Cusrow Wadia Institute of Technology, Pune - 411001

CIVIL ENGINEERING DEPARTMENT

Multi Point Entry and Credit System 2014

CURRICULUM

[W. E. F. June 2014]

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE -1.
CURRICULUM REVISION (2014)

1. Preamble :

- Cusrow Wadia Institute of Technology, Pune was granted Academic Autonomy in the year 1985 by Government of Maharashtra vide letter No. PTI 2483/119915(234)/TE-I (B) dated 27/2/1985.
- Initially the Institute adopted the Model Curriculum prepared by then TTTI, Western Region, Bhopal. Subsequently, the revisions in the curriculum were made as per the needs of the Society.
- The Institute adopted Multi Point Entry and Credit System w.e.f. June 1998.
- The earlier revision was carried out in the year 2010. Subsequently the review of the curriculum was taken in the year 2012-2013. Necessary changes in the contents and detailing of the document as regards to the scope and implementation strategy and related processes were done in the year 2013.
  The present curriculum will come into force w.e.f. June 2014 .
- The feedback was taken from various stake holders and it was strongly felt that the rapid strides in the field of Information Technology, Computers and Manufacturing Processes , a dynamic curriculum need to adopt the benefits of the fast changing expectations in the contents as well as the Teaching Learning Methodology.
- The Institute has strengthened the hardware and software which is constantly consolidated and upgraded to match the needs of the society in general and the Industries in particular.
- Students should be proficient in the use of computers and related softwares irrespective of the branch of Engineering they are studying. The students shall be made to make maximum use of software packages and use Internet to derive and update their knowledge.
- The contemporary needs of the user system and overall development of the students is the governing factor in the revision of 2014 curriculum.

2. Approach for Curriculum Revision:

- Scientific system approach has been adopted in the revision of curriculum .
- A curriculum revision model showing various steps undergone is presented.
- Analysis of the existing curriculum was done by taking feedback from the faculty implementing the curriculum, Alumni, Industry / Field Personnel, Courses Committee Members and the Experts in the field of Education.
- Entry behaviour of the students was assessed. Basic entry qualification for Diploma is SSC or equivalent. However, higher entry qualification like 12^{th} Science, 12^{th} MCVC, ITI etc. was also considered.

- Curriculum documents of MSBTE, other Boards and other Autonomous Institutions were studied for inclusion of new courses and analysis of contents of existing and newly inducted courses and also the implementation strategy.
- The curriculum is rationalised as per the AICTE and MSBTE norms and guidelines.
- The team members were identified for conducting Search Conference, collecting feedback from stake holders and interviews with Experts for noting the suggestions about the courses and necessary modifications. The Interactive Sessions were arranged through Search Conference attended by the Experts from Industry and Academia. The faculty members were trained by specialists in Technical Education System as regards to the Curriculum Revision Process.

3. Roles to be played and functions to be performed by a diploma holder:

- A Diploma holder may be employed in the Industry as a Technician or Supervisor for Production, Installation, Repairs and Maintenance. He also may be employed in drawing, estimation or as an Assistant in IT related activities. He may be an Entrepreneur, be assigned a job of Purchase/ Marketing Department. Diploma holder should have basic knowledge of the various subjects of his branch in Engineering and also the related Inter-disciplinary subjects. He should be aware of the present technologies and be able to adopt the changes in future. He shall acquire the necessary skill sets in the Engineering subjects.
- His role in the Society is that of a responsible individual and should conduct himself as regards the values and cultures. He should acquire the necessary professional, presentation and managerial Skills.

4. Analysing Job Functions and Deriving Curriculum Objectives:

- The role of a Diploma holder, as a Technician on the job, is analysed in four Domains of Professional Skills, Life Long Learning, Personal Development and Social Development.
- The curriculum should help the students to acquire professional skills and inculcate attitudes in order that the student will be able to discharge the role and functions effectively on the societal and employment front.
- Goals and objectives of each programme were framed. The courses common to several programmes and the courses relevant to particular programmes were classified under various categories.
- The overall course structure and Teaching Examination Scheme was prepared.
- The contents of various courses were finalised by considering the feedback from stake holders through interviews, Search Conference and discussions.
- The course structure and the contents were validated by the Board of Studies.
- Study of the Diploma programmes offered by MSBTE , other State Boards and other

Autonomous Institutions was done to widen the perspective .

5. Evolving the teaching learning process:

The following points were considered:

- No. of weeks – 16
- Average days per week- 5.5
- No. of contact hours per day – 7
- No. of hours per week for instruction and pre-decided Co-curricular activities – 38.
- Each course shall be taught for sixteen weeks and two weeks shall be utilised for revision in that term.

6. Course Categories:

- Foundation(1)
- Allied (2)
- Core (3)
- Applied(4)
- Specialised(5)
- Number of courses for a programme – 41.
- Number of courses for award of class – 11
- Number of Elective courses - 3
- Number of credits to be earned for obtaining Diploma – 185.
- One credit = one hour of lecture / practical per week for a course.
- Ratio of theory to practical hours per week : approx. 50:50

7. Examination scheme:

- Theory paper – 40 - 80 marks
- Tests – 10 - 20 marks
- Term Work – 25-50 marks
- Practicals -25 – 50 marks
- Viva voce- 25 – 50 marks
- Project Work -100 + 50 marks
- Grand total – 4700 marks
- Grand total of marks for award of class – 1600.

8. Course-wise content detailing:

- For finalisation of course structure from Courses Committee, Examination Committee and Board of Studies, various processes in the Curriculum Revision Model were followed. Also the documents of MSBTE and Autonomous Polytechnics were referred.

- Contents were decided by taking into consideration, the expectations of the stake holders, specific needs of Industry, Interviews , Discussions and Experts opinions .
- Every course has a unique code e.g. R14CE4101. 'R14' means the course is from the curriculum revised in 2014. CE implies Civil Engineering Department will teach this course. '4' indicates that it is Applied Course Category in the programme structure. '1' means the course is to be taught by Civil Engineering programme. '01' is the serial number of the course in Applied Courses Category.

  The 7th character in the above 9 digit code is assigned for the programme ,e.g. 1 – Civil, 2 – Mechanical, 3 – Electrical, 4 – Computer and 5 – Electronics & Telecommunication Engineering and 7 – Common courses for all programmes taught by Science Department.
- A rationale giving the importance of the course in the curriculum is vividly explained. The course objectives are derived indicating the purpose to teach the course / subject.
- The Practicals, Seminars are spelt out along with assessment technique .
- The input for professional practices and soft skills are included in most of the courses so that the students will be able to learn the contents beyond syllabus.
- The curriculum document prescribes learning resources for students e.g. Reference books, Textbooks, Websites, Handbooks, Printed notes etc.
- Use of Learning Management System, Audio Visual Aids be increased for enhancing the Teaching Learning Process.

9. Curriculum implementation strategy:

- Members of the faculty shall continuously undergo Induction Training Programme, Content upgrading programme conducted by ISTE , NITTTR and other Organisations.
- The faculty members will be deputed to attend Refresher courses and Training programmes so as to help them keep abreast with latest developments and technology.
- Faculty members will be trained in respect of various aspects and methods of evaluation systems , paper setting etc.
- Faculty will be trained for monitoring the curriculum implementation.
- Library will be constantly modernised with additions of latest titles and books .The Library will have open access to the students. Library will be open for extended hours. The Books Bank Facility will support the demand of the students.
- The Laboratory and Field Manuals will be structured and standardised so that the students can spend more time for doing practicals, understanding the significance, discussions and result analysis rather than only writing the journals.
- The Examination rules will be revised to suit the curriculum and will have similarity as regards to principles followed by MSBTE and other Examination bodies.

- The Evaluation Systems and marking schemes will be commensurate with the input hours and importance of the topics in the course.
- 24 X 7 – 5 MBPS internet connection is available for faculty, staff and students . Also Wi-Fi connectivity provided in all classrooms and laboratories will support the modern methods of teaching.
- Uninterrupted Power Supply and captive power is made available to take over the load shedding.
- The laboratories, equipments and computers be maintained in working conditions. The models, charts and exhibits be displayed to invite attention of the students.
- Industrial visits, Field visits, Study tours shall be arranged regularly in a preplanned and structured manner so as to have focus on technical aspects.
- Guest faculty should be invited to deliver lectures on recent trends, technologies, materials and processes. These activities be planned in the beginning of the term.
- The students should imbibe various life skills, soft skills, learn stress management and adjust help and appreciate colleagues especially during group activities, study tours and visits etc.

What is Civil Engineering?

Civil engineering is a professional engineering discipline that deals with the planning, design, construction and maintenance of the physical and naturally built environment, including works such as buildings, roads, dams, canals, effluent treatment plants etc. The Various sub- disciplines are material science, geotechnical engineering, surveying, construction, water resource engineering, transportation engineering, environmental engineering, structural engineering and project management.

Aim of a Civil engineering fraternity is to improve the standard of life of human beings by providing physical means for human activities. The existence of creations of Civil engineer can be felt from building, roads, dams, canals and all structures. A Civil engineer learns and works with the nature. He integrates the knowledge of physical science, mathematics, sociology and management by providing solutions to challenges posed by the society and nature. It is one of the oldest discipline addressing basic needs of water, shelter and food. It grooms civilization by providing the basic infrastructure for the businesses, industries, and organizations dealing with health, education and entertainment.

New challenges of sustainable development, maintaining ecological balance with ever increasing demand for the physical means from the society can be mitigated by adopting clean technologies, eco friendly materials and advanced knowledge based decision system with integration with other engineering disciplines. Therefore the scope of civil engineering has crossed all physical, socio-political and technological boundaries. The leadership, team work, good human engineering with sound technical bias will be the key elements in making of a Civil engineer.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

PROGRAMME : DIPLOMA IN CIVIL ENGINEERINGSCHEME: MPECS 2014.

Sr. No.	Category	Course Code	Subject Title	Prerequisite	C/O	Teaching Scheme			Examination Scheme					
						L	P	C	TH	TT	PR	OR	TW	Total
1	**Foundation**	R14SC1701	Basic Mathematics		C	4		4	80	20				100
2		R14SC1702	Engineering Mathematics		C	4		4	80	20				100
3		R14SC1703	Basic Physics		C	2	2	4	40	10			25	75
4		R14SC1704	Basic Chemistry		C	2	2	4	40	10			25	75
5		R14SC1709	Applied Science		C	4	4	8	80	20			50	150
6		R14SC1707	Technical English		C	2	2	4	80	20			25	125
7		R14SC1708	Communication Skills		C	1	2	3				@25	25	50
8		R14CE1101	Office Automation & CAD		C	1	4	5			@ 50		50	100
9		R14ME1203	Engineering Graphics skills		C	1	4	5			@ 50		50	100
					Total	**21**	**20**	**41**	**400**	**100**	**100**	**25**	**250**	**875**

* : Tutorial @ Internal

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

PROGRAMME : DIPLOMA IN CIVIL ENGINEERINGSCHEME: MPECS 2014.

Sr. No.	Category	Course Code	Subject Title	Prerequisite	C/O	Teaching Scheme			Examination Scheme					
						L	P	C	TH	TT	PR	OR	TW	Total
10		R14AM2101	Engineering Mechanics		C	3	2	5	80	20			25	125
11		R14AM2102	Strength of Materials		C	4	2	6	80	20			25	125
12		R14CE2103	General Engg (Elec and Mechanical)		C		4	4				@50	50	100
13		R14CE2104	Environmental Studies		C	2	1*	3				@25	25	50
14	**Allied**	R14SC2701	Advanced Mathematics	R14SC1701	C	3		3	80	20				100
15		R14ME2206	Entrepreneurship Development		any one	3**		3				@25	25	50
16		R14ME2208	Elements of Accounts and Finance			3**		3				@25	25	50
17		R14EE2303	Marketing Management			3**		3				@25	25	50
					Total	**15**	**9**	**24**	**240**	**60**		**100**	**150**	**550**

*Tutorial @Internal ** 1L for Tutorial

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PROGRAMME : DIPLOMA IN CIVIL ENGINEERINGSCHEME: MPECS 2014.

Sr. No.	Category	Course Code	Subject Title	Prerequisite	C/O	Teaching Scheme			Examination Scheme					
						L	P	C	TH	TT	PR	OR	TW	Total
18		R14CE3101	Building Drawing		C	2	4	6			50		50	100
19		R14CE3102	Civil Engineering Drawing	R14CE3101	C	1	4	5	80	20			50	150
20		R14CE3103	Building Construction		C	3	2	5	80	20			25	125
21		R14CE3104	Building Services		C	3		3	80	20				100
22		R14CE3105	Construction Technology	R14CE3103	C	3	2	5	80	20			25	125
23	**Core**	R14CE3106	Surveying -I		C	3	4	7	80	20	25		25	150
24		R14CE3107	Surveying-II	R14CE3106	C	3	4	7	80	20	50		25	175
25		R14CE3108	Hydraulics		C	3	2	5	80	20			25	125
26		R14AM3109	Theory of Structures	R14AM2102	C	4		4	80	20				100
27		R14AM3110	Concrete Technology		C	3	2	5	80	20		25	25	150
28		R14AM3111	Geo Technical Engineering		C	3	2	5	80	20			25	125
29		R14CE3112	Construction Materials		C	2		2	40	10				50
					Total	**33**	**26**	**59**	**840**	**210**	**125**	**25**	**275**	**1475**

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PROGRAMME : DIPLOMA IN CIVIL ENGINEERINGSCHEME: MPECS 2014.

Sr. No.	Category	Course Code	Subject Title	Prerequisite	C/O	Teaching Scheme			Examination Scheme					
						L	P	C	TH	TT	PR	OR	TW	Total
30		R14CE4101	Transportation Engineering		C	3		3	80	20				100
31		R14CE4102	Road Engineering		C	3	2	5	80	20		25	25	150
32		R14CE4103	Public Health Engineering		C	3	2	5	80	20			25	125
33		R14CE4104	Irrigation Engineering		C	3	2	5	80	20			25	125
34		R14CE4105	Quantity Surveying		C	2	4	6			50		50	100
35	**Applied**	R14CE4106	Civil Engineering Estimating Valuation & Costing	R14CE4105	C	3	2	5	80	20		50	25	175
36		R14CE4107	Construction Management		C	3	2	5	80	20		25	25	150
37		R14CE4108	Project Work	100 Credits	C		4	4				50	100	150
38		R14AM4109	Design of RCC Structures	R14AM3109	C	3	2	5	80	20		25	25	150
39		R14AM4110	Design of Steel Structures	R14AM3109	C	3	2	5	80	20		25	25	150
					Total	**26**	**22**	**48**	**640**	**160**	**50**	**200**	**325**	**1375**

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PROGRAMME : DIPLOMA IN CIVIL ENGINEERINGSCHEME: MPECS 2014

Sr. No.	Category	Course Code	Subject Title	Prerequisite	C/O	Teaching Scheme			Examination Scheme					
						L	P	C	TH	TT	PR	OR	TW	Total
40		R14CE5101	Advanced Construction Techniques	R14AM3110		3	2	5	80	20		50	25	175
41		R14CE5102	Project Management	R14CE4107		3	2	5	80	20		50	25	175
42		R14CE5103	Advanced Surveying	R14CE3107	Any Two	3	2	5	80	20		50	25	175
43		R14CE5104	Township Planning	R14CE3102		3	2	5	80	20		50	25	175
44		R14AM5105	Pre stressed Concrete	R14AM3109		3	2	5	80	20		50	25	175
45	**Specialised**	R14AM5106	Advanced Structural Design	R14AM3109		3	2	5	80	20		50	25	175
46		R14CE5107	Geo informatics *	R14CE3107		1	2	3				50	25	75
47		R14CE5108	Real Estate Management*	R14CE3102		1	2	3				50	25	75
48		R14CE5109	MS Project Software*	R14CE4107	Any One	1	2	3				50	25	75
49		R14AM5110	Earthquake Engineering *	R14AM3109		1	2	3				50	25	75
50		R14AM5111	RCC Detailing using CAD *	R14AM4109		1	2	3				50	25	75
					Total	**7**	**6**	**13**	**160**	**40**		**150**	**75**	**425**
					GRAND TOTAL	**101**	**84**	**185**	**2280**	**570**	**275**	**500**	**1075**	**4700**

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

PROGRAMME: DIPLOMA IN CIVIL ENGINEERING

SUMMARY OF MPECS 2014 SCHEME

Summary of 2014 Scheme		No of Courses		Teaching Scheme			Examination scheme					
	Category	Compulsory	Opt	L	P	C	TH	TT	PR	OR	TW	Total
1	Foundation	9	0	21	20	41	400	100	100	25	250	875
2	Allied	5	1	14	10	24	240	60		100	150	550
3	Core	12	0	33	26	59	840	210	125	25	275	1475
4	Applied	10	0	26	22	48	640	160	50	200	325	1375
5	Specialised	0	3	7	6	13	160	40		150	75	425
	Total	**36**	**4**	**101**	**84**	**185**	**2280**	**570**	**275**	**500**	**1075**	**4700**
Grand Total		**40**					**2850**			**1850**		**4700**

Total No. of courses to complete programme : 36 Compulsory + 4 Optional=40

Total No. of Theory Examinations : 30

Total No, of Practical/Oral Examinations : 8 internal + 14 external

Theory Credits to Non-theory Credit ratio : 55 : 45

Theory Marks to Non-Theory Marks ratio : 60 : 40

CUSROW WADEA INSTITUTE OF TECHNOLOGY, PUNE 1

PROGRAMME: DIPLOMA IN CIVIL ENGINEERING : SCHEME : MPECS 2014
LIST OF COURSES FOR CLASS DECLARATION

Class Declaration courses				Teaching Scheme			Examination scheme					
Sr No	Category	Code	Course Title	L	P	C	TH	TT	PR	OR	TW	Total
1	Applied	R14CE4102	Road Engineering	3	2	5	80	20		25	25	150
2	Applied	R14CE4103	Public Health Engineering	3	2	5	80	20			25	125
3	Applied	R14CE4104	Irrigation Engineering	3	2	5	80	20			25	125
4	Applied	R14CE4106	Civil Engineering Estimating Valuation & Costing	3	2	5	80	20		50	25	175
5	Applied	R14CE4107	Construction management	3	2	5	80	20		25	25	150
6	Applied	R14CE4108	Project Work		4	4				50	100	150
7	Applied	R14AM4109	Design of RCC Structures	3	2	5	80	20		25	25	150
8	Applied	R14AM4110	Design of Steel Structures	3	2	5	80	20		25	25	150
9	Specialised		Elective 1	3	2	5	80	20		50	25	175
10	Specialised		Elective 2	3	2	5	80	20		50	25	175
11	Specialised		Elective 3	1	2	3				50	25	75
			Total	**28**	**24**	**52**	**720**	**180**	**0**	**350**	**350**	**1600**

Total Theory Credits : 28

Total Theory Makrs : 900

Total practical credits: 24

Total non-thror marks : 700

Ttotal Credits to practical credits ratio =54:46

Theory marks to non -theory marks ratio = 56:44

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PROGRAMME: DIPLOMA IN CIVIL ENGINEERING SCHEME: MPECS 2014.

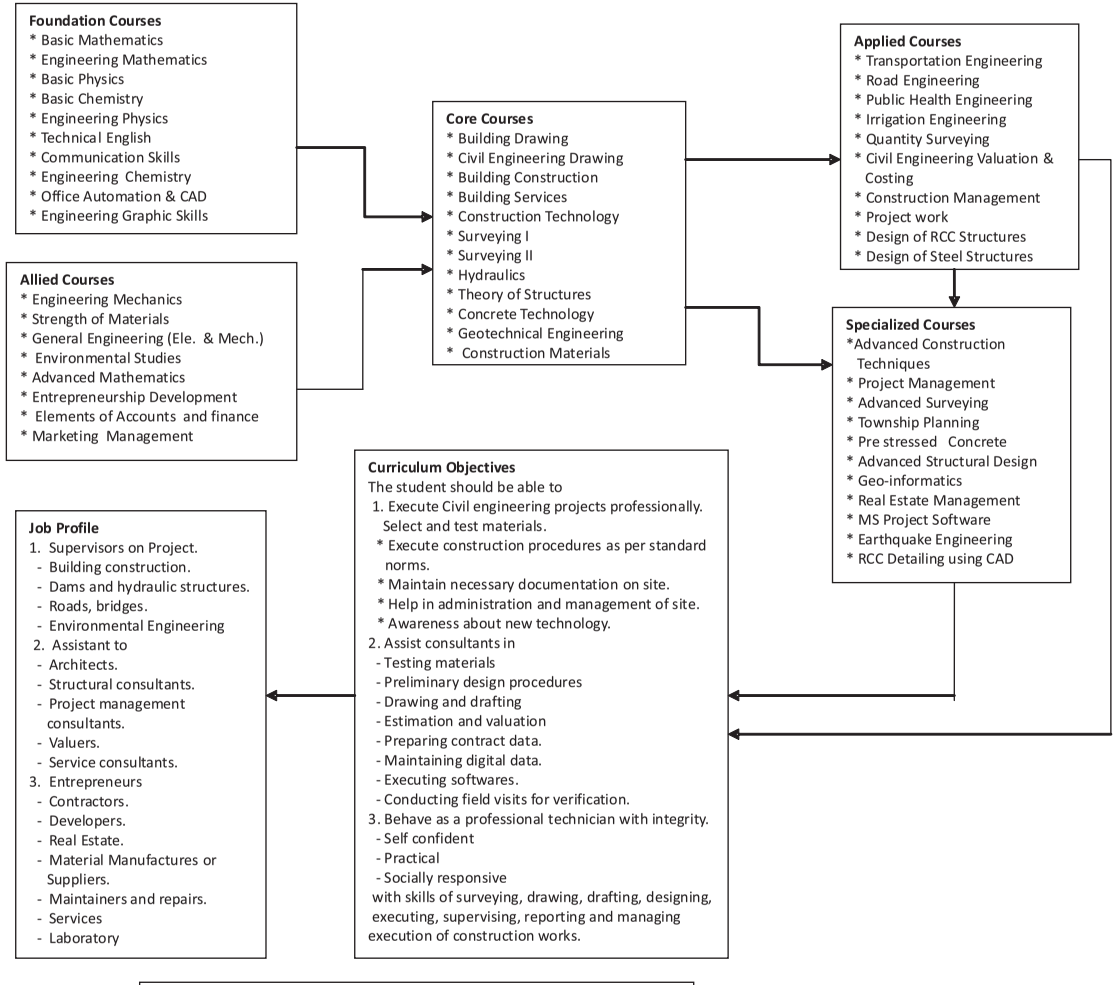
List of Optional Subjects

Elective 1 (any 1)	Elective 2 (any 1)	Elective 3 (any 1)	Allied courses (any 1)
a) Advanced Construction Techniques	a) Project Management	a) Geo informatics	a) Entrepreneurship Development
b) Advanced Surveying	b) Township Planning	b) Real Estate Management	b) Elements of Account and Finance
c) Pre stressed Concrete	c) Advanced Structural Design	c) MS Project Software	c) Marketing Management
		d) Earthquake Engineering	
		e) RCC Detailing using CAD	

Total optional courses offered = 14

Total optional courses to be opted by the students= 4

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1



LINK DIAGRAM FOR CIVIL ENGINEERING

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

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CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./COMP./E&TC. ENGINEERING
Course : Basic Mathematics Course Code: R14SC1701
Course Category: Foundation Credits : 4

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	-	3	80	20	-	-	-	100

Rationale:
Mathematics is an important prerequisite for the development and understanding of engineering concepts. The aim of the course is to acquire some essential competencies in Mathematics by the students of diploma in engineering. The course will help the students to think logically and systematically. The students will develop the attitude of problem solving.

Objectives:
The students will be able to
1.Understand all the basic concepts of Mathematics used in various fields of engineering.
2.Know the methods and procedures of problem solving.

Course Details

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Trigonometry:** 1.1 **Trigonometric ratios of an angle** Definition of positive and negative angles. Unit of measurement of an angle. Signs of trigonometric ratios of an angle in the four quadrants.(ASTC RULE) Trigonometric ratios of negative angles. 1.2 Trigonometric ratios of compound angles. Trigonometric ratios of allied angles. Trigonometric ratios of multiple and sub-multiple angles. Factorization and de-factorization formulae.	15	16

2	**Inverse Circular function** 2.1 Definition of inverse circular function. Principal value of inverse circular function. Properties of inverse circular function. Simple problems based on properties. 2.2 Solution of triangle. Sine Rule. Cosine Rule. Solution of the triangle using sine and cosine rule. **Determinant:** 2.3 Definition of determinants. Problems on expansion of determinants of order 2 & 3. Solution of simultaneous equation in two and three unknowns (Cramer's Rule).	10	12
3	**Matrices:** 3.1 Definition of a Matrix. Types of Matrices. Algebra of matrices: Addition, subtraction and multiplication of matrices. 3.2 Transpose of a matrix. Cofactor matrix Adjoint of a matrix. 3.3 Inverse of a matrix and to find inverse by adjoint method. Solution of simultaneous equation by matrix method.	10	16
4	**Statistics:** 4.1 Measures of central tendency. Mean, Median and Mode for grouped and ungrouped data. 4.2 Measures of dispersion: Mean deviation. Standard deviation. Variance and coefficient of variation	10	12
5	**Vector Algebra:** 5.1 Definition of Vector. Addition, subtraction of vectors. Direction cosines, direction ratios of line. 5.2 Product of vectors and its properties: Dot product of vectors Cross product of vectors. Scalar triple product of vectors.	09	12
6	**The Straight Line:** 6.1 Slope and intercept of a line. Parallel and perpendicular lines. 6.2 Intersection of two lines. Acute angle between two lines Perpendicular distance between a point and a line. Distance between two parallel lines. 6.3 **Graphs -** Graph of linear function. Graph of quadratic equation. Graph of trigonometric function. Graph of exponential function.	10	12

Teaching Methodology: Chalkboard, Discussion, Assignments, Printed notes

Skills to be developed:
Intellectual Skills:

- Memorizing skill will be developed after studying the formulae of all the topics.
- Selection skill will be developed after studying the methods of solving problems during selection of appropriate formula.
- Calculation skill will be developed after studying the topics Trigonometry ,Determinants and Matrices
- Skill of drawing graphs will be developed after studying the topic graphs.

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Peter V. O'Neil	Advanced Engineering Mathematics	Thomson, Canada.
2	K. A. Stroud, D. J. Booth	Engineering Mathematics	Palgrave, New York, U.S.A.
3	S. L. Loney	Plane Trigonometry	Macmillan Publication

A)Websites for references:

1. www.Wikipedia.com
2. www.Wolfarm.com
3. www.Mathworld.com
4. www.nptel.iitm.ac.in

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./COMP./E&TC. ENGINEERING
Course : Engineering Mathematics **Course Code: R14SC1702**
Course Category: Foundation **Credits : 4**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	-	3	80	20	-	-	-	100

Rationale:
Mathematics is an important prerequisite for the development and understanding of engineering concepts. The subject intends to teach students basic facts, concepts and principles of Mathematics as a tool to analyze engineering problems. It also aims to teach students to apply the basic facts of Mathematics to solve engineering problem.

Objectives:
The students will be able to:
1.Understand the concept and principles of derivatives, functions, limits and integration.
2.Use the principles of derivatives for the various applications.
3.Understand the principles of complex numbers.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Functions and Limits:** 1.1 Definition of functions and Notation. Different types of functions. 1.2 Limits - Concept of limits, Algebra of limits. 1.3 Different methods of finding limits. Limits of algebraic function. Limits of trigonometric function. Limits of exponential functions.	15	16
2	**Laws of Derivative:** 2.1 Concept and definition of derivative. 2.2 Derivatives of standard functions. 2.3 Laws of derivatives :- Addition law. Subtraction law. Multiplication law. Division law. 2.4 Derivatives of composite functions (Chain rule).	09	12

3	**Methods of Derivatives:** 3.1 Derivative of parametric functions. Derivative of implicit functions. Logarithmic differentiation. 3.2 Concept of higher order derivative 3.3 Concept of partial derivative.	10	12
4	**Application of Derivatives:** 4.1 Geometrical meaning of derivative.(slope of tangent and normal to the given curve) 4.2 Radius of curvature. 4.3 Physical application of derivative. 4.4 Maxima and minima using derivative.	9	12
5	**Integration:** 5.1 Definition of integration as anti-derivative. 5.2 Integration of algebraic functions. 5.3 Integration of trigonometric functions. 5.4 Integration by substitution.	9	12
6	**Complex Number:** 6.1 Definition of complex number. Algebra of complex number i.e. addition, subtraction, multiplication and division of complex numbers. To express given complex number in x + iy form . 6.2 Representation of complex number in a plane (Argand's diagram). Modulus and amplitude of complex number. Polar form of a complex number. Exponential form of a complex number. 6.3 Powers of a complex number - De - Moivre's theorem. Euler's theorem.	12	16

Teaching Methodology: Chalkboard, Discussion, Assignments, handouts
Skills to be developed:

Intellectual Skills:•

Memorizing skill will be developed after studying the formulae of all the topics.

•Selection skill will be developed after studying the methods of solving problems during selection of appropriate formula.

•Application skill will be developed after studying the topic Application of derivatives.

•Comprehension skill will be developed after studying each and every topic.

Learning Resources:

A)Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	K. A. Stroud, D. J. Booth	Engineering Mathematics	Palgrave, New York, U.S.A.
3	Peter V. O'Neil	Advanced Engineering Mathematics	Thomson, Canada.
4	Shanti Narayan	Engineering Mathematics Vol. I & II	S.Chand & Company, New Delhi.

A)Websites for references:

1. www.wikipedia.com 2. www.wolfarm.com
3. www.mathworld.com 4. www.nptel.iitm.ac.in

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./COMP./E&TC. ENGINEERING

Course Name : Basics Physics **Course Code: R14SC1703**

Course category: Foundation **Credits : 4**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	2	2	40	10	-	-	25	75

Rationale:

The development of various engineering topics is primarily based on the fundamental principles. The different principles of physics have a wide range of applications in all the braches of engineering. A reasonably good level of knowledge of physics, therefore, forms sound base for engineering students. Physics can be considered as a basic tool in the hands of an engineer through which he can pursue his studies and research work in technical field. The foundation level of the subject acquired by the student is kept in mind for selection of the topics. To create interest in the students more stress is given on the applications, in engineering field.

Objectives:

The student will be able to

1.Use different types of systems of units.
2.Identify and minimize the errors, Understand significant figures.
3.Study different types of motion and their applications in engineering field.
4.Study molecular forces, explain surface tension and viscosity with applications.
5.Understand different concepts of sound with application.
6.Differentiate between conduction convection and radiation.
7.Use different types of thermometers.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**1.1 Units and measurements:** Unit, fundamental units & examples, derived units & examples, system of Fundamental units (C.G.S., M.K.S., S.I. system of units) Rules and Conventions for the use of spacing of symbols in SI system. Table of derived S.I. units. Multiples and sub multiples of units. Significant figures, rules for significant figures. **1.2 Errors.** – Types of errors, Minimization of errors, Percentage error, Propagation of errors, Numericals. **1.3 Surface Tension:** Molecular forces and their nature, cohesive forces, adhesive forces sphere of influence, definition of surface tension, factors affecting surface tension (Temperature, impurity nature of the liquid), concave and convex meniscus of liquid surfaces and their explanation on the basis of molecular forces, angle of contact, capillary action and its explanation, applications of surface tension. Numericals **1.4 Viscosity:** Streamline and turbulent flow of fluids, critical velocity, viscous force in fluid, significance of Reynolds's number, velocity gradient, Newton's law, Stoke's law expression , terminal velocity, Numericals.	14	16

2	**2.1 Circular Motion:** Circular motion, uniform circular motion, tangential velocity, angular velocity, periodic time, frequency, relation between 1) Angular velocity and frequency, 2) angular velocity and periodic time, 3) linear velocity and angular velocity, radial acceleration expression, centripetal force, centrifugal force ,Numericals. **2.2 Applications of Circular Motion:** Motion of a vehicle round a horizontal curve, banking of roads and tracks, expression for angle of banking and super elevation, centrifuge. Numericals **2.3 Simple Harmonic Motion:** Periodic motion, simple harmonic motion, S.H.M. as a projection of uniform circular motion, equation of S.H.M. graphical representation of S.H.M. concepts of oscillation, periodic time, frequency, amplitude, phase, phase difference. Numericals.	9	12
3	**3.1 Modes of Heat Transfer, Temperature Measurement :** Difference between heat and temperature , definition of calorie , absolute zero , units of temperature ^{0}C,^{0}F ,^{0}K with their conversion a) Conduction – Flow of heat along a bar, steady state and variable state temp. Coefficient of thermal conductivity by Searle's method. (For good conductor) and Lee's method (for bad conductor). b) Convection, c) Radiation - Emissive power, absorptive power, black body , numerical Comparison between conduction, convection and radiation. **3.2 Temperature Measurement:** Bimetallic thermometer, resistance thermometer, thermocouple & thermopile, Pyrometers – i) Ferry's total radiation, ii) Optical Pyrometer. **3.3 Sound:** Sound waves, propagation of sound, reflection of sound waves, echo, absorption of sound, co efficient of absorption, reverberation, reverberation time, formula for reverberation time (No derivation), methods for controlling reverberation time. Numericals.	9	12

Teaching methodology: Chalkboard, Group Discussions, Handouts, Question Bank, PPT, Transparency, Seminar, and Guest Lecture.

Term work:

Skills to be developed:

i)Intellectual Skills:

- Identifying skill will be developed after studying topics of Temperature measurement.
- Discriminating skill will be developed after studying topics on motion.
- Comprehension skill will be developed after studying concept ,principles laws and rules given in the syllabus.
- **ii)Motor Skills:**
- Measuring skill will be developed after completing practicals.
- Graph drawing skill will be developed after studying practicals.
- Observing the result and comparison skill will be developed after competing practicals.

List of Experiments:

1.Measurement of (i) length, breadth and height of a block ,(ii) internal, external diameter and height of a hollow cylinder using vernier calipers of different least counts and digital vernier.

2.Measurement of diameter of sphere, wire and measurement of thickness of a plate by using micrometer screw gauge.

3.Measurement of radii of concave and convex surfaces and thickness of plate using spherometer.

4.To find viscosity of water by Poiseuille's method.
5.To find viscosity of oil by Stoke's method.
6.Calibration of thermocouple and to find unknown temperature.
7.Comparison of different thermometers with respect to mercury Thermometer.
8.To study the effect of length and mass of the bob on periodic time of a simple pendulum.
9.To investigate relation between radius and height of liquid in the capillary tube.
(surface tension)
10.Determination of co-efficient of thermal conductivity of a good conductor by
Searle's method.
11.Determination of co-efficient of thermal conductivity of a bad conductor by
Lee's disc method.

Learning Resources:
A)Books:

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	R.K.Gaur, S.L.Gupta	Engineering Physics	Dhanpat Rai & sons.
2	Prof. M. P. Kurian, Prof. R. B. Birhade, Prof.A.A.Mokashi	Applied Physics	Reliable Publications.
3	Dr.A.P.Saxena & Others	Principles of Physics	J.K.Jain Brothers TTTI, Bhopal.
4	Kamat & Rao	Applied Physics	Jeevan Deep Prakashan.
5	Mrs.V.C.Chinchwadkar	Text Book in Physics	Somaiya Publications, Bombay.
6	Umrani, Joshi	Applied Physics	Nirali Prakashan.

B)Web sites for references:
1.www.physicsclassroom.com
2.www.hyperphysics.com
3.www.physicsinfo.com

C)Video
www.Youtube.com (surface tension, viscosity, sound, ultrasound)

D)PPT
1.www.khanaacademy.com
2.www.slideshare.net

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./E&TC. ENGINEERING
Course : Basic Chemistry Course Code: R14SC1704
Course Category : Foundation Credits 4

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	2	2	40	10	-	-	25	75

Rationale:

Basic sciences like Chemistry are the foundation pillar of engineering and technology .It is most essential to learn the basic science to understand the fundamental concepts of engineering and technology.

The topic of Atomic structure and Chemical bonding is helpful to study properties of elements which are required in the engineering field.

In Electrochemistry electrical energy is obtained from the different chemical reactions which are used in different types of batteries. These batteries are widely used in automobiles and in day to day life.

Metallurgy and alloys have importance in various Industries , because metals are the backbone of the Industry. Study of properties of Metals and Alloys is essential .

Non-metallic materials such as plastic and rubber have great importance and application in technology.

Objectives:

The student will be able to

1) After studying the atomic structure and chemical bonding student will be able to draw the electronic configuration of various elements with the formation of various types of molecules.
2) With the study of electrochemistry student will be able to know electrolysis, Faraday's laws and working of different batteries.
3) After study of Metals and alloys student will be understand properties and applications of various Metals and alloys used in engineering industries.
4) After studying the non-metallic material student will be able to know the different properties and current applications of plastic and rubber in the engineering field.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Atomic Structure and Chemical Bonding: 1.1 Atom , Bohr's atomic model (postulates) Fundamental particle of atom, their Mass, Charge, Locations, 1.2 Atomic number, Mass number, Isotopes and Isobars, 1.3 Hund's rule of maximum Multiplicity, Pauli's Exclusion Principle ,Aufbau principle, 1.4 Electronic configuration, Octet rule & Duplet rule. (Electronic configuration upto Atomic number 30). 1.5 Types of Chemical bond, Electrovalent, Covalent, Formation and structure of Electrovalent molecules such as NaCl, $CaCl_2$,$AlCl_3$ etc 1.6 Covalent compounds such as H_2O, Cl_2, O_2, NH_3, N_2 etc 1.7 Distinction between Electrovalent and Covalent compounds.	09	12
2	Electrochemistry 2.1 Definitions of basic terms involved in Electrolysis: Conductors, Non conductors, Electrolytes: Strong and Weak Electrolyte, Difference between strong and weak electrolyte, Non electrolytes, Electrolysis, Electrolytic cell, Current density. 2.2 Ionization, Electrolytic Dissociation, Arrhenius theory of degree of Ionization /Dissociation and Factors affecting the Degree of Ionization. Definition of electrolytic cell, Electrodes -Cathode and Anode , Electrode potential – Oxidation potential and Reduction potential 2.3 Mechanism of Electrolysis, Electrolysis, Electrochemical series for Cations and Anions , Electrolysis of $CuSO_4$ solution using Platinum electrodes & Copper electrodes 2.4Applications of Electrolysis: Electroplating of Silver, Electro refining of blister Copper , Electrometallurgy 2.5 Electrochemical Processes: Faradays laws of Electrolysis (1^{st} and 2^{nd} law), Relation between ECE and CE. Numerical problems , 2.6 Electric Cells and Battery , Types of Cells : Primary and Secondary cells, Construction & Working of dry cell.	10	12

3	A) METALS & ALLOYS Metals 3.1 Introduction , Characteristics of Metals, Definitions – Mineral , ore, Gangue, flux and Slag, Metallurgy 3.2 Metallurgy- flow chart for extraction of metal 3.3 Important Extraction Process- Concentration- Gravity Separation, Electromagnetic separation , Froth flotation Process, Calcinations and Roasting. Reduction – Smelting , Aluminothermic Process ,Electrolytic reduction. Refining-Poling, Liquation, Electrolytic refining . 3.4 Mechanical Properties of Metals: Hardness , Ductility, Malleability, Tensile strength, Toughness ,Machinability , Weldalibity, Forging, Soldering, Brazing , Castability. Alloys 3.5 Definition, Purposes of Making Alloy with examples. Preparation Method – Fusion and Compression Classification of Alloys – Ferrous and Non Ferrous alloys with examples. 3.6 Composition , Properties and Applications of Duralumin , Wood metal, Babit metal, Monel metal ,Brass B) NON METALLIC ENGINEERING MATERIALS 3. 7 Polymers, Definition of polymer (plastic) Polymerization , Types of polymerization with examples. 3.8 Types of Plastic – Thermo-softening and Thermo- setting plastic and their differences , Properties and Applications of plastic. 3.9 Rubber: Definition ,Types of rubber, Drawbacks of natural rubber, Vulcanization of rubber with chemical reaction , Synthetic rubber- Definition , differences between Natural and synthetic rubber, Examples of synthetic rubber, Properties of synthetic rubber like Elasticity, Tack and Abrasion resistance, Their definition and applications	9 04	10 06

Teaching Methodology: Chalk board, Discussion, Assignments, Handouts and Question Bank, moodle.

Term work

Skills to be developed:

i) Intellectual Skills:

- Understand the concept of Construction & working of different batteries.
- Calculation of C.E. and E.C.E

List of Practical's/Experiments

1)Know your Chemistry laboratory & prepare sample solutions of different concentrations.
2)Drawing of Electronic configuration of atoms from atomic number 1 to 30 & Draw the molecular structure of various electrovalent and covalent compounds.
3)To determine Alkalinity of a given Water sample.
4)To determine the Neutralization point of weak acid and weak base using Conductivity Meter.
5)To determine the ECE of copper by Electrolysis of $CuSO_4$ solution.
6)Determination of percentage purity of Iron from stainless steel alloy
7)To determine percentage of Copper from the brass.
8)To determine percentage of Nickel from given Monel metal alloy.
9)To determine phosphate in a given water sample by using spectrophotometer.
10)To draw the Flow sheet of extraction of Metal form it`s ore.
11)Precipitation titration of $BaCl_2$ with H_2SO_4 using Conductivity meter.
12)Prepare Phenol formaldehyde resin used in manufacturing of Bakelite plastic

Learning Resources : A)Books:

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	V.P .Mehta	Polytechnic Chemistry	Jain brothers , New Delhi
2	Sharma B.K. & Kaur H.	Industrial Chemistry	Goel Publishing House, Meerut.
3	Jain P.C. & Jain Monika	Engineering Chemistry	Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
4	S.S. Dara	Engineering Chemistry	S. Chand Publication

B) Web site for references:

1.www.in.wikipedia.org 2.www.nptel.iitm.ac.in
3.www.youtube.com, watch v= KjoQHqzda8 (related to Chemical bonding)

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./E&TC. ENGINEERING
Course : Applied Science (E.Phy.+E.Chem.) Course Code : R14SC1709
Course category : Foundation Credits : 8

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	4	*4	80	20	-	-	50	150

*** Note:-** Applied Science contains Section I –Engg. Physics & Section II- Engg. Chemistry. Both the sections will have separate papers of two hours duration each.

Rationale:

Applied Science includes applied Chemistry as well as applied Physics. The Development of various engineering topics is primarily based on the fundamental principles. The different principles of physics have a wide range of applications in all the braches of engineering. A reasonably good level of knowledge of physics, therefore, forms sound base for engineering students. Physics can be considered as a basic tool in the hands of an engineer through which he can pursue his studies and research work in technical field. The foundation level of the subject acquired by the student is kept in mind for selection of the topics. To create interest in the students more stress is given on the applications, in engineering field.

Applied chemistry involves science and chemical principle that have resulted into development of new materials used in modern age. The topic water has wide application in all branches of engineering & technology. In the curriculum topic like Corrosion & its protection is needed for every engineering field. Whereas the study of the Lubricants is needed to know how various types of machines work smoothly and efficiently in various conditions. Students must know the efficiency of various types of fuels, its calorific value and the importance of chemical analysis of the fuel in engineering field.

Objectives:

The student will be able to

1. State the principle and measure the EMF by potentiometer.
2. Understand the concept of resistance and capacitance.
3. Study magnetic effect of electric current and apply right hand thumb rule.
4. Study effect of magnetic field on current carrying conductor and apply Fleming's left hand rule.
5. Differentiate magnetic materials and study their applications in engineering field.
6. Explain different terms related to lasers, its properties and application in engineering field.

7. After studying the topic Water student will be able to understand the types of impurities present in water, as well as its removal i.e purification processes such as ion exchange method, permutit method and important analytical tests of drinking water.
8. Student will be able to understand definition of Corrosion, its mechanism and different factors affecting the Corrosion. Protection methods like Cathodic protection and Application of different metal coating.
9. By studying Lubricant student will be able to select proper lubricant for different conditions in various Machines.
10. After studying the topic Fuel, student will be able to understand how conventional as well as non conventional energy is used for mankind.

Section-I (Engg.Physics)
Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	2	2	40	10	-	-	25	75

Section-II (Engg. Chemistry)
Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	2	2	40	10	-	-	25	75

Section-I (Engg.Physics)
Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	1.1 **Measurement of Resistance and EMF :** Definition of charge, current, Potential difference ,specific resistance, color code for resistance, types of resistance, resistance in series & parallel combinations (numerical), concept of temperature dependence of resistance, thermister, principle of potentiometer and balancing condition of potentiometer, potential gradient, measurement of EMF by potentiometer (numerical) 1.2 **Measurement of Capacitance:** Capacitor & capacitance, units, capacitor in series and parallel combinations (numerical),applications of capacitor (air, solid dielectric, electrolytic)	9	12

2	2.1 **Magnetic Effect of Electric Current:** Magnetic effect of electric current, lines of induction due to a straight conductor; right-hand thumb rule, magnetic induction (direction and magnitude), concept of uniform field 2.2 **Effect of Magnetic Field on Current Carrying Conductor:** Force of a magnetic field on current carrying conductor, (No derivation) **Fleming's left hand rule, couple acting on a rectangular coil placed in the uniform magnetic field, numericals** 2.3 **Magnetism:** Magnetic materials, permeability, susceptibility, relation between relative permeability and susceptibility, properties of diamagnetic, paramagnetic and ferromagnetic substances, ferrites and their application-antenna cores, television picture tube. 2.4 **Electromagnetic Spectrum:** Definition, range, applications 2.5 **Ultrasonic Waves:** Ultrasonic waves, production of ultrasonic waves by magnetostriction transducer, Application – Flaw detection, drilling, welding, cleaning. 2.6 **Nanotechnology:** Introduction to nanotechnology, principle and applications.	14	16
3	3.1 **Lasers:** Excitation of particle, optical pumping, types of transitions – non radiative and radiative, spontaneous and stimulated emission, population inversion, resonance cavity, active system, Principle of laser, types of lasers, - ruby laser, Helium-Neon laser, comparison between ruby and He-Ne lasers, Uses of lasers – as carrier waves, metal cutting communication, Computers, drilling, radars, depth sounding etc. 3.2 **Fiber Optics:** Principle, types of optical fibers properties & applications.	9	12

Teaching methodology: Chalk board, Group Discussions, handouts, Question Bank, PPT, Transparency, Seminar, and Guest Lecture.

A) Term work:
Skills to be developed:

i) Intellectual Skills:

- Discrimination skill will be developed after studying topics : types of resistor and capacitors ,types of lasers
- Comprehension skill will be developed after studying concept ,principles laws and rules given in the syllabus

ii) Motor Skills:

- Drawing and connecting circuit skill will be developed after completing practicals.
- Measurement skill will be developed after completing practicals.
- Observing the result and comparing skill will be developed after completing practicals.

List of Practical's /Assignments/Experiments:

1) Specific resistance by voltmeter ammeter method.
2) Measurement of EMF by potentiometer.
3) Measurement of resistance in series and parallel
4) To study the effect of temperature on the resistance of – thermister.
5) To study the effect of temperature on the resistance of - copper coil.
6) Measurement of resistance by using color code and digital multimeter.
7) Measurement of divergence of light beam by laser

- Term work includes any six practicals (six weeks)& one mini project/seminar(six weeks)

Learning Resources:

A) Books:

Sr. No.	AUTHOR	TITLE	PUBLISHER
1	R.K.Gaur, S.L.Gupta	Engineering. Physics	Dhanput Raj Publication.
2	Prof.M.P.Kurian Prof.R.B.Birhade Prof.A.A.Mokashi	Applied Physics	Reliable Publications.
3	Dr.A.P.Saxena & Others	Principles of Physics	J.K.Jain Brothers TTTI, Bhopal.
4	Mrs.V.C.Chinchwadkar	Text Book in Physics	Somaiya Publications, Bombay.
5	David Halliday Robert Resnik	Physics	Wiley Eastern Limited.

A)Web sites for references:.

www.physicsclassroom.com
www.hyperphysics.com
www.physicsinfo.com

B)Video

www.youtube.com

C)PPT

www.khanaacademy.com
www.slidehare.net

Section-II (Engg. Chemistry)
Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
I	**WATER** 1.1 Types of impurities in the natural water. 1.2 Definition : Soft water, Hard water, Types of hardness of the Water, 1.3 Degree of Hardness of the Water in terms of equivalent amount of $CaCO_3$, Numerical based on degree of hardness of water 1.4 Bad Effects of hard water in Domestic purposes, In Industries like Textile , Paper , Sugar, Dye industry and in Steam generating boiler 1.5 Water treatment for Industrial applications :Principle , Diagram, Working, Chemical reactions , Regeneration ,Advantages – Permutit/zeolite process and Ion Exchange process 1.6 For Domestic Applications : Water quality parameters for potable water , Treatment of water for domestic application by Screening, Sedimentation , Coagulation , Filtration , Sterilization. Chlorination – using chlorine gas , bleaching powder & chloramines 1.7 Desalination of Sea water (brackish) by Reverse Osmosis 1.8 Definition of pH, pH scale, Numerical problem on pH . Industrial application of the pH	**10**	**12**
II	**CORROSION** 2.1 Definition of Corrosion, Types of corrosion, 2.2 Atmospheric Corrosion-definition, mechanism of oxidation corrosion, Types of oxide films and their significance, factors affecting atmospheric corrosion 2.3 Immersed corrosion- definition, mechanism of immersed corrosion by galvanic cell action-with evolution of hydrogen gas and absorption of oxygen gas, factors affecting immersed corrosion Protection of Metals by : 2.4 Modification of environment , Modification of properties of metal , Electrochemical protection by sacrificial anodic protection and impressed current cathodic protection , use of protective coatings 2.5 Applications of metallic coatings by Galvanizing, Tinning, Metal spraying , Electroplating , Metal cladding , Cementation.	**10**	**12**
III	**A:-LUBRICANTS** 3.1 Lubricant-Definition, Characteristic of a good lubricant. 3.2 Classification of lubricants-Solid lubricants-characteristics and applications Graphite and Molybdenum disulphide. Liquid lubricants – characteristics and applications synthetic fluid (silicon oil) , Water as a lubricant(coolant), Semisolid lubricants- Characteristics and applications of Grease . 3.3 Mechanism of Lubrication – definition of lubrication , Types of mechanism of lubrication : Fluid film lubrication, boundary lubrication & extreme pressure lubrication, 3.4 Physical characteristics of lubricants- viscosity, viscosity index , oiliness, volatility, flash and fire point, cloud and pour point, chemical characteristics of lubricants – acid value or neutralization number, emulsification ,saponification value 3.5 Selection of lubricants for Road rollers , Steam engine, Sewing Machine , Concrete mixer, IC engine, Cutting tools and Gears.	**06**	**8**
	B:- FUELS 3.6 Fuels- Definition, calorific value and ignition temperature, characteristics of good fuels with suitable example, advantages and dis- advantages of solid , liquid and gases fuels , 3.7 Classification of fuels , Solid fuels-analysis of solid fuel, proximate analysis of Coal for determination of moisture , volatile matter , ash and fixed carbon, Significance of proximate analysis. 3.8 Liquid fuels – origin , fractional distillation of crude petroleum, boiling range, carbon composition and applications of petroleum fractions obtained . Composition , properties and applications of Bio- diesel 3.9 Gaseous fuels – composition, properties , applications of Biogas, LPG & CNG	**06**	**8**

Teaching methodology: Chalk board, Group Discussions, handouts, Question Bank, PPT, Transparency, Moodle.

Term work
Skills to be developed:

i) Intellectual Skills:

- Comprehension skill will be developed after studying concept ,principles laws and rules given in the syllabus
- Comprehension skill will be developed after studying topics: Corrosion and water.
- Selection skill will be developed after studying topics: Lubricants and Fuels.

ii) Motor Skills:

- Measurement skill will be developed after completing practicals.
- Observing the result and comparing skill will be developed after completing practicals.

Term work includes six experiments (six weeks) and mini projects or seminar (six weeks)
List of Practical's/Experiments:

1) Determination of Total hardness of water by using EDTA method.
2) To determine Moisture contents in a given coal sample by proximate analysis.
3) To determine Ash contents in a given coal sample by proximate analysis.
4) To determine viscosity of liquid by using Ostwald viscometer.
5) To determine Dissolved Oxygen in a given water sample by Winkler`s Method.
6) To determine pH of different solutions by using pH meter.
7) To determine the Acid value of a given oil.(lubricant)

Learning Resources:
A) Books:

Sr. No.	AUTHOR	TITLE	PUBLISHER
1	Jain P.C. & Jain Monika	Engineering Chemistry	Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2	Ved Prakash Mehta	Polytechnic Chemistry	Jain brothers, New delhi.
3	C. V. Agarwal	Chemistry of Engg. Materials	Tara Publucations Waranasi
4	B.K. Sharma	Industrial chemistry	Goel publication
5	S.S.Dara	Engineering Chemistry	S. Chand publication

B) Web sites for references:

1. www.in.wikipedia.org
2. www.nptel.iitm.ac.in

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./COMP./E&TC. ENGINEERING

Course : Technical English **Course Code: R14SC1707**

Course Category: Foundation **Credits : 4**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	2	3	80	20	-	-	25	125

Rationale:

Students need effective writing skills in their academic and professional life. This syllabus is need based and special efforts are taken to improve the writing skills of students. Students admitted to polytechnic come from rural and urban areas. They are from different mediums and backgrounds. As the students are weak in writing correct English, more stress is given on improving their basic concepts of written communication.

Objectives:

The students will be able to

1.Learn the basic concepts of grammar and sentence formation.

2.Express their ideas logically and correctly.

3.Comprehend the given passage and arrange their ideas in sequential order.

4.Improve their presentation skills in oral and written communication.

5.Interact effectively from the industry point of view.

6.Use the various formats of business correspondence.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Grammar:** 1.1 Parts of Speech. 1.2 Transformation of sentences. [tenses, prepositions, conjunctions, punctuation, direct-indirect speech, active & passive voice] 1.3 Features of technical writing.	8	16
2	**Communication:** 2.1 Written and oral communication. 2.2 Barriers in communication. 2.3 Principles of communication	4	12
3	**Applied Writing:** 3.1 Dialogue writing 3.2 Comprehension. 3.3 Speech writing on : - Farewell speech - Introducing a guest -Vote of thanks	4	12

4	**Office Drafting:** 4.1 Notice and Circular. 4.2 Memo. 4.3 Email writing.	4	12
5	**Business Correspondence:** 5.1 Letter of Enquiry, Order and job application. 5.2 Letter of Complaint, resignation, reminder. 5.3 Joining letter, appreciation letter.	8	16
6	**Report writing:** 6.1 Visit report. 6.2 Accident report. 6.3 Progress report, Investigation report.	4	12

Teaching Methodology: Chalkboard, whiteboard, improved lecture method, discussion method, power point Presentations, case study.

Term work: Skills to be developed:

i)Intellectual Skill:

- Speaking and listening skills will be developed on completion of the assignment nos. 7-12 of term work.
- Presentation skills will be developed on performance of assignment nos.1-6 of term work.
- Writing skills will be developed by studying topics of applied writing, Office drafting, Business correspondence and Report writing.
- Reading and comprehension skills will be developed by studying the topic of Comprehension.

ii) Skills to be developed in Professional practices are included in these assignments.

List of Practical/Assignment/Experiment:

1.Self introduction. (**Professional Practices)**
2.Technical presentation. (**Professional Practices)**
3.Elocution. (**Professional Practices)**
4.Power Point presentation. (**Professional Practices)**
5.Email Writing.
6.News Presentation. (**Professional Practices)**
7.Introduction of Basic English words and their pronunciation.
8.Introduction of friends, guests, visitors.
9.Meeting and greeting people.
10.Talking about the family.
11.Giving directions about places in town.
12.Describing your home, neighbourhood and region.

(Note: Practical no.7 to 12 will be covered by using Linguaphone Language lab machine. In every practical student will solve the assignment based on that unit. Student will learn basic English words, their pronunciation, introducing new situations and rules to keep the conversation going)

Learning Resources:
A)Books:

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Locker,Stephen Kyo Kaczmarek	Business Communication : Building Critical Skills	Published by McGraw Hill Professionals.
2	Alok Pandey & Deepak Pandey	Advanced English Grammar & Composition	Published by Sahni Publication, Delhi-7.
3	Raymond Murphy	Intermediate English Grammar	Published by Foundation Book 2003 (Second Edition), New Delhi.
4	Raymond Murphy	Essential English Grammar	Published by Foundation Book Pvt. Ltd., 2004 (Second Edition), New Delhi.
5	M.P. Bhatia	Applied Grammar & Composition	Published by M.I. Publications (Eighth Revised Edition), Agra.

B)Web sites for references :

1. www.learn4good.com
2. www.fluentzy.com
3. www.edufind.com
4. www.khake.com
5. www.learnenglish.org.uk
6. www.english4engineer.com
7. www.owl.english.purdue.edu

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./COMP./E&TC. ENGINEERING
Course : Communication Skills Course Code: R14SC1708
Course Category: Foundation Credits : 3

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
1	2	-	-	-		@25	25	50

@ Internal Exam

Rationale:

The old course materials comprising anthologies of prose selections and the old methodology based mainly on the classroom lecture are not conducive to the development of study skills and communicative competence in the students. Therefore, a need to develop an appropriate course in English for students of engineering and technology and to adopt an innovative approach to English language teaching and learning is essential. The aim of this course is to impart to the students the necessary communication skills that they need in their academic and professional life.

This course demands an actual use of the English language by students in the classroom and encourages interaction among them. It is designed to develop the linguistic skills and not to test their memory skills. In this new approach, all the four skills involved in learning a language, namely- 1) Listening 2) Reading 3) Writing 4) Speaking are developed.

Objectives:

The students will be able to
1.Practice the basic skills of speaking, reading, listening and writing.
2.Express their ideas correctly and fluently in English.
3.Interact with others in English and gain confidence in the use of the English language.
4.Realise the importance of effective presentation skills.
5.Improve their communication skills that will lead to their overall personality development.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS
1	**Presentation Skills:** 1.1 Personal grooming. 1.2 Matter of presentation. 1.3 Manner of presentation.	3
2	**Interview Techniques:** 2.1 Communication skills. 2.2 Stress management. 2.3 Presence of mind.	3

3	**Group Discussion Techniques:** 3.1 Manners and etiquettes. 3.2 Discussion rules. 3.3 Effective presentation of views.	3
4	**Body Language:** 4.1 Facial expressions. 4.2 Posture and gesture. 4.3 Eye movements.	3
5	**Resume Writing:** 5.1 Correct language. 5.2 Strengths and achievements. 5.3 Format of biodata.	2
6	**Vocabulary:** 6.1 Synonyms. 6.2 Antonyms. 6.3 Homonyms.	2

Teaching Methodology: Chalkboard, Whiteboard, Discussion Method, Power Point Presentation, Case study, Improved Lecture Method etc.

Term work:
Skills to be developed:
i)Intellectual Skills :
- Listening and speaking skills will be developed on completion of assignments of Term work & the topic of group discussion techniques.
- Presentation skills will be developed by studying the topic of Presentation skills and after performing the assignments based on it.
- Writing skills will be developed by studying topic of resume writing.

ii) Skills to be developed in Professional practices are included in these assignments as presentation and guest lectures.

List of Practical/ Assignment/Experiment

1.Interview of the candidates. (**Professional Practices)**
2.Debate on different topics. (**Professional Practices)**
3.Poster Presentation. (**Professional Practices)**
4.Group discussion. (**Professional Practices)**
5.Role Play. (**Professional Practices)**
6.Power Point Presentation. (**Professional Practices)**
7.Talking about different jobs and types of work.
8.Talking about your hobbies and enquiring about those of other people.
9.Enquire about people's programmes, plans and booking facilities.
10.Telephone etiquettes and information about the postal service.
11.Talking about the public transport system.
12.Talking about accommodation facilities in a hotel & shopping.

(**Note**: Practical no.7 to 12 will be covered by using Linguaphone Language lab machine. In every practical student will solve the assignment based on that unit. Student will learn the conversation techniques, pronunciation, etiquettes, manners and he will develop the ability to speak in different situations).

Learning Resources:

A) Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Dr.B.R.Kishore , D.S.Paul	Kumar's Group Discussions and Interviews	Vee Kumar Publications Private Limited, New Delhi-110008.
2	Adam B. Cooper	PowerPoint Presentations that Sell	McGraw Hill Professionals.
3	R.C.Bhatia	Business Communication	Ane Books India, New Delhi.
4	Krishna Mohan, Meera Banerji	Developing Communication Skills	Published by Rajiv Beri for Macmillan India Ltd., New Delhi.

B) Web sites for references:

1. www.skillstudio.co.uk
2. www.khake.com
3. www.search4excellence.com
4. www.selfgrowth.com
5. www.mindtools.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: CIVIL ENGINEERING
Course:Office Automation and CAD **Course Code : R14CE1101**
Course Category: Specialized **Credits : 5**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
1	4	-	-	-	@50		50	100

Rationale:
Now a days, civil industry is using computer aided drafting as a routine.. Computers being the inevitable part in an engineer's life due to its inbuilt characteristics which helps him to do various task with acceleration and accuracy. Using computers and CAD software it is easy to create and modify drawings. In civil engineering industry operating skills are required for computer aided drafting ,handling of printers & plotters. This subject is also useful to built up concepts in 3 D modeling.

Objectives:
Students will be able to
1)Draw, edit and modify 2D drawings.
2)Give dimensions, tolerances and geometrical tolerances.
3)Draw Isometric drawing and 3 D drawing.
4)Plot a drawing.

Course Details:

Unit	Name of The Topic	Hours	Marks
01	**1.1 MS-Word :** Introduction, Starting of MS-Word. Creating and Editing a document. Formatting a document. Other features: - find and replace, tables, grammar and spell check. **1.2 MS-Power Point :** Introduction, Application - presentation and slide show Creating and displaying a presentation.	02	
02	**2.1 MS-Excel :** Introduction, Starting of MS -Excel. Creating and Formatting a document. Features: - Auto sum, drag and drop, auto fill, insert clipart, row and column. Charts: - Column, bar, pie, line area. Formula and functions - Types, terms like cell address, types of references, values, objects, add inns. Sorting, filtering, data validation	04	

03	**Introduction to Computer Aided Drafting** **3.1** Co-ordinate system- Cartesian & Polar-Absolute, Relative mode. CAD initial settings commands - Snap, grid, ortho, osnap, limits, units, filters, itscale, mbuttonpan Object Selection methods – picking, window, crossing, fence, last, previous etc. **Zoom and formatting Commands** **3.2** Zoom Commands – all, previous, out, in, extent, realtime, dynamic, window, pan. Formatting commands - Layers, block, linetype, lineweight, color. **Draw and Enquiry commands** **3.3** Draw Command - Line, arc, circle, rectangle, polygon, ellipse, spline, block, hatch Enquiry commands - distance, area	02	
04	**Edit and Modify commands** **4.1** Modify Command - Erase, oops, break, trim, copy, move, mirror, offset, fillet, chamfer, array, extend, rotate, scale, lengthen, stretch, measure, divide, explode, align. **4.2** Grips editing- Move, Copy, Stretch.	02	
05	**Dimensioning, Text and Plot Commands** **5.1** Dimensioning commands - Dimension styles, Dimensional Tolerances and Geometrical Tolerances. **5.2** Text commands - dtext, mtext command. **5.3** Plotting a drawing - paper space, model space, creating table, plot commands.	02	
06	**Isometric Drawings** 6.1 3D Edit Commands -Pline, 3Dpoly, pedit, join splinedit commands. 6.2 View Commands - View ports, UCS, WCS commands **6.3** Shade and Enquiry commands – mass property, Shade and render command.	04	

Teaching Methodology: Power Point Presentations (PPT), Guest Lecturers, Software applications with the help of computer, actual working with AutoCAD.

Skills to be developed:
Intellectual skills:
1.Select and develop coordinate system.
2.Interpret a drawing to draw in CAD software.
3.Select & use appropriate CAD commands for given situation.
4.Able to convert any sketch in engineering drawing with a scale.

Motor Skills:
1.Use pull down menu and their submenu, toolbars
2.Setting the initial drawing setup.
3.Draw, edit and modify drawings.
4.Use printers and plotters for plotting production drawings.

Practical:
List of Practicals:
Office Automation
1.Two exercises each using word and PowerPoint for any topics from curriculum
Four exercises demonstrating power of Excel in data manipulations

(Civil Engineering Objects will be drawn)
Practice exercises for following topics ,
1.Set the initial view.
2.Use of Draw command.
3.Use of Edit command.
4.Use of Modify command.
5.Apply dimensions.
6.Draw Isometric drawing.
7.Draw 3 D drawings.
8.Plotting of drawings on A2/A3 size sheet.

Submission of following drawings using CAD software:
1.Load bearing structure building drawn in building drawing Submission work
2.Framed structure building drawn in Civil engineering drawing submission work.

Internal examination will assess student mainly for accuracy and speed of drawing using Cad software.
Exercise should be designed so that average student should be able to complete the work in 1.5 hours.

A)Learning Resources:

B)1.Books:

Sr. No	Author	Title	Publisher / Edition
1	Sham Tickoo	AutoCAD: A Problem-Solving Approach	Thomson Learning EMEA, Limited
2	George Omura	Mastering Auto CAD	BPB Publication
3	George Omura	ABC's of Auto CAD	BPB Publication
4	Gautam Purohit & Gautam Ghosh	M/c Drawing with AutoCAD	Pearson Publication
5	T Jeyapoovan	Engineering Graphics Using AutoCAD	Vikas Publishing House Pvt. Ltd. Fifth Edition
6	-	Various software manuals	-

2. Websites:
1.http://www.we-r-here.com/cad/tutorials/index.htm
2.http://www.cadtutor.net/tutorials/autocad/
3.http://www.caddprimer.com/AutoCAD_training_tutorial/AutoCAD_training_lessons.htm
4.http://www.autocadmark.com/
5.http://www.autocadtutorials.net/

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN : CIVIL/MECH./ELECT./COMP./E&TC.ENGINEERING
Course Name : Engineering Graphics Skill Course Code : R14ME 1203
Course Category : Foundation Credits : 05

Teaching & Examination Scheme

Teaching Scheme		Examination Scheme						
TH	PR	Paper Hrs	TH	TEST	PR	OR	TW	TOTAL
1	4	-	-	-	@50		50	100

Rationale :
Drawing which is known as the language of engineers is widely used means of communication among the designers, engineers, technicians & craftsmen in an industry. The translation of ideas into practice without the use of this graphic language is really beyond imagination. Thus for the effective & efficient communication among all those involved in an industrial system, it becomes necessary for a diploma engineer to acquire the appropriate skills in the use of graphic language. This preliminary course aims at building a foundation for the further courses in drawing and other allied subjects.

Objectives :
The students will be able to
1. Apply basic principles of engineering drawing.
2. Draw orthographic projections of different objects.
3. Draw isometric view from given two orthographic views.
4. Draw various engineering curves and know their applications

Course Details :

	NAME OF THE TOPIC
1	**1.1 Introduction to subject :** Use of instruments, types of lines, types lettering, full, enlarging and reducing scales, dimensioning techniques. **1.2 Geometrical construction :** To construct a regular polygon of given side. To construct a regular polygon in a given circle. To inscribe a circle in a given polygon. To circumscribe a circle around a given polygon. To draw circles touching each other and the sides of a given polygon internally and externally **1.3 Tangent exercises :** To bisect a given straight line/arc/angle. To divide given straight line into given number of equal parts.

	To draw a normal to a given straight line/arc from a given point within or outside it. To draw a straight line parallel to a given straight line / arc through a given point / at a given distance. To draw an arc touching to two straight lines / two arcs (internally / externally) / one line and one arc. To draw an internal / external tangent to two given arcs apart from each other.		
2	**2.1 Redraw figures :** To redraw the given figure (using the knowledge of geometrical constructions and tangent exercises). **2.2 Construction of curves :** To study the construction of following curves using the method mentioned against them. 2.3 Ellipse – Directrix focus method, arcs of circle method and concentric circle method. 2.4 Parabola – directory focus method and rectangle method. Involutes – of a polygon, of a circle and of combination of a polygon and circle.	2	
3	**Orthographic projection :** Conversion of simple pictorial views into orthographic projections using first angle and third angle method of projections. Dimensioning the views.	4	-
4	**Sectional views :** Conversion of simple pictorial views into sectional orthographic projections using first angle and third angle method of projection. Dimensioning the views.	4	-
5	**Isometric projections and views :** Construction and use of isometric scale. Conversion of simple orthographic views into isometric projections / views.	3	-
6	**Freehand sketches :** Of section of a load bearing structure, Concrete footing, RCC Lintel and chhajja, Door frame and shutter	1	-

Teaching Methodology : Discussions, Chalk-Board, Charts, Models, Transparencies

Skills to be developed :

i)Intellectual Skills :
- Conversion of given Orthographic views in to Isometric & vice-versa.
- Visualization of an object.

ii)Motor Skills :
- Use of various drawing instruments.
- Drawing of various engineering curves & loci of points.
- Redrawing the given figures.
- Drawing free hand sketches of concrete structures, doors, windows etc.

Term Work :

List of Drawing Sheets / Assignments :

***(All drawing objects will be civil engineering objects . Scales used in civil engineering will be adopted. e.g. footings, retaining wall structure , door frame, step block ,stairs, compound wall)

Sr. No.	Topic Name	Number of sheets
1	Geometrical constructions and tangent exercise	1
2	Redraw and Engineering Curves	2
3	Orthographic views	2
4	Sectional views	2
5	Isometric views	2
6	Freehand sketches	1

* No. of assignments equivalent to sheet
* Assignments to be completed in sketch book.
* Contents of assignment shall be equivalent a sheet

Learning Resources:

Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
01	N.D. Bhatt	Engineering Drawing	Charotar Publication, Anand..
02	Mali and Chaudhary	Engineering Drawing	Vrinda Publications,Jalgaon
03	Kamat & Rao	Engineering Drawing	Jeevandeep Publicatons, Mumbai
04	N.Y. Prabhu	Geometrical Engineering Drawing	Pune Vidyrthi Griha, Publications, Pune.
05	Ozarkar & Utturkar	Engineering Drawing	Maharashtra Publishing house
06	K. Venugopal	Engineering Drawing	New Age International Ltd., Delhi

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL / MECHANICAL ENGINEERING
Course : Engineering Mechanics Course Code : R14AM2101
Course Category : Allied Credits : 5

Teaching and Examination scheme :

Teaching Scheme		Examination scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	-	-	25	125

Rational :
This is Allied subject which will enable the students to understand the fundamentals of mechanics. The main purpose is to help the students to develop the logical, orderly processes of thinking that characterize an engineer. The relations between a force and its components, Newton's laws of motion applied to a wide variety of practical situations in the field of civil and mechanical engineering.

Objectives :
The students will be able to
1. Understand the force, force system and their effects on the body.
2. Understand various laws and principles in Engg. Mechanics.
3. Apply the concepts and principles in Engg. Mechanics to various problems in different fields of engineering.
4. Build the pre-requisites for higher semester subjects related to Analysis and Design.

Course Contents :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Composition and Resolution of Forces :** 1.1 Concept of force and its unit, system of coplanar forces, concurrent and non concurrent, like and unlike parallel forces. 1.2 Resultant and equilibrant of forces, composition of forces: triangle, parallelogram and polygon law of forces. Resolution of forces in rectangular components.	8	16
2	2.1 **Equilibrium of Forces:** Moment of a force, Equilibrium conditions, Types of Supports, Beam reactions, Varignon's theorem, concept of couple. Principle of transmissibility of a force.	8	12

	2.2 **Friction :** Friction as opposing force, advantages and disadvantages of friction, Laws of friction, coefficient of friction, its value for different materials in contact, angle of friction, cone of friction, 2.3 A body resting on rough horizontal plane under applied force of different magnitude. Equilibrium of a body resting on rough inclined plane when Applied force is i) inclined to plane, ii) along the plane and iii) horizontal.	8	12
3	**Centre of Gravity :** 3.1 Concept of center of gravity and centroid. Standard case: Rectangle, circle, semicircle and Triangle. 3.2 Determination of centroid for sections such as I, T, L and other compound sections.	8	16
4	**Moment of Inertia** 4.1 Definition, Parallel axes theorem, Perpendicular axis Theorem, radius of gyration. 4.2 Moment of Inertia of different shapes : rectangle, Triangle, circle, semicircle and compound sections.	8	12
5	**Kinetics :** 5.1 Momentum, impulse, impulsive force, Newton's laws of motion, 5.2 Direct impact, D'Alembert's Principle, Law of conservation of momentum.	8	12
6	**Work, Power and Energy :** 6.1 Definitions of work, power and energy and their units, graphical representation of work, work done by a torque. 6.2 Definition, forms of energy – kinetic and potential, law of conservation of energy, work energy principle.	8	12

Term Work :

Skills to be developed :

i) Intellectual Skills :

- Understand the concept of Resolution, Composition of forces, Work, Power and Energy.
- Apply and use various principles to solve engineering problems.

ii) Motor Skills:

- Calculate the Resultant of force system, Beam reactions, Coefficient of friction, Centre of Gravity, Moment of Inertia of various plane laminas.
- Locate the position of resultant and centroid in the given figure.

List of Experiments/Practical's/Assignments:

1)To verify Lami's Theorem.
2)To verify law of parallelogram of forces.
3) To verify law of triangle.
4)To verify the law of polygon of forces.
5)To determine the value of 'g' the acceleration due to gravity by Atwood's machine.
6)To verify principle of moment.
7)To find the coefficient of friction between wood and glass using a rough horizontal plane.
8)To find the coefficient of friction between wood and glass using a rough inclined plane.
9)To find mechanical advantage, velocity ratio and efficiency of worm and worm wheel.
10)To find mechanical advantage, velocity ratio and efficiency of screw jack.
11)To find the support reactions of a simple beam.
12)To find the forces in jib and tie of a jib crane.

Assignments on:

1)Topic No. 1 and 2.
2)Topic No. 3 and 4.
3)Topic No. 5 and 6.

Text/Reference books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
1	Beer and Johnston	Engineering Mechanics	Tata McGraw Hill
2	S.P. Timoshenko	Engineering Mechanics	Schaum Outline Series
3	Dadhe Jamdar and Walavalkar	Fundamentals of Applied Mechanics	Sarita Prakashan, Pune.
4	S.B.Junnarkar	Elements of Applied Mechanics	Charotor Book Stall, Anand.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL / MECHANICAL ENGINEERING
Course : Strength of Materials **Course Code : R14AM2102**
Course Category : Allied **Credits : 6**

Teaching and Examination scheme :

Teaching Scheme		Examination scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
4	2	3	80	20	-	-	25	125

Rational :
This is allied subject which will enable the students to understand the fundamentals of solid mechanics and deals with elementary knowledge of stresses, strains, shear forces and bending moments, it's applications in the field of civil and mechanical engineering.

Objectives :
The students will be able to
1. Understand the normal stress, shear stress and their effects on the body.
2. Understand stress-strain diagrams for ductile and brittle materials.
3. Understand the concepts of shear force and bending moment diagrams.
4. Build the pre-requisites for higher semester subjects related to Analysis and Design.

Course Contents :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1.	**Simple Stresses and Strain :** 1.1 Concept of stress and strain, direct, tensile, compressive and shear stress and strain, lateral strain, Poisson's ratio. Stresses in composite sections under direct loading only. Temperature stresses for homogeneous bar only. 1.2 Stress strain curve for mild steel and cast iron, Salient points such as limit of proportionality, elastic limit, yield point, ultimate stress and breaking stress, plastic stage, % elongation, % reduction in area, proof stress working stress, and factor of safety. 1.3 Concept of elasticity, Hook's law, Young's modulus of elasticity, modulus of rigidity and bulk modulus, relation between three elastic module and Poisson's ratio.	12	16

2.	**Beams and bending:** 2.1 Concept of beam, Bending moment and shear force diagrams for cantilevers and simply supported beams with and without overhangs subjected to point loads, uniformly distributed loads (u.d.l.), couples, uniformly varying load (u.v.l.). 2.2 Location of point of contra flexure. Relation between bending moment, shear force and rate of loading.	10	12
3.	**Bending Stresses and Shear Stresses:** 3.1Theory of simple bending, flexural formula (No derivation), concept of bending stress, assumptions in the theory of bending, moment of resistance, section modulus, neutral axis, comparative strengths of rectangular, circular, I, T, channel section 3.2 Concept of shear stresses in a beam, average shear stress, max sh ear stress shear stress distribution diagrams for rectangular, circular, I, T, channel sections.	10	12
4.	**Combined bending and direct stresses :** 4.1 Axial load, eccentric load, eccentricity, direct stress, bending stress, uniaxial bending biaxial bending. Maximum and minimum total stress, no tension condition, limiting eccentricity, core of section, middle third rule, total stress variation diagrams. 4.2 Strain energy , Resilience, proof resilience and modulus of resilience. Stresses due to gradual,sudden and impact loads.	10	12
5.	**Principle planes and principal stresses :** 5.1 Stresses on inclined planes, planes, planes of max. shear stress, definition of principal plane and principal stresses, location of principal planes, expression for normal and tangential stress, max. shear stress, Mohr's circle of stresses, condition of max. obliquity of resultant stress 5.2Thin cylindrical shells: Longitudinal and circumferential (hoop) stresses in seamless thin walled cylindrical shells, shear stress.	12	16
6.	**Torsion:** 6.1 Concepts of torsion, Torsional equation (No derivation) for solid circular shaft, hollow circular shaft, shear stress distribution over cross section. 6.2 Comparison between a solid and hollow shaft for same strength and same weight, power transmitted by shafts, average torque, maximum torque and torsional rigidity.	10	12

Term work:
Skills to be developed:
i) Intellectual Skills:
- Understand the procedure of testing the materials.
- Analyse the beam for flexure, shear and torsion.
- Apply the basic knowledge of Engieering Mechanics to solve the problems.
- Apply the principles studied to field situations.

ii) Motor Skills:
- Graphical representation of stress - strain relationship.
- Drawing shear force and bending moment diagrams for various beams.
- Drawing shear and bending stress distribution diagrams.

List of Experiments/Practicals/Assignments:
Any twelve of the following –
1 Tensile test on mild steel bar (ductile material).
2 Tensile test on tor steel bar (brittle material).
3 Shear test on two different metals under single and double shear.
4 Bending test on a wooden beam.
5 Izod Impact Test.
6 Compression Test on Metals.
7 Bend Rebend Test on Steel bars.
8 Torsion test on mild steel bar (ductile material).
9 Torsion test on cast iron bar (brittle material).
10 Hardness test on metals: Brinell's hardness test.
11 Fatigue Test on metals.
12 Abrasion Test on flooring tiles.
13 Flexural Test on flooring tiles.
14 Flexural Test on plywood.
15 Water Absorption Test on bricks.
16 Compressive Test on Bricks.

Assignments on :
1)Topic No. 1 and 2. 2)Topic No. 3 and 4. 3)Topic No. 5 and 6.

Reference Books :

SR.NO.	AUTHOR	TITLE	PUBLISHER
1	M.V.Panchanadikar	Strength of Materials	Nirali Prakashan, Pune.
2	Sunil Deo	Strength of Materials	Nirali Prakashan, Pune-2.
3	Walavalkar Y.N .	Strength of Materials for Engineer	EPH Pune.
4	Gharpure V. Y. & Panchanadikar M. V.	Strength of Materials S.I.	PVT Pune.
5	Khurmi R. S.	Strength of Materials	S. Chand and Co., Delhi.
6	Adavi H. V.	Strength of Materials	PVG Pune.
7	Timoshako S. P. and Young D. H.	Strength of Materials	Affiliated, Delhi.
8	Patel A. and Singer F.L .	Strength of Materials	New York, Harper and Row.
9	Nash W. A .	Strength of Materials	Schaum's Series.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING
Course : General Engg.(Elec. & Mech.) Course Code : R14CE2103
Course Category : Allied Credits : 4

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
0	2+2 =4	--	--	--	-	@50	50	100

Rationale :
Civil engineering technocrat is expected to know basic workshop practices like welding, cutting, fitting, drilling, tapping, plumbing, carpentry and electrical wiring etc. site engineer requires to know the use different machineries, tools, equipments to enhance productivity on work sites. It is essential for civil engineers to have basic knowledge of Mechanical & Electrical Engineering so that he can interact with his counter parts more confidently.

Objectives :

The student will be able to
1)Understand basics of Mechanical & Electrical engineering concept.
2)Operate, control different machines and equipments.
3)Produce jobs as per specified dimensions.
4)Identify, select and use various tools, equipment, fastening & fixtures for plumbing, fabrications, carpentry & electrical work.
5)Study of various tools used for fabrication work.
6)Demonstrate on fabrication of grill showing lap and butt joint with finishing.

Teaching Methodology :
Chalkboard, Discussion, PPT'S, Transparencies, Demonstration

Term Work :

Skills to be developed

1. Intellectual Skills :

- Differentiate and identify types of building materials.
- Select appropriate material for building construction.
- Prepare notes for given topics.
- Able to state properties and function of materials.
- Able to state basics of Mechanical and Electrical Engineering concepts.

2. Motor Skills :

- Acquire information from different sources.
- Supervise effectively the electrification of building.
- Operate various tools and equipment.
- Select and use of various tools, equipment, fastening and fixtures.

Workshop Journal writing Based on following :

Note: The instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.

Mechanical Engineering Part :

1)Study of Mechanics.
2)Study of Mechanical prime movers (2-stroke engine, 4- stroke engine).
3)Study of pneumatic, hydraulic mechanism.
4)Study of various fixtures & fastening in plumbing of G.I. and P.V.C.
5)Study of various tools used for plumbing work.
6)Demonstration of G.I. pipe cutting, threading and joining.
7)Study of various tools used for carpentry work.
8)Demonstration on various types of joints in woodwork.
9)Study of various tools used for fabrication work.
10)Demonstration on fabrication of grill showing lap and butt joint with finishing.

Professional practice (Mechanical Engg.) :

1.Collect the market information regarding the various fixtures & fastening required in plumbing.
2.Collect the market information regarding various timber product, metal product, plaster product.

Electrical Engineering Part :

1.Study of House wiring diagram (figures) and physical identification of components / accessories.
2.Comparative study of different system of wiring such as open C.T.S casing capping conduit (open & concealed).
3.Energy meter details (calculation) and estimation of consumption of power.
4.Use of Megger.
5.Study of various electrical equipment used in Civil Engineering.
6.Demonstration of staircase wiring.
7.Safety measures in electrical installations.
8.Study of earthing process.
9.Study of various domestic electrical appliances like fan, water heater, iron etc.
10.Study of solar lighting systems fixtures.

Professional practice (Electrical Engg.) :

1.Collect the information from market along with broachers regarding various kinds of electrical fixtures & fitment.
2.Testing and identifying faults in electrical circuits.

Learning Resources :

Books:

SR.NO	AUTHOR	TITLE	PUBLISHER
1	Patel Karamchandani	I.C. Heat Engines	--
2	Khurmi	Hydraulic Machinery	S.Chand & Co. New Delhi.
3	B.L. Thereja	Text book of Electrical Engg.	S.Chand & Co. New Delhi.
4	S.L. Uppal	Electrical Wiring, Estimation	Dhanpatl Rai & Co., N. Delhi.
5	S.K. Hajare	Workshop Technology	Tata McGraw, N. Delhi
6	H.S. Hajare	Workshop Technology	Media Promoter & Publishers, N. Delhi.
7	Sushil Kumar	Building construction and Materials	Standard Publication, N.Delhi.
8	D.N. Gose	Materials of Construction	Tata McGraw, N. Delhi .
9	V.R. Phadke & P.D. Dhavale	Material of Construction & Concrete Technology	Nirali Prakashan.
10	Sandeep Mantri	A to Z, Bldg. Construction	Satya Prakashan, N. Delhi.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING
Course: Environmental Studies **Course code: R14CE2104**
Course Category:Allied courses **Credits : 03**

Teaching Scheme		Examination Scheme						
TH	PR	Paper Hrs	TH	TEST	PR	OR	TW	TOTAL
2	1*	-	-	-	-	@25	25	50

* Tutorial session

Rationale:
Environment essentially comprises of our living ambience. For the betterment of human life, we have adopted the model of economic development with increasing industrialization in the last few decades. It has resulted into overexploitation of natural resources resulting into ecological imbalances, leading to natural and human induced disasters like degraded land, disappearing forests, endangered species, dangerous toxins, global warming , water ,air land pollution etc. If we continue human activities without any concern for the well being of our surroundings ,human species itself will be in danger. It is therefore necessary to study environmental issues to realize how human activities affect the environment and what could be possible approaches which need to be implemented so as to protect the environment.

Objectives:
The student will be able to**,**
1. Appreciate importance of protection of environment.
2. Identify/ discuss key issues about environment
3. Describe the reasons for environment degradation
4. Justify aspects about environment improvement methods
5. Explain initiatives taken by the world bodies to restrict and reduce degradation

Unit	Name of the Topic and Contents	Hours	Marks
1	**1.1Environmental Studies:** Definition, Scope and Importance of the environmental studies, need for creating public awareness about environmental issues **1.2 Ecosystems:** Concept of Ecosystem, Structure and functions of ecosystem, energy flow in ecosystem, major ecosystems in the world	4	
2	**Natural Resources and Associated Problems:** Natural resources - renewable ,non renewable resources and associated problems. Soil, mineral, water ,energy ,air ,forest, food resources and problems related with its conservation, use and remedial solutions.	4	
3	3.1 **Biodiversity and its conservation** : Biodiversity, Benefits of biodiversity and threats to it. Biodiversity conservation. 3.2 **Environmental pollution :** Pollutants. Soil, water, land, air, Noise pollution-sources, effect and remedial measures. Solid waste management ,	6	

4	**4.1 Environmental Impact analysis for civil engineering projects:** EIA tools like surveys, Modeling, expert's opinion, interviews, literature surveys. Methods to identify causes, effects and impacts using checklists, matrices, flow diagrams, predication and documentation of EI reports. With reference to infrastructure project, dam project, township project, mining project. ET Plant etc.	6	
5	**5.1 Environmental Disasters and their management :** Environmental issues – Green House Effect, Acid Rain, Ozone layer depletion, Tropical cyclones, Earthquake, Floods, Droughts, Landslides etc. Means to control its effect .means of mitigations and disaster management.	6	
6	**Environmental Protection Acts :** Brief description of the following acts and their provisions, Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act	6	

Teaching Methodology : Chalkboard, PPTs, Visits

Practical: Skills to be developed:

Intellectual Skills:

1.Collection of information, data

2.Analysis of data

3.Report writing

Motor Skills:

1.Presentation Skills

2.Use of multi media

Journal based on following activities:

The student should observe ,note and prepare report for the area of his residence

1.Study of eco system (natural and artificial) in the locality of his/her residence.

2.Identify pollutants, types of pollutions ,their effects and remedial measures.

3.Study of any recent natural disaster occurred in that region and the study from newspaper's reporting , web sites, reports of experts for means of management of Natural disaster.

4.Study of EIA report for any two civil engineering projects.

5.Prepare power point presentation of any of the topics of this curriculum or project report.

Learning Resources:

A.Books:

SR NO	AUTHOR	TITLE	PUBLISHER
1	Dr.J.P.Sharma	Environmental Studies	University Science Press (Laxmi Publication)
2	P.D.Sharma	Ecology and Environment	Rastogi Publications,Meerut
3	Dr. R. J. Ranjit Daniels, Dr. Jagdish Krishnaswamy	Environmental Studies	Wiley India
4	Anindita Basak	Environmental Studies	Pearson Education

B. Websites :

1. www.envfor.nic.in
2. www.unep.org
3. www.who.int
4. www.cseindia.org

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN:CIVIL/MECHANICAL/ELECT./COMP./E&TC. ENGINEERING

Course : Advanced Mathematics Course Code: R14SC2701

Course Category: Allied Credits : 3

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
3	-	3	80	20	-	-	-	100

Rationale:

Mathematics is the backbone of all technical courses. Understanding the engineering concepts requires logical approach and thinking. The course aims to give the diploma students a perfect knowledge of Mathematics which can be used in the engineering field. They will be able to apply the advanced concepts of Mathematics in solving the varied kinds of engineering problems.

Objectives:

The students will be able to

1. Learn the new concepts of Laplace transform, Probability and Differential **e**quations.
2. Solve the given mathematical problem with **i**ntelligent combination of techniques.
3. Apply the laws and principles of Mathematics to practical situation.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Integration:** 1.1 Different methods of integration. Integration by different types. Some general integral. Integration by parts. Integration by partial fraction. 1.2 Definite integral. Properties of definite integral.	12	16
2	**Application of Integration:** 2.1 Area under the curve. Area between two curves. 2.2 Mean value. 2.3 Root mean square value.	8	12
3	**Introduction to Laplace Transform:** 3.1 Definition of Laplace transform. First shifting theorem. 3.2 Inverse Laplace transform. Properties of inverse Laplace transform.	6	12

4	**Differential Equation:** 4.1 Definition of differential equation. Order and degree of differential equation. Formation of differential equation. 4.2 Solution of differential equation of 1^{st} order and 1^{st} degree. Variable separable differential equation. Homogenous differential equation. Linear differential equation.	8	16
5	**Probability:** 5.1 Definition: Event, sample space and probability. 5.2 Introduction to permutation and combination. Factorial notation. Meaning of ${}^{n}P_{r}$ and ${}^{n}C_{r}$. 5.3 Addition theorem for probability. Simple examples on probability. 5.4 Conditional probability.	8	12
6	**Probability Distribution:** 6.1 Binomial distribution. 6.2 Poisson distribution. 6.3 Normal distribution.	6	12

Teaching Methodology: Chalkboard, Discussion, Assignments, printed notes.

Skills to be developed:

i)Intellectual Skills:

- Memorizing skill will be developed after studying the formulae of all the topics.
- Selection skill will be developed after studying the methods of solving problems during selection of appropriate formula.
- Logical thinking will be developed after studying the topic Probability.
- Application skill will be developed after studying the topic Application of Integration

Learning Resources:

A) Books:

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Peter V. O'Neil	Advanced Engineering Mathematics	Thomson, Canada.
2	Joel L.Schiff	The Laplace Transform	Springer Verlag, New York.
3	Shanti Narayan	Engineering Mathematics Vol. I & II	S. Chand & Company, New Delhi.

B) Web sites for references:

1. www.wikipedia.com
2. www.wolfarm.com
3. www.mathworld.com
4. www.nptel.iitm.ac.in

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL/MECH./ELECT./COMP./ E&TC ENGINEERING

Course: Entrepreneurship Development **Course Code: R14ME2206**

Course Category: Allied **Credits : 3**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
2	1*	-	-	-	-	@25	25	50

@ Internal examination

Rationale:

This course consists of topics related to the development of entrepreneurial skills and other details such as selection of product lines, site selection, financial aspects, personnel management, quality control and creative thinking. The course includes case studies in the related field. The course emphasizes the development of enterprising qualities among young engineers.

Objectives:

Students will be able to

1.Identify entrepreneurship opportunity.
2.Acquire entrepreneurial values and attitude.
3.Use the information to prepare project report for business venture.
4.Develop awareness about enterprise management.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	1.1 **Introduction :** Definition of entrep reneur, concept of entrepreneur and entrepreneurship , importance of entrepreneur . Types of entrepreneur: Innovating entrepreneur, imitative entrepreneur, fabian entrepreneur, drone entrepreneur and according to type of business . Difference between Entrepreneur and Intrapreneur. 1.2 **Entrepreneurial Competencies : -** Characteristics of an entrepreneur, qualities of an entrepreneur, competencies of entrepreneur. 1.3 **Women Entrepreneur:** Definition, characteristics of women entrepreneur. Causes of limited growth in India, remedies for limited women entrepreneurship development.	6	-
2	**Motivation :** Definition and concept of motivation, types of motivation: affiliation, power, and achievement motivation. Need and importance of achievement motivation, challenges of motivation, Motivating factors. Theories of motivation: a) Maslow Hierarchy theory ,b)Mc Gregor X-Y theory, c) .	4	-
3	**Creativity and Innovation :** Definition and concept of Innovation, definition and concept of Creativity. Characteristics of creative peo ple. Discussion of various examples with respect to creativity and innovation.	5	-

4	4.1 **Business Opportunity Search and Scanning :** Opportunities available in different sectors such as manufacturing, services and trading. Classification o f opportunities on the following : - Natural resource based, Demand based, Local industrial based, Service sector based, Export based, Skill based, Off-farm based. 4.2 **Business Idea :** Search for business idea, sources of business idea, ways of genera ting ideas, ideas processing & selection (factors affecting product idea). SWOT Analysis. 4.3 **Sources of Business Idea :** Market survey & techniques, prospective consumers, development in other nation, study of project profile, government organizatio n, trade fair and exhibitions. Checklists for information collection.	6	-
5	**Government and Non Government Agencies for Promotion and Development :** Importance of funds, Types of fu nds. Various schemes of assistance of government, Government policies and incentives. Registration with various government agencies, definition of SSI and Ancillary.	5	-
6	**Business Plan Preparation :** Project identification, project formulation, feasibility analysis, Estimation of cost of production, Cost volume profit relationship at different levels, Interpretation of financial statements, Institutionalized and Non - institutionalized sources of worki ng capital, Funds flow statements, Loan application form for appraisal. Project report preparation.	6	-

Teaching Methodology: Group Discussion, visits, guest lectures.

Term Work:

Skills to be developed:

i)Intellectual Skills :

- Identify various opportunities in market.
- Identify individual's entrepreneurial competencies.
- Interpret risk to be taken during a task.
- Interpret SWOT of individual.
- Prepare a report of business plan.
- Enhance/Improve presentation and writing skills.

List of Experiments / Practicals / Assignments:

1.Biography of any entrepreneur.
2.Self Disclosure Exercise (Who am I?).
3.Self rating questionnaire.
4.Thematic Appreciation Test (TAT).
5.Ring Toss Exercise.
6.Tower Building Exercise.
7.Convince and Crown.
8.Creativity and Problem solving.

Professional Practices:-

9.Walking through Market.
10.Business plan preparation.
11.Interview of a successful entrepreneur.
12.Interview / Biography of a successful women entrepreneur.

Learning Resources:

Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
1	Vasant Desai	Dymanics Of Entrepreneurial Development And Management.	Himalaya Publishing House, 1997, Reprint-1999.
2	Dilip M. Sarwate	Entrepreneurial Development Concept and Practices.	Everest Publishing House, 1996.
3	Gupta Srinivasan	Entrepreneurial Development.	Sultan Chand & Sons, 1993.
4	D. D. Mali	Training of Entrepreneurship and Self Employment.	Mittal Publications, 1999.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL/ MECH./ELECT./COMP/ ELEX. ENGINEERING
Course : Elements of Accounts and Finance Course Code: R14ME2208
Course Category: Allied Credits : 3

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
2	1*	-	-	-	--	@25	25	50

@ Internal oral

Rationale :
The aim of this course is to provide with the basic level skills and knowledge required by engineers in the accounting and finance. The curriculum envisages the elementary theory and practice of financial accounting. This involves understanding of the concepts and choices that underline measurement and disclosure in financial statements.

Objectives:
The students will be able to
1. acquire knowledge of basic concepts of accounting
2. acquire basic accounting knowledge
3. interpret the financial statements

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Introduction to Book-keeping and Accountancy Meaning & definition, objectives, importance and utility, Difference between Book-keeping and Accountancy. Basis of accounting: Cash basis and accrual basis Branches of accounting: Financial , Cost, management Accounting terminology: Business transactions- Cash, Credit, Non-monetary transactions Types of assets- Fixed, Current, Fictitious Types of liabilities: Fixed, Current, Contingent Net worth, Capital, Debtor, Creditor, Expenditure, Types of Expenditure: Capital, Revenue, Deferred revenue Solvent- insolvent	5	
2	Fundamentals of double entry book-keeping: Principles, Comparison between conventional and double entry system, Classification of accounts: Personal, Real, Nominal Meaning of debit and Credit Basic rules for debit and credit for different accounts	6	
3	Journal: Definitions, Importance and utility of journal, Specimen of a journal, Journalizing and steps for journalizing Ledger: Meaning, need and contents of ledger, specimen of ledger account, posting of entries in ledger Balancing of ledger accounts	8	

4	Trial Balance: Meaning and purpose Specimen of trial balance, preparation of trial balance from given balances of accounts, introduction to errors and their rectification methods Depreciation: causes and need, methods of computing depreciation Provisions and reserves: Meaning and objectives	3	
5	Final Accounts: Financial statements, preparation of profit and loss account, trading account, Valuation of stock, provisions for bad debts, Balance sheet: Arrangements of assets and liabilities Accounting standards:	5	
6	Cash flow and fund flow statements Difference between cash flow and fund flow statement, advantages and limitations Ratio analysis: current ratio, return on equity, the debt-equity ratio, the dividend payout ratio and the price/earnings (P/E) ratio	5	

Teaching Methodology: Discussions, Chalk-Board, Charts, and Transparencies.

Term Work :
List of Assignments :

1.Minimum Two exercises on Journalising
2.At least two assignment on posting entries into Ledger
3.Preparation of Trial Balance,
4.Interpreting a Profit and Loss Account / Income and Expenditure statement
5.Reading a Balance Sheet
6.Exercise on Cash flow statement
7.Finding financial ratios from Balance sheet and interpreting them
8.Reading and interpreting financial Statement of a Private/Public Limited Company

9.**Learning Resources:**

Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
1	T.S. Grewal S.C. Gupta	Introduction to accountancy	S. Chand Publications, New Delhi
2	-	Book-keeping and Accountancy For Std XI And XII	Maharashtra State Board Of Secondary And Higher Secondary Education

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL/ MECH./ELECT./COMP/ ELEX. ENGINEERING
Course : Marketing Management Course Code: R14EE 2303
Course Category: Allied Credits : 03

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
2	1*	-	-	-	--	@25	25	50

@ Internal oral

Rationale :
An engineer of any branch may be required to deal with marketing activity related with his field. This course covers the basic techniques used in the marketing management generally related with any field of application.

Objectives: The student should be able to
1 To know the principles of market research & analysis
2 To know about the organization of marketing department& marketing network
3 To know about the aspects of international marketing.
4 To undertake a small market survey.

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	1.1 **Introduction**- Marketing Management, process & functions. Developing marketing strategies. Marketing environment	7	-
2	2.1 **Market Research & Sales forecasting**- Need of market research, Methods of data collection, sales forecasting, consumer behavior, Case Study .	8	-
3	3.1 **Market Planning**- market positioning, market targeting, marketing strategy, product policy, branding, pricing & pricing strategy, Advertising	8	-
4	4.1 **Sales management**- **Setting** objectives& deciding policies, development of sales force, sales organization 4.2 **International marketing**- Liberalization, need of International Marketing, International marketing process & Exim policy of Govt. of India, Case Study	9	-

Teaching Methodology: Group Discussion, Visits, Guest Lectures
Term work:
Skills to be Developed:
i)Intellectual Skills
- Identify
- Discrimination
- Selection
- Interpretation
- Understanding
- Report Writing

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A group of 4 to 5 students have to complete the following assignments
1.Select an existing /hypothetical product related with their discipline
2.Carry any market survey by preparing suitable questionnaire.
3.Prepare a marketing plan indicating the advertising, price strategy & sales promotion techniques.
4.Prepare & submit the report of above activities.
The internal oral examination will be conducted on the above report.

Reference:

Sr. No	Author	Title	Publishers
1	Kotler	Marketing Management	(11th Edition), Pearson Education India.
2.	Dr. V.O. Vorkey	A Handbook on Marketing Management	Everest Publishers, Pune
3.	Dr. S. L. Gupta	Elements of Marketing Management	Everest Publishers, Pune

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING

Course: Building Drawing **Course Code : R14CE3101**

Course Category: Core **Credits : 6**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
2	4	-	-	-	50	-	50	100

Rationale:

Drawing is the graphical language. Ideas conceived in the mind of technician have to be expressed in the language of the drawing. The expression by drawing is accurate, precise & brief. At a glance one can understand details of any part of the structure to be constructed or developed. For all technicians thorough understanding of principles of drawing is essential. A civil engineering technician shall be able to communicate with the superiors, subordinates, clients, contractors, consultants etc. through building drawings. This subject describes technique of drawing & reading building drawings. It also introduces the students to basic aspects such as planning, design, regulations, byelaws, standards etc. related with buildings.

Objectives:

Students will be able to

1. Understand about the principles, concepts, facts & procedures in Building Drawing.
2. Develop skills of preparing various types of building drawings & sketches to explain details as a Draftsman.
3. Interpret & apply development control rules.
4. Prepare measured, submission & working drawings as per IS 696 & IS 962
5. Read & interpret the building drawings for execution of work as a supervisor or a contractor or for estimating & costing as a quantity surveyor.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Requirement of Building Drawing** Definition & purposes of building drawing, Requirements of good building drawing. Types of building drawings: preliminary; submission, working; presentation & measured. Sizes of drawing papers & boards. General Layout of building drawing. Scales: Selection of scales for drawing and metric scales for architectural & building drawing. Lettering & dimensioning, Numbering of building components in drawing. Standard symbols & conventions in building drawing, Colouring the building plan. Folding of drawing sheets.	8	-

2	**Planning of Buildings** Selection of building site. Proper location of building, orientation & sun diagram. Principles of planning: Aspect & prospect, privacy, grouping, roominess, furniture requirement, circulation, flexibility, sanitation, elegance & economy. Principles of architectural composition: Unity, mass composition, contrast, proportion & scale. Building Regulations: Tenement density, plot area , ground coverage, built up area, number of storey's/height and marginal distances for residential (including group housing schemes), commercial, industrial & special type of buildings.	8	-
3	**Drawing and Checking Building Views** Drawing & checking building plan, elevation, section. Foundation plan, roof plan, site plan, location plan, area key/block plan, layout plan. Preparing construction notes, area statement and schedules for room finishes; doors & windows and fixtures & fastenings for doors & windows.	10	
4	**Building Area Calculation** Calculation of Plinth floor & carpet areas. Floor Area Ratio (FAR) or Floor Space Index (FSI), Volume Plot Ratio (VPR), Concept of TDR. General building/space requirements & norms for various facilities in the residential, commercial, educational, health & entertainment buildings. Check list for planning the job.	6	-

Teaching Methodology: Chalkboard, Group Discussions, PPT's, 35mm Slide Shows, OHP Transparencies, Wall Hung Charts, Expert Lectures, Technical Visits

Term Work:

Skills to be developed:

1. Intellectual Skills:

1Read and interpret the building drawing.
2Apply building rules, regulation and by-laws.
3Able to state the principles, facts, concept in building drawing.
4Prepare notes for given topics.
5Prepare measured, submission and working drawing.

2. Motor Skills :

1.Measure the dimension of building units.
2.Collecting copy of submission drawing from architect or licensed engineer.
3.Develop a line plan into a submission drawing.

List of Drawings to Be Prepared:

1.Measured drawing to the scale of 1:50 or 1:100 of small, having maximum three rooms with/without toilet blocks, single storied load bearing structure with Mangalore tiled or AC/GI sheeted pitched roof on wooden/steel scantling. Student is expected to take measurement of the building, record it in proper format & prepare on A1/A2 sized drawing sheet the plan, elevation, section, site plan, construction notes, schedule for openings & brief area statement

2.Collection of copy of submission/working drawing of a single or multistoried, load bearing or framed bungalow, within the jurisdiction of any urban local body, prepared by professional architect or licensed engineer. Student is expected to read the drawing carefully & submit in standard format, supplied by the Department, the answers to few question related with planning of the building on that drawing.

3.Development of the given line plan in to a submission drawing. Student is expected to study the given line plan carefully & then develop on A1 size drawing sheet, to the scale of 1:100, a floor plan, a road side or front elevation, a section passing through staircase &/or toilet block, site plan, area key/block plan, location plan, brief construction notes, brief schedule of openings & detailed area statement.

Students shall submit a file consisting of above three drawings sheets

Learning Resources : A.Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
01	Shah, Kale & Patki,	Building Drawing,	Tata McGraw Hill Co., Delhi
02	B. V. Verma, Khanna,	Civil Engg. Drg. & House Planning,	. V. Verma, Khanna, Delhi 6.
03	M. Chakraborti,	Civil Engg. Drawing,	M. Chakraborti,Kolkotta
04	S. V. Deodhar,	Civil Engg. Drawing,	Vrinda, Jalgaon.
05	--	Civil Engg. Drawing Work Book	T TT I , Bhopal.
06	Y.S. Sane	Planning & Design of Buildings	PVG, Pune.
07	W. B. Mackey.	Building Construction, Vol. I to IV	
08		National Building Code 2005	Bureau of Indian Standards

B.Reference Standards & Codes

1.IS: 962 – 1967
2.ISI hand book of functional requirements of Ind. Buildings, SP: 32– 1986.
3.ISI hand book of functional requirements of other than Ind. buildings, SP: 41– 1987.
4.National Building Code 2005.

C.Magazines :
1.Inside outside
2.Indian Architect & Builder
3.Building Materials & Construction World
4.Civil Engineering Construction Review
D.Software: AutoCAD Websites for reference
: www.archtectview.com, www.greatbuildings.com, www.wikipedia.com

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DIPLOMA PROGRAMME: CIVIL ENGINEERING
Course : Civil Engineering Drawing **Course Code: R14CE3102**
Course Category : Core **Credits: 05**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
1	4	04	80	20	--	–	50	150

Rational:

Initial part of the subject is in continuation of subject Building Drawing and deals with few more concepts, techniques & methods in building drawing. The student has to use this subject to develop ability to read, understand and prepare drawing, to use it for different subjects during diploma course. He will be taught to draw civil engineering. Structure and its various parts using conventions and symbols. The knowledge of this subject is useful for building construction, estimating and costing, design of structure, surveying, projects etc.

Objectives:

The student will be able to

1. Prepare drawings for the residential buildings & Plan public buildings.
2. Produce copies of drawings by technique of ammonia printing
3. Prepare presentation/perspective drawings.
4. Understand roles of various agencies involved in building industry.
5. Understand the concept of Green building.
6. Plan various types of building considering the functional requirements.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Presentation Drawing and Plan Sanctioning** 1.1. Perspective Drawing: Definition, Necessity, Principles of perspective of drawing, Term used in perspective drawing. Classifications – One point or parallel perspective, two point or angular perspective, birds eye perspective. Axonometric Drawing: Concept, procedure & uses. 1.2. Plan Sanctioning Procedure, Documents pertaining to the Records of land, Essential documents required for plan sanctioning duration of sanctioning deviation during constructions. Scrutiny form, Development charges, Scrutiny fee hardship & premium.	08	--
2	**Agencies in Building Industry.** 2.1. Role of various agencies in building industry like owner, promoter, builder, legal consultant, contractor, architect, quantity surveyor, valuer, arbitrator, structural designer, management consultant, landscape architect, specialist designer for foundation, building service consultant 2.2. Plan sanctioning authorities like Municipal council, Municipal Corporation, MRDA, NTDA, CIDCO, MHADA, MIDC etc. 2.3. Norm & Regulations for Green / Eco -friendly Buildings in the contents of Solar heating, Rain Water harvesting, Sewage water recycling, plantation, ventilation & lighting. Norm & Regulation for high Rise Building.	08	--

Nature of question paper			
Sect. I	A. Two questions based on contents of theory.	04	24
	B. Perspective drawing or Drawing for KT Weir or Road or Culvert.		16
Sect. II	A. Drawing Building Plan.		12
	B. Drawing Building Elevation.		08
	C. Drawing Building Section.		16
	D. Schedule of openings/room finishes or construction notes		04

Teaching Methodology :
Chalkboard, Group Discussions, PPT's, 35 mm Slide Shows, Video Shows, Transparencies, Experts Lectures, Technical Visits.

Term Work:
Skills to be developed:
1. Intellectual Skills:
1Plan residential and public building.
2Apply the building rules, regulation and by-laws.
3Able to select the various agencies involved in building industry.
4Preparing presentation / perspective drawing.
5Able to state the concept of green building and eco-friendly building.

2. Motor Skills:
1.Drawing plan, elevation, section, zooming view, foundation plan, layout, site plan with suitable scale.
2.Prepare plan and section for various civil engineering structures.
3.Producing negative by tracing.
4.Produce a copy of ammonia print from traced negative.
5.Collecting basic data for planning of public building.

List of Drawings To Be Prepared:

Students shall submit a file of consisting of following drawings.
1.Planning of two storied framed building & preparing for the same, the working drawing on A1 size drawing sheet to the scale of 1:100 or 1:200. The drawing shall consist of ground floor plan, first floor plan, road side or front elevation, minimum one section passing through staircase &/or toilet block, foundation plan, site plan, details of foundation for wall &/or column, details of plinth & plinth filling, details of step block, details of lintel & chajja, details of compound wall & gate, detailed construction notes, detailed schedule of openings & brief area statement.
2.Planning a multistoried public building such as school, bank, rural hospital, community hall, theatre etc. and preparing on A1 size graph paper to suitable scale only line plan along with schedule of openings & brief specifications/construction notes.
3.Axonometric or Perspective drawing of a small building.

Drawing plan & section of Civil Engg. Structure.

1.Drawing typical plan & cross section of K.T. Weir with its dimension and components.
2.Drawing typical cross – section showing earthen dams & Road way with its component part.
3.Drawing typical plan and cross section showing culvert (box or pipe) with its dimension and components.

Introduction to Google sketch up.
1.Drawing a three dimensional view of a single room with some interior furniture arrangement using Google sketch up.

Learning Resources :
.Books :

SR.NO.	AUTHOR	TITLE	PUBLISHER
1	Shah, Kale & Patki,	Building Drawing	Tata Mc Graw Hill Co., Delhi.
2	B. V. Verma,	Civil Engg. Dreawing & House Planning	Khanna, Delhi .
3	M. Chakraborti,	Civil Engg. Drawing	M. Chakraborti, Kolkotta.
4	S. V. Deodhar,	Civil Engg. Drawing	Vrinda, Jalgaon.
5		Civil Engg. Drawing Work Book	T TT I, Bhopal.
6	Y.S. Sane,	Planning & Design of Buildings,	PVG, Pune.
7	J. K. Mckay,.	Construction of Building Vol. I to IV	Longman,Newyork.
8	Barry,	Construction Technology, Vol. I to IV	Lockwood, London.
9	Bharat Singh,	Construction & Foundation Engg.	Katson Publishing.
10	Dr. B.C. Punmia,	Building Construction	Laxmi Publication, Delhi .
11	Arora & Bindra,	Building Construction	Dhanpat Rai & Sons, Delhi.
12	Phadake & others	Building Construction	Nirali Prakashan Pune.
13		National Building Code 2005	Bureau of Indian Standards

Reference Standards & Codes
1.IS: 962 – 1967
2.ISI hand book of functional requirements of Ind. Buildings, SP: 32– 1986
3.ISI hand book of functional requirements of other than Ind. buildings, SP: 41– 1987
4.ISI handbook of water supply & drainage with special reference to planning, SP: 35 – 1987.
5.National Building Code 2005.

B. Magazines :
1.Inside outside
2.Indian Architect & Builder
3.Building Materials & Construction World
4.Civil Engineering Construction Review
5.Indian Plumber
C.Softwares :
Autocad
D.Websites for reference :
1.www.archtectview.com
2.www.greatbuildings.com
3.www.wikipedia.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING
Course : Building Construction **Course Code : R14CE3103**
Course Category : Core **Credits : 5**

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
03	02	03	80	20	-	-	25	125

Rationale :
Building Construction is core subject in civil engineering. A civil engineer is identified with the construction of building. It is imperative for him to know thoroughly the different construction process with respect to facts, concepts, principles and procedures related to building construction system, so that student can effectively plan, execute building construction work with quality so that a strong and pleasing structure is added to the environment. The site engineers should be able to guide the artisans on the site. Course contents shall make the student conversant with the various procedures encompassing the construction of a building.
Objectives :

The students will be able to
1. Identify various components of building and their function.
2. Draw various building components and state function, method of constructions.
3. Mark layout of building on ground.
4. Supervise various procedures related to the building construction.
5. Prepare checklist of various constructions activities.
6. Check line, level & plumb of various construction activities.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Building Components, foundation and setting out for Building.** 1.1 Definition of Building, basic requirement of building, types of structure & comparison. 1.2 Building components and their function, Loads acting on foundation, Bearing capacity- definition, types, factors affecting & ways to improve. 1.3 Foundation – definition, classification, requirement, function, necessity & their suitability. 1.4 Setting out of Load bearing & framed structure on ground. Precautions while setting out of Building. 1.5 Checklist for excavation, PCC, construction of foundation, & checklist for Line-out of Building.	08	16

2	**Masonry Construction** 2.1 Brick Masonry – Definition, Principal of Brick masonry construction, terms used in brick masonry, sizes, Bonds in brick masonry, Rules in Bonding, English, Flemish, Header, stretcher bond. Comparison of English and Flemish Bond, Various forms of Brick masonry 2.2 Stone masonry – Definition, classification, Terms used in stone masonry, General principles in the construction stone masonry, comparison of stone and Brick masonry. 2.3 Hollow block masonry, situation where hollow block masonry is used, Merits & demerits of hollow block masonry, Glass block masonry, reinforced brick masonry, cavity wall, composite masonry. 2.4 Mortar – definition, types, function, requirement & proportions. 2.5 Checklist for Brick masonry, stone masonry.	08	12
3	**Arches, Lintels, Doors & Windows** 3.1 Arch – Definition, function, types, technical terms in arch work, stability of an arch. 3.2 Lintel – Definition, function, types, material used, advantages over arch. 3.3 Doors - Door frame components, types of doors, Technical terms used in doors and windows, function, material used, size & Location of doors, procedure for fixing of door frame, technical designation of door, fastening & fixtures required & their standard position on shutter. 3.4 Window - Component and types of window, function, material, sizes & location of window, procedure for fixing of window, Designation of Window, fastening & fixtures required. 3.5 Checklist – for door frame & shutter fixing, for MS Window, window frame, Aluminium Window fixing.	08	12
4	**Floors, Roofs And Stairs** 4.1 Floors – Concept, Requirement, components, construction of flat, jack arch, timber & concrete floor. 4.2 Floor covering – types, tools required, Process of flooring, finishing & polishing. False ceiling, false flooring. Procedure for fixing tiles in W.C. & Bathroom. 4.3 Roof - Necessity, types, requirement, component, Roof trusses, roof structure for supporting roofing material. Laying, fixing details of tiled & sheet roofing. 4.4 Stairs and vertical circulation - Means of vertical communication, types of staircase, component & terms used in stair, Constructional details of R.C.C. stair, functional design, introduction to lift & escalators. 4.5 Checklist – for flooring.	08	16
5	**Plastering & Pointing** 5.1 Plastering - Necessity, Types, material required, terms used in plastering, tools required. Procedure for internal & external plastering. 5.2 Special decorative plaster like Heritage plaster, towel plaster, wall paper etc. 5.3 Common defects of plaster – causes and remedial measures. 5.4 Pointing – Definition, necessity, Types of pointing, function, preparation of surface & application. 5.5 Checklist for – internal plastering, external plastering & pointing.	08	12
6	**Painting & Glazing** 6.1 Painting - Types, objects of painting, tools required for painting, terms used, Ingredient of paint. 6.2 Preparation of paint. Application of paints on different surfaces, white washing, colour washing, distempering, precautions to be taken before applying paints.	08	12

	6.3 Defects in painting. 6.4 Glazing - Types of glass, procedure for fixing glass to MS Window & Aluminum Window. 6.5 Checklist – internal & external painting, glazing.		

Teaching Methodology :

Chalkboard, Discussions, PPTs, Video show, Guest Lectures, Visits.

Term work :

Skills to be developed

1. Intellectual Skills :

Supervise the building construction activity.

Identify components of a building.

- Identify various tools and equipments used for construction of building components.
- Observing the various building process.
- Preparing checklist of various items of building work.

2. Motor Skills :

- Mark layout of building on the ground.
- Check and mark various levels in building.
- Drawing the foundation plan.
- Drawing sketches showing showing various building elements.
- Measurement of various building components

List of Assignments :

A. Sketch book :

The student will prepare A3 size sketch book consisting of following sketches showing:

1. a) Plan and section of simple and stepped footing for wall.(dimensioned)
   b) Plan and section of pedestal and sloped footing for a column.(dimensioned)
2. Draw different forms of brick portion and terms related with brick masonry.
3. Section through a wall showing - foundation, plinth masonry, damp proof course, plinth filling, step block at entrance or at rear, a door, a window, lintels, a chhajja, a balcony, a parapet etc.
   Various components of building.
4. Plan & elevation of different types of stone masonry.

5. Elevation, sect. Plan and sect, side view of a fully glazed steel window fabricated from Z & T Sections.
6. Elevation, sect. Plan and sect. Side view partly paneled, partly glazed timber door with ventilator.
   a) Partly paneled, partly glazed timber door with ventilator.
   b) Solid core flush door.
   c) Hollow core flush door.
7. Sketches showing various terms related with stair and common types of stairs.
8. Typical isometric view and plan of pitched roof.
9. Timber king post truss (4m span) & steel queen post truss (9m span)

B.Professional Practice :

1. Reports on minimum one construction site visits.
2. Line out for framed / load bearing structure building.
3. Prepare check list for supervision minimum of 10 item related to building constructions.

Learning Resources :

A.Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Mantri Institute's (Sandeep Mantri)	Building Construction & its Managemnt	Satya Prakashn, New Delhi.
2	G.S.Birdie & T.D. Arora	Building Construction & Construction Materials	Dhanpat Rai & Sons, Delhi-6.
3	Arora & Bindra	Building Construction & Tech.	Dhanpat Rai & Sons, Delhi.
4	Sushil Kumar	Building Construction & Material	Standard Publication, Delhi-6.
5	R. Chudley	Construction Technology, Vol. 1	Longman (ELBS).
6	S.C. Rangwala	Building Construction	Chartar Book Stall, Anand.
7	W.B. Mackay	Bulidng Construction Vol.1 to IV	Loangman (ELBS).
8		National Building Code 2005	Bureau of Indian Standards

B. Magazines :

1. New Building Materials & Construction World
2. Civil Engineering & Construction
3. Construction and Business Records.

C. Websites for references :

www.icivilengineer.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING
Course : Building Services Course Code : R14CE3104
Course Category : Core Credits : 3

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	0	3	80	20	-	-	-	100

Rationale :
Effective building cannot be created in absence of essential services; hence the civil engineer shall also be well versed with some of the common services related with the buildings. Also building cannot be used for occupancy unless various services required for effective working of a building is provide. It creates healthy & working environment in the building. By considering design aspect and recent materials student will develop skills and ability to become an entrepreneur for these services.

Objectives :

The student will be able to
1. Plan and design various building services required in residential & commercial buildings.
2. Understand about the principals, concepts, facts, material related to the different services.
3. Apply various methods of providing these services and its maintenance.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Thermal Insulation of Building:** 1.1 Thermal Insulation – Introduction, Necessity, Definition of terms, principals of thermal insulation. Heat transfer, comfort factors, heat exchange of building. 1.2 Thermal insulation types, forms & finishes , methods of thermal insulation. Mechanical thermal insulation, Function of Insulation, Advantages. 1.3 Calculation of heat loss & heat gain, thermal transmittance value.	8	12
2	**Ventilation, Air conditioning and Lighting:** 2.1 Ventilation – Definition, Comfort factors, Systems of ventilation, Wind effect, Stack effect, Necessity of ventilation, orientation with respect to ventilation. Area of opening Calculation. 2.2 Lighting- Principals, day lighting, Design of windows, sky Component, orientation, artificial and supplementary illumination. 2.3 Air Conditioning - Definition, purpose and principals of comfort air conditioning. Essential of ideal air conditioning systems. Systems of air conditioning their installation & working.	8	16

3	**Damp proofing, Termite proofing & Fire Protection of Building:** 3.1 Sources of dampness. Effects of dampness. Techniques of damp prevention. Materials used for damp proofing. Damp proofing treatment in buildings. 3.2 Termite proofing - essentials of termite proofing, termiteproofing methods 3.3 Fire Protection - Fire safety, fire load, grading of occupancies by fire load, consideration in fire protection, properties of fire resistant construction - wall & columns, roofs & floors, wall opening, fire escape elements, Fire Layout.	8	12
4	**Acoustic & Sound Insulation:** 4.1Introduction, characteristic of audible sound. Behavior of sound and its effect, Acoustical defects. 4.2 Sound Absorption, Sound absorbents or Acoustical Materials & their requirement. Acoustics of Building. Requirement & Conditions of Good Acoustics. Principles in acoustical Design. Absorption power & reverberation time calculation 4.2 Effect and types of Noise, Transmission of noise, comfort standards, noise control, sound insulation.	8	16
5	**Building Water Supply:** 5.1 Principles governing design of Building water supply system. Necessity of water supply arrangement. Distribution system, Requirement of Plumbing system, service connection. 5.2 Water supply fixtures & their function – ferrule, gooseneck, stopcock, bib cock, tap cock, mixer, showers, non return valve, water meters. Various types of distribution pipes and its fittings. 5.3 Testing, advantage & disadvantage of water storage, problems occurred & remedies in water supply arrangement.	8	12
6	**Building Drainage:** 6.1 Definition of terms, Aims and Principles 6.2 Pipes and traps, function, characteristics, Sanitary fittings, system of plumbing. 6.3 Septic tank, Gully trap chamber, inspection chamber, ITC, manhole, testing of drainage system.	8	12

Teaching Methodology :
Chalkboard, Group discussion, PPT's, Slide shows, Video shows, Expert Lectures, Technical visits.

Term Work :
Skills to be developed
1. Intellectual Skills :
- Prepare notes for given topics.
- Report writing on actual site visit.
- Able to state the principle, facts, concept to the different building services.
- Draw the sketches for various fastening and fixtures related to building services.
- Plan the layout for house drainage and water supply arrangement.

2. Motor Skills :
- Apply various methods for providing and maintenance of services.
- Report writing on site visits.
- Compare the various methods for different building services.

Learning Resources :

A.Books:

SR.NO	AUTHOR	TITLE	PUBLISHER
1	S. Deolalikar	Plumbing Design & Practice	McGraw – Hill, New Delhi Tata.
2	Prof. S.M. Patil	Building Services	Patil Publication, Mumbai
3	Sandeep Mantri	A to Z of Practical bldg. & its manaement	Satya Prakashan, New Delhi.
4	Bindra & arora	Building Construction	Dhanpat Rai Publishing
5	Rangwala	Building Construction	Chorotor Publishing house, Anand.
6		National Building Code 2005	Bureau of Indian Standards

A.IS/International Codes.

1.National Building Code – 1983, Bureau of Indian standards, New Delhi.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING
Course : Construction Technology **Course Code:** R14CE3105
Course Category : Core **Credits: 5**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	--	-	25	125

Rationale:

Due to rapid urbanization and development, new technologies and methods are being adapted by construction sector. The subject focuses on need of mechanization in construction, specialized equipments and processes.

Objectives :

Students will be able to
1. Understand various Construction processes and related equipments.
2. Supervise construction processes like water proofing, underpinning, shoring, dewatering.
3. Acquaint with various specialized construction processes.
4. Know special types of formworks.
5. Supervise activities carried out by using various construction equipment & machinery.
6. Analyze a construction process and suggest modifications

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Construction Mechanization** 1.1 Introduction: Necessity of mechanization in the construction Industry. Types of construction such as light, medium and heavy duty. Classification of equipments .Factors affecting selection of an equipment 1.2 Engineering fundamentals related to equipments like engine factor, time factor, operating factor, power, break horse power, drawbar pull. 1.3 Financing of construction plant and equipment, factor affecting cost of owning and operating of equipment. Agencies for financing of equipment. Agencies for financing.	10	16
2	**Earth moving Equipment** 2.1 Power shovels, Back Hoe, Drag-line, JCB excavator, loaders, Dozer, Scrapper. 2.1 Use of Trucks, tractor and Dumpers. 2.3 Factors affecting selection of equipment, work cycle, output, estimation for operation.	07	12

3	**Specialized construction equipments and processes** 3.1 Drilling, blasting and hoisting equipments, 3.2 Vacuum dewatering systems, concreting Operation using pump. 3.3 Shortcrete and guniting	07	12
4	**Preengineered structures** 4.1 Definition and types of prengineered structures. 4.2 Prefabrication in construction, Industrialized building system, Advantages and Disadvantages of Pre-cast construction. 4.3 Production Techniques for precast elements, Precast techniques Curing methods, process flowchart . 4.4 Hoisting and placing of elements, jointing of elements.	10	16
5	**Temporary structures** 5.1 Conventional formwork system, steel form work, Aluminum form Work, specialized formwork system. 5.2 Estimation and design of conventional formwork. 5.3 Scaffolding, shoring, underpinning.	07	12
6	**Structural cladding and allied process** 6.1 Cladding Materials & Specifications. 6.2 Framing Detailing, Method of construction 6.3 Water proofing – Necessity and importance, different methods used for waterproofing for W.C, Bath, Basement, Terrace and New Techniques.	07	12

Teaching Methodology :
Chalkboard, Power Point presentation, Visits, Guest Lecture

A. Term Work :
Skills to be developed :
1. Intellectual Skills :
- Able to state various construction processes.
- Indentify various construction equipment and machinery.
- Acquaint with various specialized construction processes.
- Able to state engineering fundamentals related to construction equipment.
- Select the appropriate construction techniques.

2. Motor skills :
Arranging the site visit and guest lecture.
- Preparing the site visit report.
- Drawing sketches showing various construction techniques.
- Analysis a construction process and suggest modification.
- Supervise activities carried out by using various construction equipment and machinery.

A.List of Practical : A journal consisting of the following exercises :

1.Assignment based on engineering fundamentals related to construction equipment.
2.Assignment based on approximate estimate of material requirement of conventional formwork required for R.C.C work.
3.Assignment based on owning and operating cost of an equipment.
4.Assignment based on work study of a construction equipment or plant.

A3 size sketch book consisting of following sketches :

1. Typical formwork for beams, columns & slabs.
2. Scaffolding single in timber, double in steel.
3. Sketches showing different types of shoring.
4. Sketches showing different types of underpinning.
5. Typical cross sections of water proofing techniques used for w.c /bath or terraces.
6. Sketch showing jointing details of prefab elements.

B.Professional Practice :

a.Report on visit to a construction site involving specialized construction process
b.Report on visit to a construction site involving specialized construction equipment

Learning Resources :

A.**Books :**

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Dr. B.C.Punamia	Building Constructions	Laxmi Publication, Delhi –2.
2	Vizirani & Chandolia	Heavy Constructions	Khanna , Delhi –6.
3	Dr .Mahesh Varma.	Construction equipment planning and application	Metropoliton Book Company, Delhi.
4	Peurifoy	Construction planning ,methods and applications	Tata –McGraw Hill
5	K .K. Chitkara	Construction project management	Tata –McGraw Hill
6		National Building Code 2005	Bureau of Indian Standards

B. Web sites for references :

www.icivilengineer.com

www.wikipedia.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING

Course: Surveying - I **Course Code: R14CE3106**

Course Category: Core **Credits: 07**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	4	3	80	20	25	–	25	150

Rational:

One of the main concerns of Civil engineering technician is survey work required to be carried out for many civil engineering works either in their stage of planning or execution. Through this course it is intended to acquaint the students about the principles, concepts, facts, & procedures in Surveying. With this knowledge & Skills, he will be able to select & use appropriate techniques & instruments to establish controls, locate details, measure distances & directions, reduce positions; distances; areas; etc. during the surveys for construction / maintenance / repair / extension of townships, buildings, roads, railways, bridges, dams, canals, service lines for water; drainage; electricity; telecommunication, while serving as investigator for planning & design department or supervisor on the site of work, or draftsman in the drawing office or estimator in the estimating office. He will also be able in minor repair, maintenance & adjustments of these instruments.

Objectives:

The student will be able to

1.Operate survey instruments like tapes, EDM, compass, plane table & level etc.

2.Carry out survey to locate details over a property/estate & find out its area.

3.Find out difference in elevations between different points/objects/places.

4.Carry out survey for a route for roads, railways etc.

5.Check own survey work for accuracy to extent of error admissible.

6.Plot & prepare survey plans/maps & sections.

7.Read & interpret the records created by Land Records Department & others.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Introduction to Surveying & Linear Measures** 1.1 Definition & objectives of surveying, Map & Plan, Units for distances . Primary & secondary c lassification of surveying . Traversing – Concept, types & applications. 1.2 Topographical, Cadastral, City & Engineering surveys. Principles of Surveying. Survey stations & lines. Fixing of survey stations. Uses of surveying. 1.3 Linear Measures: Instrument for marking of stations – Pegs, arrows & ranging rods. Instruments for measurement of distances - chains (only introduction), tapes, EDM.	08	12

2	**Survey with linear measures** 2.1 Principle. Ranging, types of ranging & line ranger. Chaining on flat & sloping ground. Correcting for incorrect linear measures. 2.2 Errors & mistakes in chaining. Degree of accuracy in survey with linear measure. Tape surveying. 2.3 Offsets: types, offsetting instruments - open cross staff & optical square. Numbers of offset. Tape & cross staff survey. Units for areas.	08	16
3	**Plane table survey** 4.1Plane table & the outfit. Telescopic & EDM alidade. Temporary adjustments of a plane table. Orientation – concept, importance & types. 4.2 Methods of Plane table survey: radiation, intersection, traversing & resection. Plain Scales. Conventional symbols. 4.3 Merits & demerits of plane tabling. Errors & degree of accuracy. Records pertaining to land & Solving a tippan.	08	12
4	**Compass survey** 3.1 Definition of bearing. Concept of fore & back bearing. Meridian & its types. Whole circle & Quadrantal system of bearing designation. Construction. & use of Prismatic compass. 3.2 Reducing angles from whole circle bearings. Local attraction, it's causes & effects. Correcting whole circle bearings for local attraction. 3.3 Dip of needle. Declination – Concept & referring it for. Errors & precautions in compass surveying. Degree of accuracy in compass surveying.	08	16
5	**Leveling I** 5.1 Basic definitions: leveling, level line, horizontal line, vertical line, datum. Bench mark & its types. Construction & temporary adjustments of Dumpy & tilting level. 5.2 Introduction to auto level, precision level, laser level, digital level. Leveling staves: Types, graduation & reading. 5.3 Principal axes of a level & inter relations between them. Principal methods of leveling – simple and compound.	08	12
6	**Leveling II** 6.1 Recording the levelling work in a field book. Methods of reducing levels. Arithmetical checks. 6.2 Other methods of leveling: fly leveling,Icheck leveling, double check leveling, profile & cross section leveling. 6.3 Field precautions. Levelling difficulties. Common mistakes & errors in leveling. Permissible errors of closure.	08	12

Teaching Methodology: Chalkboard, Group Discussions, MS. Power Point Presentations, Wall Hung Charts, Slide Shows, Instruments, Expert Lectures, Technical Visits.

Term Work:

Skills to be developed :

i) Intellectual Skills :

- ●Identify the survey instruments.
- ● Discriminate one survey instrument/technique from the other.
- ●Select a most adequate survey instrument/technique for the given work.
- ●Read the survey instrument such as tapes, compass & level
- ●Process the data collected on field to work out relative positions, areas, volumes etc.
- ●Interpret the results.
- ●To read & interpret the survey drawings.
- ●Understand mistakes & errors in work & techniques to avoid/minimize it.
- ●Write report on the survey carried out.

ii) Motor Skills :

- To handle the tapes, ranger, square, compass, plane table & level.
- To make temporary adjustments of the compass, plane table & level.
- To measure with tapes, compass, plane table & level the distances/direction data to establish controls & to locate details.
- To plot the survey data graphically in form of plans/maps & sections.

List of Practicals :

1. A. Study of Chaining instruments: tapes (Metallic, plastic & steel), arrows & ranging rods.
   B. Ranging with eye & line ranger, chaining & recording.
2. A. Taking offsets & recording: Swinging tape & Open cross staff.
   B. Introduction to location sketches & running measurements.
3. A. Tape & cross staff survey to find area of small plot.
   B. Introduction to Key plan.
4. Study of outfit of a plane table & method of radiation.
5. Plane table surveying: Method of inter section.
6. A. Study of Prismatic compass.
   B. Finding fore & back bearings of sides of a triangular traverse & checking for local attraction.
7. Finding fore & back bearings of sides of a triangular / quadrilateral traverse & applying correction for local attraction.
8. Tape & compass traverse survey of small area, not requiring more than four control stations. The said traverse shall be plotted on A3 size paper & if required shall be corrected for closing error by Bowditch's graphical method.
9. A. Study of internal or external focusing Dumpy level & levelling staves.
   B. Simple leveling.
10. A. Study of Tilting/Auto level.
    B. Compound & fly leveling. Reduction of levels by HI method.
11. A. Study of Laser level.
    B. Flying levels by double Check method. Reduction of levels by rise & fall method.
12. Leveling with Digital level.

Professional Practice:

Items 1 & 2 is compulsory, any 2 items rest of 3 can be carried out.

1. Project I: Detailing Survey of a small property or an Institutional campus by plane table traversing with minimum four control stations. (One day for survey & 6 hours for plotting. Sheet to be drawn by each student separately).
2. Project II: Road Project (Profile levelling & Cross sectioning) - Running a profile for a length of about 250m with cross sections at every 20m interval. The width of cross section shall be 20m on either side. Spot levels shall be collected at 10m intervals along profile as well along the cross sections. The ground profile & cross sections shall be plotted on an A1 size drawing sheet. (One day for survey & 6 hours for plotting profile and cross sections on A1 size drawing sheet. Sheet to be drawn by each student separately).
3. Visit to Planetarium or State Land Record Department's Museum. Report on it shall be prepared & submitted along with term work.
4. Expert's lecture on state land survey practices and records pertaining to land. Report on it shall be prepared & submitted along with term work.

5. Visiting a shop/office of survey instrument manufacturer/supplier or browsing on internet & collecting/downloading brochures for some of conventional/modern survey instruments & practices & submitting it along with term work.

   Term work should consist of record of all practicals indicated in the practicals & project contents. A field book cum journal containing readings & write-ups for all the practicals & projects and a sheet file containing minimum two I.S. A1 sized drawing sheets based on project works should be prepared & submitted as term work.

Instructions:

1. Practical will be carried out in groups of students.
2. Each group will consist of about five students.
3. Each student from the group shall be given chance to handle the instrument, to understand the function of different components & use of the instrument.
4. Drawing, plotting should be considered as part of practicals.

Learning Resources:

A.Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
01	Kanetkar & Kulkarni	Surveying & Levelling, Vol. I	. PVG, Pune.
02	Dr. B. C. Punmia,	Surveying, Vol .I.	Laxmi Publications, Delhi
03	Hussain & Nagraj, S.	Text book of Surveying	Chand & Co., Delhi.
04	C. L. Kochher,	Text book of Surveying,	Dhanpat Rai.Publishing Co., Delhi
05	Dr. K. R. Arora	Surveying, Vol. I	Standard Book house, Delhi.
06	S. K. Roy	Fundamentals of Surveying	Prentice Hall of India, Delhi.
07	Narinder Singh,	Surveying,	The Tata Mc Graw Hill Co., Delhi.
08	S. K. Duggal	Surveying, Vol. I	
09	N. N. Basak	Surveying & Levelling	
10	Blinker & Wolf.	Elementary Surveying	
11	A. Bannister, S. Raymond & R. Baker	Surveying	Pearson Education, Delhi.
12	Shelar, Mali, Patil	Surveying	Nirali Prakashan, Pune

CDs/Videos:

Watershed Management by Hind Swarajya Trust Ralegan Sidhi

C. Websites for reference :

1. www.wikipedia.com
2. www.surveying.otago
3. www.amerisurv.com
4. www.thecivilegineer.net
5. www.surveyofindia.gov.in

D. Indian Standards

1. IS 1492 : 1970 Metric surveying Chains
2. IS 1842: 1961 Surveying Chain Pins Arrows
3. IS 1269 (Part I): 1997 Woven Metallic and Glass Fiber Tape Measures

4. IS 1269 (Part II): 1997 Steel Tape Measures
5. IS 12888: 1989 Short range infrared distance measuring instruments
6. IS 228: 1963 Specification for Ranging Rods
7. IS 7009: 1973 Optical Square (For Surveying)
8. IS 1955: 1961 Prismatic Compass, liquid
9. IS 1957: 1961 Prismatic Compass, non liquid
10. IS 2539: 1963 Plane Tables
11. IS 1764: 1961 Specifications for Trough Compass
12. IS 12874: 1989 Optical & mathematical instruments – Telescopic Alidade
13. IS 5706: 1993 Spirit level for use in precision engineering
14. IS 9613: 1980 Primary Level (Precision level for 1st order levelling)
15. IS 4590: 1980 Specifications for Secondary Level (Tilting)
16. IS 9607:1980 Specification for teritary level
17. IS 1779: 1961 Four metre levelling staff, folding type.
18. IS 11961: 1986 Four metre levelling staff, telescopic
19. IS 15483 (Part I):2004 Invar Levelling Staffs
20. IS 8330: 2004 Tripods for surveying instruments – Fixed leg type
21. IS 15483 (Part II):2004 Tripods - Telescopic
22. IS 9849: 1991 Optics & optical instruments – Geodetic instruments - Vocabulary
23. IS 1481: 1970 Specification for Metric Steel Scales for Engineers
24. IS 10713: 1983/ISO 5455 : 1979 Scales for use in technical drawings
25. IS 1071 : 1983/ISO 128 : 1982 General principles of presentation on technical drawings

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING

Course: Surveying - II **Course Code: R14CE3107**

Course Category: Core **Credits : 07**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	4	3	80	20	50	–	25	175

Rational:

Through this course in addition to the knowledge derived under course Surveying - I (R10CE3106), student will derive knowledge about some intermediate methods of land surveying popularly used in practice. Students will also be introduced to topographical maps prepared by Survey of India which are invariably required in planning & execution of civil engineering projects.

Objectives:

The student will be able to

1. Survey the terrain & prepare contoured plans.
2. Handle major survey instruments like, theodolite, tacheometer, total station.
3. Handle supporting survey instruments like plannimeter, GPS etc.
4. Develop skills in different methods of surveying with above mentioned instruments.
5. Carry out survey to establish controls & locate details over a property/estate & find out its area.
6. Set out horizontal & vertical curves.
6. Check the survey work for error.
7. Read & interpret the toposheets

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Contouring & Toposheets** 1.1 Definitions: contour, contour interval & horizontal equivalent. Factors deciding contour interval. Contour intervals for various works. Characteristics of contour lines. 1.2 Plotting of direct contours. Indirect methods of contouring. Interpolation of contours. Grade contour & locating grade contour on contoured map and ground. Uses of contoured maps. 1.3 Toposheets: Introduction. General layout of toposheets. Information available on toposheets . Sheet numbering & index to sheet. General and Engineering applications of topo sheets.	08	16

2	**Theodolite Surveying I** 1.1 Introduction to, uses & types of theodolites (including micro optic & electronic digital). Transit vernier theodolite: components, temporary adjustments, principal axes & their inter relation. 1.2 Important terms: face left & right, swinging, plunging, & transiting. Measuring with theodolites – horizontal & vertical angles and magnetic bearing by loose needle method. 1.3 Fixed Stadia tacheometry with vertical staff – Principle, instruments, procedure and use.	08	12
3	**Theodolite Surveying II** 1.1 Other uses of theodolite: prolonging a line, lining in, setting out perpendicular, marking point of intersection of two lines. 1.2 Theodolite traversing: fieldwork, checks on measurements & balancing the traverse. Gales traverse table. 1.3 Plotting of traverse with independent coordinates. Errors & precisions in theodolite survey.	08	12
4	**Total Station Surveying** 2.1 Definition & Necessity. Construction of a total station. Classification of total stations. Advantages of a total station. Features of a total station. 2.2 The prism reflector , constant of a reflector and its determination . Common onboard program s available on a total station. Uses of a total station & Factors affecting use. Temporary adjustments of a total station. 2.3. Measuring distanc es & angles with a total station. Survey with a total station. The communication/transfer software. The post processing software.	08	12
5	**Curve ranging** 1.1 Definition & Necessity of curves. Types of horizontal curves. Principal points, lines & angles of a circular curve. Elements of the simple circular curves. 1.2 Nomenclature for circular curve and relation between radius & degree of a curve. Chainages of tangent point. Peg interval. Concept of unit chord & sub-chord. Length of sub-chord & number of unit chords. 1.3 Methods of setting out simple circular curves: method of offset from long chord & Rankine's method of deflection angles . Vertical curves: concept and types.	08	12
6	**Area & Volume Measurement and Advanced Survey Techniques** 1.1 Construction and use of Mechanical & electronic digital Planimeters. Computation of volume from contour maps by Trapezoidal and Priszmoidal formulae. 1.2 Space Based Positioning System (SBPS): Introduction & Principle. SBPS in action – GPS & GLONASS. Segments of SBPS . SBPS receivers – Navigational & Surveying. Methods of positioning with SBPS – Absolute & Relative. SBPS Co -ordinates & heights. Sources of errors in SBPS. Accuracy, advantages & uses of SBPS. 1.3 Remote sensing (RS): Introduction, Definition, principle & nec essity of RS. Types - Active & passive RS. Components of a RS system. Basic Processes in RS – Data acquisition & data Analysis. RS data products. Advantages, limitations & applications of RS. Introduction to GIS.	08	16

Teaching Methodology : Chalkboard, Group Discussions, MS. Power Point Presentations, Wall Hung Charts, 35mm Slide Shows, Instruments, Expert Lectures, Technical Visits.

Term Work:

Skills to be developed :

i) Intellectual Skills :

- Identify the survey instruments.
- Discriminate one survey instrument/technique from the other.
- Select a most adequate survey instrument/technique for the given work.

- Read the survey instrument such as theodolites, tacheometers, total stations & planimeters etc.
- Process the data collected on field to work out relative positions, areas, volumes etc. Interpret the results.
- Understand mistakes & errors in survey work & techniques to avoid/minimize it.
- To read & interpret the survey drawings.
- Write report on the survey carried out.

ii) Motor Skills :

- To handle the theodolites, tacheometers, total stations, planimeters etc..
- To make temporary adjustments of the theodolites, tacheometers & total stations.
- To measure with theodolites, tacheometers & total stations, the distances/direction data to establish controls & to locate details.
- To interpolate contours.
- To set out a curve.
- To plot the survey data graphically in form of plans/maps and sections.

List of Practicals:

1. Direct contouring using plane table & telescopic alidade.
2. A. Study of vernier transit theodolite, its principal axes and important terms such as face left, face right, transiting, swinging & plunging.
   B. Temporary adjustments of vernier transit theodolite.
   C. Determining least count & learning to read the vernier.
3. Measurement of horizontal angle with a theodolite by method of repetition.
4. Measurement of vertical angles using a theodolite.
5. Measurement of horizontal & vertical distances & calculations of R. L. using principle of tacheometry.
6. Study & use of electronic digital total station.
7. Traverse survey with electronic digital total station (For a small 3 sided traverse, locate two details from each traverse station.
8. Down loading data collected with a total station in traverse survey & preparing plan from it using drafting software.
9. Curve ranging by linear method of offset from long chord.
10. Curve ranging by angular method with a theodolite/total station.
11. Finding out area of irregular figures using mechanical & electronic digital planimeters.
12. Reducing coordinate of the stations with a SBPS.

Professional Practice

Items 1, 2 & 3 is compulsory, any 1 item rest of 2 can be carried out.

1. Interpolation of contours by arithmetical method from given readymade dataset for indirect contouring by method of squares or method of sections.
2. Project I: Detailing Survey of a small property or an Institutional campus by theodolite or total station traversing with minimum four control stations. (One day for survey & reduction of independent coordinates by Gale's method & 6 hours for plotting. Sheet to be drawn by each student separately).
3. Project II: Tacheometric or total station contour survey of a small field about 2ha in area.

Three control stations, about 120m apart, shall be set over the field of survey. Horizontal control i.e. Northing & Easting shall be established by a vernier theodolite or by a total station traversing. Vertical control i.e. elevation shall be transferred, from Bench Mark to each of the control station either by total station survey or by tacheometry with an electronic digital theodolite. Locate at least six spot levels, by a total station or by a tacheometer, at about 10m intervals along every ray radiating at an angular interval of about 30° from each of the control station. Reduce the distance of spot from control station along the ray & elevation of the spot by total station survey or tacheometry. The control stations & the spot levels shall be plotted to their correct relative geographical positions on an A1 size drawing sheet. Elevation shall be written against every spot. Contours to be interpolated by approximate method at interval suitable to purpose of survey, topography, scale of plotting etc. (One day for survey, reduction of independent coordinates of control stations by Gale's method & reduction of stadia notes and 6 hours for plotting. Sheet to be drawn by each student separately).

4. Visit to State Land Record Department's Museum / Survey of India. Report on it shall be prepared & submitted along with term work.
5. Going through an article published on survey instrument & techniques published in any national/international magazine journal related with construction/surveying & preparing & submitting brief extracts of it. (Such magazines/journals are also available on internet)

Term work should consist of record of all practicals indicated in the practicals & project contents. A field book cum journal containing readings & write-ups for all the practicals & projects and a sheet file containing minimum two I.S. A1 sized drawing sheets based on project works should be prepared & submitted as term work.

Instructions

1.Practical will be carried out in groups of students.
2.Each group will consist of about five students.
3.Each student from the group shall be given chance to handle the instrument, to understand the function of different components & use of the instrument.
4.Drawing, plotting should be considered as part of practical.

Learning Resources:

A. Books

SR.NO.	AUTHOR	TITLE	PUBLISHER
01	Kanetkar & Kulkarni	Surveying & Levelling, Vol. I & II,	PVG, Pune.
02	Dr. B. C. Punmia,	Surveying, Vol .I.&II	Laxmi Publications, Delhi
03	Hussain & Nagraj,	Text book of Surveying	Chand & Co., Delhi
04	C. L. Kochher	Text book of Surveying,	Dhanpat Rai.Publishing Co., Delhi
05	Dr. K. R. Arora	Surveying, Vol. I & II	Standard Book house, Delhi.
06	S. K. Roy	Fundamentals of Surveying	Prentice Hall of India, Delhi.
07	Narinder Singh	Surveying,	The Tata Mc Graw Hill Co., Delhi
08	S. K. Duggal	Surveying, Vol. I & II	
09	N. N. Basak	Surveying & Levelling	
10	Blinker & Wolf.	Elementary Surveying	
11	A. Bannister, S. Raymond & R. Baker	Surveying	Pearson Education, Delhi.
12	Dr. A. M. Chandra	Higher Surveying	New Age International, Delhi.
12	Shelar, Mali, Patil	Surveying	Nirali Prakashan, Pune.

B. CDs/Videos

A video film on construction of a Theodolite by EMRC, Pune.

C. Websites for reference :

1.www.iscmapping.com

2.www.webinfolist.com

3.www.surveyofindia.gov.in

4.www.mcnetboy.net

5. www.wikipedia.com

D. Indian Standards

1.IS 8330: 2004 Tripods for surveying instruments – Fixed leg type

2.IS 15483 (Part II):2004 Tripods

3.IS 9849: 1991 Optics & optical instruments – Geodetic instruments - Vocabulary

4.IS 2976: 1964 Optical Theodolites

5.IS 2988: 1955 Specifications for vernier theodolites

6.IS 5497: 2008 Guide to topographical surveys for river valley projects

7.IS 1481: 1970 Specification for Metric Steel Scales for Engineers

8.IS 10713: 1983/ISO 5455 : 1979 Scales for use in technical drawings

9.IS 1071 : 1983/ISO 128 : 1982 General principles of presentation on technical drawings

10.IS 7543:1975 Specification for Planimeters

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING
Course Name : Hydraulics Course code : R14CE3108
Course Category : Core Credits : 5

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	-	--	25	125

Rationale:

The subject deals with statics and dynamics of water. The subject is intended to teach the students concepts, principles and procedures of Hydraulics which will enable him to apply this knowledge for planning, designing, supervising, executing and maintaining the Civil Engineering projects related to water supply & treatment, irrigation engineering ,bridge engineering.

Objectives:

Students will be able to

1. Appreciate the importance of hydraulics
2. Calculate forces, pressure, center of pressure etc. on bodies like gates, retaining structures .
3. Design pipes for water supply and other purposes.
4. Design canal sections and work out capacity of canal
5. Describe the working of various pumps and turbines.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**PROPERTIES OF FLUID AND HYDROSTATICS** 1.1 Importance of hydraulics in civil engineering, Definitionof Fluid, Fluid Mechanics, Hydraulics, Hydrostatics, hydro kinematics, hydro dynamics. Fluid properties –density, specific weight ,specific gravity ,viscosity ,surface tension, capillarity 1.2 Hydrostatics: Pressure and depth relationship. Pascal's law Atmospheric pressure, gauge pressure, absolute pressure, manometers, mechanical gauges. Measurement by different gauge. . Total pressure on plane surfaces, centre of pressure	10	16

2	**HYDRODYNAMICS** 2.1 Hydrokinematics: Velocity and acceleration of liquid particles, discharge, Different types of flows, , equation of continuity and its simple applications **2.2** Energy and Momentum equations : Types of energies, energy equation, applications, hydraulic grade line and total energy line Momentum equation, applications to forces	8	12
3	**FLOW MESUREMENT** 3.1 Pipe flow measurement - venturi meter, pitot tube, prandtl's tube. Orifice –hydraulic coefficients. 3.2 Notches and Weirs -Different types of notches, computation of flow over notches, different types of weirs., flow calculations	8	12
4	**PIPE FLOW** 4.1 Characteristics, losses in pipe flow energy gradient, hydraulic gradient. Darcy – Weisbach equation, 4.2 Analysis of simple pipe networks. Use of Moody's diagram, use monograms and tables.	8	12
5	**OPEN CHANNELS** 5.1 Characteristics of flow, uniform flow through channels, applications of Chezy, Manning formulae. 5.2 Velocity distribution over section, specific energy, sub critical and super critical flows. Hydraulic jump, Venturi flume to measure flow.	8	16
6	**HYDRAULIC MACHINES** 6.1 Power station and its components, 6.2 Fundamentals of Centrifugal and reciprocating pumps and Turbines types .	6	12

Teaching methodology : Chalkboard, PPTS

Term Work :
Skills to be developed :
Motor Skills :
- Measure & calculate discharge passing through pipe, channel section.
- Measure pressure in pipe using pressure measuring devices.
- Calculate pipe size for water supply works.
- Calculate capacity of centrifugal pump for given conditions.

List of Practicals :
1.Use of manometers & mechanical gauge in pressure measurement.
2.Verification of Bernoulli's theorem .
3.Finding. Cd. for an orifice.
4.Measuring pipe flow with Venturi meter/ Orifice meter.
5.Calibrating a notch.
6.To find friction factor 'f '.
7.Study of uniform flow formulae for open channel.

Assignments :
1.Assignment based on fluid properties and hydrostatics
2.Assignment based on Bernoulli's equation and discharge measuring devices
3.Assignment based on Pipe flow
4.Assignment based on Open channel flow

Professional practices :
1.Sample excel spreadsheet for calculation of down take pipe sizing/rising main
2.Calculation of capacity of a centrifugal pump supplying water to overhead tank.

Learning Resources :
A.Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Dahigaonkar	Hydraulics	Central Techno Publications
2	Modi, Seth	Hydraulics & Fluid Mechanics	Standard Book House, Delhi
3	Jagdish Lal	Hydraulics	Metropoliton Book Company, Delhi.
4	S. Ramamruthan	Hydraulics Fluid Mech. & Fluid M/C	Dhanpat Rai, Delhi
5	R.S. Khurmi	Hydraulics	S. Chand, Delhi
6	K. Subramanya	Problems in Fluid Mechanics	Tata McGraw – Hill, Delhi
7	Chow V.T.	Open channel Hydraulics	McGraw Hill

B. Web sites for references :
www.efm.leeds.com
www.wikipedia.com
www.efluid.com
www.nptel.iitm.ac.in

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING

Course : Theory of Structures **Course Code : R14AM3109**

Course Category : Core **Credits : 4**

Teaching and Examination scheme :

Teaching Scheme		Examination scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
4	0	3	80	20	-	-	-	100

Rationale :

This is core subject which will enable the students to understand the analysis of indeterminate structures and roof trusses, also the deformation of beams.

Objectives : The students will be able to:

1. Understand the basic principles of behavior of beams/columns subjected to various loads.
2. Analyze the structure for flexure, shear, slope and deflection.
3. Analyze the forces in the various members of the frame.
4. Predict the maximum shear force and maximum bending moment under transverse loading.
5. Apply various principles, theorems and methods in theory of structures to solve the various problems in field situations.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1.	**Trusses** 1.1 Definition of a truss, types of trusses, perfect, imperfect, redundant. Law of perfect frames. Method of joints, 1.2 Method of sections, zero force member, types of trusses used in roofs, bridges with vertical and inclined loading at nodal points	12	16
2.	**Slope and Deflection** 2.1 Concept of slope and deflection, stiffness of a beam, slope and deflection from differential equation of bending moment by double integration method, constants of integration and their evaluation, standard cases a cantilever with a concentrated load at free end, a cantilever carrying a u.d.l. of intensity 'w' per meter run over the entire span, a cantilever carrying a concentrated load not at the free end, a simply supported beam carrying a central concentrated load, a simply supported beam carrying an eccentric load, a simple beam carrying a u.d.l. of intensity 'w'per meter run over the entire span. 2.2 Macaulay's method Technique of taking a section while using the method, 'if required' terms, slope and deflection at different sections of a simple beam carrying concentrated loads by using Macaulay's method (solution of a cubic equation at any stage, is not expected)	10	12

3.	**Fixed Beam** 3.1 Concept of fixity, effect of fixity, advantages and disadvantages, fixed end moments, nature of fixed end moments, and principle of superimposition. 3.2 Derivation of formulae of fixed beams subjected to concentrated loads and uniformly distributed load over entire span, application of standard formulae in finding end moments and drawing S.F. and B.M. diagrams for fixed beams. 3.3 Calculating fixed end moments from first principle for fixed beams subjected to concentrated loads and uniformly distributed load over entire span, drawing S.F. and B.M. diagrams	10	12
4.	**Continuous Beams** 4.1 Definition, effect of continuity, nature of moment induced due to continuity, advantages and disadvantages, practical examples, concept of deflected shape Clapeyron's theorem of three moments, its application to various types of continuous beam having supports at some level, subjected to concentrated and uniformly distributed loads over entire span. 4.2 Shear force and bending moment diagrams up to three spans with or without overhangs. S.F. and B.M. diagrams for two spans with one end fixed with or without overhang.	12	16
5.	**Moment Distribution Method** 5.1 Introduction, sign convention, carry over factors, stiffness factors, distribution factors. 5.2 Application of moment distribution method to various types of continuous beams subjected concentrated loads and uniformly distributed loads over the entire span, shear force and bending moment diagrams (supports rigid and at the same level) 5.3 Application of moment distribution method to non-sway symmetrical portal frames of single bay and single storey, S.F. and B.M. diagrams	10	12
6.	**Columns** 6.1 Prismatic columns, concept of a columns and struts. Modes of failure of a column, types of columns. Buckling load, crushing load, slenderness ratio and equivalent length Euler's formula (No proof) for critical load for different end conditions, constraints for equivalent length for different condition, limitations of Euler's formula, 6.2 Rankine's formula Rankine's constants. Applications of Rankine's formula	10	12

Skills to be developed :

i)Intellectual Skills :
Understand the behavior of Beams, Columns and Frames subjected to various loads.
Analyse the beam for Flexure, Shear, Slope and Deflection.

ii)Motor Skills :
Draw Shear Force and Bending Moment diagrams of different beams and Portal Frames subjected to various loads.
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Reference Books :

SR.NO.	AUTHOR	TITLE	PUBLISHER
1.	S.Ramamruthum	Strength of Materials	Dhanpat Rai Publication, Delhi.
2.	Panchanadikar M.V.	Theory of Structures	Pune Vidyarthi Griha Prakashan, Pune-30.
3.	Junnarkar S.B.	Mechanics of Structures Vol. I	Charotar Publishing House, Anand.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING
Course : Concrete Technology **Course Code :R14AM3110**
Course Category : Core **Credits : 05**

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	-	25	25	150

Rationale :
This is core subject, which will enable the students to understand concepts, principles and procedures about quality control of concrete before, during and after construction of various civil structures.

Objectives :
T**he students will be able to**
1. Develop overall understanding of concrete operations in civil Engineering construction.
2. Understand the properties of concrete and its ingredients with the focus on importance and effect of these properties on concrete and concreting operations.
3. Understand basic principles of quality control in construction operation.
4. Develop supervisory skills in all concrete operations prior to, during and after concreting by making use of knowledge acquired and practice tools developed by ISI & IRC.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Ingredients of Concrete** 1.1 Cement: Manufacturing of cement , types and grades of cement, field and laboratory tests on cement, sampling of cement. 1.2 Aggregate: classification characteristics and grading of aggregates, maximum size of aggregates, combination of fine and coarse aggregates. 1.3 Water : Role of water in concrete, quality of water, Duff Abram's law for water cement ratio, effect of water cement ratio on workability and strength of concrete.	10	16
2	**Properties of Concrete** 2.1 Fresh state: Introduction, cohesion and workability. Concept of workability. Factors affecting workability. Measurement of workability by slump test, compacting factor test. Recommended degrees and corresponding values of workability, Various measures to improve workability. 2.2 Hardened state: Strength, shrinkage, Creep, Thermal expansion, Permeability, Durability, Resistance to chemical attack, Resistance to corrosion, Fire resistance.	6	12

3	**Quality control of concrete** 3.1 Storing of ingredients, batching of cement and aggregates, mixing of concrete ingredients. 3.2 Transportation of concrete, various methods, placing of concrete, compaction, methods of compaction, precautions. 3.3 Curing of Concrete – Purpose, methods and period of curing. Types of Finishing of concrete.	7	12
4	**Concrete mix design** 4.1 Introduction: Basic considerations for concrete mix design., Factors influencing the choice of mix proportions. 4.2 Methods of concrete mix design for medium strength concrete – Indian Road Congress (I.R.C.) method. American Concrete Institute (A.C.I.) method, Department of Environment (D.O.E.) method, Trial and error method. 4.3 High strength concrete – Introduction, methods of mixing high strength concrete. Field adjustments.	8	12
5	**Special concretes & Special concrete Techniques** 5.1 Introduction, hot weather concreting, Cold weather concreting, Under water concreting, Concreting in seawater, Concreting in aggressive soils and water. 5.2 Introduction : Light weight concrete, Ultra – Light weight concrete, Vacuum concrete, Ferro cement,. Gap-graded concrete, Fiber reinforced concrete. 5.3 Colcrete, Shot Crete or Guniting, Pumping of concrete. Vacuum dewatered concrete, Jointing.	9	16
6	**Ready Mixed Concrete & Admixtures** 6.1 Ready Mixed Concrete: Introduction., RMC Plant:- Layout, Capacity, Transit Mixer, Precautions, Maintenance etc.. Ready Mix Concrete :- Batching & Mixing . Test on RMC at plant. 6.2 Admixtures: Definition, factors affecting their effectiveness, Classification:- Accelerating, Retarding, Water Reducing, Air entraining, Plasticizers, Super plasticizers, Brand names of various admixtures.	8	12

Teaching Methodology :
Chalkboard, Discussion, PPT, Transparencies, Expert Lectures, Visits.
Term work :
Skills to be developed :
i.Intellectual Skills:
Identify & classify properties of ingredients of concrete
Design of concrete mix based on properties of ingredients & requirement of construction work.
Interpretation of strength & other properties of concrete with design.
Understanding various steps for concreting work.

ii.Motor Skills:
Preparation of moulds for concrete testing.
Testing of various properties of concrete ingredients with necessary apparatus.
Drawing of graph based on measurement & testing.

List of Practical :

A. Laboratory

1.Fineness test on cement.
2.Standard consistency test on cement.
3.Initial and final test on cement.
4.Compressive strength of cement.
5.Specific gravity and water absorption of aggregates.
6.Size gradation analysis for fine and coarse aggregate.
7.Bulking of sand.
8.Effect of Water-Cement ratio on Workability & Compressive Strength of Concrete .
9.Effect of Admixture on Workability & Compressive Strength of Concrete .
10.Effect of Admixture on Setting Time of Cement.

B. Professional Practice

a) Visit (Any Two):

1. Study from literature and site visit of any one special concreting technique.
2. Study from literature and factory visit of any one precast concrete product.
3. Study from literature and plant visit of Ready Mixed Concrete or Lightweight concrete.

b) Individual Visit (Minimum 05): Visits to Residential Buildings, Commercial Buildings, Road works, Bridges etc. to collect information for

1. Simple field test on cement, fine and coarse aggregate, wet concrete and hardened concrete.
2. Enlisting job requirements of site engineer with respect to concrete.

Learning Resources :

A.Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	M.S. Shetty	Concrete Technology	S. Chand and Company Ltd., New Delhi.
2	M. L. Gambhir	Concrete Technology	Tata M$_c$Graw-Hill Publication, New Delhi.
3	A. M. Neville	Properties of Concrete	Edison Wesley, London

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING

Course : Geotechnical Engineering **Course Code : R14AM3111**

Course Category: Core **Credits: 5**

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
03	02	3	80	20	-	-	25	125

Rationale :

This is core subject which will enable the students to understand the science of soil mechanics and deals with elementary knowledge of engineering of earth materials and it's applications in the field of engineering constructions.

Objectives :

The students will be able to

1. Know the properties and behavior of soils..
2. Know and understand various theories and various principle.
3. Develop the ability of interpreting results.
4. Understand the procedures of testing the soil.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Fundamental Definitions and Their Relationship** 1.1 Meaning of soil, types of soil available in India & their behavior in short, graphical representation of soil as a three phase system, definitions of moisture content, unit weight, bulk density saturated density, submerged density, dry density, specific gravity, voids ratio, porosity, degree of saturation, percentage air vo ids, air content and density index. 1.2 Relationship between various terms stated above index properties, laboratory determination of moisture contain by over drying and by torsion balance method, laboratory determination of specific gravity by using Pycnometer. 1.3 Determination of field density by Core cutter, Sand replacement & Water displacement method. 1.4 Rocks – Introduction, rock cycle, Structural features of rocks(folds, faults, joints, overlaps and nappe) - definitions, parts and types.	10	16

2	**Consistency of soil & Classification of Soil** 2.1 Definition, Atterberg's limits of consistency : liquid limit, plastic limit and shrinkage limit, graph of volume vs water content for different consistency limits. 2.2 Laboratory determination of Atterberg's limits. 2.3 Particle size classification M.I.T. and I.S., Particle size distribution curve & it's interpretation, U. S. Bureau of soils and U.S.P.R.A. textural classification and brief description of plasticity chart.	7	12
3	**Permeability of Soil & Compaction** 3.1 Definitions of permeability, laminar flow and turbulent flow, Darcy's law, definitions of discharge velocity, seepage velocity and coefficient of percolation, factors affecting permeability. 3.2 Methods of determination of permeability, laboratory methods, falling head method and constant head method. 3.3 Definition of compaction and consolidation, Proctor's compaction test : standard and modified, different methods of compaction, density and moisture content relationship, factors affecting compaction and brief description of field compaction methods.	7	16
4	**Bearing Capacity of Soil** 4.1 Concept of bearing capacity, Ultimate bearing capacity, safe bearing capacity & allowable bearing pressure. 4.2 Introduction to Terzaghi's analysis, assumptions made & limitations, effect of water table on bearing capacity. 4.3 Field methods for determination of bearing capacity – Plate load test & Standard Penetration Test procedures as per I.S.	10	12
5	**Shear strength of soils** 5.1 Definition of shear strength major, intermediate and minor principal planes and stresses, cohesion, frictional resistance and structural resistance, methods of improving shear strength of soil. 5.2 Two dimensional stress analysis by Mohr's stress circle and its interpretation, Mohr's circle for c – soils and c –ϕ soils, interpretation of coulomb's equations. 5.3 Different types of shear tests.	7	12
6	**Earth Pressure and Retaining Structures** 6.1 Definition of earth pressure, active and passive earth pressures, terms and symbols relating to a retaining wall, relation between movement of wall and earth pressure and movement resisting force on the sliding wedges. 6.2 Rankine's and Coulomb's earth pressure for cohesive and cohesion less soils. 6.3 Numerical problems on non-cohesive soils only.	7	12

Teaching Methodology :

Chalkboard, Discussion, PPT, Transparencies, Expert Lectures.

A. Term work:

Skills to be developed:

i.Intellectual Skills:

- Identify & classify various type of soil.
- Interpretation of soil characteristics for construction.
- Understanding suitability of soil based on results.

ii.Motor Skills:

- Measurement of soil properties by suitable equipment.
- Testing of given soil with specified values.
- Drawing of graph based on measurement & testing.

List of Practical: (Minimum Twelve) :

1.Determination of Moisture content by oven drying.
2.Determination of Specific gravity by Pycnometer.
3.Determination of field density by core cutter
4.Determination of field density by sand replacement.
5.Determination of field density by soil clod.
6.Grain size distribution by mechanical sieve analysis.
7.Determination of liquid limit by Casegrande's apparatus.
8.Determination of plastic limit
9.Determination of shrinkage limit.
10.Determination of coefficient of permeability under constant head.
11.Determination of coefficient of permeability under variable head.
12.Determination of O.M.C. and O.D.D. by standard proctor test.
13.Determination of Shear parameters by direct shear test.
14.Determination of Shear parameters by vane shear test.
15.Determination of Shear parameters by unconfined compression test.
16.Determination of Shear parameters by triaxial shear test.

Learning Resources :

A.Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	B. J. Kasmalkar	Geotechnical Engineering	Pune Vidyarthi Griha Prakashan Pune.
2	Punmiya B. C.	Soil Mechanics and Foundation Engineering	Standard Book House, Delhi.
3	Taylor	Fundamental of Soil Mechanics	Asia Pub. House, Bombay
4	S. K. Garg	Physical & Engineering Geology	Khanna Publishers, New Delhi

B.Web sites for references :

www.totalgeotechnical.com.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING
Course : Construction Materials Course Code : R14CE3112
Course Category : Core Credits : 02

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
02	-	--	40	10	-	-	-	50

Rationale :
Civil engineering technocrat deals with construction of civil structures. It is imperative for him to know thoroughly the knowledge of basic materials and their uses. The site engineer should be able to distinguish between good & bad quality materials received on site by testing. He should be able to guide the artisans on the site regarding the use of materials and maintaining good workmanship.

Objectives :
The student will be able to
1) Learn a vast variety of materials.
2) Identify, selection, testing, storing & use of various materials in civil engineering project.
3) Know the different properties and functions of material.
4) Use of materials with minimum wastage.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Stones** 1.1 Introduction, Civil Engineering Application 1.2 List of rock forming minerals, Classification of rocks, characteristics of good stones. 1.3 Properties & Testing of stones, Quarrying & dressing.	6	8
2	**Bricks** 2.1 Introduction, sizes & forms of Bricks. 2.2 Classification of bricks, requirement of bricks. 2.3 Constituents of brick earth, manufacturing, testing of bricks, fly ash bricks.	5	6
3	**Concrete Blocks & Lime** 3.1 Introduction, types of building blocks. 3.2 Soil cement stabilized, aerated, cement concrete, sizes of building blocks, mix proportions, testing of concrete blocks. 3.3 Lime – Introduction, manufacturing, slaking of lime, types of lime.	5	6

4	**Timber & Glass** 4.1 Timber – Introduction, properties of good timber, classification of timber. 4.2 Seasoning of timber, defects in timber, market forms & wood products. 4.3 Glass – Introduction, types & forms of glass products.	6	6
5	**Metals, Alloys (Including Steel) & Plastics** 5.1 Metals & Alloys – Introduction, Ferrous metals – Pig iron, wrought iron, cast iron. 5.2 Non ferrous metals – copper, aluminium, brass, gun metal – introduction, properties & uses. 5.3 Plastics – Inroduction, Classification, advantages, plastic building products & uses.	5	6
6	**Tiles, Paints & Varnishes** 6.1 Tiles – Introduction, Types (Natural & Ceramic), Cement tile. Types & uses of ceramic tiles, durability, warranty, maintenance , care & cost. Testing of tiles, Introduction to terra cotta, earthen wares, stoneware & porcelain. 6.2 Paints – Introduction, requirements, constituents & their function, material used as constituents. Types of paints (anti corrosion, asbestos, bituminous, aluminium, coal tar). 6.3 Varnishes – Introduction, characteristics, classification.	5	8

Teaching Methodology : Chalkboard, Discussion, PPT'S, Demonstration

Skills to be developed

1. Intellectual Skills :

- Differentiate and identify types of building materials.
- Select appropriate material for building construction.
- Prepare notes for given topics.
- Able to state properties and function of materials.
- Able to state basics of Mechanical and Electrical Engineering concepts.

2. Motor Skills :

- Acquire information from different sources.
- Select and use of various materials required on construction work.

Learning Resources : Books:

SR.NO	AUTHOR	TITLE	PUBLISHER
1	Sushil Kumar	Building construction and Materials	Standard Publication, N.Delhi.
2	D.N. Gose	Materials of Construction	Tata McGraw, N. Delhi .
3	V.R. Phadke & P. D. Dhavale	Material of Construction & Concrete Technology	Nirali Prakashan.
4	Sandeep Mantri	A to Z, Bldg. Construction	Satya Prakashan, N. Delhi.
5	S.K.Duggal	Building Material	New Age, International Publication
6	TTTI	Civil Engineering Materials	Tata McGraw Hill

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING

Course: Transportation Engineering Course Code: R14CE4101

Course Category: Applied Credits: 03

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	--	3	80	20	--	–	--	100

Rational:
Transportation plays an important role in development of the country. The major share of the budget is allotted to development of transportation. Progress of country is measured by the development of communication system, which has direct relation to prosperity of a nation. The civil engineer must possess knowledge and skills in different areas such as planning, execution, supervision and maintenance of railways, bridges & tunnels. Railway is such a huge organization that its budget is prepared & presented before general budget of India. Railways employ more than one million of technical & nontechnical people. Railways have it's own recruitment board. Civil engineer can execute lot of works of railways as a contractor. Same way lot of business & employment potential is available in the field of bridge & tunnel engineering. Topic on Airport engineering and Docks and harbour engineering will be useful to understand different terms used in these fields.

Course Objectives:
Student will be able to:
1. Get acquainted with terminologies related with railways, bridges, tunnels, airports & harbours.
2. Select most suitable site for railways, bridges, tunnels, airports & harbours.
3. Align and/or plan a railway/bridge/tunnel/airport in given situation.
4. Know component parts of railways, bridges, tunnels, airports & harbours.
5. Identify & select appropriate track component & fitting.
6. Select/suggest appropriate method of construction for railways, bridges & tunnels.
7. Understand the geometric standards for railways, bridges, tunnels, airports.
8. Supervise construction, and maintenance activities of railways, bridges, tunnels.

Course Details:

UNIT	NAME OF THE TOPIC		HOURS	MARKS
1.	**Railway Engineering - I**		08	12
	1.1	Importance of railway. Indian Railways. Gauges – Types, Su itability, factors affecting adoption. Surveys for Railway Projects. Requirements of a permanent way. Tilting of rails & coning of wheels.		
	1.2	Components of Permanent Way I: Rails – Definition, functions, types. Rail joints & welding of rails. Sleepers – Definition, functions, types – PSC & Steel Channel. Spacing & density of sleepers.		
	1.3	Components of Permanent Way II: Fixtures & fastenings – fish plates & fish bolts, Elastic Rail Clip (ECR) & rubber pads. Definition & functions of ballast. Crushed stone ballast & acceptance criteria for it.		

2.	**Railway Engineering - II**		08	16
	2.1	Track geometrics: Track alignment. Standard C/S of BG Single and double line in cutting and embankment. Gradient. Curves. Grade compensation on curves. Cant, cant deficiency & negative cant.		
	2.2	Branching of Tracks: Definition, functions, component & types of Points, Switches, Crossings & Turnouts.		
	2.3	Track Construction: Different operations involved in track construction. Telescopic & PQRS methods of track laying.		
	2.4	Track Maintenance – Definition, Necessity, advantages, classification, organization, tools & plants.		
3	**Bridges Engineering - I**		08	12
	3.1	Definition of bridge. Classification of bridges. Site selection for a bridge. IRC & IS references for bridge design & construction.		
	3.2	Considerations in Bridge design– Design discharge, Waterway, Economical span, Afflux & Vertical clearance, Scour depth, Depth of foundation, Width of carriage way, Horizontal clearance & Loads.		
	3.3	Plan and sectional elevation of bridge showing component parts of, substructure and super structure. Bridge substructure – Foundation, Pier, Pier cap, Girder pedestals, Bearings, Abutments & wing walls.		
4	**Bridges Engineering - II**		08	12
	4.1	Bridge super structure – Decked, Through, Arched, Girdered, Trussed, Suspended, Cable stayed & Mobile or Moving. Approaches to bridge.		
	4.2	Culverts & Causeways : Definition of culvert & causeways. Types of culverts – RCC slab, pipe & box Types of causeways –Bed level, Vented & High level.		
	4.3	Inspection & Maintenance of Bridges: Items of inspection for foundation, substructure, bearings, superstructure & joints. Maintenance of masonry, concrete & steel bridges.		
5	**Tunnel Engineering**		08	12
	5.1	Definition, necessity , advantages & disadvantages of tunnels. Classification of tunnels. Shape & size of tunnels. Shaft & its types. Setting out tunnel centre line on surface & inside of tunnel.		
	5.2	Methods of tunneling in rocks – Full face, heading & benching and drift. Methods of tunneling in soft strata – Fore poling, Needle beam, Liner plate & shield.		
	5.3	Tunnel boring machine. Lining of tunnels – Objectives, Cast in situ & precast concrete lining. Rock bolting. Ventilation & drainage of tunnels.		
6	**Airport and Docks - Harbour Engineering**		08	16
	6.1	Airport terminology - Aerodrome, airfield, apron, approach area, cargo, control tower, clearway, hangar, holding apron, rudder, landing strip, landing area, flight visibility . Components of airports, location of airports, types of airports.		
	6.2	Runway – definition, purpose, runway orientation, layout pattern of runways. Taxiway - Definition, purpose, layout of taxiways, ge ometric standards of taxiways. Terminal area, facilities to be provided at terminal building.		
	6.3	Harbours - Definition, types, site selection, shape. Port - Definition, classification, requirements. Docks - Definition, classification, advantages and disadvantages		

Teaching Methodology: Chalkboard, Group Discussions, MS. Power Point Presentations, 35mm Slide Shows, wall hung charts, , Experts Lectures, & Technical Visits.

Skills to be Developed

1. Identify & select the methods for survey & investigation.
2. Select the most suitable site.
3. Select an adequate method of construction & maintenance.
4. Discriminate a technique of survey, investigation, construction & maintenance from another technique.
5. Coordinate & Supervise the construction/maintenance activity of various components.

Professional Practice

1. Gathering information on: Indian Metro, Indian railway's production units, construction & consultancy services of Indian railways, Government of India undertakings under Ministry of Indian Railways, Recruitment in Indian railways, Centralized training institutes of Indian railways.
2. Gathering information on drilling pattern & their suitability, drilling equipments & their selection, types of explosives and their quantity to be used.
3. Technical visit to railway track/IRICEN's Railway Museum/Bridge or Tunnel construction site or a dock - harbour
4. Arranging an experts lecture on planning/design/construction of a railway track/bridge /tunnel/ dock - harbour.

Learning Resources:

A.Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
1	A. Kamala.	Transportation Engineering	Tata McGraw-Hill Publishing Company Ltd, New Delhi 2.
2.	N. L. Arora	A Text Book of Transportation Engineering	New India Publishing House, Delhi -31.
3.	M. M. Agarwal	Indian Rail Track	Prabha & Co. Delhi.
4.	S. C. Saxena & S. P. Arora	A Text Book of Railway Engineering	Dhanpat Rai Publications, Delhi
5.	T. D. Ah uja & S. P. Birdi	Roads, Railways, Bridges & Tunnel Engineering	Standard Book House, Delhi.
6.	S. C. Rangwala	Principles of Railway Engineering	Charator Publishing,
7.	P.W.D. of Maharashtra.	Bridges in Maharashtra	Maharashtra Govt.
8.	S.P. Bindra.	Bridge Engineering	Dhanpat Rai Publications, Delhi.
9.	S. C. Saxena	Tunnel Engineering	
8.	R.Srinivasan and Rangawala	Harbour Dock and Tunnel Engineering	Charator Publishing,
9 .	S. C. Rangawala	Airport Engineering	Charator Publishing,

B.Magazines:

1.Building Materials & Construction World
2.Civil Engineering Construction Review

C. Websites for reference :

1.www.asce.org (Site of American Society of Civil Engineers)
2.www.bridgesite.com
3.www.wikipedia.com
4.www.theconstructiontimes.com
5.www.mahapwd.org

D.Indian Standards

1. IS 10753:1983 Code of practice for preservation of wooden sleepers for railway track by pressure treatment
2. IS 10394:1982 Specification for wooden sleepers for railway track
3. IS 5317:2002 Specification for pitch-mastic for bridge decking and roads
4. IS 4756:1978 Safety code for tunneling work (first revision)
5. IS 1200(Part 25):1971 Method of measurement of building and civil engineering works: Tunneling
6. IS 15026:2002 Guidelines for tunneling methods in rock masses
7. IS 4651(Part 1to 5):1974 Code of practice for planning and design of ports and harbours
8. IS 7314:1974 Glossary of terms relating to port and harbour engineering
9. IS 9527(Part 1 to 6):1981 Code of practice for design and construction of port and harbour structures
10. IS 10020(Part 1 to 4):1981 Recommendations for design and construction of port and harbour components

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING

Course: Road Engineering **Course Code: R14CE4102**

Course Category: Applied **Credits: 05**

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	--	25	25	150

Rational :

Road is important, largest & basic mode of transport not only in India but all over the world. It is a mode of transportation which can give service directly to the users end. The development of nation can be measured in terms of length of road network in it. There is lot of scope for a civil engineer in planning, design, construction & maintenance of the roads. Students holding Diploma in Civil Engineering have considerable opportunities in the field of roads. They could work as a technician in state B & C Department, in MSRDC, in CPWD and also in private sector. Also he could take the road construction/maintenance works on contract basis immediately after completing his diploma by registering with concerned authority in appropriate class.

Course Objectives :

Student will be able to:

1.Survey & investigate for a road project.
2.Organize supervise & coordinate the activities in construction for a road.
3.Improve, maintain & repair of existing roads.
4.Prepare & interpret drawings related to road works.
5.Select & test road materials on site & in laboratory.
6.Handle work force & monitor quality control for different items of road work.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Development, Planning, Classification & Alignment of Roads** 1.1 Importance of road transportation. Scope for road engineering. Road development in India – Jaykar Committee Report, Central Road Fund, Indian Road Congress(IRC), Motor Vehicle Act, Central Road Research Institute (CRRI) 1.2 Road Planning – Principles of road planning, Factors considered in road planning, Procedure of road planning. Road Planning in India – Nagpur plan, Bombay plan, National Transport Policy Committee, Lucknow plan . Road financing in India . Prime Minister Gram Sadak Yojana (PMGSY). 1.3 Classification of non urban & urban roads as per IRC . Survey for Road Project. Road alignment & factors governing it.	6	12

2	**Road Geometrics** 2.1 Concept of road geometrics. Terrain classification. Design speed. 2.2 Cross sectional Elements of Track Geometrics – Right of way, Road way width, Width of carriage way, Kerbs, Shoulders, Camber. 2.3 Longitudinal Elements of Track Geometrics – Sight Distances (Stopping, Overtaking, Intermediate, At horizontal curves, At intersections). Curves – Horizontal curves (Types, Factors governing their provision, widening of roads at curves), Vertical curves (Types & Factors governing good vertical alignment). Superelevation – Concept, Advantages, Magnitude, Limiting values, Methods of Attaining. Gradients – Types & Grade compensation at curves.	8	16
3	**Traffic Engineering Hill Roads & Road Drainage,** 3.1 Traffic engineering : Introduction. Listing seven sections of traffic engineering, Traffic Characteristics – Road user's & vehicular. Traffic Studies – Objects & items of traffic studies. Traffic volume study & parking studies. Traffic control devices – Signs, Signals, Markings, Islands & Intersections. 3.2 Hill Roads: Necessity of study, Alignment, Resisting length, Different types of curves on hill roads, Stages in construction of hill roads & concept of trace cut, Protective works on hill roads. Maintenance problems on hill roads. 3.3 Road Drainage: Importance & significance, Requirements of good drainage system. Surface & subsurface drainage systems.	8	12
4	**Road Construction Materials** 4.1 Road Pavement: Definition, Classification as per behavior (Flexible & Rigid), Classification as per material of construction, Different layers of pavement – location, function , & requirement. Pavement Design approach for flexible & rigid pavements. 4.2 Soil & Aggregates : Desirable properties of sub -grade soil & soil stabilization. Introduction to & desirable properties of road aggregate. Laboratory & Field tests & for road aggregates. CBR Concept. 4.3 Binder (Bituminous materials): Salient features of bitumen, Requirements of bituminous materials as binder, Types of bituminous materials, Tests on bituminous materials.	9	16
5	**Construction of Roads** 5.1 Earth & WBM Roads : Terms related with earthwork in road. Construction, advantages, disadvantages & limitations of earthen roads. WBM Roads – Introduction, features, materials & procedure for construction, merits & demerits. 5.2 Bituminous Roads: Bituminous construction in use – Surface painting or surface dressing, bituminous macadam, bituminous concrete & sheet asphalt or asphaltic mat. The prime, tack & seal coats. Commonly used machinery/plant in construction of bituminous roads. 5.3 Cement Concrete Roads: Introduction. Alternate & continuous bay methods of construction. Stages in construction. Joints – Need, types and filler & sealer compounds. Machinery in construction.	9	12
6	**Evaluation, Strengthening & Maintenance** 1.1 Introduction to & necessity of maintenance. Failures in different layers of flexible & rigid pavements – causes & typical failure forms. 1.2 Routine, Periodic & Special maintenance. Checklist for inspection for maintenance. Prioritization for maintenance operation. Maintenance of earth, WBM, bituminous & concrete roads. 1.3 Pavement evaluation & strengthening – Objectives. Condition & evaluation surveys. Present Serviceability Index (PSI). Evaluation for structural adequacy. The Benkelman beam test. Strengthening of pavements by overlaying.	8	12

Teaching Methodology : Chalkboard, Group Discussions, MS. Power Point Presentations, 35mm Slide Shows, wall hung charts, Experts Lectures, & Technical Visits.

Term Work :

Skills to be developed :

i) Intellectual Skills :
- Identify the road construction material test equipment
- Discriminate one test equipment/technique from the other.
- Selecta proper test equipment for given material under given condition.
- Read the test equipment
- Reduce & Interpret the test results.
- Understand the field significance of test result.
- Write the test report in standard form.

ii) Motor Skills :
- Prepare the test samples.
- Test the instrument for calibration & find out index error.
- Handle the intended test equipment in the process of testing of sample.
- Routine maintenance & minor adjustments of the test equipment.
- Tabulate the observations.
- Present the test results graphically.

Experiments :
Student should perform following EIGHT experiments.
1.Specific gravity and water absorption test on aggregates.
2.Flakiness index and elongation index of the aggregates.
3.Crushing/ Impact/ Abrasion test on bitumen
4.Softening point/penetration test on bitumen.
5.Ductility test on bituminous binder.
6.Viscosity test on cutback.
7.Stripping value of an aggregate.
8.Determination of bitumen content in bituminous mix.

Professional Practice
1.Traffic volume study & its presentation for an important road intersection in your city.
2.Going through an article on road construction/maintenance/machinery in a national/ international magazine/journal on highway/construction engineering preparing brief extract of it & presenting it in front of other students.
3.Technical Visit to a road construction/maintenance site, preparing report in form of power point presentation & presenting it in front of other students.
4.Arranging a lecture of an expert from outside the Institute on road planning/design/ construction & maintenance.

Learning Resources :
A.Books :

SR.NO.	AUTHOR	TITLE	PUBLISHER
1	A. Kamala.	Transportation Engineering	Tata McGraw-HillPublishing Company Ltd, New Delhi 2.
2	G. V. Rao.	Transportation & Highway Engg.	
3.	N. L. Arora	A Text Book of Transportation Engineering	New India Publishing House, Delhi
4	T.D. Ahuja	Highway Engineering	Standard Book House, Delhi 6
5	S. K. Sharma.	Principes, Practice & Design of Highway Engineering	S. Chand & Co., Delhi 55
6	R.K Khitoliya	Principles of Highway Engineerng	Dhanpat Rai Publications, Delhi 2
7	Khanna & Justo	Highway Engineering.	Nemchand & Bros. Roorkee
8	Papacostas & Prevedouros	Transportation Engineering & Planning	Pearson Education, Delhi
9	Dr. Kadiyali & Dr. Lal	Principles & Practices of Highway Engineering	Khanna Publishers, Delhi.
10.	P. Chakraborty & A. Das	Principles of Transportation Engineering	Prentice Hall of India, Delhi.
12.	L. R. Kadiyali	Traffic Engineering & Transport Planning	Khanna Publishers, Delhi.
13.	Duggal & Puri	Laboratory Manual in Highway Engineering	New Age International, Delhi.
14.	Khanna & Justo	Highway Material Testing (Laboratory Manual)	New Chand & Bros. Roorkee.

B.Magazines :
1.New Building Material & Construction World (Monthly)
2.Civil Engineering Construction Review (Monthly)
3.Indian Concrete Journal (Monthly)
4.Indian Geotechnical Journal (Quarterly)

C. Websites for reference :
1.www.irc.org.in (Site of Indian Road Congress)
2.www.mahapwd.com (Site of Maharashtra State PWD)
3.www.crridom.gov.in (Site of Central Road Research Institute)
4.www.asce.org (Site of American Society of Civil Engineers)
5.www.bridgesite.com
6.www.wikipedia.com
7.www.theconstructiontimes.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING
Course Name : Public Health Engineering Course code : R14CE 4103
Course Category : Applied Credits : 5

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	-	--	25	125

Rationale:
Water is a basic need of every day living. With growing need of water for irrigation, industry, drinking water, hydropower, pollution free water has assumed greater importance. Similarly waste in form of solid and liquid if not treated and disposed of in a scientific and hygienic manner ,may lead to health hazards, The job of civil engineer is to conduct survey, collect data, prepare drawings, and supervise construction of water and waste water treatment plants .This subject is intended to teach the students concepts, principles and procedures of Public health Engineering which will enable him to apply this knowledge for construction, supervision, execution of environmental Engineering projects

Objectives:
At the end of the term student will be able to
1.Project population for number of decades.
2.Indicate water quality standards
3.Explain working of water treatment and sewage treatment plants
4.Explain distribution system of water.
5.Define sewage & sewerage works.
6.Discuss solid waste management
7.Discuss air & water pollution.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Water Supply** 1.1 Water works:- Necessity and importance of water works, components in water works, Components in water supply scheme 1.2 Quantity of water:- Population forecast , rate of water consumption for various purposes, per capita demand & factors affecting it, fluctuations in demand and its effects on design of water supply units. Sources of Water: Surface & subsurface sources, choice of source, Intake works – types, factors affecting location. 1.3 Quality of water:- Impurities in water, water sampling, water analysis – Physical, Chemical, bacteriological test and their significance, water quality standards. Water borne diseases.	10	16

2	**Treatment of Water** 2.1 Components in water treatment plant:- Objects, flow diagram of water treatment plant, Functions of each unit, Design principles and construction deaitls constructional details of screens chamber , aerators, sedimentation units, flash mixer ,flocculators. 2.2 Filtration – theory, types – slow sand; rapid sand & pressure Disinfection:- Methods, chlorination, types of chlorination, chlorinator.	8	12
3	**Distribution of water** 3.1 Distribution networks Requirements of a good distribution system. Zoning. Systems of forcing water in distribution network – gravity; pumping & dual. Layouts of distribution network – dead end, grid iron, radial & ring. 3.2 Service reservoirs Functions, types, location & capacity. 3.3 System of supply Continuous & intermittent. Pressure & velocity of flow in distribution lines. Hydraulic design of water line. Maintenance of distribution system.	6	12
4	**Sewerage Works** 4.1 Definition of terms:- Sewage, sullage, refuse, garbage sewer & sewerage. Methods of sewage disposal – Conservancy & water carriage system. 4.2 Systems of sewerage:- Separate, combined & partially separate systems. Quantity of sewage - Types of flow in sewer, variation in sewage flow. 4.3 Design of sewers:- Peak flow & self cleansing velocity, gradient of sewer, size of sewer, use of tables & monograms in design of sewer, shapes for cross - section of sewer. Maintenance of sewers.	8	12
5	**Characteristics, Treatment & Disposal of Sewage** 5.1 Analysis of sewage Strength of sewage. Properties of sewage. Analysis of sewage 5.2 Treatment of sewage Preliminary treatment - Screening; grit removal; grease removal, primary treatment – sedimentation & chemical precipitation, secondary treatment – filtration & activated sludge process. 5.3 Sludge & effluent disposal Types of sludge, method of sludge disposal. Natural & artificial methods of disposal of effluent, Miscellaneous treatment – oxidation pond & ditch, aerated & anaerobic lagoons.	10	16
6	6.1 Principles governing design of building water supply system. Layout of water supply arrangement and design basics. 6.2 Components of house drainage , design fundamentals and layouts..Recycling of waste water	6	12

Teaching Methodology :
Chalkboard, Group Discussions, MS. Power Point Presentations Experts Lectures, & Technical Visits.

Term Work :
Skills to be developed :
Intellectual skills :
Forecast population for given data.
Calculation storage capacity of reservoir & sketch.
Understand various components of water & waste water treatment.
Design sewer / storm water drain.

A.Assignments
A journal containing description of the following topics.
1.Preparation of chart related to characteristics of water showing details like type, permissible limits, testing equipment, effects, treatment method.
2.Excel spreadsheet solution for population forecasting methods.
3.Excel Assignment based on calculation of storage capacity of reservoir.
4.Excel assignment based on design of sewer/storm water pipes.
5.AutoCAD detail drawings based on water supply and drainage pipe network layout for a small building
6.Assignment based on water treatment processes
7.Assignment based on wastewater treatment processes.
8.Presentation by students on any one of the advanced treatment related to water / waste water treatment .

Professional practices
1.Report on visit to water treatment plant.
2.Report on visit to Waste water treatment plant.
3.Study of software related to design of water supply distribution network design/sewer design
4.Collecting information regarding norms ,for water and wastewater treatment of various statutory bodies ,information regarding new treatment processes through internet, manuals etc.

Learning Resources :

A.Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1.	K.N. Duggal,	Elements of Public Health Engg.	S. Chand & Co. Delhi.
2.	M. Lal & L.R. Sidhana	Water Supply & Sanitary Engg.	India Publishing house Delhi.
3.	A. Kamala & D.L. Kanth Rao	Environmental Engg.	Tata Mc-Graw-Hill publishing co. Ltd., Delhi.
4.	Punmia & Jain	Water Supply & Waste Water Engg. (Two vol.)	Arihant Publication,Jodhpur
5.	G.S. & J. S. Biridie	Water Supply & Sanitary Engg	Dhanpal Rai & Sons,, Delhi.
6.	B. S. N. Raju	Water supply & waste water engg. (Two vol.)	Tata Mc-Graw-Hill publishing co. Ltd., Delhi.
7.	S.K. Garg	Water Supply & Waste water Engg. (Two vol.)	Khanna Publisher,Delhi
8.	P.N. Modi	Water Supply Engg. Volume – I & II i,	Standard book house, Delhi.

A.Internet sites :

- www.nptel.iitm.ac.in
- www.icivilengineer.com
- www.epa.net
- www.mud/cpheeo.in

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING

Course Name : Irrigation Engineering **Course code : R14CE4104**

Course Category : Applied **Credits : 5**

Teaching and Examination Scheme :

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
3	-	2	3	80	20	-	-	25	125

Rationale :

Water is a basic need of every day living. This subject is intended to teach the students principles and practices related to irrigation which will enable him to apply this knowledge for construction, supervision, execution of irrigation Engineering projects like construction of dams, canals .

Objectives :

1.State importance of irrigation, advantages, disadvantages in Indian context.
2.Discuss methods water application to crops and types of crops in Maharashtra.
3.State types of dams and spillway structures and their suitability conditions.
4. Describe types of canals, canals structures and cross drainage works.
5. Select appropriate methods for stated conditions.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Introduction to irrigation** 1.1 National water policy. 1.2 Definition of irrigation. Necessity of irrigation advantages/disadvantages of irrigation. 1.3 Types of irrigation projects, data collected for irrigation project. 1.4 Water logging and efflorescence – effects, causes, preventive & remedial measures **Hydrology** 1.5 Surface Hydrology: study of rain gauges, mean rainfall over a catchment by different methods. Runoff – definition, factors affecting runoff, Method to estimate runoff, yield, dependable yield	10	16
2	**Methods of Irrigation** 2.1. **Water requirement of crops**. Definition of crop season, duty, delta , base period, cumecs, ham, GCA,CCA, Irrigable area, water requirements for different crops in Kharif, Rabi, and in hot weather. Relationship between duty, delta and base period. 2.2. **Application of water of fields**; conventional methods and modern methods.	7	12

3	**Minor Irrigation Scheme** 3.1 Definition, line sketches & functional design of diversion weirs & barrages, bandhara irrigation schemes, percolation tanks, lift irrigation scheme. 3.2 Well irrigation Geological formation of ground, Specific yield, Types of wells, advantages and disadvantages of well irrigation.	10	16
4	**Storage reservoir & Dams** **Storage Reservoir s** 4.1 Selection of site for reservoir, sedimentation & control of sedimentation. Fixing control levels of reservoir. **Dams** 4.2 Classification of dams. Selection of site for a dam, Fixing alignment of a dam. **Earthen Dams** 4.3 Type of earthen dams causes of failure of earthen dam and preventive measures **Masonry & concrete gravity dams** Forces acting, theoretical & practical profile, stability analysis.	7	12
5	**Spillways** **Spillway Structures** 5.1 Type of spillways, Hydraulic design to work out capacity of spill way. 5.2 Energy dissipation devices, 5.3 Spillway gates - vertical lift gate, Vishveshvaryya gate, taiter gate.	7	12
6	**Canal, Canal Structures & CD Works** **Canal** 6.1 Classification of canals, canal alignment, Hydraulic & functional design of canal, cross sections for lined and unlined canals. **Canal Structure** 6.2 Definition, line sketches and functional design of control structures – head regulator, cross regulator, escapes, falls, slit ejector, outlet. **Cross drainage works** 6.3 Culvert, aqueduct , super passage, siphon, inlet-outlet.	7	12

Teaching methodology :

Chalkboard, PPTS, models, technical visits, presentations

Term Work :

Skills to be developed :

Intellectual skills :

- Compute field by demarcating contributory areas in water shed area.
- Design canal section.
- Understand components of various dams major & minor project.

Term Work :

1.Collect data from irrigation atlas for rivers, basins, major and minor irrigation projects in India and Maharashtra.
2.Demarcating Catchment area and computing Yield and MFD for given problem.
3.Preparing a presentation on different methods of irrigation and its use in different parts of world with specific reference to India.
4.Solving a problem on well hydraulics./ study of well construction.
5.Illustrate any Minor Irrigation Schemes executed in Maharashtra.
6.Fixing control levels for a Reservoir, based on given data.
7.Sketching and illustrating Masonry / Earthen Dam section.
8.Sketching and explaining canal structures.
9.Designing of a canal section for given conditions.
10.Visit to any major/minor irrigation project site and write report based on visit.
11.Report on any article published in journal /magazine regarding international practices in irrigation.
12.Power point Presentation on any of the following topics based on existing project in Maharashtra, specifically Pune district.

- Earthen dam
- Gravity dam
- Composite dam
- Spillway structure any type
- Canal structure
- CD Works
- Any method of irrigation
- Any minor irrigation scheme

Professional skills developed :

Presentation skill, Communication skill, Report writing, Browsing the information through different source

Learning Resources:

A. Reference Books :

Irrigation Engg. :- S.K. Mujumdar (Tata Mcgraw-Hill , Delhi 2)
Irrigation Engg. :-J.G.Dahigaonkar (Central Techno, Nagpur 12)
Irrigation Engg. & Hydraulic Structures:- (Khanna , Delhi 6)
Irrigation Engg. :- S.K.Sharma (S.Chand & Co., Delhi 55)
irrigation Engg. :- N.N. Basak (Tata Mcgraw-Hill)
Irrigation Water power and water resources Engineering :-Dr. K.R. Arora(standard publishers)

B. Web sites for references :

www.nptel.iitm.ac.in

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING
Course Name : Quantity Surveying Course code: R14CE 4105
Course Category : Applied Credits : 6

Teaching and Examination Scheme :

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
02	--	04	--	--	--	50	--	50	100

Rationale :
The success of a project is determined by the utilization of various resources optimally. In order to achieve this an estimation of quantities of materials, items Tool & Plants, machinery to be used needs to be done meticulously in details.
The schedule of rates for a region assists us in preparing an estimate as well as in analysis the rates if net given in the schedule of rates. Authenticity of rates & working them out can be done by analysing them.
An understanding of specification and drafting them to suit our work is imperative for every Civil Engineer.

Objectives :
A student should be able to take off the quantities of items, construction cost.
and abstract them .
1 Take off the quantities of items.
2 Abstract the quantities.
3 Work out the construction cost.
4 Analysis the rate of items.
5 Use the schedule of rates prepared by PWD.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Introduction :** 1.1 Purpose of estimates. Types of estimates. Factors effecting estimate. Overhead charges, Contingencies., Work charged establishment. 1.2 Methods of preparing approximate estimates. 1.3 Considerations underlying the selection of units and modes of measurement, unit for payment Area & volume for different figures and shapes, Conversion of units, body measurements. Vehicles' measurements, volume, materials carrying capacity. 1.4 Various tabular forms used in estimating. Measurement sheets, Abstract sheets, Rate Analysis sheets. 1.5 Specifications – Definition, Purpose , Types, Importance, Legal aspects. Drafting of specifications for non stand ard items eg. Kitchen otta. ACP cladding.	6	-

2	**Analysis of Rates.** 2.1 Components of cost of items of work, task work. 2.2 Calculation of dry materials. 2.3 Labour requirement for major items of work like bricks masonry, stone masonry. Cement c oncrete. R.C.C. flooring, plastering, white washing, distempering, painting etc. Draw Kitchen otta and analyses the rate. 2.4 Taxation , insurance, ESIC, PF, CAR, SCT, BST, Excise, VAT, Service Tax, Octr oi. 2.5 Prepare an Excel program for Analyses of rat es.	5	-
3	**Calculation of Earth Work :** 3.1 Road, Canal, Dam, Embankment, & Cutting, 3.2 Lead & Lift, stages, Royalty, 3.3 Balancing of the earthwork. Borrow pits & Spoil banks, Mass Curves, through rates. 3.4 Estimate of Water Bound Macadam road, Bituminous roads, and Concrete roads.	5	-
4	**Use of Schedule of Rates :** 4.1 Information available in schedule of rates. Reference to schedule of rates – Rates of materials. Rates for transportation, analysis of transportation, choice between truck, tempo, cart etc. 4.2 Loading, lead, lift, unloading, stacking, its effect on overall rate of materials. 4.3 Calculation of rates considering extra lead & lift of materials.	5	-
5	**Detailed Estimate** : 5.1 Standard modes of measurement. I.S. 1200. Sequencing of items, Overheads, WCE, Contingencies. 5.2 Building with ordinary foundation, R.C.C., slab, different methods of water proofing. 5.3 Simple building with hipped / gabled roof (with different roof materials, Intersection of different spans, valleys). King Post Truss roof, Panelled Doors and Windows 5.4 Use of Excel programme for detailed estimate.	6	-
6	**Miscellaneous :** 6.1 Cross Drainage works, Estimate of a Culvert – R.C.C. slab, Hume pipe. 6.2 Specifications for a framed structure, materials required. 6.3 Estimate of swimming pools, Tremix pavements.	5	-

Teaching Methodology : Chalkboard, Group Discussions, Experts Lectures, Visits.

Skills to be developed :

i. Intellectual Skills:

- Reading drawing & taking off quantities
- Discriminate between IS & state PWD specifications
- Referring IS 1200 interpreting the clauses & applying to modes of measurements of items.
- Understanding Standard PWD specifications.

ii. Motor Skills:

- Preparing an estimate using measurement & abstract forms.
- Carry out rate analyses using DSR rates & current market rates & finding fluctuations in them.
- Derive stagarise requirement of materials, labour, machinery & funds.
- Preparing Excel programmes for the estimates.

Term Work :

1.Ergonomics (Sketches of body measurements & positions.
2.Sequence of items of construction of load bearing and framed structure.
(Own class room also).
3.Formulae for areas and valumes.
4.Conversions of units – linear, area, volumetric.
5.Units of measurements.
6.Analysis of Rates of ten important items of building construction one item to be done by actual site observation.
7.Estimate of Earthwork & Bituminous surfacing.
8.Detailed Estimate of a G+1 structure.
9. Estimate of R.C.C. slab culvert.
10.Specifications of ten important items of construction. One item specs should be drafted.
11.Excel programme for Rate analysis. Preparing an indent for requirement of items.

Professional Practice:
The course itself is a professional one.
- Study of current DSR.
- Collecting rates of materials and labour from market and contractors respectively.
- Expert lecture on analysis of rates considering all types of taxation and other incidental expenses.

Learning Resources:
A.Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	M. Chakraborthi	Quantity Surveying and Costing	Self published
2	G. S. Birdie	Quantity Surveying and Costing	Dhanpat Rai, Delhi
3	J.M.Muley	Quantity Surveying and Costing	Vrinda, Jalgaon
4	G.B.Deshpande	Quantity Surveying and Costing	Nirali, Pune
5	J.C. Malhotra	Quantity Surveying and Costing Vol. 1&2	Khanna, Delhi
6	N.A.Shah	Quantity Surveying and Valuation	Khanna, Delhi
7	B.N. Dutta.	Estimating and Costing in Civil Engg.	Self published

A. Web sites for references :
mahapwd.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING

Course Name : Civil Engineering Estimation, Valuation & Costing

Course code: R14CE 4106

Course Category : Applied Credits : 5

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
03	02	04	80	20	-	50	25	175

Rationale :

Estimation of quantities and costing of civil structures are part of daily routine jobs required to be performed on sites. This subject requires thorough understanding of drawings, construction processes and market prices of materials and labour. In any transaction of buying, selling or renting a property, valuation should be done first. Various methods are in vogue & a student should be aware of these.

Concrete, reinforcement steel, Water supply & sanitary works contribute a major percentage to the construction cost. Hence a student has to estimate these in details.

Objectives :

The student should be able to

1. Understand and interpret drawings prepared by architects, structural engineers and service engineers.
2. Work out quantities of material and items of work.
3. Prepare bar bending schedule.
4. Estimate cost of executing items.
5. Understand various procedures in stock keeping, account keeping adopted by government organizations.
6. Prepare valuation report for various structures and purposes.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Valuation** 1.1 Meaning and purpose of valuation. Factors affecting valuation. Type of values determination of sinking fund, obsolescence and depreciation. 1.2 Capitalised value and year's purchase. Annuity, valuation of buildings, valuation of land, different methods, rent fixation , present value future value of rupee.	10	16

2	**Estimate of R.C.C. works** 2.1 Items of work in R.C.C. construction. Bar bending S chedule, Estimate of R.C.C. T -beam, slab, estimate of column with footing, estimate of staircase, 2.2 Estimate of water tanks. 2.3 Estimate of whole R.C.C. framed building, Estimate of PT slabs.	10	16
3	**Estimate of steel structures** 3.1 Estimate of GI, AC, FRP sheets resting over steel stanchion, estimate of plate girder. 3.2 Estimate of Structural steelwork shed. 3.3 Estimate of ACP cladding. Aluminum Composite panel. 3.4 Estimate of structural glazing	7	12
4	**Water supply & drainage layout (plan) elevation, section** 4.1 Estimate of water supply and sanitary works for a residential Building. 4.2 Estimate of manhole, estimate of water mains, estimate of septic tank, soak pit. 4.3 Estimate of rainwater harvesting.	7	12
5	**PWD Procedures** 5.1 Pre - audit & Post Audit account system. Types of works, administrative approval, 5.2 Measurement books, use, Do 's and Don'ts for entries in M.B., Standard Measurement books. 5.3 Tenders – Notice types, identifying mistakes in tenders. Standard tender forms used by Government. Agreement, general conditions of contract, types of contracts. Arbitration, 5.4 Site ord er book, purpose, procedure of issue of materials to the contractor, procedure to prepare a bill, Price variation clause.	7	12
6	**Department procedures For Government & Private organization.** 6.1 Hierarchy of organisation in PWD. 6.2 Materials procurement, Survey report form no.18. Store and Records. Indents and Materials at Site. 6.3 Road Metal Return, Accounts of Tools and Plants. Account Register and Stock register. 6.4 Charge to be handed over in case of transfer. Inspection of Rest Houses. 6.5 Cash Book, Cash sources of receipt of money in a section, Modes of payment. T.A.D.A. rules, Imprest Account, Temporary Advance, Hand Receipt, 6.6 Checking of suppliers bills Vouchers, R.A. bills, Recovery statement. Secured advances and reconciliation of materials. 6.7 Introduction to ERP Software, its functionality, usage, adaptability limitations.	7	12

Teaching Methodology: Chalkboard, Group Discussions, and Experts Lectures.

Skills to be developed :

i. Intellectual Skills :

- Select the method of valuation to be adopted for valuation of a property.
- In case of housing loans, which bank's offer of rate of interest is to be beneficial for repayment of loan.

ii. Motor Skills :
- Preparation of a valuation report
- Filling in tenders
- Writing up of MB.

Term Work
1. Valuation of a building.
2. Estimate of R.C.C. frame for a building.
3. Estimate of structural steel work.
4. Detailed estimate of Water supply & Sanitary works.
5. Manner of submission of tender, tender documents.
6. Conditions of Contract.
7. Prepare EXCEL programs for valuation, costing and estimates.

Professional Practice:
- The course itself is a professional one.
- Lecture of an expert valuer.
- Study of EMI for housing loan and purchase of vehicles.
- Estimate of RCC frame structure of G+1 of a professional drawing.
- Estimate of structural steelwork from a professional drawing.
- Collecting rates of different brands of cement, reinforcement, structural steel.
- Collecting rates of labour from the market.

Learning Resources:

A.Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	G. S. Birdie	Text book of Estimating & Costing	Dhanpat Rai, Delhi
2	J. C. Malhotra	Quantity Surveying & Costing, vol. I & II	Khanna, Delhi
3	M. Chakraborti.	Estimating, Costing, Specification & Valuation	M. Chakraborti.
4	N.A. Shah	Quantity Surveying & Valuation	Khana, Delhi
5	J.R. Muley	Quantity Surveying & Costing –	New Vrinda, Jalagaon.
6	Vazirani Chandola	Construction Mgmt. & Accounts	Khana, Delhi.
7	B.N. Dutta	Estimating & Costing in Civil Engg.	B.N. Dutta
8		ISO 1200 - Method of measurement for Building works.	

A. Websites for reference :
www.mahapwd.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING
Course : Construction Management **Course Code: R14CE4107**
Course Category : Applied **Credits : 5**

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	-	25	25	150

Rationale :
The skills of construction management are highly desirable for improving organisational effectiveness and performance in highly competitive, changing world market place. Construction management techniques provide structured and organised way to achieve desired performance by team efforts. It is necessary for all Civil engineers to learn and apply construction management tools, techniques for successful completion of Civil engineering projects.

Objectives :
The student will be able to
1. Explain principles and functions of management.
2. Plan, schedule and update a project using network –techniques
3. Monitor and control project.
4. Appreciate the use of computers in project management.
5. Maintain documentation for controlling project.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Introduction** 1.1 Construction sector in India, need of scientific management. Project feasibility reports: Technical, financial, Economic and ecological feasibility studies. **Management** 1.2 Principles of management (Fayol), Functions of management. Management by objectives (MBO) technique. System concept.	7	12
2	**Construction Project Planning** 2.1 Necessity of planning, Work break down structure, Estimating work content, duration of activity. Identifying and presenting key relationships of project activities. **Scheduling Techniques** 2.2 Bar chart., Milestone chart Activity on Arrow (CPM) ,Activity on Node network, (Precedence Network) and PERT **Organization** 2.3Necessity, principles and types of organization. Project organization structure and Team building for projects.	7	12

3	**Network Computations** 3.1Activity times, Event times, Floats, Critical activities-events, Critical Path. Project duration. **Application of Network Technique** 3.1Use of floats for Resource allocation and Leveling of Resources Crashing of Network for Optimization.(Focus on concepts than computations),Project calendar. **Use of Softwares** 3.2 Introduction of software like MS project, Primavera. Various facilities available for project planning. Use of Spreadsheets like Excel for computations.	10	16
4	**Materials Management** 4.1 Importance, objectives of materials management, function of materials manager. ABC analysis. Economic Ordered Quantity (EOQ), Inventory models. Stores Management.. **Supervision and Quality control** 4.2Role of specifications in quality control. Inspection, Sampling, Testing and Doc umentation for quality systems. Factors affecting qualities. Preparation of check list for items of works , Supervision and Quality control measures	7	12
5	**Work Study** 5.1Factors affecting productivity, Objectives of work study, Time and Motion study techniques, Process analysis using Activity charts, man and machine chart, **. Site Layout** 5.2 Principles, factors affecting site layout. Preparation of site layout for Civil Engg. Sites. **Safety on construction site.** 5.3 Causes and effects accidents, safety measures, occupational Health Hazards, Personal protective equipment ,safety management.	10	16
6	**Control system for Construction Project**s. 6.1 Preparation of baseline plan for resources as per schedule. Preparing project status report Tracking of project for cost and time. Identifying problem areas using fishbone diagram, corrective actions and updating of network. **Project Documentations** 6.2 Introduction to Project site data, formats for recording, reporting and tracking of a project. DBMS and MIS concepts.	7	12

Teaching Methodology : Chalkboard, Group Discussions, MS – PowerPoint, Transparencies, Experts Lectures.

Skills to be developed : Intellectual Skills :

The students should be able to

- State basic Management concepts and related theories.
- Prepare project schedule for a simple construction project.
- Prepare and use check list for a construction activity .
- State various factors affecting site layout and draw a site layout for a project
- Interpret and use site layout for site management.
- Interpret site documents and use it for project organization and reporting.

Other Skills: The students should be able to

- Conduct group discussions for a given topic and report its outcomes.
- Conduct market survey and collect data required for Materials Management.
- Present report on a topic chosen / allotted to the student.

Term Work :

List of assignments :

1.Study of a civil engineering project report. Identify elements of civil engineering projects..
2.Preparation of work breakdown structure for a small project. Its presentation in various forms like bar chart, CPM or AON type network.
3.Minimum 3 exercises on computation of activity, event times and floats using CPM / precedence network techniques.
4.Study of organizational structure for a construction firm / Government department
5.Preparation of a base plan for a proposed schedule.
6.Tracking procedure for the project plan. Computations and Analysis of deviations..
7.Preparation of ABC analysis for a project and inventory models for A, B and C type materials .
8.Preparation of quality control plan for a civil engineering project.
9.Time and motion studies for construction activities.
10.Preparation of site layout for any civil engineering site.
11. Study and report writing for safety measures on project sites.
12.Presentation by a student for any one topic allotted to him / her from construction management curriculum.

Professional Practices:

1.Students will visit any on-going civil engg. work site and interact with project manager to understand construction management aspects and write a brief report based on the visit.
2.Students will arrange Expert's Lectures (Minimum 2) on Construction Management related topics and write brief reports about contents of the lectures.
3.Student will search Internet sites for the topics of course and submit list with abstract of contents on the Internet site for the allotted topic.

Learning Resources :

A.Books:

SR.NO	AUTHOR	TITLE	PUBLISHER
1	Chitkara	Civil Engineering Project Management	Tata McGraw – Hill, New Delhi
2	B. Sengupta H. Guha	Construction Management & Planning	McGraw – Hill, New Delhi Tata.
3	Harpal Singh	Construction Management & Accounts	Tata McGraw – Hill, New Delhi
4	Trevor L young	The Handbook of Project Management	Kogan Page
5	TTTI, Madras,	Elements of Construction Management	Oxford University Press
6	Dr. B.C. Punmia	Planning and Control with PERT and CPM	K.K.Khandelwal, Laxmi Publication ,New Delhi.
7	S.Seetharaman	Construction Engineering and Management	Umesh Publications,New Delhi.

A.Softwares : MS Project , Excel, Primavera or equivalent.

B.Web site reference :

1. http://pmbook.ce.cmu.edu
2. http://www.constructionplace.com
3. http://ocw.mit.edu/courses/civil-and-environmental-engineering/1-040-project-management-spring-2009

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING

Course Name : Project Work **Course code : R14CE 4108**

Course Category : Applied **Credits : 4**

Teaching and Examination Scheme :

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
--	-	04	--	--	--	-	50	100	150

Rationale :

It is necessary that a student should be able to apply acquired knowledge of various civil engineering subjects for solving civil engineering problems. Project work course offers opportunity to apply creative thinking, skills and knowledge of subjects to face challenges. Aim of the course is to built-up self confidence and self learning skills in students.

Objectives :

The students should be able to

1. Define the problem.
2. Identify and collect the relevant facts.
3. Analyse and classify observed data.
4. Develop models for solution.
5. Identify and Evaluate solutions for given problem.
6. Document the process in appropriate format.
7. Present the findings of studies using appropriate media.

Guidelines for conduct of Project work.

A batch of not less than 3 students and not more than 6 students are supposed to work on a project. It should have practical importance and should incorporate planning, design, experimentation, compilation of submission drawings and reports. Every individual should have his own copy and two copies of every project should be handed to the department. The Project may contain one or more of the following items pertaining to Civil Engineering Fields.

1.Literature and allied surveys, photographs.
2.Experimental verifications.
3.Design & fabrication of Models or building components
4.Design Problems.
5.Industrial assignments.
6.Computerized solutions of C. E .Problems.
7.Working out feasibility of a small project for execution, by actual field survey, planning, designing, final drawings etc. complete (Ready for technical sanction.)

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1) Topics could be one out of the following or on similar lines:

a.Lift irrigation.
b.Group Housing scheme with a number of buildings, internal roads & other developments.
c.Water supply or sanitary system for a all township.
d.Any major irrigation structure.
e.A bridge structure.
f.A small road project for length @ 2 km.
g.Green Buildings..
h.Retrofitting of structures..
i.Rectification, dismantling renovating structures, preservation of structures of national importance.
j.Technical appraisal of project as conducted by financial institution.

2) Working out

i) Cash flow requirement.
ii) Material requirement.
iii) Manpower requirement.
iv) Financial feasibility

k. Study & / or development of an appropriate technology for

i) Low cost housing.
ii) Rural sanitation.
iii) Rural water treatment

l.Making out a complete tender and rate analysis for an actual project in reply to a tender notice.
m.Environmental friendly alternative building materials for different items of construction industry.
n. Advance experimental work discovering new relationship between a range of variables. This may require developments in the field of construction.
o.Inter disciplinary projects to accommodate latest development in the field of construction.

Stages in Project Preparation :

1.Briefing session – to define project theme . Aims of projects are clarified to the students.
2.Selection of project work.
3.Literature survey – Procurement of material.
4.Planning of work.
5.Fabrication works if necessary.
6.Experimental work – maintaining log book.
7.Analysis experimental work data – identifying problems, group discussion.
8.Presentation of Project work.
9.Seminar.
10.Participating in project exhibition – like ' DIPEX' (Optional)
11.Presentation in examination.

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Presentation of Project Work :

1.Title of Project.
2.Names of students.
3.Certificate.
4.Acknowledgements.
5.Index.
6.Aim of project.

Guidance for Chapters.

Chapter: 1.0 Introduction.
Chapter - 2.0 Theoretical background.
2.1 Topics
Chapter 3.0 Project work
3.1 Design.
3.2 Fabrication – drawings.
3.3 Experimental work carried out.
3.4 Materials – specifications.
3.5 Observation tables.
3.6 Mechanical testing – other tests.
3.7 Graphs photographs – charts.

Chapter 4 - Discussion on results.
4.1 Comparison with standard results expected.
4.2 Critical comments on data.
4.3 Cost calculations.
4.4 Scope of applications.
4.5 Experts opinions.
Chapter 5.
5.1 Summary and Conclusion
5.2 Further scope

Annexure :

1. Appendices.
2. Bibliography and references.
3. Glossary

Professional Practice:

Lectures of experts from the field.
Site visits.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING

Course : Design of R.C.C. Structures **Course Code: R14AM4109**

Course Category : Applied **Credits : 5**

Teaching and Examination scheme :

Teaching Scheme		Examination scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	-	25	25	150

Rationale : This is applied subject who will enable students to understand design principles and procedures for structural components like slab, beams, columns & footings.

Objectives :

The student will be able to

1) Understand concept of Reinforce Cement Concrete.
2) Know various methods for designing Reinforced Cement Concrete structures.
3) Analyze given sections and apply the knowledge of designing standard structural elements like, slabs, beams, columns and footing; using Limit state Method.
4) Know the rules and regulations given in IS 456-2000.
5) Prepare read and interpret structural drawings.

Note: - Use of IS: 456-2000 is recommended

Course contents:

Sr. No.	Name of Topic	Hours	Marks
1	**Introduction to Design Methods :** 1.1 Working stress method, Assumptions in WSM, stress and strain distribution diagrams, limit state method of design. 1.2 Characteristic load and characteristic strength. Assumptions made in limit state of collapse for flexure. Stress-strain relationship, 1.3 Singly reinforced section – analysis and design	8	16
2	**Doubly reinforced and flanged sections** 2.1 Definition , Necessity of Doubly Reinforced sections, Determination actual neutral axis, deciding type of sections. flanged sections. (NA lies in the Flange only) 2.2 Calculation of moment resistance, area of steel	8	12

3	**Design for shear and development length:** 3.1 Nominal shear stress (τ_v) shear resisted by concrete, maximum shear stress in concrete, design shear reinforcement, minimum shear reinforcement, maximum and nominal spacing of stirrups, bend up bars, 3.2 Development length, values of design bond stress, design problems.	8	12
4	**Columns :** 4.1 Assumptions made in limit state of collapse: compression. Axially loaded short columns, slender/long columns, effective length, minimum eccentricity. 4.2 Analysis and design of axially loaded square, rectangular and circular columns with lateral ties. (No helical reinforcement)	8	16
5	**Slabs :** 5.1 Design of one way and two way slabs for flexure, cantilever slabs, 5.2 Design of two way slabs simply supported on all four sides.	8	12
6	**Design of footings :** 6.1 Design of square and rectangular footing, check for one way shear, check for two way shear. 6.2 Design of isolated footing.	8	12

Skills to be developed :

i) Intellectual skills :

- Should be able to read and refer IS:456-2000.
- To know the types of loads, stresses acting on the section and their effects on the structures.
- Calculate the strength/capacity of given section.

ii) Motor skills :

- To be able to design the RCC sections by using IS:456-2000

Termwork:

A)Sketch book- It shall consist of minimum 10 plates which shall includes sketches of typical reinforcement details from SP-36 like beams, staircases, columns, footings, one-way slabs, two-way slabs etc. Any 5 plates should be drawn using AUTOCAD

B)A journal consists of following assignments:
1)Analysis and design of singly reinforced beams.
2)Analysis and design of doubly reinforced beams.
3)Analysis and design of flanged beams.
4)Analysis and shear design of beams.
5)Design and drafting for one way slabs.
6)Design and drafting for two way slabs.
7)Analysis and design of columns.
8)Analysis and design of footings.

C) Professional Practice: A site visit and report of the same should be prepared by students.

D) Reference Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
1.	Dr. S.R.Karve and Dr. V.L.Shah	Limit State Theory and Design	structures
2.	Shah and Kale.	R.C.C. Design	Shah and Kale.
3.	P. C. Varghese	Limit State Design	EEE
4.	Dr. V. L. Shah and Dr. S.R.Karve	Illustrated R.C.C. Design	structures
5		IS:456-2000 Plain and Reinforced Concrete – Code of Practice	BIS
6	Bureau of Indian Standards	National Building Code 2005	BIS

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING

Course : Design of Steel Structures **Course Code : R14AM4110**

Course Category : Applied **Credits : 5**

Teaching and Examination scheme :

Teaching Scheme		Examination scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	-	25	25	150

Rationale :

This is applied subject which will enable the students to understand concepts, design principles of bolted connections, welded connections, tension members, compression members, beams and column bases for various industrial structures.

Objectives :

1) Understand concept of steel design.
2) Know various loads for designing steel structures.
3) Analyze given sections and apply the knowledge of designing standard structural elements.
4)Select proper sections from steel table(IS:808).
5) Design the tension members, compression members, beams, purlins, column bases and their connections.
6) Know the rules and regulations given in IS 800-1984.
7) Prepare, read and interpret structural drawings.

Design as per IS: 800-1984 (Working Stress Method)

Course Contents :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1.	**General Considerations:** 1.1 Steel as a structural material, various grades of structural steel, properties, various rolled steel sections and their properties. Introduction to IS:808, IS:875(part I-III) **Bolted Connections:** 1.2 Types ,Designations, properties, permissible stresses, Failure of the bolted joint, bolt value, efficiency of the joint, strength of a joint, pitch, design of simple bolted connections (axial and moment resisting).	8	16
2.	**Welded Connections:** 2.1 Types of welds, symbols, merits and demerits of welding, permissible stresses, size of weld, throat thickness, design of butt welds, design of fillet welds, 2.2 Design of simple welded connections (axial and moment resisting).	8	12

3.	**Tension Members :** 3.1 Types of Tension members, permissible stress, single angle and double angle used as a tie, net cross sectional area, capacity of a tension member, 3.2 Design of a tension member for the given capacity, different I.S. sections, end connections.	8	12
4.	**Compression Members:** 4.1 End conditions, effective length, slenderness ratio, permissible stress, single angle and double angle strut, capacity of a strut, limits of slenderness ratio, column, capacity of a column, different I.S. sections used for a column, 4.2 Compound sections for maximum capacity.	8	16
5.	**Beam** 5.1 Type of sections, lateral stability of beams, bending stresses, Design of the simply supported beam (with compression flange fully restrained) for bending moment, check for shear and deflection, permissible deflection, design of beam to beam framed connections only. 5.2 Design of purlins (angle section and I section).Introduction to Plate Girder	8	12
6.	**Lacing, Battening and Bases:** 6.1 Built-up columns, calculation of back to back or face to face distance, Introduction to lacing and battening, detailed design of battened and laced columns, 6.2 Type of column bases ,slab base, gusseted base, design of slab base for axially loaded column, design of plain concrete foundation block under the base plate	8	12

Skills to be developed :

i) Intellectual skills :

- Should be able to read and refer IS:800-1984.
- To know the types of loads, stresses acting on the section and their effects on the structures.
- Calculate the strength/capacity of given section.

ii) Motor skills:

- To be able to design the steel sections by using IS:800-1984.

Term Work :

1)Design of structural members like tension members, compression members, and purlins etc .and design of bolted & welded connections showing design calculations with appropriate sketches.

2)**Sketch book-** It shall consist of minimum 10 plates which shall included important information and clauses from I.S.800-1984 and sketches of typical section with properties, beam to beam connection, beam to column connection, section with properties, column bases, lacing, battening, connections in roof trusses. Any 5 plates should be drawn using AUTO**CAD.**

3)Professional Practice: A visit to Railway Station and report of the same should be prepared by students

Reference Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
1.	P. Dayaratnam	Design of Steel Structures	-
2.	L.S.Negi	Design of Steel Structures	Tata McGraw Hill
3.	Ramchandra	Design of Steel Structures	Standard book house.
4.	A.S.Arya & J.L.Ajmani	Design of Steel Structures	Nem Chand & Bros.Roorkee.
5	IS:875(I-III) Code of Practice for Design Loads for Buildings and Structures		BIS
6	IS:800-1984 General Construction in Steel- Code of Practice		BIS
7	Bureau of Indian Standards		Bureau of Indian Standards

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING

Course : Advanced Construction Techniques Course code : R14CE 5101

Course Category : Specialized Credits: 05

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	-	50	25	175

Rationale:

The subject stresses on various construction processes like earth, road, and underwater construction .The subject will help students to supervise various construction processes and execute different construction projects.

Objectives :

Students will also be able to

1. Understand different construction processes like dredging, roadway construction etc
2. Identify and select appropriate construction equipment or plant depending on project types while executing the project.
3. Interpret performance of various equipments.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Soil compaction and stabilization techniques** 1.1 Principle used in compaction, types of equipments used for soil compaction, methods. 1.2 Soil stabilization – concept, methods. 1.3 Geosynthetics techniques laying in retaining walls, road works.	10	16
2	**Construction in earth** 2.1 Introduction to soil survey and investigations prior to construction in earth, Construction of embankment as a water retaining structure 2.2. Pneumatic drilling equipments and crushers. 2.3 Heavy duty Industrial concrete flooring with epoxy resin.	07	12

3	**Underwater Construction** 3.1 Coffer dams, Pneumatic sinking using compressed air, dredging Techniques, use of barges, dewatering systems. 3.2 Underwater concreting, diaphragm wall techniques.	07	12
4	**Deep Foundation** 4.1 Pile Foundations: - Introduction. Classification of piles. Load Carrying capacity of piles. Grouping of pile. Pile caps & grade Beams. Construction of bored cast in situ concrete piles. 4.2 Caisson foundations – Uses. Types – Construction procedure of Caissons. 4.3 Well foundations – Types, Component and functions. Construction Procedure of well sinking.	10	16
5	**High Rise Structures** 5.1High rise structures and their construction. 5.2Material movement and construction difficulties. 5.3Labour safety norms and fire safety norms.	07	12
6	**Specialized construction processes** 6.1 Pre stressing operation- Pre-tensioning & Post tensioning. 6.2 Girder launching techniques, 6.3 Trench less techniques, micro tunneling, use of tunnel boring Machine in tunneling.	07	12

Teaching Methodology: Chalkboard, Group Discussions, MS. Power Point Presentations, Wall Hung Charts, Slide Shows, Instruments, Expert Lectures, Technical Visits.

A. Practical's:

Skills to be developed :

1. Intellectual Skills :

- Interpret performance of equipment.
- Report writing on site visit.
- Able to select various specialized construction techniques.
- Able to state principles, concept of soil stabilization.

2. Motor Skills :

- Collecting market information regarding specialized construction process / equipment.
- Preparing chart showing engineering fundamental related to equipment.
- Select appropriate construction equipment.

List of Practical:

Journal consisting of the following exercises:

1.Prepare a chart showing compaction equipments with reference to capacity, suitability based on type of soil, Technical specifications.
2.Study of various types of joints in cement concrete road, filler and sealer compounds.
3.Study of earth moving equipment w.r.t working, output, common manufacturer, cost, Useful life, area of use
4.Study of coffer drams, pneumatic sinking and dewatering systems.
5.Study of Deep foundation & their construction process.
6.Study of Girder Launching Techniques.
7.Study of pre-stressing techniques.

Professional Practice :

1)Report on visit to a construction site involving specialized construction process.
2)Student should collect information on any of the above topics in form of pamphlets, brouchers, internet data, Photographs, videos etc and presentation of the same in power point.

Learning Resources :

A. Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Dr. B.C.Punamia	Building Constructions	Laxmi Publication, Delhi –2
2	Vizirani Chandolia	Heavy Constructions	Khanna , Delhi –6
3	A. Kamala	Transportation Engg	Tata McGraw-Hill , Delhi -2
4	Dahigaonkar	Irrigation Engineering	Central Techno, Nagpur
5	Dr .Mahesh Varma	Construction equipment planning and application	Khanna Publication, Delhi –6
6	Peurifoy	Construction planning ,methods and applications	Tata –McGraw Hill
7	Sandeep Mantri	A to Z of practicle Building construcrtion	Satya Prakashan, New Delhi

B. Web sites for references :

www.icivilengineer.com
www.wikipedia.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING
Course : Project Management Course Code : R14CE5102
Course Category : Specialized Credits : 5

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	-	50	25	175

Rationale :
This is a specialized course. The subject will provide some insight in managing civil engineering project sites. Application of knowledge of civil engineering technology and project management is essential for effective performance on construction project. This subject will orient student for choosing career option as a project managers.

Objectives :
The student will be able to
1. State role of labour laws, feasibility reports for construction projects.
2. Compute resources allocation and level it with constraints.
3. Implement work study exercise and compute cycle time for defined operations.
4. Perform computation for crashing and cost optimization based on network computations.
5. Evaluate decision based on financial statements of construction firm.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	1.1 Concepts of objectives, organization, management, efficiency, effectiveness, stakeholders, inter -disciplining nature of management, resources, constraints Project, project life cycle, and feasibility studies of project 1.2 **Project planning and control system** Statement of work, Project specifications, Work Breakdown Structure, Total Project planning process, Types of plans, Planning cycle of a management cost and control system. 1.3 **Network techniques:** Computations for Program Evaluation and Review Technique (PERT),Line of Balance technique, Ladder Technique	7	12
2	. **Resource Planning** 2.1 Resource allocation, resource smoothening and leveling based on network. Aggregation of resources. Drawing squared network, Histogram, Computations of Effective force ratio, Idle force ratio.. 2.2 Resource planning using Computer software. ERP concept.	7	12

3	3.1 **Network compression** Time cost relationship for an activity .Network compression, Direct – Indirect costs of project, Cost slope, Computing cost time relationship for a project, Optimal duration of a project, All crash duration of a project. Cost optimization. **Cost control system** 3.2 Cost control systems , cost control codes, collection of site cost data, recording and analysis of costs, works abstract for cost control	10	16
4	.4.1 **Time Value of Money** Simple and compound interest, Present and Future value for a single payment and Annuity. 4.2 **Investment Criteria** Methods Net Present Value, Benefit Cost Ratio, Internal Rate of Return, Payback Period, Accounting Rate of return	6	12
5	5.1 **Financial Aspects of Project** Elements of cost of project, Means of finance ,Cost of production, Working capital requirements, Projections of profit and loss statement, balance sheet and cash flow. Financial ratios and significance.	8	12
6	**Value Engineering** 6.1 Definition, phases of VE job plan, Life cycle cost concept, value engineering applications 1.1 **Legal aspects** Condition of construction works in India, Construction labour laws and labours Welfare. Payment of wages act, minimum wages act, workmen's compensation act, contract labour act. Types of construction contracts, Important contractual obligations, disputes and settlement.	10	16

Teaching Methodology : Chalkboard, Group Discussions, MS – PowerPoint, Transparencies, Experts Lectures, Site Visits.

Term Work :

Skills to be developed :

i) Intellectual Skills : The student should be able to

- Identify project related activities and draw the project network.
- Perform Network computation.
- Design work study experiment and carry out it for a simple site operation.
- Interpret balance sheet and profit and loss statements .
- Design and perform value engineering study for a simple decision situation.

ii) Life skills: The student should be able to

- Arrange site visits, guest lectures.
- Present site visit report using latest presentation techniques.
- Organize group discussion and conduct it for a technical topic.

Journal based on following activities : (Any Twelve)

1. Study of feasibility report of a project prepared by a Government authority / consulting firm.
2. Group discussion and report writing for two laws related to construction labour.
3. Computations of EFR, IFR, cumulative resource requirement and resource leveling. (Minimum 2 examples)
4. Computation of cycle time and output rate for any repetitive type of work data.
5. Drawing LOB diagram / Ladder network to understand various parameters affecting cycle time of repetitive work.
6. Computation of normal, optional and crash durations and cash for given problem. (Minimum 2 examples)
7. Preparation of profit & loss statement for a given data.
8. Preparation of balance sheet for a given data.
9. Computation and interpretation of performance related financial ratios.
10. Computations of fund flow statement for a given data.
11. Collection of Annual reports of two construction companies ,preferably civil engineering construction organizations and Study financial ratios and write your conclusion about financial health of the organizations.
12. Application of a value engineering concepts for newly introduced construction materials/processes.
13. Decision of investment based on Investment criteria .(minimum 3 examples)
14. Study of any two construction industry related acts.

Students will be encouraged to use EXCEL / MS Office, Tally or other related suitable software, wherever possible.

Professional practice :

Students should visit at least 2 ongoing sites and interview project managers regarding their project management practices and submit report about it.

Student should watch Discovery channel for civil engineering construction of world reputation and prepare a presentation about the project using Internet and other sources of information.

Learning Resources :
A.Books :

SR.NO	AUTHOR	TITLE	PUBLISHER
1	Chitkara ,	Civil Engineering Project Management	Tata McGraw – Hill, New Delhi .
2	B. Sengupta H. Guha,	Construction Management & Planning	Tata McGraw – Hill, New Delhi .
3	Harpal Singh	Construction Management & Accounts -	Tata McGraw – Hill, New Delhi
4	Trevor L young	The Handbook of Project Management	Kogan Page India Private Limited, New Delhi
5	Harold Kerzner	Project Management	CBS publishers , New Delhi ,
6	Dr. B C Punmia	Planning and Control with PERT and CPM –	K.K.Khandelwal, Laxmi Publication ,New Delhi.
7	S.Seetharaman,	Construction Engineering and Management	Umesh Publications,New Delhi.
8.	Prasanna Chandra	Projects, Planning, Analysis, Financing,, Implementation and Review	Tata McGraw – Hill, New Delhi

B.softwares : MS Project, Excel, primavera or equivalent

C. Web Site reference :
1. http ://pmbook.ce.cmu.edu
2. http ://www.constructionplace.com/pdf_files/CM_Made_Easy.pdf
3.http://ocw.mit.edu/courses/civil-and-environmental-engineering/1-040-project-management-spring-2009

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING
Course: Advanced Surveying **Course Code : R14CE5103**
Course Category: Specialised **Credits : 05**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	--	50	25	175

Rational:

The students have already learnt basic surveying through core courses. However, due to the rapid modernisation & development, diploma technicians should also know advanced survey instruments & techniques. The knowledge of advanced surveying will help them to collect more precise data with in reasonable time & cost. Through this specialized subject students will be introduced to testing & adjusting procedures for the survey instruments they have already handled, construction surveying, advanced curve ranging & photogrammetry useful in resources planning & management.

Objectives:

The student will be able to

1. Test & adjust levels & theodolites.
2. Do river cross section survey & plot it.
3. Set out for buildings, pipelines, highways, etc.
4. Range out compound & reverse curves.
5. Handle aerial photographs & reduce from it, data required for preparing plans/maps & sections
6. Develop skills in different methods of surveying with above mentioned instruments and techniques.
7. Find out the most probable value of survey observations.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Testing & Adjusting Surveying Instruments** 1.1 Concept & necessity of permanent adjustment of the survey instruments . Permanent adjustments of a level. 1.2 Permanent adjustment of vernier transit theodolite. 1.3 Errors in total station surveying adjusting for it.	7	12
2	**Hydrographic Surveying** 2.1 Concept & necessity . Horizontal & vertical controls. Tidal gauging & establishment of mean sea level. 2.2 Sounding. Sounding equipments, signals, buoys & nautical sextant. Personnel for sounding. Range lines. 2.3 Methods of locating soundings. Reduction of soundings. Plotting of soundings by mechanical, graphical & analytical methods.	7	12

3	**Construction Surveys** 3.1 Introduction. Horizontal & Vertical controls. Requirements of good controls. Equipments for construction survey. Staking out for a building by conventional method and by a total station. 3.2 Staking out a drainage line: use of offset stakes, sight rails & boning rods, pipe line lasers, developing a working profile to set out a drainage line. 3.3 Staking out a highway: use of offset/reference stakes, slope stakes , grade/formation stakes . Sources of errors & mistakes in construction surveys.	10	16
4	**Advanced Curve Ranging** 4.1. Setting out simple circular curves by methods of - successive bisection of arcs, by offsets from tangents & by offsets from chord produced. 4.2. Compound & Reverse Curves : Definition, location, necessity, working out chainages of key points & procedure to set out. Transition Curves : Definition, objectives, functions, advantages, requirements & forms. 4.3. Obstacles in ranging out horizontal curves. Vertical curve : Necessity of using parabolic arc, concept of tangent correction, reduction of length of vertical curve and chainages & elevations of key points.	10	16
5	**Photogrammetry** 5.1 Definition & Types of photogrammetry. Types of aerial photographs. End & side lap. Aerial photograph & map. Scale of aerial photograph. 5.2 Ground coordinates from single vertical photograph. Heights/Elevations from aerial photograph by relief displacement & stereoscopic parallax. 5.3 Ground Controls & Flight planning. Digital photogrammetry – Introduction, advantages, elements. Stereo-viewing techniques.	7	12
6	**Theory of Errors & Adjustment of Survey Observations** 6.1 Types of errors – Gross, systematic & random. Laws of accidental errors & Gaussian distribution. Definitions – Direct & indirect observations; Observed, true & Most Probable Values; True, residual & most probable errors; observational, conditional & normal equations. 6.2 Indices of precision for observation of same weight – Standard deviation, variance, standard error of the single observation & the mean. Concept, allocation & laws of weight. 6.3 Rules for determination of most probable values. Principal of least square. Most probable values of direct & indirect observations of equal & unequal weights.	7	12

Teaching Methodology: Chalkboard, Group Discussions, MS. Power Point Presentations, Slide Shows, Transparencies, Guest Lectures, Visits.

Term Work:

Skills to be developed :

i) Intellectual Skills :

- Identify the survey instruments.
- Discriminate one survey instrument/technique from the other.
- Select a most adequate survey instrument/technique for the given work.
- Read the survey instrument
- Process the data collected on field to work out relative positions, gradients, areas, volumes etc.
- Interpret the results & transform it if required.
- To read & interpret the survey drawings.
- Understand mistakes & errors in work & techniques to avoid/minimize it.
- Write report on the survey carried out.

ii) Motor Skills :

- To handle the survey instrument.
- To make temporary adjustments of the survey instrument.
- To establish controls & to locate details.
- To set out for buildings, drainage lines & roadways.
- To reduce the data from aerial photographs.
- To test & permanently adjust survey instruments such as levels & theodolites etc.
- To set out compound & reverse curves.
- To plot the survey data graphically in form of plans/maps /sections.

List of Practicals

Student should perform minimum NINE of following practicals.

1. Testing & adjustment of a dumpy level for collimation error.
2. Testing & adjustment of a vernier theodolite for vertical index error
3. Use of Nautical Sextant in measurement of horizontal angles.
4. Solution of a three point problem by graphical method of intersecting circles.
5. To plot cross section of a river at given discharge site.
6. Setting out a building with electronic total station instrument.
7. Setting out for a compound or reverse curve with a total station.
8. Study of mirror stereoscope, parallax bar & aerial photograph.
9. Finding Air Base distance for given stereo pair of aerial photos by using Mirror Stereoscope.
10. Use of parallax bar for measuring parallax of two points & finding out difference of elevations between them.
11. Calculating most probable value and probable error for a length of base line from its equally reliable direct measurements.
12. Adjusting for a triangle angular observations of unequal weights.

Professional Practice

1. Collecting information about construction & use of pipe line lasers & other such products from internet/magazine/journal & submitting it along with the term work.
2. Reading an article on modern techniques/instruments in surveying published in a periodical & writing brief extract of it.
3. Visit to CME's surveying lab or survey professional's office or a site where construction survey activity is in progress & submitting report on it.

Term work should consist of a field book &/or journal containing readings & write-ups for all the practicals indicated in the list of practicals.

Instructions

1. Practical will be carried out in groups of students.
2. Each group will consist of about five students.
3. Each student from the group shall be given chance to handle the instrument, to understand the function of different components & use of the instrument.
4. Drawing, plotting should be considered as part of practical.

Learning Resources:

A.Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
01	Kanetkar & Kulkarni	Surveying & Levelling, Vol. I & II,	PVG, Pune.
02	Dr. B. C. Punmia,	Surveying, Vol . I, II & III	Laxmi Publications, Delhi
03	Hussain & Nagraj,	Text book of Surveying	Chand & Co., Delhi
04	C. L. Kochher	Text book of Surveying,	Dhanpat Rai.Publishing Co., Delhi
05	Dr. K. R. Arora	Surveying, Vol. I & II	Standard Book house, Delhi.
06	S. K. Roy	Fundamentals of Surveying	Prentice Hall of India, Delhi.
07	Narinder Singh	Surveying,	The Tata Mc Graw Hill Co., Delhi
08	S. K. Duggal	Surveying, Vol. I & II	
09	N. N. Basak	Surveying & Levelling	
10	Blinker & Wolf.	Elementary Surveying	
11	A. Bannister, S. Raymond & R. Baker	Surveying	Pearson Education, Delhi.
12	Dr. A. M. Chandra	Higher Surveying	New Age International, Delhi.
13.	Shelar, Mali, Patil	Surveying	Nirali Prakashan, Pune.

A.Websites for reference :

1 www.surveyinstrument.com
2 www.hydrobharat.com
3 nauticalcharts.noaa.gov
4 www.123photogrammetry.com
5 www.surveyofindia.gov.in
6 www.wikipedia.com

B.Softwares

1.Autocad

2.Liscad (A post processing software for data collected in surveying)

C.Indian Standards

1.IS 9849: 1991 Optics & optical instruments – Geodetic instruments - Vocabulary

2.IS 1481: 1970 Specification for Metric Steel Scales for Engineers

3.IS 10713: 1983/ISO 5455 : 1979 Scales for use in technical drawings

4.IS 1071 : 1983/ISO 128 : 1982 General principles of presentation on technical drawings

5.IS 9441:1979 Specification for sextant

6.IS 5146: 1969 Specifications for sounding sextant

7.IS 8691:1986 Specification for mirror stereoscope

8.IS 11445:1985 Specification for parallax bar

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING
Course Name : Township Planning **Course code: R14CE 5104**
Course Category : Specialised **Credits : 5**

Teaching and Examination Scheme :

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
03	-	02	03	80	20	-	50	25	175

Rationale:
A student should know elements in a township their planning & execution. The govt has allowed construction on mass scale on own agricultural lands to the extent of 100 acres or more to form self sufficient townships. But these townships have to manage their own utility service systems. A student should be made aware of these facts and should be taught the factors leading to site selection. He should know the government procedures regarding land purchase, plan sanctioning etc. He should be able to execute a township scheme and maintain the various services in order. He should be able to liase with the Govt. Officials.

Objectives:

Students should be able to
1.Know the elements in Township.
2.Know the concessions offered for Township.
3.Understand the financial planning for the Township.
4.Understand the principles of zoning & surveys.
5.Prepare sub division of land and neighbourhood drawings.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Definition** 1.1 Difference between Town Planning and Township Planning. Extent of township. Hierarchy in Planning. Area of influence. Flow of funds. Horizontal and vertical growth. 1.2 FDI in Township. 1.3 Amenities in the township. D.C. rules applicable to township 1.4 Subdivision of land. 1.5 Relaxation in rules for townships. Effect on services provi ded by the local body. Authority to be set up for administration. Amenities needed, Design of amenities.	10	16

2	**Financing Townships** 2.1 FDI in Townships 2.2 Time needed for completion. Phasing out of the construction activity. 2.3 Documentation needed for purchase of land. Competent Authority for seeking sanction or approval. 2.4 Expenditure to be incurred for the project Teams to be formed for rising, finance purchase, liaisoning execution. Selling, finalization. 2.5 Various agencies to be appointed for planning and execution of the project. RCC Contractor, Architect, Landscape architect, Consultants for RCC, water management electrical, security, estate managers.	7	12
3	**Effect on Land use** 3.1 Various land uses & their colour codes. 3.2 Execution on own by builder or company. Execution on joint venture basis. Fixing of rate done for joint venture. 3.3 Purchase of land, pooling of land, selection of site, criteria. 3.4 Land owners as share holders.	7	12
4	**Surveys** 4.1 Zoning- Meaning, objects, 4.2 Principles, advantages, aspects, economy, powers, maps, Transition Zone. 4.3 Types of Surveys.	7	12
5	**Housing** 5.1 Agencies for housing. HUDCO, HDFC, LIC housing finance, CIDCO, NBFC, MHADA. 5.2 Investment in housing sector	7	12
6	**Miscellaneous** 6.1 Maharashtra Regional & town Planning Act. 6.2 Repeal of Urban land ceiling and Regulation Act. 6.3 Land Acquisition Act. 6.4 Maharashtra land Revenue Code. 6.5 Environmental Impact Assessment of Township Projects.	10	16

Teaching Methodology : Chalkboard, Group Discussions, MS – PowerPoint, Slide Shows, Transparencies, Experts Lectures, Visits.

Term Work:

1.Subdivision of land taking in to account the prevailing DC rules.
2.Preparing an information brochure, professional type, of the above subdivision.
3.Visit report of site visit to a township scheme.
4.Neighborhood planning conforming with the present norms.

Skills to be developed :

i. Intellectual Skills :

Understanding of procedures of granting approval for a RP, DP or TP .
Understanding the role of various agencies in a Township scheme.

ii. Motor Skills:

Work out various option of a joint venture construction project and suggest which is more beneficial.

Professional Practice:

Site visits to two Townships in or around Pune.
Collecting documents regarding purchase of land, tenement.
Guest Lecture of Project Manager/ Developer of Township.
Collecting brochures of townships.

Learning Resources:

A.Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Hiraskar	Town Planning	Dhanpat Rai, Delhi.
2	Rangwala	Town Planning	Charotor Pub. House. Anand .
3	Arther Gallion	Urban Planning	CBS, Delhi.
4		Town Planning Act 1966	Govt. of Maharashatra Publication
5		Maharashatra Land Revenue Code	Govt. of Maharashatra Publication
6		Uraban Land ceiling & regulation Act.	Govt. of India Publication

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING

Course: Prestressed Concrete **Course Code: R14AM5105**

Course Category: Specialized **Credits : 5**

Teaching and Examination scheme:

Teaching Scheme		Examination scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	-	50	25	175

Rational:

This is specialized subject which will enable the students to understand the fundamentals of prestressed concrete and deals with knowledge of high strength concrete and steel required for PSC. Economy of PSC girders for long span and it's applications in the field of civil engineering.

Objectives :

The student will be able to

1)Understand concept of prestressing.

2)Know the difference between Prestressed concrete and Reinforce Cement Concrete structures.

3)Understand the various methods of prestressing for pretensioned and post tensioned members.

4)Know different concepts of analysis and analyze the sections using different concepts.

5)Know the rules and regulations given in IS 1343-1980.

6)Design simple beams using codal provisions.

Note: use of IS:1343-1980 is recommended.

Course Contents :

Sr. No.	NAME OF THE TOPIC	HOURS	MARKS
1.	**Basic principles of prestressing:** 1.1Types of prestressing: Pretensioning Systems - Hoyer's method. Post tensioning Systems -Gifford Udal, Magnel Blaton, Le McCall systems, Freyssinet System, Chemical Prestressing, Thermo-Electric Prestressing, 1.2Advantages of PSC over RCC, Requirements of high grade of steel and concrete, Grouting : purpose and essential qualities	8	12

2.	**Analysis of Prestress and Bending Stresses**: 2.1 Basic assumptions, Analysis of Prestress, Resultant stresses, Location of pressure line or thrust line. 2.2 Introduction to basic Concepts: Stress concept, Strength concept, and Load balancing concept. Effect of variation of stress in steel and cracking moment	8	16
3.	**Design of sections for flexure :** 3.1 Assumptions in prestressed concrete design Design of the sections for flexure. Square, rectangular and symmetrical İ sections, Box sections. Simplified Code Procedures, 3.2 Design requirements confirming to IS:1343-1980	8	12
4.	**Losses in prestress:** 4.1Nature of Losses of Prestress, Losses in pre tensioned members and post tensioned members : elastic deformation of concre te, relaxation of stress in steel, creep of concrete, shrinkage, friction, anchorage slip, friction. 4.2Total losses allowed for pre tensioned members and post tensioned members for design	8	16
5.	**Prestressed concrete precast units :** 5.1 Ad vantages, design consideration for prestressed concrete pipes, 5.2 Design consideration for poles, design consideration for piles, design consideration for sleepers etc	8	12
6.	**Anchorage Zone Stresses in Post-tensioned Members:** 6.1 Cable profile computations. Anchorage zone in post tensioned members. Stress distribution in end block. Anchorage zone reinforcement. 6.2 Analysis by Magnel's method. Use of mild steel reinforcement in Prestressed Concrete. Construction procedures	8	12

Skills to be developed :

i) Intellectual skills :

- Should be able to read and refer IS:1343-1980.
- To know the systems of prestressing, losses of prestress, stresses acting on the section and their effects on the structures.

  Calculate the strength/capacity of given section.

ii) Motor skills:

- To be able to design the PSC sections by using IS:1343- 1980

Term Work

Term work will consist of the assignments covering each of the topics:

1. Assignment on Pre-tensioning and Post-tensioning Systems.
2. Assignment on Analysis of Pre-tensioned and Post-tensioned Members.
3. Assignment on Losses in Pre-tensioned and Post-tensioned Members.
4. Assignment on Design of Pre-tensioned and Post-tensioned Members.
5. Assignment on Anchorage Zone Stresses in Post-tensioned Members.
6. Assignment on Pre-stressed concrete precast units.

Reference Books:

SR,NO	AUTHOR	TITLE	PUBLISHER
1.	T. Y. Lin, Ned H Burns	Design of Prestressed Concrete Structures	McGraw Hill
2.	N. Krishna Raju	Prestressed Concrete Structures	Tata McGraw Hill
3.	S. Ramamrutham	Prestressed Concrete	Dhanpat Rai Publications
4	IS:1343-1980 Code of Practice for Prestressed Concrete		BIS

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING

Course : Advanced Structural Design **Course Code : R14AM5106**

Course Category : Specialized **Credits : 5**

Teaching and Examination scheme:

Teaching Scheme		Examination scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	-	50	25	175

Rationale:

This is specialized subject which will enable the students to understand design principles and procedures for earth retaining structures, water retaining structures, continuous slabs, columns subjected to moments, moment resisting bases, staircases etc.

Objectives:

The student will be able to

1) Understand concept of earth retaining structures.
2) Know various types of earth retaining structures.
3) Analyze given sections and apply the knowledge of designing standard structural elements like continuous slabs, beams, columns subjected to bending using Limit state Method.
4) Know various types of staircases and their design criterions.
5) Know various types of water tanks and their design criterions
6) Know the rules and regulations given in IS 456-2000 and IS:3370 (I&II)
7) Prepare read and interpret structural drawings.

Note: - Use of IS: 456-2000 and IS:3370 (I &II) is recommended

Course Contents:

Sr. No.	Name of Topic	Hours	Marks
1	**Design of continuous slabs :** 1.1 Design of one way continuous slabs using SF and BM coefficients only(IS 456-2000), 1.2 Design of two way continuous slabs for different conditions, Reinforcement detailing.	8	16
2	**Design of columns subjected to bending:** 2.1Introduction to Pu-Mu Interaction Diagrams, Concentric axial load (Puz), design of columns using charts, Design of columns subjected to axial compression and uni-axial bending, columns subjected to axial compression and biaxial bending (only introduction).	8	12

3	**Design of Water tanks:** 3.1 Classification, permissible stresses in concrete and steel, joints in tanks, base slab of tank. 3.2 Design of circular tank resting on ground with flexible joint between the walls and the base , Design of circular tank resting on ground with fixed joint between the walls and the base, Reinforcement detailing	8	12
4	**Design of Retaining Wall:** 4.1 Types of retaining walls - T, L, Counter fort -type (No detail design). 4.2 Design of retaining wall (Cantilever type only), Checks for Stability, Design of stem, Design of toe slab, Design of heel slab. Reinforcement detailing	8	16
5	**Design of moment resisting bases:** 5.1 Design of footing subjected to axial load and moment, Locating centre of gravity of footing, proportioning base, check for one-way shear, check for two- way shear, 5.2 Introduction about combined footing (No detailed design)	8	12
6	**Design of staircases :** 6.1 Types of Staircases, Design of staircases: spanning longitudinally and transversely, 6.2 Design of dog-legged staircase, Reinforcement Detailing	8	12

Skills to be developed :

i) Intellectual skills :

- Should be able to read and refer IS:456-2000.
- To know the types of loads, stresses acting on the section and their effects on the structures.
- Calculate the strength/capacity of given section.

ii) Motor skills:

- To be able to design the RCC sections by using IS:456-2000

Term work: A journal consists of following:

1)Design and drafting for Retaining Wall (one full imperial size sheet)
2)Design and drafting for one way and two way continuous slabs. (one half imperial size sheet)
3)Design and drafting for water tanks resting on Ground. (one half imperial size sheet)
4)Assignment on analysis and design of columns with uni-axial bending.
5)Assignment on design of moment resisting bases.
6)Design and drafting of dog-legged staircases. (one half imperial size sheet)

Reference Books:

SR.No.	AUTHOR	TITLE	PUBLISHER
1.	Dr.S.R.Karve & Dr.V.L Shah	Limit State Theory & Design	Structures Publication
2.	Dr.S.R.Karve & Dr.V.L Shah	Illustrated Reinforced Concrete Design	Structures Publication
3.	P. C. Varghese	Limit State Design	Prentice Hall
4	IS:456-2000 Plain and Reinforced Concrete- Code of Practice		BIS
5	IS:3370 (I &II) Code of Practice for the Storage of Liquids		BIS

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING
Course : Geoinformatics Course Code : R14CE5107
Course Category: Specialised Credits : 03

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
1	2	--	--	--	--	50	25	75

Rational:
In many instances civil engineer, requires to take decisions related with planning, design and execution of the project in his charge. Effective decisions cannot be made in absence of adequate information. To generate such information lot of spatial & attribute data is required to be made available, which when processed, yields desired information. Much of such data can be collected reliably in stipulated time & cost by the way of Remote Sensing (RS). This data is converted in to information & made available almost in no time to the managers' end through a Geographic Information System (GIS). Through this specialized subject students will be introduced to RS & GIS, the high end alternatives to conventional surveying and maps very useful in resources planning & management.

Objectives:
The student will be able to
1.Identify the remote sensing data products.
2.Discriminate one RS data product from the other.
3.Recommend a most adequate RS data product for the given work.
4.Interpret the RS data product.
5.To state the functionalities of each of the component of a GIS.
6.To describe the common functions a GIS can carry out.
7.Input data, analyse & visualise results through a GIS.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	**Remote Sensing (RS)** 1.1 Electromagnetic energy, electromagnetic spectrum, interaction of electromagnetic energy with atmosphere & matter, fundamental equation of RS, atmospheric window, spectral signature. 1.2 Platforms for RS, Remote sensors, Resolutions of RS images, Different Indian & foreign RS systems, RS data products, Georeferencing of RS images. 1.3 Data analysis: Methods to study RS images – fishing expedition & logical search, Keys for interpretation – selection & elimination, Visual & digital techniques in analysis & interpretation of RS images,	08	--

2	**Geographic Information System (GIS)** 2.1 Necessity, definition & objectives of GIS. Components of GIS – People, procedure, hardware, software & data. Spatial & attribute data. Vector & raster models of spatial data. Vector data forms – Points, lines & polygon. 2.2 Database management system, primary & foreign key. Metadata & factors affecting selection of data. Data acquisition for GIS. Functions of GIS – Inputting, manipulation, management, query & analysis and visualisation. 2.3 Spatial analysis techniques : Data modeling, Topological modeling (Aggregation & buffering), Overlaying, Network analysis, Classification & measurement. Errors in GIS, limitations of GIS, applications of GIS.	08	--

Teaching Methodology: Chalkboard, Group Discussions, MS. Power Point Presentations, Slide Shows, Transparencies, Guest Lectures, Visits.

Term Work:

Skills to be developed:

i) Intellectual Skills :

- Identify & discriminate the RS data products.
- Select a most adequate RS data product for the given work.
- Interpret the RS data product.
- Extract the attribute data from given RS data product.
- To state the functionalities of each of the component of a GIS.
- To describe the common functions a GIS can carry out.

ii) Motor Skills :

- To handle the RS data products.
- To geo-reference the given RS data product.
- To extract the spatial data from given RS data products.
- To input vector/raster data in a GIS.
- To analyse vector/raster data in GIS.
- To visualize the results from a GIS.

List of Practicals

Student should perform minimum EIGHT of following practicals.

1.Study of various types of sensors used in remote sensing.

2.Study of resolutions of remote sensing data products.

3.Study of Indian RS systems such as Resourcesat, Cartosat & Oceansat.

4.Study of various remote sensing data products available with NRSA.

5.Visual interpretation of given RS image.

6.Understanding features & capabilities of QGIS software.

7.Introduction to interface of and tools in QGIS software

8.Creation of vector data set in GIS (By scanning, digitization & geo-referencing of paper map).

9.Linking of attribute data set to a vector data set.

10.Network/overlay/buffer or such other analysis on data set created in practical numbers 9 & 10.

Professional Practice

Items 1 is compulsory, any 2 items rest of 3 can be carried out.

1.Collecting information about organizational structure, role, duties of National Remote Sensing Agency (NRSA), Hyderabad & submitting it along with the term work.
2.Collecting information about features & functionalities about commercial GIS software & submitting it along with term work.
3.Visit to an office of a GIS professional & submitting report of it.
4.Expert's lecture on applications of RS &/or GIS in Civil Engineering. Report on it shall be prepared & submitted along with term work.
Term work should consist of a field book &/or journal containing readings & write-ups for the practicals indicated in the list of practicals.

Instructions

1.Practical will be carried out in groups of students.
2.Each group will consist of about five students.
3.Each student from the group shall be given chance to handle the instrument, to understand the function of different components & use of the instrument.
4.Drawing, plotting should be considered as part of practical.

Learning Resources: A.Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
01	Dr. B. C. Punmia,	Surveying, Vol . III	Laxmi Publications, Delhi
02	Dr. K. R. Arora	Surveying, Vol. II	Standard Book house, Delhi.
03	S. K. Duggal	Surveying, Vol. II	The Tata Mc Graw Hill Co., Delhi
04	A. Bannister, S. Raymond & R. Baker	Surveying	Pearson Education, Delhi.
05	Dr. A. M. Chandra	Higher Surveying	New Age International, Delhi.
06	Shelar, Mali, Patil	Advanced Surveying	Nirali Prakashan, Pune.
07	S. Choudhary, D. Chakrabarti, & S. Choudhary	Introduction to Geographic Information Technol ogy	I. K. International, Bangalore
08	D. Chakraborthy & R. Sahoo	Fundamentals of GIS	Viva Books, Delhi
09	W. Gorr & K. Kurland	Learning & Using GIS	Cengage Learning (I), Delhi.
10	George B. Korte	The GIS Book	
11	Lo & Yeung	Concept & Techniques of GIS	Prentice Hall of India, Delhi.
12	P. A. Burrough, R. A. McDonnell	Principles of GIS	Oxford University Press
13	Ian Heywood	An Introduction to GIS	Pearson Education Asia
14	B. Bhatiya	Remote Sensing & GIS	Oxford University Press,
15	Anji Reddy, M.	Textb ook of RS and GIS	BS Publications, Hyderabad.
16	George Joseph	Fundamentals of RS	University Press (I), Hyderabad.
17	Paul J. Curran	Principles of Remote Sensing	Longman Scientific & Technical, Hongkong.
18	T. M. Lillesand, R. W. Kiefer & J. W. Chipman	Remote Sensing and Image Interpretation	John Willey and Sons (Asia) Pvt. Ltd., New Delhi.
19	Ravi P. Gupta	Remote Sensing Geology	Spronger, Newyork.

B .Websites for reference :

1. www.nrsa.gov.in,
2. www.remotesensing.org,
3. www.iirs-nrsa.gov.in,
4. www.gisdevelopment.com,
5. www.surveyofindia.gov.in,
6. www.wikipedia.com

C. Softwares :

1.QGIS – An open source GIS software.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING

Course Name : Real Estate Management **Course code : R14CE 5108**

Course Category : Specialsed **Credits : 3**

Teaching and Examination Scheme :

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
01	-	02	--	--	--	-	50	25	75

Rationale :

Due to continuous urbanization, there is ongoing activity of buying and selling of lands, plots and built up properties. Civil engineering students have technical know how about constructional aspects. By providing some knowledge of legal aspects, procedures and marketing concept, students can venture as self employed .The knowledge of this subject offers good financial returns for clever, hard working person without much of financial investments.

Objectives :

The student should be able to
1.Understand customers (buyers or sellers) needs.
2.Analyse and interpret legal aspects of deals.
3.Negotiate with customers.
4.Carry out all legal procedures for the deals.
5.Advice about alternatives for financing, insurance scheme and other services.

Course Details

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	1.1 Real estate Market in India .Scope of Real estate consultant as a career option. 1.2Virtues required becoming successful in career as consultant.	3	--
2	2.1 Understanding potential customers and their exacts needs, 2.2 Assessing type of customer and developing strategies to win the customer.	3	--
3	3.1 Type of property: Land, plot, bungalow, flat, industrial shed, Legal standing: freehold, leasehold, Cooperative society, apartment, 3.2 Ownership status and factors affecting fair market valuation of property. 3.3 Government Ready Reckoner Guide for Stamp duty & Registration.	2	--
4	4.1 Documents and points to be scrutinized for identifying legal status / ownership of property. 4.2 Procuring loans, legal deals. 4.3 7/12 extract, Property Card, Sales Deed, No Objection Certificates, Income tax clearances etc.	4	--

5	5.1 Alternative modes for getting finances, their pros and cons. 5.2 Evaluating Financing options, Insurance options. 5.3 Effect on tax liabilities.	2	--
6	6.1 Need of networking, Team building. 6.2 Use of computers in real estate. 6.3 Tips for building business through customer satisfaction and service. 6.4 Keeping proper documentation about deals and earnings through business.	2	--

Teaching Methodology : Chalkboard, Group Discussions, MS – Power Point, Transparencies, Experts Lectures, Visits.

Skills to be developed :

i. Intellectual Skills :
Identify Discrimination
Selection Interpretation
Understanding Reading

ii. Motor Skills :
Measurement Drawing
Graphical presentation

Term Work :

1. Collect and analyse the information of 10 potential customers and identify their needs and assess chances of striking deal in near future. Reason out why you think so.
2. Collect and analyse the information of 10 potential in your area and assess their. Fair market value. Reason out why you think so.
3. Study one deal of property transaction in details which has taken place in recent past. Study all documents generated through the process. Write critical comments and observations. Regarding each document.
4. Interview one of your potential customers and assess his capacity to get loan and advice him the best possible solution for him to finance the deal.
5. Collect information about financing agencies, their financing options, and chances of networking with them. Your ranking and suitability of them.
6. Prepare computer programs (using excel/Access/VB/VC++) for database, financial computations.
7. Collect Video information of properties, customers for smart business applications.
8. Presentation on any topic allotted by a teacher.

Learning Resources:

A.Books:

SR. NO.	AUTHOR	TITLE	PUBLISHER
01		Real Estate Observer Magazine	

A.Websites for reference :

www.99acres.com
www.magicbricks.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL ENGINEERING

Course :MS Project Software Course Code : R14CE5109

Course Category : Specialised Credits : 03

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
1	2	--	--	--	--	50	25	75

Rational:

Microsoft Office Project is widely used project management tool for effective project planning and control. Hands on experience and proficiency in using this software will enhance employment potential of the student in civil engineering industy.

Objectives:

The student will be able to
1.Prepare work breakdown structure (WBS)
2.Define relationships and constraints
3.Assign resources , cost elements to project tasks
4.Do resource planning and cost estimation using software
5.Apply filters to avail required information.
6.Analyze resources by levelling the resource using crashing, stretching & splitting
7.Perform earned value analysis

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	1.1**MS Project Overview,** Creating new projects, Global project settings and properties, Navigating the Gantt chart, Choosing views and tables, Adding, editing, configuring and deleting tasks, 1.2 **Advanced task features** Creating and assigning resources, Displaying resource allocations Setting a baseline, Tracking a project, Updating tasks and projects Analyzing projects, Using resource allocation and scheduling tools.	08	--
2	2.1**Customizing views** panes and tables, Using filters and custom fields, Editing tables and views, Creating and editing standard and customized reports. 2.2**Status reports** Creating and editing custom fields ,Adding and configuring resources Managing and editing resource costs, Advanced budgeting and Tracking features, Creating and editing custom forms, Creating and editing custom reports	08	

Teaching Methodology: Chalkboard, Group Discussions, MS. Power Point Presentations, Guest Lectures, Visits.

Term Work:

Skills to be developed:

i) Intellectual Skills :

Identify &define tasks, its hierarchy and relationships.
Select a most adequate view for data input.
Interpret the reports generated
Extract the data from given statements.
To select appropriate report format and presentation tool.

ii) Motor Skills :

To handle the menu bar efficiently
To use short cuts to reduce output time.

List of Practicals

Student should perform following practicals.

1.Prepare a report based on searching for e books , video tutorials and videos concerned with MS Project
2.Create work breakdown structure for a given civil engineering project.
3.Study of MS project GU interface and various views .
4.Study of any existing project data in MS project software.
5.Interpretations of output of project data.
6.Creating MS project data files for civil projects (minimum 3 examples)
7.Assigning Resources ,costs to tasks in above examples
8.Create reports for early and late schedules
9.Level critical resources and prepare schedules for the case.
10.Feed some tracking data for proposed schedules and make Earned value analysis
11.Mini Project for some real data based project demonstrating capabilities of the software.

Professional Practice

1.Study of some MS project work done by the professional person.
2.Interaction with Project manager to discuss various practical aspects of MS project as a tool.

Web site References:

1.http://www.ese.upenn.edu/seniordesign/resources/MS_Project_Tutorial.pdf
2.http://www.slideshare.net/jillmitchell8778/ms-project-lectures

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING

Course : Earthquake Engineering **Course Code : R14AM5110**

Course Category : Specialized **Credits : 3**

Teaching and Examination scheme :

Teaching Scheme		Examination scheme						
TH	PR	PAPER	TH	TEST	PR	OR	TW	TOTAL
1	2	-	-	-	-	50	25	75

Rationale :

When an earthquake occurs seismic waves will generate and it will radiate away from the source and travels rapidly through the earth's crust. When these waves reach on earth's surface, it will produce shaking which will remain for seconds to minutes. The strength and duration of shaking of a particular place depends upon the size and location of the earthquake and the characteristics of the site. All the sites near the source of large earthquake will produce huge damage. In fact, we can consider ground shaking as the most important hazard because all other hazards are occurring due to the ground shaking.

Objectives :

The student will be able to

1. Student should understand behavior of structure during earthquake
2. Devise a method to make the structure integrated and ductile
3. Able to apply the above on field.

Course Details :

UNIT	NAME OF UNIT	HOURS	MARKS
1	Earthquakes & their Effects : Introduction, Causes of earthquake., Characteristics of earthquake, Effects of earthquake on buildings, Seismic zones & coefficient of ground motion & building frequencies.	6	-
2	Determination of Earthquake Forces: Static method, Equivalent static lateral force method as per IS 1893 : Part1,2002.	5	-

3	Earthquake Resistance Provisions: General provision and Rules to be followed for buildings in seismic areas, Various irregularities in buildings, Concept of SMRF & OMRF (Special & Ordinary Moment Resisting Frame) Details for earthquake resistant design as per IS 13920 : 1993.	5	-

Term work:

1.Assignment on characteristics, causes and effects of earthquake.

2.Assignment on calculation of earthquake forces using seismic coefficient and response spectrum method.

3.Assignment on Earthquake Resistance provisions as per IS: 1893 and IS: 13920

Text Books/ References

1. Dynamics of Structures –A.K. Chopra

2. Structural Dynamics - Mario Paz , CBS Publications

3.Earthquake Resistant Structures –D.J. Dowrick John Wiely Publications

4.P.C. Vergesse, “Advanced RCC design”, Prentice Hall Publications

5.N. Subramanyam, “Design of steel structures”, Oxford University Press.

6.IS 13920-1993. Ductile detailing of reinforced concrete structures subjected to seismic forces - **Code** of **Practice**

7.IS:1893:2000. Criteria for Earthquake Resistant Design of Structures, General Provisions and Buildings

8. IS:4326-1993 Earthquake Resistant Design and Construction of Buildings of Reinforced Concrete Structures Subjected to Seismic Forces – **Code** of Practice.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : CIVIL ENGINEERING

Course : RCC Detailing using CAD **Course Code : R14AM5111**

Course Category : Specialized **Credits : 3**

Teaching and Examination scheme :

Teaching Scheme		Examination scheme						
TH	PR	PAPER	TH	TEST	PR	OR	TW	TOTAL
1	2	-	-	-	-	50	25	75

Rationale:

Detailing is as important as design since proper detailing of engineering designs is an essential link in the planning and engineering process as some of the most devasting collapses in history have been caused by defective connections or detailing. Analysis and design of RCC structures can only be materialized on site through detailed working drawing. Safe and sound construction can be achieved by focusing on joint details and connections. Detailing and drafting of various components of concrete adhering to codal provisions is covered.

Objectives :

The students will be able to

1.Draw reinforcement details adhering to norms specified in SP:34

2.Understand critical issues related to connections between different components.

3.Reproduce working drawings adhering to industry standards.

Course Details :

UNIT	NAME OF UNIT	HOURS	MARKS
1	Introduction: 1.1 Requirements of Detailing, Normal Detailing Rules 1.2 Development Length, Anchorage Length, Cover, Spacing	6	-
2	Detailing Of Slab:– 2.1 One Way Slab, Two Way Slab Cantilever Slab 2.2 One Way Continuous Slab, Two Way Continuous Slab,.	5	-
3	Detailing Of Column: 3.1 Column Footing, Square Footing, Trapezoidal Footing, 3.2 Detailing Of Beam- Column Junction	5	-

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ASSIGNMENTS

.Sheet No – 1 Detailing Of Beam - Simply Supported Beam, Continuous Beam

Sheet No – 2 Simply supported slabs : One Way Slab,

Cantilever Slab

Two Way Slab

Sheet No –3 Column Footing, Beam Column Junction

Sheet No - 4 Detailing Of Staircase : Dog Legged Staircase

Sheet No - 5 Detailing Of Retaining Wall

References:

1. Handbook On Concrete Reinforcement And Detailing-SP:34 -1987.
2. Manual Of Standard Practice –Concrete Reinforcing Steel Institute.
3. Design Principles And Detailing Of Concrete Structures. By D.S. Prakash Rao.
4. IS:2502-1963 Code of practice for bending and fixing of bars for concrete reinforcement.
5. IS:456:2000 Plain and Reinforced Concrete – **Code of** Practice