapped								1								

**Note**: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.

BUILDING MATERIALS LABORATORY     Semester     4												
Course	Code	BCV404	CIE Marks	50								
Teachin	ng Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks	50								
Credits		01	Exam Hours	100								
Examination type (SEE) Practical												
Course objectives:												
• Ability to apply knowledge of mathematics and engineering in calculating the mechanical properties of structural materials.												
• Ability to function on multi-disciplinary teams in the area of materials testing.												
• Ability to use the techniques, skills and modern engineering tools necessary for engineering.												
• Understanding of professional and ethical responsibility in the areas of material testing.												
<ul> <li>Ability to communicate effectively the mechanical properties of materials</li> </ul>												
Sl.NO	SI.NO Experiments											
1	Tests on Bricks, Tiles, Cement Concrete blocks (Weight &Dimensionality, Water											
	Absorption, Strength) (L1, L2, L3, L4)											
2	Tests on Fine aggregates - Sieve Analysis, Moisture content, Specific gravity, Bulk density, Bulking and Silt Content. (I 1 I 2 I 3 I 4)											
3	Tests on Coarse aggregates- Sieve Analysis Water absorption Moisture content specific											
-	gravity and Bulk density (L1, L2, L3, L4)											
4	gravity and Dam density		(21, 22, 20	, 21)								
	Compression test on mild steel, cast iron and wood. (L1, L2, L3, L4)											
5	Tension test on mild steel and HYSD bars(L2, L3, L4)											
6	<sup>6</sup> Torsion test on mild steel circular sections. (L1, L2, L3, L4)											
7	Bending Test on Wood Un	der two-point loading.	(L1, L2,	L3, L4)								
8	Shear Test on Mild steel- single and double shear. (L1, L2, L3, L4)											
9	Impact test on Mild Steel (	Charpy & Izod).	(L1, L2,	L3, L4)								
10	<sup>10</sup> Hardness tests on ferrous and non-ferrous metals- Brinell's, Rockwell and Vicker's.											
11	Demonstration of Strain gauges and Strain indicators. (L1, L2, L3, L4											
NOTE: All tests to be carried out as per relevant latest BIS Codes												
Course	outcomes (Course Skill Set):	L										
At the end of the course the student will be able to:												
• Analyze the physical characteristics, and behavior of common building materials.												
• Reproduce the basic knowledge of mathematics and engineering in finding the strength in												
tension, compression, snear and torsion for steel												
• Evaluate the impact of engineering solutions on the society and also will be aware of												
contemporary issues regarding failure of structures due to unsuitable materials.												

• Recognize the importance of ethical conduct, integrity, and accuracy in materials testing and reporting..

# Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

# Continuous Internal Evaluation (CIE):

# CIE marks for the practical course are **50 Marks**.

The split-up of CIE marks for record/ journal and test are in the ratio **60:40**.

- Each experiment is to be evaluated for conduction with an observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments are designed by the faculty who is handling the laboratory session and are made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to **30 marks** (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct a test of 100 marks after the completion of all the experiments listed in the syllabus.
- In a test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The marks scored shall be scaled down to **20 marks** (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

# Semester End Evaluation (SEE):

- SEE marks for the practical course are 50 Marks.
- SEE shall be conducted jointly by the two examiners of the same institute, examiners are appointed by the Head of the Institute.
- The examination schedule and names of examiners are informed to the university before the conduction of the examination. These practical examinations are to be conducted between the schedule mentioned in the academic calendar of the University.
- All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. **OR** based on the course requirement evaluation rubrics shall be decided jointly by examiners.
- Students can pick one question (experiment) from the questions lot prepared by the examiners jointly.
- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.

General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)

Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero.

The minimum duration of SEE is 02 hours

Suggested Learning Resources:

- Davis, Troxell and Hawk, "Testing of Engineering Materials", International Student Edition McGraw Hill Book Co. New Delhi.
- M L Gambhir and Neha Jamwal, "Building and construction materials-Testing and quality control", McGraw Hill education (India)Pvt. Ltd.,2014.
- Fenner, "Mechanical Testing of Materials", George Newnes Ltd. London.
- Holes K A, "Experimental Strength of Materials", English Universities Press Ltd. London.
- Suryanarayana A K, "Testing of Metallic Materials", Prentice Hall of India Pvt. Ltd. New Delhi.
- Kukreja C B, Kishore K. and Ravi Chawla "Material Testing Laboratory Manual", Standard Publishers & Distributors1996.
- Relevant latest IS Codes.

## CO & PSO - PO Mapping (Individual Teacher has to fill)

Mapping of Course Outcomes and Program specific outcomes to Program Outcomes																			
Course outcomes					Pro	ogram	n outc	omes					Program Specific Outcomes						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4			
CO1																			
CO2																			
CO3																			
CO4																			
CO5																			
Total																			
Average																			
Level 0: Not Mapped. 1: Low Mapped. 2: Moderately Mapped 3: Highly Mapped																			

**Note**: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.
Building Information Modelling in Civil Engineering		Semester	4
Course Code	BCV405A	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	2:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3
Examination type (SEE)	Theory		

## **Course objectives:**

- Understand the concept of Building Information Modelling
- Create the workflow followed in industry during creation of BIM 3D model which includes
- Building the discipline-based model and create the federated models
- Design the process of creating the 4D & 5D BIM model

## **Teaching-Learning Process (General Instructions)**

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

- 1. Blackboard teaching
- 2. Power point Presentation
- 3. Videos, NPTEL materials
- 4. Quiz/Assignments/Open book test to develop skills.
- 5. Adopt problem-based learning (PBL) to develop analytical and thinking skills.

## Module-1

Evolution of Engineering, Introduction to BIM Concepts and Design Authoring: Evolution of Engineering from 2D drawings to BIM Model, Isometric View, Limitation of Isometric views and concept of 3D-Modeling, Building Information Modelling – Introduction & Process, Design Authoring – Concepts and workflow, Fundamentals of Discipline Based Modelling, Introduction to stages of BIM Modelling process as per ISO 19650, Federated model- concepts and demonstrations, workflow of design coordination, Engineering Analysis – Concept and types of analysis, Process and workflow of Design Review in BIM.

## Module-2

Visualization and Interference/Clash check: Views in BIM Model, Visualization Modes, Walkthrough of the Model, Fly through the model, Layers & Properties, Concept of viewpoints, Sectioning and Visualization through Tablet and Mobile, Concept of BIM Kiosk & BIM Rooms, Visualization through Augment Reality (AR), Virtual Reality (VR) & Mixed Reality (MR) Clash Check – Types, Clash avoidance process, Clash Detection Process, Clash Detection Priority Matrix and Report generation, Clash Detection Rules, Report, Grouping, Clash Detection Process – Demo.

#### Module-3

Documentation & CDE & Level of Development: Documentation and CDE (Common Data Environment) -2D drawings generation from BIM Model, Computer Network types, Concept of Cloud Computing, Concept and Application of CDE: Traditional Information Sharing, Definition, Reference, and Concept, Setting up the workflow and process for CDE- File naming convention, Roles and Responsibilities, Request for Information and Review Process Concept of LOD (Level of Development), preparation of LOD matrix and Progression matrixDefinition of LOD, Level of Detail and Information, LOD- Wall foundation, Precast Structural Inverted T-Beam, Domestic Water Piping, Plumbing Fixture, Packaged Generator Assembly, LOD- Chart, Matrix and Model Progression Matrix

**Module-4** 

4D / Field BIM & Its Applications: Introduction to 4D / Field BIM: Concept of 4D, Introduction to construction sequence and project schedule, Project scheduling using Gantt Chart and its limitation, 4D BIM ModelingProject demo and workflow, Synchronization of 4D BIM Model with project schedule, Reviewing project progress w.r.t planned dates and actual dates, Generation of Reports Application of Field BIM/ 4D BIM: Understanding concept and usage of BIM in field for coordination- 3D Coordination and Visual Communication, Site utilization planning and Construction analysis, Application of wearables in coordination. 3D Control and planning Other Applications of Field BIM/ 4D BIM: Concept and usages of BIM in field for safety, disaster and risk analysis, digital fabrication and scan to BIM, Existing Condition Modeling, Phase Planning, As-built/ Record Models

## Module-5

5D BIM, AIM & Beyond BIM - Emerging Trends: 5D BIM: Introduction concepts of 5D BIM, Quantity take off with UoM, Concept of QTO with UoM, 5D BIM with UoM with cost, Quantity take off exercise, Demo of Quantity take off: Understanding QTO for Wall, Plaster & Tile, BIM Maturity LOD and General Practice of QTO, Cost Breakup structures, 5D BIM and cost control AIM: Introduction to Asset Information Model (AIM), COBie structures and Asset Information Deliverables, Space Attributes and Asset Attributes- Examples with data, Asset requirementDiscipline wise Infrastructure System, Classification code and Information Exchange, Information Exchange with Facility Management Beyond BIM: Emerging Trends-Concepts of Industrialisation, IoT, Big Data, Data Analytics and their applications in BIM: Industrialisation of Construction through BIM- DfMA, IoT in BIM, BIM and Big data, Data Analytics using AI & ML Future scope of BIM Applications: Smart Infrastructure and the need for connected infrastructure, Digital twins- Concepts and benefits, National Digital Twin or a City level Digital Twin in a Smart City, Fundamental requirements for the success of a Digital Twin and its uses, Digital Twin applications in diverse industries.

## Course outcome (Course Skill Set)

At the end of the course, the student will be able to :

- 1. Interpret the basic principles of BIM evolution and concept of BIM in lifecycle of project
- 2. Understand the workflows of Design authoring followed in industry during creation of 3D model
- 3. Analyze the engineering analysis and the process followed in industry to check and resolve clashes
- 4. Evaluate the integration of schedule and cost in 3D model using 4D and 5D BIM
- 5. Illustrate the various emerging trends of BIM & concept of digital twin

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

## **Continuous Internal Evaluation:**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

## Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored shall be proportionally reduced to 50 marks

## Suggested Learning Resources:

Books

- 1. ISO 19650 Building Information Modelling (BIM)
- 2. BIM Handbook Chuck Eastman, Paul Teicholz, Rafael Sacks, Kathleen Liston

## Web links and Video Lectures (e-Resources):

• E-learning content on L&T EduTech Platform.

## Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

• Create a plan of residential building and practice BIM tools

Construction Equipment, Plants and Machinery Semester			4
Course Code	BCV405B CIE Marks		
Teaching Hours/Week (L: T:P: S)	2:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3
Examination type (SEE)	Theory		
<ul> <li>Course objectives:</li> <li>To provide insight on the different functions and operations of different equipment and techniques during construction</li> <li>To impart knowledge on the various maintenance and safety to be considered during construction</li> <li>To acquire knowledge on the life cycle of a construction equipment</li> <li>To adopt mechanization in the Construction industry</li> </ul>			
<ul> <li>Teaching-Learning Process (General Instructions)</li> <li>These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.</li> <li>1. Blackboard teaching</li> <li>2. Power point Presentation</li> <li>3. Videos, NPTEL materials</li> <li>4. Quiz/Assignments/Open book test to develop skills.</li> <li>5. Adopt problem-based learning (PBL) to develop analytical and thinking skills.</li> </ul>			

## Module-1

Basics and Hydraulics of Construction Equipment: Introduction to Construction Equipment-Functions, Operations of Construction EquipmentIntroduction to Four & Two Stroke Engine and their components- Introduction and Components to Automobiles. Introduction to Principles of Hydraulic- Calculation of Pressure, Force & Flow- Components of a Hydraulic System- Basic layout of Hydraulic SystemApplications of Hydraulics- Strand Jack Operation

## Module-2

Concreting, Earth Moving, Road Making and Quarry/Mining Equipment: Operations of a Batching Plant - Introduction and Components of Concrete Pump & Placer- Concrete Pipeline-Laying and Cleaning- Bulldozer- Classification and Components- Classification, Components and Attachments of Excavator- Backhoe Loader- Classification & components- Introduction and classification to Hot mix Plant Process of Asphalt Paver-PQC Paver- Classification & Components- Motor Grader Classification & Components- Horizontal Movement Vehicles-Quarry/Mining

#### Module-3

Equipment Life Cycle Management: Life Cycle of an Equipment- Equipment Performance Parameters - Introduction to Maintenance- Types of Maintenance- Maintenance Practices

## Module-4

Tunnelling Equipment / Piling Equipment: Introduction to Tunnel Boring Machines- Details and Operation of a Hard-Rock TBM Details of Earth Pressure Balance (EPB) TBM- Details and operation of Slurry TBM & Components- Hydraulic Grabs- Piling Rig

## Module-5

Mechanization and Digitalization in Construction and Safety in Construction Equipment: Importance of Digital Analytics- Digital Solution in Construction Projects- Importance of Mechanization - Railway Track Construction- Rebar Processing Machine- Operation of Mechanized Equipment- Introduction to 3D Concrete Printer- Importance of Safety- Various PPE & Purpose- Safety of Men & Machines at Work- Safety During Construction Activities Safety with Tools & Tackles

## Course outcome (Course Skill Set)

At the end of the course, the student will be able to :

- 1. Evaluate equipment and techniques required during construction
- 2. Understand the operation of a batching plant.
- 3. Analyse the equipment life cycle management.
- 4. Comprehend mechanization and digitalisation in construction

## **Assessment Details (both CIE and SEE)**

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

## **Continuous Internal Evaluation:**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

# Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

## Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored shall be proportionally reduced to 50 marks

## Suggested Learning Resources:

Books

- 1. Velumani. P, "Construction Techniques and Practices", SIA Publishers & Distributers Pvt Ltd, 2020.
- 2. Dr. Manoranjan Samal, "Advanced Construction Techniques and Equipment" S.K. Kataria & Sons
- 3. S.C.Sharma, "Construction Equipment and management" E-Book .2019

Web links and Video Lectures (e-Resources):

• E-learning content on L&T EduTech Platform.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

• Visit to construction site to understand construction equipments

Concreting Techniques and Practices		Semester	4
Course Code	BCV405C	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	2:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3
Examination type (SEE)	Theory		

## **Course objectives:**

- To present the basics of concrete and different materials used in it.
- To impart knowledge on materials used in concrete, relevant Indian standard codes, and practical aspects on concreting activities at projects.
- To explain the importance of making good quality concrete to build durable structures.
- To introduce the Design of concrete mixes from the Industrial experiences at Sites and optimization of higher grades of Concrete.
- To learn the best practices in concrete construction from industry's decades of experiences, thumb rules, mitigation of concreting issues at Sites

## **Teaching-Learning Process (General Instructions)**

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

- 1. Blackboard teaching
- 2. Power point Presentation
- 3. Videos, NPTEL materials
- 4. Quiz/Assignments/Open book test to develop skills.
- 5. Adopt problem-based learning (PBL) to develop analytical and thinking skills.

## Module-1

Introduction to concrete, overview of materials- cement, low carbon cement, coarse aggregate and fine aggregate, and mineral admixture:- fly ash, GGBS, micro silica / silica fume, metakaolin / rice husk ash, composite cement and ultrafine materials, lab test - fineness of fly ash, recycled aggregate

#### Module-2

Water and chemical admixture: source, requirements, limits and testing Blending of aggregate -: Blending of fine and coarse aggregate, gradation for optimization and practical aspects.

#### Module-3

Mix design - Volumetric mix design, mix design by absolute volume method, worked out practical examples based on industries experience at project sites over several decades, higher grades of concrete, high performance concrete, test on concrete: workability of concrete, flexural and compressive strength tests.

#### Module-4

Production of concrete-: batching plant, calibration, mixing and transportation of concrete handling of concrete at construction, ready-mix concrete, pumping, placing of concrete with boom placers, levelling, vibration and compaction, cold joints, finishing and curing and protection of concrete

#### Module-5

Special types of concrete: self-compacting concrete, mass concrete, dry lean concrete, geopolymer concrete, pavement quality concrete, fiber reinforced concrete, composite concrete, lightweight concrete, ferrocement, shotcreteing, guniting, grouting, challenges faced at sites: plastic shrinkage cracks, plastic settlement, honey comb, bug holes, cover to concrete, do's and

## don'ts in concrete construction, site shoot, introduction on 3D printing.

## Course outcome (Course Skill Set)

At the end of the course, the student will be able to :

- 1. Evaluate the properties of concrete by conducting test on cement, aggregate and concrete (with & without admixtures) for using the data for Mix design procedures
- 2. Understand to Select and proportionate different materials used in a concrete mix including admixtures
- 3. Design a concrete mix as per requirement of construction project
- 4. Apply the best practices in concrete construction from industry's requirement, thumb rules, mitigation of concreting issues at Sites.

## Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

## **Continuous Internal Evaluation:**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

## Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

## Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored shall be proportionally reduced to 50 marks

## Suggested Learning Resources:

Books

- 1. Concrete Technology by M. S. Shetty, S Chand, New Delhi-110055.
- 2. Concrete Technology by M. L. Gambhir, Tata McGraw-Hill.
- 3. IS 456, IS 269, IS 516, IS 1786, IS 1893, IS 12269, IS 9103, IS 8112

## Web links and Video Lectures (e-Resources):

• E-learning content on L&T EduTech Platform.

#### Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

• Visit to construction site to understand concreting process

		<b></b>	1		
Watersh	ed Management	Semester	4		
Course Code	BCV405D	CIE Marks	50		
Teaching Hours/Week (L:T:P: S)	2:2:0:0	SEE Marks	50		
Total Hours of Pedagogy	40	Total Marks	100		
Credits	U3 Theory/practical/Viva-Voce/Te	Exam Hours	3		
Examination type (SEE)		mi-work/others			
Course objectives:					
• To understand Watershe	d Hydrology				
• To estimate water deman	nd and learn, water conservation methods				
• To understand application	on of Remote Sensing and GIS in watershee	d management			
Sustainable measures for	watershed management				
Teaching-Learning Process (General Instructions)         These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.         • Power point Presentation, video       • Video tube, NPTEL materials         • Quiz/Assignments/Open book test to develop skills       • Encourage collaborative learning in the class with site visits related to subject and impart practical knowledge         Module-1         Principles of Watershed Management: Basics concepts, hydrology and water availability, surface water, ground water, conjunctive use, human influences in the water					
	Module-2				
Water recourses system	si Integrated water recourses of	uctom rivor h	acine		
water resources system	S. Integrated water resources s	ysteill, livel D	asiiis-		
morphometric analysis of	watersneus for watersneu mar	lagement, wate	ersned		
management practices in ar	id and semi-arid regions, watershed	management th	rough		
wells, management of water s	supply, short term and long-term strat	egic planning.			
Module-3					
Conservation of Water: Pers	spective on recycle and reuse, wastew	ater reclamation	ı, social		
<ul> <li>aspects of watershed management and community participation, private sector participation, institutional issues, socio-economy, integrated development, water legislation and implementations, case studies.</li> <li>Water Harvesting: Rainwater management, conservation, storage and effective utilization of rainwater, structures for rainwater harvesting, roof catchments system, check dams, aquifer storage.</li> </ul>					
	Module-4				
Sustainable Watershed A	oproach: Sustainable integrated w	atershed manag	gement.		
	•		, -,		

natural resources management, agricultural practices, integrated farming, soil erosion and conservation.

## Module-5

**Applications of RS and GIS in Watershed management:** Role of decision support system in watershed management, watershed characteristics of coastal regions, coastal aquifer tor management, uniqueness of coastal water resources.

#### Course outcome (Course Skill Set)

At the end of the course, the student will be able to :

- Discuss surface and ground water resources system and, human influences.
- Integrate water resources system in arid and semi-arid regions and explain watershed aquifer for management.
- Analyse water resources related issues for conservation and synthesize augmentation of water resources.
- Design integrated watershed management system.
- Apply modern tools in watershed management.

## Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

## **Continuous Internal Evaluation:**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

## Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

- 1. The question paper will have ten questions. Each question is set for 20 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- 3. The students have to answer 5 full questions, selecting one full question from each module.
- 4. Marks scored shall be proportionally reduced to 50 marks

# Note: Subject to be taught by Geologist with qualification M. Sc Geology/MPhil/ Ph. D in Geology or Faculty of Civil Engineering

## Suggested Learning Resources:

## Books

- 1. Singh Vir, Raj., "Watershed Planning and Management", Yash Publishing House, Bikaner.3<sup>rd</sup> Revised Edition, 2016.
- Murthy, J. V. S., "Watershed Management in India", New Age Publishers, New Delhi. 2<sup>nd</sup> Edition, 2017.
- 3. "Decision Support System for Integrated Watershed Management", Colorad State University. 2012.
- 4. Tideman, E. M., "Watershed Management", Omega Scientific Publishers, New Delhi, 2002

## Web links and Video Lectures (e-Resources):

- <u>https://www.youtube.com/watch?v=wkPu4LwRKro</u>
- <u>https://youtu.be/wkPu4LwRKro</u>
- <u>https://youtu.be/wkPu4LwRKro</u>
- <u>https://youtu.be/wkPu4LwRKro</u>

## Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Seminars/Quiz (To assist in GATE Preparations)
- Self-Study on simple topics
- Discussion of case studies
- Field visits to construction sites

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Finance for Professionals Semester			4
Course Code	BCV456A	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	1:0:0:0	SEE Marks	50
Total Hours of Pedagogy	15	Total Marks	100
Credits	01	Exam Hours	1
Examination type (SEE)	Theory		
<ul><li>Course objectives:</li><li>To give learners an overvie</li></ul>	w of finance and develop their financ	e sense	
<b>Teaching-Learning Process (General</b> These are sample Strategies, which teac outcomes. 1. Blackboard teaching 2. Power point Presentation	<b>Instructions)</b> chers can use to accelerate the attainment	of the various cou	rse
3 Videos NPTEL materials			
4. Quiz/Assignments/Open book	test to develop skills.		
	Module-1		
Economics: Introduction to eco	nomics, Economic policies, Role	of monetary p	olicy in
managing the economy			
	Module-2		
Finance Vocabulary and Financia example, Accounting, finance & Sources & uses of funds, Source Double entry bookkeeping, Illustr loss, Understanding profit & los example 1, Profit and profitability	auditing, Capital vs. revenue, Capit s & uses of funds example, Revenue ration of double entry book keeping, s example, Profit and profitability, example 2	, Unique role o al vs. revenue e recognition pr Understanding Profit and pro	f finance example, rinciples, profit & ofitability
	Module-3		
Financial Statement and Risk Ana metrics & financial statement liquidity example, Funds flow an Example of cash flow analysi management example, Managem example, Understanding risk mana	lysis: Finance metrics & financial sta analysis example, understanding alysis, Example of funds flow analy s, Introduction to risk management ent of risk, understanding risk ma agement products example, Holistic le	tement analysis iquidity, under rsis, Cash flow ent, understand magement mea- ook at risk mana	, Finance rstanding analysis, ling risk surement agement.
	Module-4		
Time Value of Money: Time value of money, understanding time value of money, understanding financial functions, Applications of time value of money, Capital structure, Capital structure example, Cost of capital, Cost of capital example, Capital budgeting, Understanding capital budgeting - example			
Demonal Eingeneen Eingeneint In (	Module-5	fonimuster	Doutfal:-
management principles, Example of portfolio, forming a portfolio, Forming a portfolio example			
Course outcome (Course Skill Set)			
<ul><li>At the end of the course the student will</li><li>1. Understand how their work an</li><li>2. Comprehend financial acument</li></ul>	l be able to: d effort contribute to organizational f a and tools to optimize outcomes	inancial perforn	nance

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

## **Continuous internal Examination (CIE)**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

## Semester End Examinations (SEE)

SEE paper shall be set for 50 questions, each of the 01 marks. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is **01 hour.** The student has to secure a minimum of 35% of the maximum marks meant for SEE.

OR

MCQ (Multiple Choice Questions) are preferred for 01 credit courses, however, if course content demands the general question paper pattern that followed for 03 credit course, then

- 1. The question paper will have ten questions. Each question is set for 10 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module may or may not have the sub-questions (with maximum sub-questions of 02, with marks distributions 5+5, 4+6, 3+7).
- 3. The students have to answer 5 full questions, selecting one full question from each module.

## Suggested Learning Resources:

Books

- 1. Financial Management: Theory & Practice | 11th Edition by Prasanna Chandra
- 2. International Financial Reporting Standards (Bangalore Univ)

## Web links and Video Lectures (e-Resources):

• E-learning content on L&T EduTech Platform.

## Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

• Case study to understand the project finance concept

GIS with Quantum GIS Semester			4	
Course Code	BCV456B	CIE Marks	50	
Teaching Hours/Week (L: T:P: S)	0:2:0:0	SEE Marks	50	
Total Hours of Pedagogy	15	Total Marks	100	
Credits	01	Exam Hours	1	
Examination type (SEE)	Theory/practical/Viva-Voce /	Term-work/Other	S	
<ul> <li>Course objectives:</li> <li>Learning the open source Q</li> <li>Understand raster and vector</li> <li>Creation of base map and the</li> </ul>	GIS software for Civil Engineering a or data nematic maps for specific application	applications		
<ul> <li>Teaching-Learning Process (General These are sample Strategies, which teac outcomes.</li> <li>1. Demonstration of open sou</li> <li>2. YouTube videos to learn G</li> <li>3. Power Point presentations</li> </ul>	Instructions) chers can use to accelerate the attainment rce software for GIS IS software	of the various cou	rse	
<b>5.</b> Tower Form presentations.				
	Module-1			
QGIS Introduction: Definition o	f GIS and its use. Introduction to	a free and ope	n source	
web services, useful commands digital satellite image processing a INTRODUCTION IN QGIS Abo TOOLS QGIS Configuration, O WORKING WITH RASTER D	And utilities for geo-processing, extend analysis         Module-2         Out QGIS Characteristics of QGIS S         General tools, Working with projection         OATA Introduction, Display raster	Start using QGI data, Raster ca	S. QGIS Browser. alculator,	
Working with images, Practical	exercises: Working with raster da	ata and operation	ons with	
	Module-3			
QGIS PLUGINS Additional modules of QGIS or "plugins" Description of Plugins incorporated in QGIS Operations through "plugins" Practical exercises: Different QGIS "plugins" and their applications: GDAL library tool, georeferencing, coordinate capture, format converter.				
	Module-4			
CREATE MAPS AND RELATED PRODUCTS: Creation tools, Graphic elements, Atlases generation, and Graphic output creations. Practical exercises: Map creation with QGIS.				
Module-5				
RELATIONAL DATABASE MA	NAGEMENT SYSTEMS AND SP	ATIAL DATA.	Database	
design, Database connections, Table joins Spatial joins, generate new statistics and new data				
using table and spatial data information. Practical exercises: Creation of thematic maps like				
population data of taluk, Watershed map with drainage and water bodies, Highway with other 2				
road intersection details				

#### Course outcome (Course Skill Set)

At the end of the course the student will be able to:

- 1. Use open source software for civil engineering applications
- 2. Various tools in QGIS software
- 3. Create thematic layers with attribute data
- 4. Generate maps for decision making

#### **Assessment Details (both CIE and SEE)**

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### **Continuous internal Examination (CIE)**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

#### Semester End Examinations (SEE)

SEE paper shall be set for 50 questions, each of the 01 marks. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is **01 hour.** The student has to secure a minimum of 35% of the maximum marks meant for SEE.

OR

MCQ (Multiple Choice Questions) are preferred for 01 credit courses, however, if course content demands the general question paper pattern that followed for 03 credit course, then

- 1. The question paper will have ten questions. Each question is set for 10 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module may or may not have the subquestions (with maximum sub-questions of 02, with marks distributions 5+5, 4+6, 3+7).
- 3. The students have to answer 5 full questions, selecting one full question from each module.

#### Suggested Learning Resources:

#### Books

- 1. Geographic Information System-An Introduction, Tor Bernharadsen, 2009, 3rd Edition, Wiley India Pvt. Ltd. New Delhi, ISBN 9788126511389.
- 2. Principles of Remote sensing and Image Interpretation, Lillesand and Kiefer, 2011, 6th Edition, John Wiley Publishers, New Delhi, ISBN 8126532238.

#### Web links and Video Lectures (e-Resources):

- YouTube videos
- https://docs.qgis.org/3.16/pdf/en/QGIS-3.16-DesktopUserGuide-en.pdf for QGIS manual
- NPTEL Lectures.

#### Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

• Prepare the thematic maps using google earth images for various applications

Electronic Waste Management - Issues and Challenges Semester				
Course Code	BCV456C	CIE Marks	50	
Teaching Hours/Week (L: T:P: S)	0:2:0:0	SEE Marks	50	
Total Hours of Pedagogy	15	Total Marks	100	
Credits	01	Exam Hours	1	
Examination type (SEE)	Theory			
<ul> <li>Course objectives:</li> <li>To provide students with a compension environment.</li> <li>To familiarize students with the particular students with the particular students with the particular students to various.</li> <li>To introduce students to various</li> <li>To develop an understanding of particular students in India.</li> </ul> Teaching-Learning Process (General These are sample Strategies, which teac outcomes. <ul> <li>Blackboard teaching</li> <li>Power point Presentation</li> </ul>	prehensive understanding of e-waste generation, composition, and hazard conmental risks associated with impu- e methods of e-waste collection, recyc the relevant policies and regulations Instructions) chers can use to accelerate the attainmen	and its impact or ous components oper e-waste man cling, and disposa governing e-wast	a the of e-waste. nagement. l. te	
3. Videos, NPTEL materials				
	Module-1			
Introduction to E-Waste Management,	Overview of e-waste and its impact on t	he environment,		
	Module-2			
E-Waste Generation and Composition,	Types of e-waste and their components			
	Module-3			
E-Waste Hazards and Environmen waste	tal Impacts, Health and environmen	tal risks associate	ed with e-	
	Module-4			
E-Waste Collection and Recycling, Meth	ods of e-waste collection, recycling, and	disposal		
	Module-5			
E-Waste Management Policies and Regu	lations, Relevant laws, policies, and reg	ulations in India		
Course outcome (Course Skill Set)				
<ol> <li>At the end of the course the student will</li> <li>Explain the concept of e-waste and</li> <li>Identify and classify different type</li> <li>Recognize the potential health management.</li> <li>Evaluate and apply appropriate matrix</li> <li>Demonstrate knowledge of the exit</li> </ol>	l be able to: d its significance in the context of environ s of e-waste and describe their compone and environmental hazards associa ethods for the collection, recycling, and o sting policies, regulations, and framewo	nmental sustainabil ents. ated with improp disposal of e-waste. orks for e-waste ma	lity. per e-waste nagement in	

India

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

## **Continuous internal Examination (CIE)**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

## Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

#### Semester End Examinations (SEE)

SEE paper shall be set for 50 questions, each of the 01 marks. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is **01 hour.** The student has to secure a minimum of 35% of the maximum marks meant for SEE.

OR

MCQ (Multiple Choice Questions) are preferred for 01 credit courses, however, if course content demands the general question paper pattern that followed for 03 credit course, then

- 1. The question paper will have ten questions. Each question is set for 10 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module may or may not have the sub-questions (with maximum sub-questions of 02, with marks distributions 5+5, 4+6, 3+7).
- 3. The students have to answer 5 full questions, selecting one full question from each module.

#### Suggested Learning Resources:

#### Books

- 1. "E-Waste Management: From Waste to Resource" by R. K. Rathore and H. N. Chanakya, TERI Press, 2019
- 2. "E-Waste in India: An Emerging Crisis" by Sangeeta Sharma, Cambridge Scholars Publishing, 2019
- 3. "E-Waste Management: Research, Technology, and Applications", Majeti Narasimha Vara Prasad, CRC Press, 2016
- 4. "Electronic Waste Management and Treatment Technology" by Rezaul Begg, R. M. Sarcar, and R. V. R. Singh, Springer, 2018
- 5. "E-Waste Management: From Waste to Resource" by Florin-Constantin Mihai, Academic Press, 2018

#### Web links and Video Lectures (e-Resources):

• NPTEL video Lectures.

#### Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

• Visit to an E-waste management industry

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Technical Writing Skills		Semester	4
Course Code	BCV456D	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	1:0:0:0	SEE Marks	50
Total Hours of Pedagogy	15	Total Marks	100
Credits	01	Exam Hours	1
Examination type (SEE)	Theory		

## **Course objectives:**

- Achieve better Technical writing and Presentation skills for employment.
- Develop adequate knowledge of paragraph writing and precise writing techniques
- Write business proposals and reports.
- Write conference papers and prepare gist of published papers.
- Develop efficiency in drafting social media posts and blogs.

## **Teaching-Learning Process (General Instructions)**

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

- **1.** Chalk and talk
- 2. Power point Presentation, video
- 3. Practice sessions.

## Module-1

**Technical Report Writing:** Introduction to Technical writing process, Understanding of writing process, Introduction to various Technical Report writing.

## Module-2

Art of condensation and Paragraph Writing: Introduction and importance, Types and principles of condensation. Importance of paragraph writing, Features and its construction styles.

## Module-3

**Business Report Writing:** Introduction, Definition and Salient features of Business reports. Significance and types of report writing. (Formal and Informal). Resume building and Types of resumes. (samples of resumes)

## Module-4

**Technical Articles and Proposals:** Nature and significance, Types of technical Articles Journal articles and conference papers. Elements of technical articles .Introduction to technical proposal writing, Purpose, importance, structure and types of technical proposals.

#### Module-5

**Social media posts and Blog Writing:** Ethics and practices of social media posts, Principles and fundamentals, Guiding principles for composition of articles, some common pitfalls. Maintaining common etiquette. Blogs and Blog writings strategies.

## Course outcome (Course Skill Set)

At the end of the course the student will be able to:

- 1. Effectively communicate in technical matters.
- 2. Practice preparation of gist, abstract and notes from a technical article.
- 3. Prepare a business proposals and reports.
- 4. Write and respond in social media and write blogs.

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

## **Continuous internal Examination (CIE)**

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

# Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

## Semester End Examinations (SEE)

SEE paper shall be set for 50 questions, each of the 01 marks. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is **01 hour.** The student has to secure a minimum of 35% of the maximum marks meant for SEE.

OR

MCQ (Multiple Choice Questions) are preferred for 01 credit courses, however, if course content demands the general question paper pattern that followed for 03 credit course, then

- 1. The question paper will have ten questions. Each question is set for 10 marks.
- 2. There will be 2 questions from each module. Each of the two questions under a module may or may not have the sub-questions (with maximum sub-questions of 02, with marks distributions 5+5, 4+6, 3+7).
- 3. The students have to answer 5 full questions, selecting one full question from each module.

## Suggested Learning Resources:

Books

- 1. Sanjay Kumar and Pushpalata, 'Communication Skills', Oxford University Press. 2018.
- 2. M. Ashraf Rizvi, 'Effective Technical Communication', McGraw Hill, 2018.
- 3. Gajendra Singh Chauhan and et.al. 'Technical Communication', Cengage Publication, 2018.
- 4. Meenakshi Raman and Sangeeta Sharma, Technical Communication Principles and Practice, Oxford University Press, 2018.

## Web links and Video Lectures (e-Resources):

- <u>https://developers.google.com/tech-writing/announcements</u>
- <u>https://www.classcentral.com/course/technical-writing-7117</u>.

## Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Demonstrations of Videos
- Group Discussion
- Practice sessions
- Presentation on any social issues
- Quizzes