UNIVERSITY OF

RAJSHAHI

FACULTY OF ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING

Syllabus for

B.Sc. in Civil Engineering

Session 2014-2015

December 2014

University of Rajshahi
Faculty of Engineering
Department of Civil Engineering
Syllabus for B.Sc. in Civil Engineering
Session: 2014-2015

The courses designed for B.Sc. in Civil Engineering consist of 4075 marks of 163 credits distributed over eight semesters in four academic years. Each academic year is divided into two semesters (odd & even) each of duration not less than 11 weeks (66 working days). There shall be final examinations at the end of each semester. The medium of answer in all examinations will be either Bangla or English, but not the mixer of both. The theoretical examination of courses less than or equal to 2 credits shall be of 2 hours duration and courses greater than 2 credits shall be of 3 hours duration. An academic schedule for an academic year shall be announced for general notification before the start of the academic year, on the prior approval of the academic committee.

1. Attendance (Ref. The Rajshahi University Academic Ordinance, 2013 for B.Sc. in Engineering Curriculum of the Affiliated Colleges/Institutes, article no: 13): In order to be eligible to appear, as a regular candidate, at the semester final examinations, a student shall be required to have attended at least 70% of the total number of periods of lectures/ tutorials/laboratory classes offered during the semester in every course. A student whose attendance falls short of 70% but not below 60% in any course may be allowed to appear at the final Examinations as **non-collegiate** student and **he/she shall not be eligible for the award of any scholarship or stipend** for the following academic year/semester. A student, appearing the examination under the benefit of this provision shall have to pay in addition to the fees, the requisite fee prescribed by the syndicate for the purpose. Students having less than 60% attendance in lectures/tutorials/laboratory classes of any courses will not be allowed to appear in the final examinations of the semester. The basis of awarding marks for class participation and attendance is shown in Table-1.

Table-1: Distribution of Marks in Attendance

Attendance	Marks%	Remarks
90% and above	100	Regular
85% to less than 90%	90	
80% to less than 85%	80	
75% to less than 80%	70	
70% to less than 75%	60	
65% to less than 70%	50	Non-collegiate
60% to less than 65%	40	
less than 60%	00	

(Ref. The Rajshahi University Academic Ordinance, 2013 for B.Sc. in Engineering Curriculum of the Affiliated Colleges/Institutes, Article no.13), unit=100 marks.

2. The Grading System

The letter grade system shall be used to assess the performance of the students as shown in Table-2 (Ref. The Rajshahi University Academic Ordinance, 2013 for B.Sc. in Engineering Curriculum of the Affiliated Colleges/Institutes, Article no. 14.1):

Table-2: Letter Grade System

Numerical grade	Letter Grade (LG)	Grade point (GP) (G_i)	Credit (C_i)
80% or above	A+	4.00	4.00
75% to less than 80%	A	3.75	4.00
70% to less than 75%	A-	3.50	4.00
65% to less than 70%	B+	3.25	4.00
60% to less than 65%	B	3.00	4.00
55% to less than 60%	B-	2.75	4.00
50% to less than 55%	C+	2.50	4.00
45% to less than 50%	C	2.25	4.00
40% to less than 45%	D	2.00	4.00
less than 40%	F	0.00	4.00
Incomplete	I	0.00	4.00

A letter grade 'I' ((incomplete) shall be awarded for courses in the odd semester which continue through to the even semester.

A **Grade Point Average (GPA)** shall be calculated for each semester as follows:

$$GPA = \frac{\sum\limits_{i=1}^{n} C_i G_i}{\sum\limits_{i=1}^{n} C_i} \qquad (i)$$

Where, n is the number of courses offered during the semester, Ci is the number of credits allotted to the i-th course and Gi is the grade point earned for that course.

Illustration: Suppose a student obtained following grade in Part-1 odd semester:

Code No	Subject	Credit	Letter Grade	GP
PHY 1111	Physics-1	4	C	2.25
CHEM 1113	Chemistry-1	4	A+	4.0
MATH1115	Mathematics-1	4	B-	2.75
TE 1111	Introduction to Textile Engineering	6	B+	3.25
CE 1112	Engineering Drawing	2	A+	4.0

$$\text{Therefore, GPA in the Part-1 odd semester} = \frac{4(2.25)+4(4)+4(2.75)+6(3.25)+2(4)}{4+4+4+6+2} = 2.40$$

And let's assume that his/her GPA in Part-1 even semester is 3.13

A **Yearly Grade Point Average (YGPA)** shall be calculated for each academic year as follows:

$$YGPA = \frac{\sum\limits_{j=1}^{2} C_j G_j}{\sum\limits_{j=1}^{n} C_j} \qquad (ii)$$

$$\text{Therefore, YGPA of Part-1 Examination} = \frac{20(2.40)+20(3.13)}{20+20} = 2.77$$

The **Cumulative Grade Point Average (CGPA)** gives the cumulative performance of students from the first year upto the end of the fourth year to which it refers, and will be calculated as follows:

$$CGPA = \frac{\sum_{k=1}^{m} C_k G_k}{\sum_{k=1}^{m} C_k} \qquad \text{(iii)}$$

where, m is the total number of years being considered, C_k is the total number of credits registered during the k-th year and G_k is the YGPA earned in that particular year.

Similarly assume that, the YGPA of the student for the other 3 Parts are as follows:

Year	Credit	YGPA
Part-II	40	3.47
Part-III	40	2.96
Part-IV	40	3.33

Then his/her CGPA of four academic years is

$$\text{Therefore, } CGPA = \frac{40(2.77) + 40(3.47) + 40(2.96) + 40(3.33)}{40 + 40 + 40 + 40} = 3.13$$

(Both YGPA & CGPA will be rounded upto the second place of decimal for reporting. For instance, YGPA= 2.212 shall be rounded up as YGPA=2.22)

3. Earned Credit

The courses in which a student has obtained minimum 'D' in 'Theoretical courses' and 'C' in 'Laboratory courses & Board Viva-Voice' or higher grade will be counted as credits earned by the student. Any course in which a student has obtained 'F' grade will not be counted towards his/her earned credit. 'F' grade will not be counted for GPA calculation but will stay permanently on the Grade sheet and Transcripts.

4. Marks and Credits distribution for B.Sc. in Civil Engineering

The distribution of marks and credits in various Definitions of Disciplines in the ordinance for B.Sc.. Engineering Degree in the Department of Civil Engineering are given in Table-3 [Ref. The Rajshahi University Academic Ordinance, 2013 for B.Sc. in Engineering Curriculum of the Affiliated Colleges/Institutes, Article no 6.1]

Table-3: Marks and Credits distribution in discipline for B.Sc. in Civil Engineering

Course Type		Marks	Marks (%)	Credits
[a]Humanities		175	4.294	7
[b]Basic Sciences (with Lab)		725	17.79	29
Engineering		3175	77.91	127
Distribution	a. Theoretical	3100	76.07	124
	b. Board Viva-Voce	75	1.84	3
	c. Laboratory	900	22.09	36
Total		**4075**	**100**	**163**

[a]Each department must include course on English.
[b]Each department must include courses on Physics, Chemistry and Mathematics.

5. Courses offered to the undergraduate students of Civil Engineering Department for B.Sc. Engineering Degree (Session 2014-2015)

Part-1 Odd Semester

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
PHY1121	Physics-I	3	3	0	0	3	3
PHY1122	Physics-I Sessional	0	0	1	2	1	2
CHEM 1123	Chemistry-I	3	3	0	0	3	3
CHEM 1124	Chemistry –I Sessional	0	0	1	2	1	2
MATH1125	Differential and Integral Calculus	3	3	0	0	3	3
CE1121	Surveying	4	4	0	0	4	4
CE1124	Civil Engineering Drawing-I	0	0	2	4	2	4
IPE1122	Workshop Practice	0	0	1	2	1	2
HUM1127	English	2	2	0	0	2	2
	Total	15	15	5	10	20	25

No. of Theory Course : 05   Total Contact Hours : 25
No. of Sessional Course : 04   Total Credit Hours : 20.00

Part-1 Even Semester

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
PHY1221	Physics-II	3	3	0	0	3	3
PHY1222	Physics-II Sessional	0	0	1	2	1	2
CHEM1223	Chemistry-II	3	3	0	0	3	3
CHEM1224	Chemistry -II Sessional	0	0	1	2	1	2
MATH1225	Matrices and Geometry	3	3	0	0	3	3
CE1221	Engineering Mechanics	3	3	0	0	3	3
EEE1221	Basic Electrical Engineering	3	3	0	0	3	3
CE1224	Civil Engineering Drawing-II	0	0	2	4	2	4
CE1226	Surveying Field Work	0	0	1	2 Weeks	1	2 weeks
	Total	15	15	5	8 + 2weeks	20	23+ 2 weeks

No. of Theory Course : 05   Total Contact Hours: 23 + 2 weeks
No. of Sessional Course : 04   Total Credit Hours : 20.00

Part-2 Odd Semester

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
CE2121	Engineering Materials	4	4	0	0	4	4
CE2122	Engineering Materials Sessional	0	0	1	2	1	2
CE2123	Fluid Mechanics	4	4	0	0	4	4
CE2124	Fluid Mechanics Sessional	0	0	1	2	1	2
CE2125	Mechanics of Materials	3	3	0	0	3	3
CE2128	Details of Constructions	0	0	2	4	2	4
MATH2125	Differential equation	3	3	0	0	3	3
HUM2123	Sociology and Government	2	2	0	0	2	2
	Total	16	16	4	8	20	24

No. of Theory Course : 05   Total Contact Hours: 24
No. of Sessional Course : 03   Total Credit Hours : 20.00

Part-2 Even Semester

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
CSE2221	Numerical Methods and Computer Programming	3	3	0	0	3	3
CSE2222	Numerical Methods and Computer Programming Sessional	0	0	1	2	1	2
CE2223	Reinforced concrete-I	3	3	0	0	3	3
CE2225	Mechanics of Materials-II	3	3	0	0	3	3
CE2226	Mechanics of Materials-II Sessional	0	0	1	2	1	2
HUM2223	Accounting and Economics	3	3	0	0	3	3
MATH2225	Vector analysis, Laplace transformation and Statistics	4	4	0	0	4	4
CE2228	Details of Estimating	0	0	1	2	1	2
CE2229	Geology and Geomorphology	2	2	0	0	2	2
	Total	18	18	3	6	21	24
CE2200	Board Viva-Voce			1		1	

No. of Theory Course : 06   Total Contact Hours: 24
No. of Sessional Course : 03   Total Credit Hours : 22.00

Part-3 Odd Semester

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
CE3121	Structural Analysis and Design-I	3	3	0	0	3	3
CE3122	Structural Analysis and Design-1 Sessional	0	0	1	2	1	2
CE3123	Reinforced Concrete-II	3	3	0	0	3	3
CE3124	Reinforced Concrete-II Sessional	0	0	1	2	1	2
CE3125	Geotechnical Engineering-I	3	3	0	0	3	3
CE3126	Geotechnical Engineering-I Sessional	0	0	1	2	1	2
CE3127	Environmental Engineering-I	3	3	0	0	3	3
CE3128	Environmental Engineering-I Sessional	0	0	1	2	1	2
CE3129	Hydrology	3	3	0	0	3	3
	Total	15	15	4	10	19	23

No. Of Theory Course: 05　　　　　　　　Total Contact Hours: 23
No. of Sessional Course: 04　　　　　　　Total Credit Hours: 19.00

Part-3 Even Semester

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
CE3221	Structural Analysis and Design-II	3	3	0	0	3	3
CE3223	Transportation Engineering-I	3	3	0	0	3	3
CE3224	Transportation Engineering-I Sessional	0	0	1	2	1	2
CE3225	Geotechnical Engineering-II	3	3	0	0	3	3
CE3226	Geotechnical Engineering-II Sessional	0	0	1	2	1	2
CE3227	Engineering Hydraulics	4	4	0	0	4	4
CE3228	Engineering Hydraulics Sessional	0	0	1	2	1	2
CE3229	Irrigation and Flood Control Engineering	3	3	0	0	3	3
	Total	16	16	3	6	19	22
CE3200	Board Viva-Voce			1		1	

No. of Theory Course: 05　　　　　　　　Total Contact Hours: 22
No. of Sessional Course: 03　　　　　　　Total Credit Hours: 20.00

Part-4 Odd semester

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
CE4121	Structural Analysis and Design-III	3	3	0	0	3	3
CE4122	Structural Analysis and Design-III Sessional	0	0	1	2	1	2
CE4123	Transportation Engineering-II	3	3	0	0	3	3
CE4124	Transportation Engineering-II Sessional	0	0	1	2	1	2
CE4125	Geotechnical Engineering-III	3	3	0	0	3	3
CE4127	Environmental Engineering-II	3	3	0	0	3	3
CE4128	Environmental Engineering-II Sessional	0	0	2	4	2	4
* CE4120	Project and Thesis	0	0	3	6	3	6
	Total	12	12	7	14	19	26
CE4100	Board Viva-Voce			1		1	

No. of Theory Course: 04   Total Contact Hours: 26
No. of Sessional Course: 04   Total Credit Hours: 20.00

Part-4 Even Semester

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
CE4221	Project planning and Construction Management	3	3	0	0	3	3
CE(Opt-1)4221	Pre-stressed Concrete	3	3	0	0	3	3
CE(Opt-1)4223	Theory of Elasticity and Elastic Instability of Structures	2	2	0	0	2	2
CE(Opt-1)4225	Finite Element Method	2	2	0	0	2	2
CE(Opt-1)4227	Design of steel Structures	3	3	0	0	3	3
CE(Opt-2)4220	Structural Analysis and Design-III Sessional	0	0	1	2	1	2
CE(Opt-2)4222	Environmental Engineering-III Sessional	0	0	1	2	1	2
CE(Opt-2)4223	Environmental Pollution Control	2	2	0	0	2	2
CE(Opt-2)4225	Solid water Management	3	3	0	0	3	3
CE(Opt-2)4227	Environmental Development project	3	3	0	0	3	3
CE(Opt-3)4221	Transportation Engineering-III	3	3	0	0	3	3
CE(Opt-3)4222	Transportation Engineering–III Sessional	0	0	1	2	1	2
CE(Opt-3)4223	Transportation Engineering–IV	3	3	0	0	3	3
CE(Opt-3)4225	Transportation Engineering–V	3	3	0	0	3	3

CE4223	Professional practices and Communication skills	2	2	0	0	2	2
CE4225	Socio Economic Aspects of Development project	2	2	0	0	2	2
CE4228	Seminar	0	0	2	4	2	4
CE4220	Project and Thesis	0	0	3	6	3	6
	Total (Opt-1)	17	17	5	10	22	27
	Total (Opt-2)	15	15	7	14	22	29
	Total (Opt-3)	16	16	6	12	22	28

No. of Theory Course: 07(Opt-1), 06(Opt-2), 06(Opt-3)   Total Contact Hours: 28
No. of Sessional Course: 02(Opt-1), 04(Opt-2), 03(Opt-3)   Total Credit Hours: 22.00

6. **Rules for Promotion** (Ref. The Rajshahi University Academic Ordinance, 2013 for B.Sc. in Engineering Curriculum of the Affiliated Colleges/Institutes, Article no. 15):

There shall be final examinations conducted by the Examinations Conducting Committee of the college/institute at the end of each semester. The results shall be finalized at the end of the even semester of the academic year. A student entering in an odd semester shall automatically move on to the next semester, <u>unless she/he was debarred from appearing at the final examinations at the end of the semester.</u> Individual course grades and GPA shall be announced within a date ordinarily not later than three weeks after the end of the semester final examinations.

6.1 **Minimum passing grade:** The minimum passing grade in a theoretical course will be D and the minimum passing grade in a laboratory/project/field work/in-plant training/ workshop/ similar Courses (henceforth referred to as laboratory course) and Viva-voce will be C.

6.2 **Promotion to higher class:** A student who has a grade point average of 2.25 or higher and no F grade in the theoretical courses and not less than C grade in the laboratory courses and viva-voce of the two semesters shall be promoted to the next higher class.

6.3 There shall be no refereed in laboratory courses and viva-voce. A student failing to secure a minimum C grade in any of the laboratory courses and Viva-voce in any semester will not pass in that year.

6.4 **Course Improvement:**

6.4.1 **Referred (with 'F'):** A student who has a grade point average of 1.7 or higher, with 'F' grade in the theoretical courses, not more than 10 credit points in an academic year shall be awarded Referred up to 10 credits in the courses where less than B grade (including F grade) were obtained and he/she may appear at a supplementary examination in those courses only. In such case the student has to give his/her choice of course/courses for supplementary examination in writing.

6.4.2 **Referred (with no 'F'):** A student having grade point average of less than 2.2 and no 'F' grade in theoretical courses may appear at a supplementary examination in not more than 10 credit points in an academic year, only for courses in which less than B grade was obtained. In such case the student has to give his/her choice of course/courses for supplementary examination in writing.

6.4.3 **Promotion of Referred student to higher Class:** In order to be promoted to the next higher class, a student must obtain a grade point average of 2.2 with no less than D grade in any of the courses in which he/she appeared in supplementary examination.

6.4.4 Grades obtained by a student in the courses in which s/he appeared at the supplementary examination will be recorded for assessment and the grade obtained by him/her in those courses at the regular final examination shall automatically be treated cancelled.

6.4.5 Clause 6.4.4 is not valid for a candidate, who cannot improve his/her course grade at the supplementary examination, in that case the previous grade shall remain valid.

6.4.6 **Improvement of YGPA**: A candidate obtaining an YGPA of less than 2.75 at the end of the academic year shall be allowed to sit for supplementary examination up to a maximum of 8 credit points of (courses in where less than 'B' grade was obtained) theoretical courses in the academic year. No improvement shall be allowed for laboratory examination and Board Viva-voce. If a candidate fails to improve YGPA with the block of new GP in total, the previous YGPA shall remain valid.

6.4.7 All **Referred examinations** shall ordinarily be held during the inter-session break. This break may also be utilized for industrial attachment training or survey practical, etc.

6.5 **Course Exemption:** students who fail to be promoted to the next higher class shall be exempted from taking the theoretical and laboratory courses where they obtained grades equal to or better than B. These grades would be counted in calculating GPA in the next year's examination results.

6.6 **Merit Position:** The YGPA obtained by a student in the semester final examinations will be considered for determining the merit position for the award of scholarships, stipends etc.

7. **Publication of Results:**

7.1 A student must successfully complete the courses of all the semesters within a maximum of seven academic years as outlined by the Committee of Courses with all its pre-requisites in order to be eligible for the award of B.Sc. Engineering degree. The student must earn 160 credits (no 'F' grade) and CGPA 2.25 or higher.

7.2 **Merit position:** Merit position of a student for each academic year of each degree) awarding department shall be determined on the basis of his/her YGPA of that particular year. Merit position for the award of the degree of B.Sc. Engineering will be based on CGPA of all the academic years.

7.3 **Honours:** Candidates for Bachelor's degree in engineering will be awarded the degree with Honours if their CGPA is 3.75 or higher.

7.4 **Result Improvement:** A candidate obtaining a CGPA of less than 2.75 at the end of Part-IV even semester examinations, within 4 or 5 academic years shall be allowed to improve his/her result, of upto a maximum 4 units (courses less than B grade) of the Part-IV, maximum 2 units from any one semester of the year, theoretical courses in the immediate next regular examination after publication of his/her result. No improvement shall be allowed for laboratory examinations and Board Viva-voce. If a candidate fails to improve CGPA with the block of new GP in total, the previous result shall remain valid.

7.5 **Dean's List:** As a recognition of excellent performance, the names of students obtaining a cumulative GPA of 3.75 or above in two regular semesters in each academic year may be published in the Dean's List in the faculty. Students who have received an 'F' grade in any course during any of the two regular semesters will not be considered for Dean's List in that year.

7.6 **Industrial and Professional Training Requirements:** Depending on each department's own requirements, a student may have to complete a prescribed number of days of industrial/professional training in addition to minimum credits and other requirements, to the satisfaction of the concerned department.

7.7 **Recording of Results:** The overall results of a successful student covering all semesters' examinations of four years shall be declared on the basis of CGPA with the corresponding Letter Grade (LG). The transcripts in English will show the course designation, course title, credit, grade and grade point of individual courses. YGPA of each year, CGPA and corresponding LG for the overall result.

8. Eligibility for Examination:

8.1   A candidate may not be admitted to any semester final examinations unless he/she has.

      8.1.1 Submitted to the registrar/ Vice-Chancellor an application in the prescribed form for appearing at the examination.

      8.1.2 Paid the prescribed examination fees, and all outstanding college/institute dues.

      8.1.3 Fulfilled the conditions for attendance in class and

      8.1.4 Been barred by any disciplinary rule.

8.2   On special circumstances the Vice- Chancellor may permit a student to appear at the examination.

8.3   A student whose attendance falls short of 70% but not below 60% in any course as mentioned above may be allowed to appear at the final examinations as a non-collegiate student

Details of course outline of each subject for Bachelor of Science in Civil Engineering

Part-1 Odd Semester

PHY1121 Physics-I

Theory: Credit Hours- 3   **Contact Hours/week 3+0**

Physical optics: Theories of light: Huygen's principle and construction. Interference of light: Young's double slit experiment, Fresnel and Fraunhoffer diffraction, diffraction by single slit, diffraction by double slit, diffraction gratings. Polarization of light: production and analysis of polarized light, optical activity, optical activity, optics of crystals.

Heat and Thermodynamics: Temperature, zeroth law of thermodynamics. Thermometers, constant volume, platinum resistance and thermocouple. First law of thermodynamics and its application, I molar specific heats of gases, isothermal and adiabatic relations, work done by a gas. Kinetic theory of gases: explanation of gas laws, kinetic interpretation of temperature, equipartition of energy and calculation of ratio of specific heats, mean free path, Vander Waals equation of state, second law of thermodynamics: reversible and irreversible processes, Camot's cynle, efficiency, Camot's theorem, entropy.

Waves and Oscillations: Oscillations: Simple harmonic motion, damped simple harmonic oscillations, forced oscillations, resonance, vibrations of membranes and columns. Combination and composition of simple harmonic motions, Lissajous' figures. Transverse and longitudinal nature of waves, travelling and standing waves, intensity of waves, energy calculation of progressive and stationary waves, phase velocity, group velocity. Sound waves: velocity of longitudinal wave in a gaseous medium and Doppler effect. Architectural acoustics: Sabine's formula, requirements of a good auditorium.

PHY1122 Physics-I Sessional

Theory: Credit Hours- 1   **Contact Hours/week 0+2**

Sessional based on the theory of course **PHY1121**

CHEM1123 Chemistry-I

Theory: Credit Hours- 3   **Contact Hours/week 3+0**

Atomic structure, Periodic table, chemical bonds, chemistry of cement, silicates and limes. Physical and chemical properties of water. Different types of solutions, concentration units, chemical equitibrium. Reactions kinetics: rate of chemical reactions, order and molecularity of reactions, different types of rate expression, methods of determining rate and order, effect of temperature on reaction rate and energy of activation, Colloid and colloidal solution: classification, preparation, purification, properties, protective action and application of colloids.

CHEM1124 Chemistry-I Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**
Sessional based on the theory of course **CHEM1123**

MATH1125 Differential and Integral Calculus

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**
Differential Calculus: Limit continuity and differentiability, n-th derivatives of standard functions. eibnit'z theorem, Rolle's theorem and Mean value theorem. Expansion in finite and infinite forms, indeterminate form and partial differentiation. Euler's theorem. Tangent and normal. Subtangent and subnormal in partial and polar co ordinates. Maxima and minima of functions of single variables. Curvature.
Integral Calculus: Integration by parts. Standard integral. Integration by the method of successive reduction. Definite integrals, improper integrals. Beta function. Gama functions. Multiple integrals. Area, Volume of solids of revolution.

CE1121 Surveying

Theory: Credit Hours- 4   **Contact Hours/week 4 + 0**
Introduction: linear measurement, chain survey, traverse survey and plane table survey. Leveling and contouring: Calculation of areas and volumes, problems on heights and distances, Curves and curve ranging. Tachometry: Introduction, principles and Problems on tachometry. Astronomical surveying: Definition, instruments, astronomical correction and systems of time. Photogrammetry: introduction to terrestrial photography, reading of photo mosaic and scale. Project surveying: errors in surveying, remote sensing and introduction to global positioning system (GPS)

CE1124 Civil Engineering Drawing-I

Sessional: Credit Hours- 2   **Contact Hours/week 0 +4**

IPE1122 Workshop Practice

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**

HUM1127 English

Theory: Credit Hours- 2   **Contact Hours/week 2 + 0**
English phonetics: the places and manners of articulation of the English sounds. Vocabulary. English grammar Construction of sentences, some grammatical problems. Comprehension. Composition on current affairs. Amplification, precis writing, Phrases and idioms. Commercial correspondence and tenders. Technical report writing, Lessons in spoken English, Drafting notes. - Short stories written by some well- known classic writers

B.Sc. in Civil Engineering
Part-1 Even Semester

PHY1221 Physics-II

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**
Structure Matter: States of matter: Solid, liquid and gas. Classification of solids: amorphous, crystalline, ceramics and polymers. Atomic arrangement in solids. Different types of bonds in solids: Metallic. Vander Waals, covalent and ionic bond, packing in solids, interatomic distances and forces of equilibrium, x-ray diffraction. Bragg's law. plasticity and elasticity. Distinction between metal, insulator and semi conductor.

Electricity and Magnetism: Electric charge, Coulomb's law, the electric field electric flux and Gauss's law, some application of Gauss's law, electric potential V, relation between E and V, electrical potential energy. Capacitors, capacitance, dielectrics: an atomic view. dielectrics and Gauss' law.

Current and resistance: Current and current density, Ohm's law, Ampere's law, Faraday law, Lenz's law, self-inductance and mutual inductance. Magnetic properties of matter: magnetomotive force, magnetic field intensity, permeability, susceptibility, classifications of magnetic materials, magnetization curves.

Modem Physics: Michelson Morley's experiment, Gallilean transformation, special theory of relativity, Lorentz-transformation, relative velocity, length contraction, time dilation, mass energy relation. Photoelectric effect, Compton effect, De-Broglie wave, Bohr's atom model. Nuclear Physics: Radioactive decay, half life, mean life, isotopes, nuclear binding energy, alpha, beta and gamma decay.

PHY1222 Physics-II Sessional
Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**
Sessional based on the theory of course **PHY1221.**

CHEM1223 Chemistry-II
Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**
Chemical corrosion: Introduction to chemical corrosion, corrosion of metals and alloys in dry and wet environments, mechanism of COrroSion, atmospheric and soil corrosion and their protective measures.

Chemistry of Environmental Pollution: Environment and its characteristics, chemistry of toxic metal and non-metal pollutants, analytical techniques used in the determination of pollutants, chemical concept of DO, BOD, COD and threshold odour number, chemistry involved in water treatment plants, quality of industrial waste water.

Polymers: Chemistry of polymerization different types of polymers and their properties. Polymers-degradation, elastomers and composite materials.
Paints and varnishes: Introduction to paints and varnishes, pre treatment of the surface, meta non and organic protective coating, types of paints and their uses.

Principle of spectophotometic analysis: Beer Lambert law and its applications.

Thermo-chemistry: Laws of thermo chemistry and problems based on them, kirchoffs equation, Heat of solution and heat of neutralization.

CHEM1224 Chemistry-II Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**
Sessional based on the theory of course **CHEM1223.**

MATH1225 Matrices and Geometry

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**
Matrices: Definition of matrix, Algebra of matrices. Multiplication of matrices. Transpose of a matrix and inverse of a matrix. Rank and elementary transformation of matrices, Solution of linear equations, linear dependence and independence of vector. Quadratic forms. Matrix polynomials Determination of characteristic roots and vectors. Null space and nullity of a matrix. Characteristic subspace of a matrix.

Two and three-dimensional Co-ordinate Geometry: A pair of straight lines and conic section in two dimensions. System of co-ordinate, Projection. Direction Cosines, Equations of planes and lines. Angle between lines and planes. Distance from a point to a plane. Co-planar lines. Shortest distance between two given straight lines. Standard equation of conicoids, sphere ellipsoid. Hyperboloid of one sheet, hyperboloid of two sheets, Tangent planes, Normal lines, Condition of tangency.

CE1221 Engineering Mechanics

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Introduction to SI Units, coplanar concurrent forces, moments and parallel coplanar forces, non-concurrent non-parallel coplanar forces, centroids, moment of inertia of areas, moment of inertia of masses, Friction, flexible cords, plane motion, force systems that produce rectilinear motion, work, kinetic energy, power, impulse and momentum

EEE1221 Basic Electrical Engineering

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Electrical units and standards. Electrical networks, series, parallel and series-parallel networks. Method of network analysis. Measurement of electrical quantities, resistance, current, voltage, power and energy measurements.

Alternating current: Instantaneous, rms and average values of current and voltage. Real and reactive power. Steady AC circuit analysis, single phase RLC circuit with sinusoidal excitation. Polyphase circuit, Balanced three phase circuit, Familiarization with different types of electrical machines, DC generators and motors, AC generators and motors and transformers.

Introduction to electronic principles and its simple applications. Introduction to electrical wiring.

CE1224 Civil Engineering Drawing-II

Sessional: Credit Hours- 2   **Contact Hours/week 0 +4**

CE1226 Surveying Field Work

Sessional: Credit Hours- 1   **Contact Hours: 2 Weeks**

B.Sc. in Civil Engineering
Part-2 Odd Semester

CE2121 Engineering Materials

Theory: Credit Hours- 4   **Contact Hours/week 4 + 0**

Brick: Constituents of brick clay, characteristics, specifications, classification and uses of bricks, efflorescence.

Aggregate: Classification and properties of aggregate, grading of aggregate, testing of aggregate, classification, properties, tests and function of sand.

Cement: Point of difference between cement and lime, composition of ordinary cement, functions of various ingredients of cement, physical properties of Portland cement, types and tests of cement.

Mortar and plaster: Types of mortar, functions of sand and surki in mortar, uses of mortar, preparation of cement mortar, precautions in using mortars, plastering, pointing, white and color washing and distempering.

Concrete: Function of aggregate and water in concrete, segregation, bleeding, properties of concrete, strength and workability of concrete, factors influence the properties of concrete, creep of concrete, chemical attack of concrete, design of concrete mixes.

Corrosion and its prevention, paints, varnishes, properties and uses of rubber, timber plastics and ferrocement.

Atomic structures and bonding, yielding, fracture, elasticity, plasticity

CE2122 Engineering Materials Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 + 2**
Sessional based on the theory of course **CE2121.**

CE2123 Fluid Mechanics-I

Theory: Credit Hours- 4   **Contact Hours/week 4 + 0**
Development and scope of fluid mechanics fluid properties, Fluid static's Manometers and pressure gages, pressure head, center of pressure, application of hydrostatic forces. Buoyancy and Floatation: Principle of Archimedes's stability of floating body, Metacenter. Kinematics of fluid flow. Fluid flow concept and basic equation continuity equations, Bernoulli's equation, Energy equation, Momentum equation and forces in fluid flow. Similitude and dimensional analysis, Study in compressible flow in pressure conduits, laminar and turbulent flow. Pipe flow: general equation for pipe flow and minor losses in pipe flow. Pipe flow problems: pipe in series and parallels, branching of pipes and pipe networks. Fluid measurements: pitot tube, orifice, mouthpiece, nozzle, venturimeter and Weir.

CE2124 Fluid Mechanics-I Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 + 2**
Sessional based on the theory of course **CE2123.**

CE2125 Mechanics of Materials-I

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**
Fundamental concept of stress and strain. Mechanical properties of materials, strain energy, stresses and strains in members subjected to tension, compression, shear and temperature changes. Bending moment and shear force diagrams of beams and frames, flexural and shearing stresses in beam, shear flow and shear center. Thin walled pressure containers: riveted and welded Joints.

CE2128 Details of Construction

Sessional: Credit Hours- 2   **Contact Hours/week 0 + 4**

MATH2125 Differential Equation

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**
Differential equation: Definition, formation of differential equation and solution of first order ordinary differential equation by various methods. Solution of differential equation of first order and higher degrees. Solution of linear equations of second degree and higher orders with constant co-efficient. Solution of differential equations when the deperident and independent variables are absent. Solution of differential equation in series by the method of Fobenious: Bessel's function, Legendre's polynomials and their properties.

Fourier series and partial differential equation: Fourier series, Periodic functions, odd and even function, evaluation of Fourier co-efficient, Fourier integral, Fourier transforms and their uses to physical problem. Partial differential equation: Solution of first order partial differential equation by Lagrange method arid Charpit method. Definition of harmonics, Laplace equation in Cartesian, polar, cylindrical and spherical co-ordinates.

HUM2123 Sociology and Government

Theory: Credit Hours- 2   **Contact Hours/week 2 + 0**

Sociology: scope, some basic concepts. Social evolution and techniques of production, culture and civilization. Social structure of Bangladesh. Population and world resources. Oriental and occidental societies, industrial revolution. Family urbanization and industrialization, urban ecology, co-operative and socialist movements. Rural sociology.

Government: Some basic concepts of government and politics. Functions, organs and forms of modem state government, socialism, Fascism, Marxism, U.N.O. Government and politics of Bangladesh. Some major administrative systems of developed countries: Local self-government.

B.Sc. in Civil Engineering
Part-2 Even Semester

CSE2221 Numerical Methods and Computer Programming

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Basic components of computer system, C/C++ language, numerical solution of algebraic and transcendental equations, matrices, solution of systems of linear equations, curve-fitting by least squares, finite differences, divided differences, interpolation, computer applications to Civil Engineering problems, numerical differentiation and integration, numerical solution of differential equations.

CSE2222 Numerical Methods and Computer Programming Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 + 2**

Sessional based on the theory of course **CSE2221.**

CE2223 Reinforced Concrete-I

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Fundamental behavior of reinforced concrete members, introduction to WSD and USD methods, analysis and design of singly & doubly reinforced beams. T-beams and one way slab according to WSD and USD methods, diagonal tension, bond and anchorage according to WSD and USD methods, lintels, and staircases.

CE2225 Mechanics of Materials-II

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Torsional stresses in shafts and tubes, helical springs, combined stresses, transformation of stresses. Deflection of beam by direct integration, moment area and conjugate beam methods. Buckling of columns.

CE2226 Mechanics of Materials-II Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**

Sessional based on the theory of course **CE2225.**

HUM2223 Accounting and Economics

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Accounting: Principles of accounting, accounts, transaction, the accounting procedure and financial statements. Cost in general: objectives and classifications. Overhead costing, Cost sheet under job costing operating costing and process costing. Marginal costing: tools and techniques, cost-volume profit analysis. Relevant costing: analyzing the profitability within the firm, guidelines for decision making. Long-run planning and control: capital budgeting.

Economics: Definition of economics, Economics and Engineering, Principles of Economics.

Micro economics: The theory of demand and supply and their elasticity's. Price determination. Nature of an economic theory, applicability of economic theories to the problems of developing countries. Indifference curve technique. Marginal analysis. Optimization. Market. Production, Production function, types of productivity. Rational region of production of an engineering firm. The short run and the long run. Fixed cost and variable cost. Internal and external economics and diseconomies.

Macro-economics: savings, investment National income analysis. Inflation. Monetary policy, fiscal policy and trade policy with reference to Bangladesh. Planning in Bangladesh.

MATH2225 Vector analysis, Laplace transformation and Statistics

Theory: Credit Hours- 4   **Contact Hours/week 4 + 0**

Vector analysis: Fundamental of vector algebra, scalar and vector product of two vectors. Triple and multiple products, vector differentiation, gradient, divergence and curl. Vector integration, divergence, Gauss's, Green's and Stoke's theorem and their application.

Laplace transformation: Definition, Laplace transforms of some elementary function. Inverse Laplace transforms of derivatives. Solution of differential equation by Laplace transforms.

Statistics: Measures of central tendency, measures of dispersion, moments, skewness and kurtosis. Elementary probability theory and discontinuous probability distribution e.g. Binomial, Poisson and normal elementary sampling theory, estimation and confidence limit, hypothesis testing, correlation and regression analysis.

CE2228 Details of Estimating

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**

CE2229 Geology and Geomorphology

Theory: Credit Hours- 2   **Contact Hours/week 2 + 0**

Mineralogy: Identification of minerals, common rock forming minerals, physical properties of minerals.

Mineralolds: Rocks: types of rock, cycle of rock change, sedimentation and metamorphism, earthquake and seismic map of Bangladesh.

Structural Geology: Faults, type of Faults, dome and basin, fold, fold types, Erosion process, quantitative analysis of erosional land forms, land subsidence, land slide.

Geomorphology: Channel development, channel widening, valley shape, stream terraces: channel pattern and river basins, channel morphology, drainage pattern, geology and geomorphology of Bangladesh.

CE2200 Board Viva-Voce

Credit Hours-1

B.Sc. in Civil Engineering
Part-3 Odd Semester

CE3121 Structural Analysis and Design –I

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Stability and determinacy of structures, analysis of statically. determinate arches. Influence lines for statically determinate structure: moving loads on beams, frames and trusses. Cable supported structures and Trusses & Trusses Analysis.

CE3122 Structural Analysis and Design –I Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**

Sessional based on the theory of course **CE3121.**

CE3123 Reinforced Concrete-II

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Two way slabs, columns, isolated and combined footings, retaining walls, reinforced concrete floor and roof systerns, flat slabs and flat plates, review of codes, plastic hinge idea and collapse mechanism, yield line method. Introduction of prestressed concrete.

CE3124 Reinforced Concrete-II Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**

Sessional based on the theory of course **CE3123.**

CE3125 Geotechnical Engineering-I

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Introduction to Geotechnical Engineering, formation, type and identification of soils, soil composition, soil structure and fabric, index properties of soils, Engineering classification of soils, soil compaction, principles of total and effective stresses, permeability and seepage, capillarity and flow net, shear-strength characteristics of soils, compressibility and settlement behavior of soils.

CE3126 Geotechnical Engineering-I Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**

Sessional based on the theory of course **CE3125.**

CE3127 Environmental Engineering-I

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Introduction to environmental Engineering, community and environment, clean water, sanitation and health, introduction to water supply, population and water requirement.

Water supply sources, ground water and surface water, common water supply systems with specific reference to Bangladesh, different types of fond pumps, installation-and O & M of hand pumps, problems of supply, presence of iron and arsenic, hardness, salinity. Alternative technologies for problem areas in Bangladesh: Shallow Shrouded Tube well (SST), Very Shallow shrouded Tube well (VSST), pond sand Filter (PSF), Deep-set technologies.

Water collection and transportation, head works, pumps and pumping machinery, water distribution system, analysis and design of distribution network, fire hydrants, leak detection, unaccounted for water, alternative technologies, solar stills, rain water harvesting.

Water quality and treatment, water quality parameters and standards, water treatment: plain sedimentation, flocculation and settlement, filtration, disinfection, other treatment methods, small scale iron and arsenic removal units, other low-cost treatment methods for rural communities, monitoring and sanitary protection of water supply distribution system. Socio-Economic aspects of WSS, Socio-Economy of rural and urban Bangladesh. Demographic characteristics, power structure, cultural issues (traits), rural leadership, local government structure, influence of socio-Economic aspects on community water supply and sanitation. Concept of community participation. participatory planning. community organization, community mobilization, sustainable development approach, gender issues conceptual frame, women empowerment, gender auditing, gender balance and sensitivity.

CE3128 Environmental Engineering-I Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**

Sessional based on the theory of course **CE3127.**

CE3129 Hydrology

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Introduction: Hydrologic cycle, meteorological aspects of hydrology, precipitation, water losses, interception, evaporation, transpiration and infiltration. Run off: Factors affecting run off, estimation of run off, stream flow, stream flow hydrograph, overland flow, flood routing, statistical methods in hydrology.

B.Sc. in Civil Engineering
Part-3 Even Semester

CE3221 Structural Analysis and Design-II

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Approximate analysis of statically indeterminate structures, deflection of beams, frames and trusses by virtual work method. Two hinged arches. Introduction to moment distribution method.

CE3223 Transportation Engineering-I

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Introduction to transportation engineering, development of transportation system, elements of transportation system, transportation in Bangladesh, transportation planning concepts: collection, study and analysis of basic data. Highway location and surveys. Geometric design of highways: elements of design, cross-section elements, curves and sight distances, road intersections. Traffic engineering: the road/traffic system, vehicle and traffic characteristics, traffic control devices, traffic studies, parking and roadway lighting.

Highway materials: Desirable properties of road aggregate; production, properties and uses of bituminous materials.

Road safety engineering: Accident data system, Road engineering, Traffic legislation, Traffic enforcement, Driver training & testing, Vehicle safety, Education & publicity, Medical services.

CE3224 Transportation Engineering-I Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**
Sessional based on the theory of course **CE3223.**

CE3225 Geotechnical Engineering-II

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Soil investigation techniques, direct measurement of consistency and relative density, correlation of strength parameters with N-Values, lateral earth pressure, stress distribution, settlement computation, types of foundations, bearing capacity of shallow and deep foundation, settlement and distortion of foundations and slope stability analysis.

CE3226 Geotechnical Engineering-II Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**
Sessional based on the theory of course **CE3225.**

CE3227 Engineering Hydraulics

Theory: Credit Hours- 4   **Contact Hours/week 4 + 0**

Open channel flow and its classification, velocity and pressure distributions, energy equation, specific energy and transition problems, critical flow and control, principles of flow measurement and devices, concept of uniform flow, Chezy and Mannings equations, estimation of resistance coefficients and computation of uniform flow, momentum equation, hydraulic jump, stilling basin, dams and related structures. Theory and analysis of gradually varied flow, computation of flow profiles, design of channel. Impact of water jet, Principles of hydraulic machines: pumps.

CE3228 Engineering Hydraulics Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**
Sessional based on the theory of course **CE3227.**

CE3229 Irrigation and Flood Control Engineering

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**
Irrigation:
Importance of irrigation: Source and quality of irrigation water, soil-water relationship, consumptive use, estimation of irrigation water requirements and irrigation scheduling and methods of irrigation. Design of irrigation canal system, irrigation structures and irrigation devices. Water logging, salinity and reclamation. Problems of irrigated land. Irrigation projects and institutional constraints.

Flood Engineering:

Flood and its causes, Methods of flood management, structural and non-structural measures, economic aspects of flood management, flood risk and vulnerability analysis, direct and indirect losses of flood. Flood damage assessment, flood damage in urban and rural areas.

CE3200 Board Viva-Voce

Credit Hours-1

B.Sc. in Civil Engineering
Part-4 Odd Semester

CE4121 Structural Analysis and Design-III

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Analysis of statically indeterminate structures by displacement method, deflection and moment distribution method. Analysis of composite structures. Influence lines for statically indeterminate beams, frames, arches and grids. Stiffness matrix, member stiffness, stiffness, stiffness transformation, assembly of stiffness matrices & solution for beams, frames and plane trusses and flexibility matrix.

CE4122 Structural Analysis and Design-III Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**

Sessional based on the theory of course **CE4121.**

CE4123 Transportation Engineering-II

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Sub-grade, sub-base and base courses, soil stabilization and soil aggregates in road constructions, low-cost roads, mix design methods. Design, construction and maintenance of flexible and rigid road pavements, equipment.

Railways: General requirements, alignment, permanent way, station and yards. signaling, points and crossings, maintenance.

Waterways: Introduction, harbors, ports, docks, coastal structures.

CE4124 Transportation Engineering-II Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**

Sessional based on the theory of course **CE4123.**

CE4125 Geotechnical Engineering-III

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Foundation Engineering: Report and selection of type of foundation, design and construction of mat and pile foundations. Sheet pilling wall, caesons and cofferdam. Introduction to soil improvement techniques.

CE4127 Environmental Engineering-II

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Environmental sanitation, introduction to environmental sanitation, environmental poliution, environmental protection and management. sanitation practices in Bangladesh, different sanitation options-various types of pit latrines. Pour flush latrines etc., -upgrading of existing systems, construction and maintenance of sanitation facilities, sanitation for densely populated area, community latrine cum bio-gas plant, design and construction of septic tank and soak well, building sanitation, code of practice.

Wastewater, estimation of wastewater, wastewater collection system, hydraulics of sewer, design, construction and maintenance of sanitary sewer and storm drainage system, microbiology of wastewater, preparatory, primary and secondary treatment waste stabilization ponds and other methods and disposal of waste water, aquacutture as treatment option, small bore sewer system, treatment and disposal of industrial effluents.

Health and hygiene: Disease description, transmission and control, hygiene education, scope and methodology, social mobilization for hygiene practice, integrated approach for water, sanitation and health education.

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CE4128 Environmental Engineering-II Sessional

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Sessional: Credit Hours- 2   **Contact Hours/week 0 +4**

Sessional based on the theory of course **CE4127.**

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*CE4120 Project and Thesis

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Sessional: Credit Hours- 3   **Contact Hours/week 0 +6**

Experimental and theoretical investigation of various topics in structural Engineering concrete technology, Environmental Engineering, Transportation Engineering, Geotechnical Engineering and water resources engineering. Individual or group study of one or more topics from any of the above fields. The students will be required to submit thesis/project report at the end of the work.
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CE4100 Board Viva-Voce

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Credit Hours-1

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B.Sc. in Civil Engineering
Part-4 Even Semester

CE4221 Project Planning and Construction Management

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Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Principles of Management, principles of construction management, construction contracts and specifications, inspection and quality control, construction safety, construction planning and scheduling, PERT. CPM case studies, resource scheduling, PERT: a cost accounting system, linear programming, decision making and simulation, psychology in administration, materials management, demand forecasting, inventory control, personnel management, stores management, procurement, project planning and evaluation, feasibility reports, cash flow, payback period, internal rate of return, benefit-cost ratio, construction equipment and plants, replacement studies.

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CE(Opt-1)4221 Pre-stressed Concrete

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Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Pre-stressed concrete: materials pre stressing systems, loss of pre stress, analysis of sections for flexure, shear, bond and bearing, beam deflections and cable layout, partial pre stress, design of pre stressed sections for flexure, shear, bond and bearing. Analysis and design of pre stressed beam section.

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CE(Opt-1)4223 Theory of Elasticity and Elastic instability of Structures

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Theory: Credit Hours- 2   **Contact Hours/week 2 + 0**

Introduction to theory of elasticity, plane stress and plane strain condition, two dimensional problems in rectangular and polar coordinates, torsion of circular and non-circular shafts, instability of structures, stability functions.

CE(Opt-1)4225 Finite Element Method

Theory: Credit Hours- 2   **Contact Hours/week 2 + 0**

Introduction to finite element method as applied to Civil Engineering problems. One dimensional stress deformation and time dependent flow problem. Analysis of two dimensional plane stress arid plane strain problems.

CE(Opt-1)4227 Design of Steel Structures

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Behavior of structural steel members and steel frames, code requirements, design of tension and compression members by WSD and USD methods, design of beam. Beam-columns joint design.

CE(Opt-2)4220 Structural Analysis and Design-III Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**

CE(Opt-2)4222 Environmental Engineering-III Sessional

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**

CE(Opt-2)4223 Environmental Pollution Control

Theory: Credit Hours- 2   **Contact Hours/week 2 + 0**

Environment Pollution and its control: Water pollution-source and types of pollutants, waste assimilation capacity of streams, dissolved oxygen modeling, ecological balance of streams, industrial pollution, heavy metal contamination, detergent pollution and eutrophication, ground water pollution, marine pollution control measures-water quality monitoring and management. Air pollution: Sources and type of pollutants, effects of various pollutants on human health, material and plants, air pollution meteorology, global warming and greenhouse effects, air pollution monitoring and control measures, noise pollution and its effects, ozone layer depletion and acid rain.

CE(Opt-2)4225 Solid Water Management

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Sources and types of solid wastes, physical and chemical properties of solid wastes, solid wastes generation, on -site handling, storage and processing, collection of solid wastes, community and municipal collection systems, transfer station and transport, ultimate disposal methods, recycling and resources recovery, soil pollution, industrial solid waste collection and disposal, hazardous waste management.

CE(Opt-2)4227 Environmental development project

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Environment and sustainable development, environmental policies and legislation, environmental implication of sectoral development, environmental quality standards, environmental issues and priorities, environmental impact assessment of development schemes, baseline studies, assessment methodologies, economics of environmental management, special topics.

<h2 style="text-align:center">CE(Opt-3)4221 Transportation Engineering-III</h2>

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

The transportation planning process, traffic management concepts, traffic accident investigations, city road and street networks, grade separation and interchanges pedestrian and bicycle facilities. The urban bypass, environmental aspects of highway traffic and transportation projects, elements of traffic flow.

<h2 style="text-align:center">CE(Opt-3)4222 Transportation Engineering-III Sessional</h2>

Sessional: Credit Hours- 1   **Contact Hours/week 0 +2**

Sessional based on the theory of course **CE(Opt-3)4221.**

<h2 style="text-align:center">CE(Opt-3)4223 Transportation Engineering-IV</h2>

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Highways drainage and drainage structures. Evaluation and strengthening of pavements,imortance advantages and trends in air transportation, planning and design of airports, aircraft characteristics related to airport design, types and elements of airport planning studies, airport configuration, geometric design of the landing area, terminal area, heliports, design of airport pavements, lighting, marking and 'signing, airport drainage.

<h2 style="text-align:center">CE(Opt-3)4225 Transportation Engineering-V</h2>

Theory: Credit Hours- 3   **Contact Hours/week 3 + 0**

Highway needs study, highway planning, economics and financing, evaluation and analysis of transportation projects, management, monitoring, organization and implementation of transportation projects. selected case studies, traffic engineering administration and legislation, urban public transportation and freight movement.

<h2 style="text-align:center">CE4223 Professional Practices and Communication Skills</h2>

Theory: Credit Hours- 2   **Contact Hours/week 2 + 0**

The project cycle, project proposal, contractual provisions, techniques of specification writing, evaluation of bids, project evaluation.

Interpretation of literature, documents etc, communicating, preparation of report, industrial and labour relations, professional ethics in Civil Engineering.

<h2 style="text-align:center">CE4225 Socio- Economic Aspects of Development project</h2>

Theory: Credit Hours- 2   **Contact Hours/week 2 + 0**

Economic and social structure, development and economic growth, socio-economic indicators, population, prosperity and poverty, employment of work force, population displacement, rehabilitation strategy, productivity, land loss, land use and land ownership patterns, fisheries and aqua culture, deforestation and afforestation, communication, commerce, industries and other economic benefits, water supply, sanitation, health and nutrition, inequalities in distribution of benefits and losses, socio-economic survey, case studies.

<h2 style="text-align:center">CE4228 Seminar</h2>

Sessional: Credit Hours- 2   **Contact Hours/week 0 + 4**

<h2 style="text-align:center">CE4220 Project and Thesis</h2>

Sessional: Credit Hours- 3   **Contact Hours/week 0 + 6**