

**CURRICULUM  
DIPLOMA  
Architecture Engineering**

(Three year program-semester system)



Council for Technical Education and Vocational Training

**Curriculum Development Division**

Sanothimi, Bhaktapur

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## **1. Introduction:**

Architecture Engineering is one of the prominent and popular disciplines within engineering. Many people in the developed countries, developing countries and under developed countries have given emphasis for the broader application of Architecture Engineering. This field has been helping the world for the all-round physical infrastructure development and it has been creating wage and self employment opportunities both in public and private sectors. This curriculum is designed with the purpose of producing middle level technical workforce equipped with knowledge and skills related to the field of Architecture Engineering so as to meet the demand of such workforce in the country to contribute in the national economic development of Nepal. The knowledge and skills incorporated in this curriculum will be helpful to deliver the individual needs as well national needs in the field of Architecture Engineering.

## **2. Curriculum title:**

Diploma in Architecture Engineering (DAR)

## **3. Programme objectives:**

This curriculum has following objectives to:

1. Prepare technicians who are capable of undertaking works in architecture engineering field as architecture engineering technicians under rural and urban development planning, design and development of building construction and other civil infrastructures development related departments and sectors;
2. Produce middle level competent technical workforce/human resources that could provide supervisory works of architecture engineering;
3. Prepare technical workforce who will demonstrate positive attitude and respect for the profession and socio-cultural values;
4. Help in meeting the demand of required architecture engineering technicians for the public and private infrastructure design and development of Nepal; and
5. Create self employment opportunities.

## **4. Programme description:**

This course is based on the job required to perform by the **Junior Architect/Draftsperson (Diploma engineers)** at different levels of public and private sectors physical infrastructures development related architecture engineering works in Nepal. Therefore, this curriculum is designed to provide knowledge and skills focusing on architecture Engineering related to the occupation. There are six semesters in total within the period of three years. The first year courses are offered focusing on foundational and core subjects of engineering; the second year courses are focused on basic disciplinary subjects of architecture Engineering. Similarly, the

third year whole courses comprise of the disciplinary subjects related to building design, construction and working drawings. Moreover, the third year insists on the application of learned skills and knowledge through the Quantity surveying, specification and project work.

The foundational subjects like Physics, Chemistry, and Mathematics are offered in diffusion model of curricular programme are applicable in the field of architecture Engineering. It also includes language subjects like Nepali and English applicable for the communication in the same area. The disciplinary subjects of architecture Engineering are offered in this programme are included in all semesters. The curriculum structure and the subject wise content that reflect the details of this curriculum. In brief, this curriculum will guide to its implementers to produce competent and highly employable middle level technical workforces in the field of architecture engineering.

The contents of individual subjects prescribed in the curriculum are incorporated in the light of "must know and must do" principle of knowledge and skills for this level.

#### **5. Duration:**

The total duration of this curricular program is three years. Each year consists of two semesters of six months each. Moreover, one semester consist of 19.5 academic weeks including evaluation period. Actual teaching learning hours will be not less than 15 weeks in each semester.

#### **6. Target group:**

The target group for this programme will be all interested individuals who passed School Leaving Certificate (SLC) with English, Science, and Mathematics or equivalent and related Technical School Leaving Certificate (TSLC).

#### **7. Group size:**

The group size will be maximum of 48 (Forty eight) in a batch.

#### **8. Target location:**

The target location will be all over Nepal.

#### **9. Entry qualification:**

Entry qualification of the applicant for diploma in civil engineering programme should be SLC pass or equivalent or Technical SLC (TSLC) in related subject. S/he should have English, Science, and Compulsory Mathematics in SLC or as per provisions mentioned on CTEVT admission guidelines.

#### **10. Entry criteria:**

- Should submit SLC or equivalent certificate

- Should pass entrance examination as administered by CTEVT

#### **11. Selection:**

Applicants fulfilling the entry criteria will be selected for admission on the basis of merit.

#### **12. Medium of instruction:**

The medium of instruction will be in English and/or Nepali.

#### **13. Pattern of attendance:**

Minimum of 90% attendance in each subject is required to appear in the respective final examination.

#### **14. Teacher and student ratio:**

- For theory: As per the nature of the course
- For practical/demonstration: 1:10
- For bench work: 1:8

#### **15. Teachers and demonstrators:**

- The disciplinary subjects' related teachers should be a bachelor's degree holder in the related area with three years experience in the related field.
- The demonstrators should be bachelor's degree holder in the related area with two years experiences in training activities.
- The foundational subjects' related teachers (refer to course code SH and MG) should be master's degree holder in the related area.

#### **16. Instructional media and materials:**

The following instructional media and materials are suggested for the effective instruction and demonstration.

- **Printed Media Materials** (Assignment sheets, Case studies, Handouts, Information sheets, Individual training packages, Procedure sheets, Performance Check lists, Textbooks etc.).
- **Non-projected Media Materials** (Display, Models, Flip chart, Poster, Writing board etc.).
- **Projected Media Materials** (Opaque projections, Overhead transparencies, Slides etc.).
- **Audio-Visual Materials** (Audiotapes, Films, Slide-tape programs, Videodiscs, Videotapes etc.).
- **Computer-Based Instructional Materials** (Computer-based training, Interactive video etc.).

#### **17. Teaching learning methodologies:**

The methods of teachings for this curricular program will be a combination of several approaches. Such as Illustrated Lecture, Tutorial, Group Discussion, Demonstration, Simulation, Guided practice, Practical experiences, Fieldwork, Report writing, Term paper presentation, Case analysis, Tutoring, Role-playing, Heuristic, Project work and Other Independent learning.

- Theory: Lecture, Discussion, Seminar, Interaction, Assignment, Group work.
- Practical: Demonstration, Observation, Guided practice, Self-practice, Project work, Industries practice

### **18. Mode of education:**

There will be inductive and deductive mode of education

### **19. Examination and marking scheme:**

- The subject teacher will internally assess the students' achievement in each subject during the course followed by a final examination at the end of each semester.
- A weightage of 20% for the internal assessment and 80% for the semester wise final examination will be allocated for theoretical components of a subject.
- The final semester examinations of all theory components will be administered through written tests.
- Generally the method of continuous assessment will be adopted for practical components.
- In some cases semester final examinations are also conducted for practical components as per needs.
- Student who fails in the internal assessment will not be allowed to sit in the semester final examination and will also be not allowed continuing the following semester.

### **20. Provision of back paper:**

There will be the provision of back paper but a student must pass all the subjects of all six semesters within six years from the enrolment.

### **21. Disciplinary and ethical requirements:**

- Intoxication, insubordination or rudeness to peers will result in immediate suspension followed by review by the disciplinary review committee of the institute.
- Dishonesty in academic or practice activities will result in immediate suspension followed by administrative review, with possible expulsion.
- Illicit drug use, bearing arms at institute, threats or assaults to peers, faculty or staff will result in immediate suspension, followed by administrative review with possible expulsion.

### **22. Pass marks:**

The students must secure minimum of 40% marks both in theory and practical (Lab). Moreover, the students must secure minimum of 40% marks in the internal assessment and 40% in the final semester examination of each subject to pass all subjects offered in each semester.

### **23. Grading system:**

The overall achievement of each student will be measured by a final aggregate percentage of all final semester examinations and graded as follow: -

#### **Marks division:**

- Distinction : > or =80 %
- First division : 65 % to < 80 %
- Second division : 50 % to 65 %
- Pass : 40 % to < 50 %

### **24. Certification and degree awards:**

- Students who have passed all the components of all subjects of all six semesters are considered to have successfully completed the course.
- Students who have successfully completed the course will be awarded with a degree of

#### **Diploma in Architecture Engineering.**

### **25. Career path:**

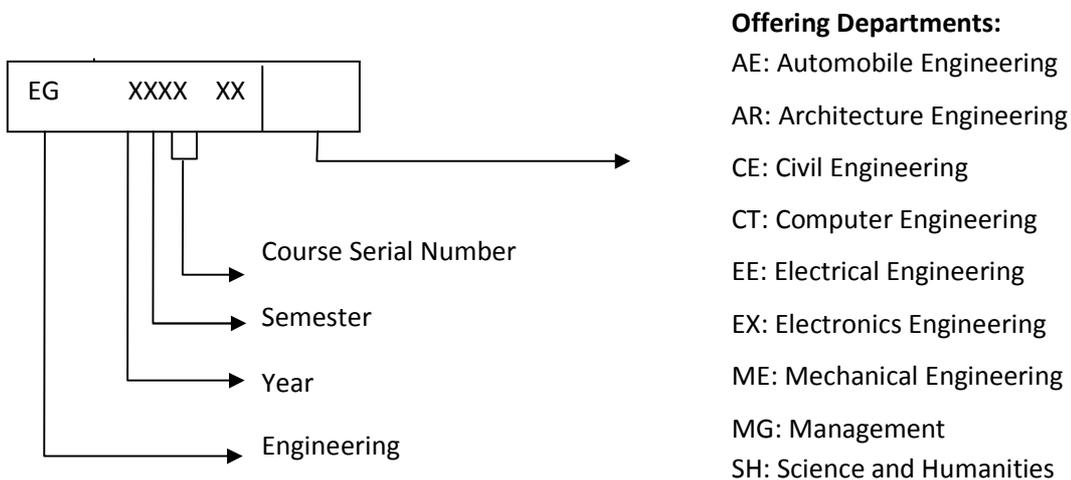
The graduates will be eligible for the position equivalent to Non-gazetted 1st class (technical) as **Junior Architect/Draftsperson (Diploma engineers)** or as prescribed by the Public Service Commission of Nepal. The graduate will be eligible for registration with the related Council in the grade as provisioned in the related Council Act (if any).

### **26. Curriculum and credits:**

In this curriculum each subject has its code; full marks; and credit hours divided into lecture hours, tutorial hours, and practical hours.

## 27. Subjects codes

Each subject is coded with a unique number preceded and followed by certain letters as mentioned in following chart:



## 28. Provision of specialization:

There will be no provision of specializing subjects are offered here with provision of the core or disciplinary subjects.

## Curriculum Structure of Diploma in Architecture Engineering

YEAR: I

SEMESTER - I

S.N.	Code No.	Subjects	Mode				Total Hours	DISTRIBUTION OF MARKS						Total Marks	Remarks
			L	T	P	Lab		Theory			Practical				
								Assmt. Marks	Final Marks	Time Hours	Assmt. Marks*	Final Marks	Time Hours		
1.	EG 1101 SH	Communication Nepali	2				2	10	40	1.5				50	*Continuous assessment
2.	EG 1102 SH	Communication English	2				2	10	40	1.5				50	
3.	EG 1103 SH	Engineering Mathematics I	4	1			5	20	80	3				100	
4.	EG 1104 SH	Engineering Physics I	3	1		2	6	20	60	3	10	10	1.5	100	
5.	EG 1105 SH	Engineering Chemistry I	3	1		2	6	20	60	3	10	10	1.5	100	
6.	EG 1101 AR	Engineering Drawing I	1		4		5				60	40	4	100	
7.	EG 1102 CE	Workshop Practice I (Brick laying)	1		4		5				60	40	4	100	
8.	EG 1102 AR	Tracing and Visualization I			4		4				60	40	4	100	
9.	EG 1103 AR	Measured Drawing & Drafting I			4		4				60	40	4	100	
<b>TOTAL</b>			<b>16</b>	<b>3</b>	<b>16</b>	<b>4</b>	<b>39</b>	<b>80</b>	<b>280</b>		<b>260</b>	<b>180</b>		<b>800</b>	

YEAR: I

SEMESTER II

S.N.	Code No.	Subjects	Mode				Total Hours	DISTRIBUTION OF MARKS						Total Marks	Remarks
			L	T	P	Lab		Theory			Practical				
								Assmt. Marks	Final Marks	Time Hours	Assmt. Marks*	Final Marks	Time Hours		
1.	EG 1201 SH	Engineering Mathematics II	3	1			4	20	80	3				100	*Continuous assessment
2.	EG 1202 SH	Engineering Physics II	3	1		2	6	20	60	3	10	10	1.5	100	
3.	EG 1203 SH	Engineering Chemistry II	3	1		2	6	20	60	3	10	10	1.5	100	
4.	EG 1203 CE	Workshop Practice II (Wood work)	1		4		5				90	60	6	150	
5.	EG 1201 AR	Engineering Drawing II			4		4				60	40	4	100	
6.	EG 1204 CE	Building Materials	4				4	20	80	3				100	
7.	EG 1211 CT	Computer Application	2		2		4	10	40	1.5	30	20	3	100	
8.	EG 1202 AR	Measured Drawing & Drafting II			3		3				60	40	4	100	
9.	EG 1203 AR	Freehand Drawing & Composition I			4		4				60	40	4	100	
<b>TOTAL</b>			<b>16</b>	<b>3</b>	<b>17</b>	<b>4</b>	<b>40</b>	<b>90</b>	<b>320</b>		<b>320</b>	<b>220</b>		<b>950</b>	

## Curriculum Structure of Diploma in Architecture Engineering

YEAR: II

SEMESTER - I

S.N.	Code No.	Subjects	Mode				Total Hours	DISTRIBUTION OF MARKS						Total Marks	Remarks
			L	T	P	Lab		Theory			Practical				
								Assmt. Marks	Final Marks	Time Hours	Assmt. Marks*	Final Marks	Time Hours		
1	EG 2101 AR	Computer Aided Drafting (CAD) I	1		4		5				60	40	4	100	*Continuous assessment
2	EG 2104 SH	Engineering Mathematics III	3	1			4	20	80	3				100	
3	EG 210 2 AR	Surveying I	2		4		6	10	40	1.5	60	40	4	150	
4	EG 2103 AR	Freehand Drawing & Composition II			3		3				60	40	4	100	
5	EG 2104 AR	Perspective	1		4		5				60	40	4	100	
6	EG 2105 AR	Architectural Model Making I			4		4				60	40	4	100	
7	EG 2108 CE	Building Materials II	4				4	20	80	3				100	
8	EG 2109 CE	Building Construction I	2		2		4	10	40	1.5	30	20	3	100	
9	EG 2106 AR	Building Services I	2		2		4	10	40	1.5	30	20	3	100	
<b>TOTAL</b>			<b>15</b>	<b>1</b>	<b>22</b>		<b>39</b>	<b>70</b>	<b>280</b>		<b>360</b>	<b>240</b>		<b>950</b>	

YEAR: II

SEMESTER II

S.N.	Code No.	Subjects	Mode				Total Hours	DISTRIBUTION OF MARKS						Total Marks	Remarks
			L	T	P	Lab		Theory			Practical				
								Assmt. Marks	Final Marks	Time Hours	Assmt. Marks*	Final Marks	Time Hours		
1	EG 2201 AR	Computer Aided Drafting (CAD) II	1		4		5				60	40	4	100	*Continuous assessment
2	EG 2202 AR	Surveying II	2		4		6	10	40	1.5	60	40	4	150	
3	EG 2203 AR	Graphics & Presentation I	1		3		4				60	40	4	100	
4	EG 2206 SH	Social Studies	2				2	10	40	1.5				50	
5	EG 2204 AR	Architectural Model Making II			5		5				60	40	4	100	
6	EG 2207 CE	Building Construction II	2		3		5	10	40	1.5	30	20	3	100	
7	EG 2205 AR	Building Services II	2		2		4	10	40	1.5	30	20	3	100	
8	EG 2206 AR	Working Drawing I	1		4		5				60	40	4	100	
9	EG 2207AR	Building Design I	1		3		4				60	40	4	100	
<b>TOTAL</b>			<b>12</b>		<b>28</b>		<b>40</b>	<b>40</b>	<b>160</b>		<b>420</b>	<b>280</b>		<b>900</b>	

## Curriculum Structure of Diploma in Architecture Engineering

YEAR: III

SEMESTER - I

S.N.	Code No.	Subjects	Mode				Total Hours	DISTRIBUTION OF MARKS						Total Marks	Remarks
			L	T	P	Lab		Theory			Practical				
								Assmt. Marks	Final Marks	Time Hours	Assmt. Marks*	Final Marks	Time Hours		
1	EG 3101 SH	Technical Communication	2	1			3	10	40	1.5				50	*Continuous assessment
2	EG 3102 SH	Society and Culture	2				2	10	40	1.5				50	
3	EG 3108 CE	Workshop Practice III (Plumbing)	1		3		4				60	40	4	100	
4	EG 3101 AR	Site Supervision	4				4	20	80	3				100	
5	EG 3109 CE	Elementary Structures I	2		2		4	10	40	1.5	30	20	3	100	
6	EG 3110 CE	Building Construction III	2		4		6	10	40	1.5	60	40	4	150	
7	EG 3102 AR	Building Design II	1		4		5				60	40	4	100	
8	EG 3103 AR	Working Drawing II	1		5		6				90	60	6	150	
9	EG 3104 AR	Graphics & Presentation II	1		3		4				60	40	4	100	
10	EG 3111 CE	Quantity Surveying I	2				2	10	40	1.5				50	
<b>TOTAL</b>			<b>18</b>	<b>1</b>	<b>21</b>		<b>40</b>	<b>70</b>	<b>280</b>		<b>360</b>	<b>240</b>		<b>950</b>	

YEAR: III

SEMESTER II

S.N.	Code No.	Subjects	Mode				Total Hours	DISTRIBUTION OF MARKS						Total Marks	Remarks
			L	T	P	Lab		Theory			Practical				
								Assmt. Marks	Final Marks	Time Hours	Assmt. Marks*	Final Marks	Time Hours		
1	EG 3219 EE	Workshop Practice IV (Electrical)	1		3		4				60	40	4	100	*Continuous assessment
2	EG 3201 AR	Construction Management	4				4	20	80	3				100	
3	EG 3208 CE	Elementary Structures II	2		2		4	10	40	1.5	30	20	3	100	
4	EG 3202 AR	Computer Aided Drafting (CAD) III	1		3		4				60	40	4	100	
5	EG 3203 AR	Professional Management, Laws & Valuation	2				2	10	40	1.5				50	
6	EG 3209 CE	Building Construction IV	2		2		4	10	40	1.5	30	20	3	100	
7	EG 3204 AR	Working Drawing III			6		6				90	60	6	150	
8	EG 3201 MG	Entrepreneurship Development	3		2		5	20	60	3	10	10	1.5	100	
9	EG 3210 CE	Quantity Surveying II	1		2		3				30	20	3	50	
10	EG 3205 AR	Project Work			4		4				60	40	4	100	
<b>TOTAL</b>			<b>16</b>		<b>24</b>		<b>40</b>	<b>70</b>	<b>260</b>		<b>370</b>	<b>250</b>		<b>950</b>	

**First Year**  
(First and Second Semester)

# First Semester

## **Subjects:**

- 1 EG 1101 SH Communication Nepali
- 2 EG 1102 SH Communication English
- 3 EG 1103 SH Engineering Mathematics I
- 4 EG 1104 SH Engineering Physics I
- 5 EG 1105 SH Engineering Chemistry I
- 6 EG 1101 AR Engineering Drawing I
- 7 EG 1102 CE Workshop Practice I (Brick Laying)
- 8 EG 1102 AR Tracing and Visualization I
- 9 EG 1103 AR Measured Drawing & Drafting I

कम्युनिकेसन नेपाली  
ई.जी. ११०१ एस.एच.

वर्ष : प्रथम  
सेमेष्टर : प्रथम

जम्मा : २ घण्टा/ हप्ता  
प्रवचन : २ घण्टा/ हप्ता:  
विशेष : घण्टा/ हप्ता:  
प्रयोगात्मक : घण्टा/ हप्ता:  
प्रयोगशाला : घण्टा/ हप्ता:

**कोर्षको परिचय**

यस विषयमा विद्यार्थीहरूले भावी व्यवसायमा प्रभावकारी ढङ्गले सञ्चार गर्नका लागि आवश्यक पर्ने ज्ञान र सीपसँग सम्बन्धित नेपाली सञ्चारात्मक भाषा, लेखन सीप, र कृति परिचयको ढाँचा गरी जम्मा ३ वटा एकाईहरू सभावेश गरिएका छन् ।

**कोर्षको उद्देश्य :**

यस पाठ्यांशको अध्ययनबाट विद्यार्थीहरूले निम्नलिखित भाषिक क्षमता विकास गर्न सक्नेछन्:-

- १ आफ्नो व्यावसायिक कार्य क्षेत्रमा प्रभावकारी सञ्चार गर्न
- २ आफ्नो व्यवसायसँग सम्बन्धित विविध लेखन सीप प्रदर्शन गर्न
- ३ कार्य सम्पादनमा आवश्यक परिस्थितिजन्य संवाद गर्न ।

**पाठ्यांशको विषयवस्तु**

**एकाइ: १ संचारात्मक नेपाली भाषा**

**[७ घण्टा]**

**१.१ भाषिक भेदको परिचय**

- मौखिक र लिखित
- औपचारिक र अनौपचारिक
- अमानक र मानक
- सामान्य र प्रयोजनपरक (विशिष्ट) भेदको सोदाहरण परिचय

**१.२ दैनिक कार्यमा प्रयोग हुने भाषाको ज्ञान र प्रयोग**

- अनुरोध तथा आदेश/निर्देशन गर्ने भाषाको ज्ञान र प्रयोग
- सोझै गरिने कामहरूमा प्रयोग हुने भाषाको ज्ञान र प्रयोग
- प्रश्नात्मक र वर्णनात्मक भाषाको ज्ञान र प्रयोग

**एकाइ २ लेखन सीप**

**[१८घण्टा]**

**२.१ बोध, बुँदाटिपोट, सङ्क्षेपीकरण र शब्दभण्डारको ज्ञान र अभ्यास**

- अनुच्छेद लेखन
- संवाद लेखन
- बुँदा लेखन
- सारांश लेखन
- पत्र लेखन (निमन्त्रणा पत्र, सूचना, सम्पादकलाई चिठी र निवेदन आदि)
- निबन्ध लेखन
- प्राविधिक तथा पारिभाषिक शब्दहरूको ज्ञान र प्रयोग

- २.२ शब्द निर्माणको अभ्यास
- उपसर्ग
  - प्रत्यय, (कृत् तथा तद्धित)
  - समास
- २.३ प्राविधिक/पारिभाषिक शब्दहरूको शब्दस्रोत,
- वर्णविन्यास (प्राविधिक शब्दका सन्दर्भमा आवश्यक मात्र)
  - अर्थ र व्युत्पत्तिका लागि शब्दकोशको प्रयोगको अभ्यास
- २.४ प्रतिवेदन लेखन

एकाइ ३

कृति परिचय

[१५घण्टा]

निम्न लिखित ढाँचामा तलका कृतिको परिचय लेख्ने अभ्यास

- ३.१ कृतिहरू:
- सौर्य उर्जा
  - ट्रेड कोर्ष (कालिगढ तालिम) : एक परिचय : इ.अ.सं. पश्चिमाञ्चल क्याम्पस पोखरा ।
  - भूकम्पबाट सुरक्षित रहन गर्ने पूर्व तयारी : भूकम्प प्रविधि राष्ट्रिय समाज नेपाल ।
  - इन्जिनियरिङ नेपाली: लालानाथ सुवेदी ।
  - सिंचाई प्रविधि ज्ञान : भोजराज रेग्मी, त्रि. वि. पाठ्यक्रम विकास केन्द्र
- ३.२ कृति परिचयको ढाँचा
- कृतिको नाम:
  - कृतिकारको नाम:
  - कृतिका मुख्य विषय: (एक अनुच्छेद)
  - कृतिको महत्व: (एक अनुच्छेद )
  - कृतिले आफूलाई पारेको प्रभाव : (छोटो एक अनुच्छेद)
  - कृतिको भाषा शैली: (छोटो एक अनुच्छेद )
  - कृतिको कमी, कमजोरी र सुझाव: (छोटो एक अनुच्छेद)

सिकाई सामग्रीहरू

- त्रि. वि. पाठ्यक्रम विकास केन्द्र, अनिवार्य नेपाली शिक्षण निर्देशन, काठमाण्डौं
- लालानाथ सुवेदी, इन्जिनियरिङ नेपाली विद्यार्थी पुस्तक भण्डार, भोटाहिटी, काठमाण्डौं ।
- लालानाथ सुवेदी, नेपाली व्याकरण, बोध/रचना (सम्बन्धित अंश मात्र) विद्यार्थी पुस्तक भण्डार, भोटाहिटी, काठमाण्डौं ।
- गोरखापत्र, कान्तिपुर आदि पत्रिका सम्पादकीय, टिप्पणी र लेखहरू ।
- प्रशिक्षकहरूले आफ्नो पुस्तक तयार गर्न वा बजारमा पाइने सामग्री छानेर पढाउन सक्ने, तर परीक्षा नियन्त्रण कार्यालयलाई यसको पूर्व जानकारी दिनुपर्ने ।

# Communication English

## EG 1102 SH

Year: I  
Semester: I

Total: 2 hour /week  
Lecture: 2 hours/week  
Tutorial: hours/week  
Practical: hours/week  
Lab: hours/week

### *Course description*

This subject consists of four units related to communicative English; writing skills in English; English sounds and structures; and English conversation practices so as to equip the students with the skills and knowledge of communication in English language in order to have an effective and efficient job performance through occupational communication in the workplace.

### *Course objectives*

After the completion of this subject, students will be able to:

1. Communicate in English language at work/job environment
2. Define and use trade related technical terminologies
3. Demonstrate various writing skills related to the job
4. Demonstrate situational/structural conversation essential for job performance

### *Course Contents*

<b>Unit 1. Communicative English:</b>	<b>[3 Hours]</b>
1.1. The structure of English: <ul style="list-style-type: none"><li>▪ Introduction</li><li>▪ Grammatical units:<ul style="list-style-type: none"><li>• The word</li><li>• The phrase</li><li>• The clause</li><li>• The sentence</li></ul></li><li>▪ The grammatical structures:<ul style="list-style-type: none"><li>• The structure of the phrase</li><li>• The structure of the clause</li><li>• The structure of sentence (functions)</li><li>• The structure of sentence (realizations)</li></ul></li></ul>	
1.2. Everyday functions.	
1.3. Requests and offers.	
1.4. Direct functions.	
1.5. Asking about / expressing.	
1.6. Asking about / stating.	
1.7. Functions of English.	
1.8. Using dictionary	
1.9. Reading comprehension	
1.10. Collection and definitions of trade related terminologies	

- Unit 2. Writing skills in English:** [15 Hours]
- 2.1 Writing paragraphs
  - 2.2 Writing dialogues
  - 2.3 Writing Précis
  - 2.4 Writing summaries
  - 2.5 Writing letters:
    - Applications
    - Official letters
    - Business letters
    - Invitation letters
  - 2.6 Writing essays
  - 2.7 Writing reports:
    - General reports
    - Technical reports
    - Needs assessment reports
    - Review reports
  - 2.8 Writing resumes
  - 2.9 Writing bibliographies
  - 2.10 Writing minutes
  - 2.11 Writing notes
  - 2.12 Writing proposals:
    - Technical proposals
    - Academic proposals
  - 2.13 Writing for action
  - 2.14 Writing for job
  - 2.15 Writing technical articles:
  - 2.16 Using technical journals/articles
  - 2.17 Writing instructions
  - 2.18 Introduction to writing technical manuals
  - 2.19 Writing memos

- Unit 3. English sounds and structures:** [4 Hours]
- 3.1 Definitions of phonology, sounds of English, morphology, lexicology, syntax, and semantics
  - 3.2 Sounds of English:
    - The vowels
    - The consonants
    - Consonant clusters
    - Vowel sequences
    - Syllable structure
    - Stress
    - Intonation

**Unit 4. English conversation practices and guidance:**

**[8 Hours]**

- 4.1. Situational conversation
- 4.2. Structural conversation
- 4.3. Familiarization with English spoken skills for employment during the stage of visa application to workstation in abroad.
- 4.4. Guidance for:
  - TOEFL preparation
  - IELTS preparation
  - Group discussion and presentation
  - Seminar conduction

**Learning materials:**

1. Poudel, R.C., A Manual to Communicative English, K.P.Pustak Bhandar, Kathmandu, 1956/57.
2. Shah ,B.L.,Atext book of writing skills in English, First edition Hira Books Enterprises, Kathmandu,
3. Fruehling, R. T. and Oldham N. B., Write to the point, McGraw- Hill, Inc. New York NY 10020
4. Tayior, G., English conversation practice, 1975.
5. Maharjan L. B..A textbook of English sounds and Structures, Vidyarthi Pustak Bhandar, Kathmandu, 2000.
6. Todd, LAN introduction to Linguistics, Longman York press, 1991.
7. References to be selected by the related lecturer(s) from among the texts available in the market that meet the content needs of this subject.
8. The related institute may develop its own textbook and approve from the related authority so as to have a prescribed textbook of this subject.

# Engineering Mathematics I

## EG 1103 SH

Year: I  
Semester: I

Total: 5 hour /week  
Lecture: 4 hours/week  
Tutorial: 1 hours/week  
Practical: hours/week  
Lab: hours/week

### *Course description*

This subject consists of four units related to trigonometry; coordinate geometry; algebra; and calculus necessary to develop mathematical background helpful for the understanding and practicing the related engineering works.

### *Course objectives*

After the completion of this course, students will be able to explain the concepts of the followings and apply them in the field of related engineering area

1. Trigonometric ratios and equations, inverse circular functions and properties of triangles
2. Straight lines, angle between lines, circle and parabola
3. The progressions, permutations and combinations, binomial theorem, exponential and logarithmic series as well as the quadratic and polygonal equations
4. Sets, limit and continuity, derivatives, integration and integrals.

### *Course Contents*

Unit 1.	<b>Trigonometry:</b>	<b>[16 Hours]</b>
1.1.	Review of trigonometric ratios: <ul style="list-style-type: none"><li>▪ Basic trigonometric formulae</li><li>▪ Identities and conditional identities.</li></ul>	
1.2.	Trigonometric equations: <ul style="list-style-type: none"><li>▪ Periodicity of trigonometric functions</li><li>▪ General solutions of the following equations:<ul style="list-style-type: none"><li>• <math>\sin x = k</math> , <math>\cos x = k</math> and <math>\tan x = k</math> and using trigonometric equations.</li></ul></li></ul>	
1.3.	Inverse circular functions: <ul style="list-style-type: none"><li>▪ Domain and their graphs</li><li>▪ Formulae involving inverse circular functions</li><li>▪ Simple identities and equations involving circular functions</li></ul>	
1.4.	Properties of triangles: <ul style="list-style-type: none"><li>▪ The sin law</li><li>▪ The cosine law</li><li>▪ The projection law</li><li>▪ The half angle formulae</li><li>▪ The area of a triangle</li><li>▪ The encircles and ex-circles of a triangle</li></ul>	

Unit 2.	<b>Coordinate Geometry:</b>	<b>[16 Hours]</b>
2.1	Straight lines: <ul style="list-style-type: none"> <li>▪ The three standard forms of equations of a line.</li> <li>▪ The linear equation: <math>ax + by + c = 0</math>.</li> <li>▪ Any line through the intersection of two lines.</li> <li>▪ Concurrency of lines.</li> </ul>	
2.2	Angle between two lines: <ul style="list-style-type: none"> <li>▪ Bisectors of angles between two lines</li> <li>▪ Pair of lines</li> <li>▪ Homogeneous equation of second degree</li> <li>▪ General equation of second degree representing two lines</li> <li>▪ Angle between a pair of lines</li> <li>▪ Bisectors of the angles for a line pair</li> <li>▪ Lines joining the origin to the points of intersection of a curve and a line</li> </ul>	
2.3.	Circle: <ul style="list-style-type: none"> <li>▪ Standard equation</li> <li>▪ General form</li> <li>▪ Tangents and normal</li> </ul>	
2.4.	Parabola: <ul style="list-style-type: none"> <li>▪ Standard equation</li> <li>▪ Tangents and normal</li> </ul>	
Unit 3.	<b>Algebra:</b>	<b>[8 Hours]</b>
3.1.	Progressions: <ul style="list-style-type: none"> <li>▪ A.P., G.P. and H.P.</li> </ul>	
3.2.	Permutations and combinations	
3.3.	The binomial theorem for any index	
3.4.	Series:	
	<ul style="list-style-type: none"> <li>▪ Exponential &amp; logarithmic</li> </ul>	
3.4.	Equations:	
	<ul style="list-style-type: none"> <li>▪ Quadratic &amp; polynomial</li> </ul>	
Unit 4.	<b>Calculus:</b>	<b>[20 Hours]</b>
4.1	Idea of set, set notations, set operations,	
4.2.	Venn diagram,	
4.3.	The set of real members and its subsets.	
4.4.	The absolute value of a real number.	
4.5.	Functions- algebraic and transcendental.	
4.6.	Graphs of simple function.	
4.7.	Limit of community.	
4.8.	Derivatives from definition of simple functions like:	
	<ul style="list-style-type: none"> <li>▪ <math>x^n</math>, <math>(ax+b)^n</math>, <math>\sin(ax + b)</math>, <math>e^{ax}</math>, <math>ax</math>, and <math>\log x</math>.</li> </ul>	
4.9.	Derivatives of sum, difference, product and quotient of functions, chain rule, parametric and implicit functions	
4.10.	Integration, Rules for finding integrals.	
4.11.	Standard integrals and their uses.	
4.12.	Definite integrals- definition and evaluation.	

4.13. Definite integral as limit of sum.

**Learning materials:**

1. References to be selected by the related lecturer(s) from among the texts available in the market that meet the content needs of this subject.
2. The related institute may develop its own textbook and approve from the related authority so as to have a prescribed textbook of this subject.

# Engineering Physics I

## EG 1104 SH

Year: I  
Semester: I

**Total: 6 hour /week**  
**Lecture: 3 hours/week**  
**Tutorial: 1 hours/week**  
**Practical: 3 hours/week**  
**Lab: 2 hours/week**

### *Course description*

This subject consists of four units related to mechanics, heat and thermodynamics, optics, and magnetism necessary to develop background in physics that supports for the understanding and practicing the related engineering works.

### *Course objectives*

After the completion of this course, students will be able to explain the basic concepts related to the followings and apply them in the field of the related engineering area.

1. Mechanics.
2. Heat and thermodynamics.
3. Optics.
4. Magnetism.

### *Course Contents*

**Unit 1. Mechanics: [14 Hours]**

- 1.1 Basic units and measurements:
  - Measurement of physical quantities
  - Introductory ideas about dimensions of physical quantities.
  - Scalar and Vector: definitions and examples, dot and cross product of two vectors
  - Composition and resolution of vectors.
- 1.2 Newton's laws of motion:
  - Newton's laws of motion (First, second and third laws)
  - Principle of conservation of linear momentum
  - Solid friction: Dynamic and rolling friction, laws of solid friction and its verification
- 1.3. Uniform circular motion:
  - Angular displacement and velocity.
  - Centripetal force and acceleration.
  - Motion of bicycle rider and banked track
- 1.4. Gravitation:
  - Newton's law of universal gravitation.
  - Gravitational attraction of earth:
  - Acceleration due to gravity.
  - Variation of acceleration due to gravity with height, depth, and latitude.
  - Motion of satellites:

- Orbital velocity,
- Geostationary satellites.
- Weightlessness.
- 1.5. Work, energy, and power:
  - Definition and units of work, energy and power.
  - Potential and kinetic energy.
  - Conservation of energy.
  - Conservative forces.
  - Transformation of energy.
  - Power efficiency.
- 1.6. Simple harmonic motion (SHM):
  - Simple harmonic motion and its characteristics.
  - Period, frequency, and amplitude of simple harmonic motion.
  - Speed and acceleration in simple harmonic motion.
  - Energy of simple harmonic motion.
  - Simple pendulum.
- 1.7. Rotation of rigid bodies:
  - Forces in equilibrium, torque, couple, C.G. and center of mass.
  - Moment of inertia.
  - Angular momentum and
  - Its conservation.
  - Work done by torque.

**Unit 2. Heat and thermodynamics:**

**[11 Hours]**

- 2.1 Heat Phenomena and Quantity of Heat:
  - Concept of temperature and thermal equilibrium.
  - Temperature of scales.
  - Quantity of heat gain or heat loss.
  - Specific heat capacity.
  - Determination of heat capacity by the method of mixtures.
  - Newton's law of cooling.
- 2.2 Change of Phase:
  - States of matter.
  - Fusion and vaporization.
  - Evaporation and boiling.
  - Specific latent heats of fusion and vaporization.
  - Melting and boiling points.
  - Saturated and unsaturated vapors.
  - Variation of melting and boiling points with pressure.
  - Triple point and critical point.
  - Dew point and humidity.
- 2.3 Thermal Expansion:
  - Coefficients of linear, superficial and cubical expansions of solid and relation between them.
  - Cubical expansion of liquids.

- Real and apparent expansions.
  - Variation of density due to expansion.
  - Barometric height correction.
- 2.4 Heat Transfer:
- Thermal conduction conductivity and determination of the coefficient of thermal conductivity.
  - Convection and convection coefficient.
  - Radiation.
  - Perfectly black body.
  - Stefan-Boltzman's law of black body radiation.
- 2.5 Gas Laws:
- Boyle's law,
  - Charles law and ideal gas equation.
  - Universal gas constant,
  - Avogadro number and Boltzman constant.
  - Volume and pressure coefficients of ideal gas.
- 2.6 Kinetic Theory of Gases:
- Pressure in an ideal gas from molecular point of view.
  - RMS speed, mean energy of a molecule of an ideal gas.
- 2.7 Thermodynamics:
- First law of thermodynamics.
  - Different thermodynamic process:
    - Adiabatic,
    - isothermal and
    - Isobaric.
  - Specific and molar heat capacities for different thermodynamic processes,  $C_p - C_v = R$ .
  - Second law of thermodynamics.
  - Carnot engine, Otto cycle and their efficiencies.

**Unit 3. Optics:**

**[10 Hours]**

- 3.1 Light and Illumination:
- Nature of light, sources of light, rays.
  - Luminous flux.
  - Luminous intensity of a point source.
- 3.2 Reflection and Refraction by plane Surfaces:
- Review of reflection and refraction by plane surfaces.
  - Speed of light in different media.
  - Deviation due to reflection and refraction.
  - Phenomenon of total internal reflection, critical angle.
  - Real and apparent depth.
  - Determination of reflective index.
- 3.3 Reflection by Spherical Surfaces:
- Review of reflection by spherical surfaces.
  - Method of construction of image by ray diagrams.

- Real and virtual images.
  - Nature of images formed by spherical mirrors.
  - Spherical aberration: parabolic mirror.
  - Uses of Mirrors: driving mirror of a car, field of view.
- 3.4 Refraction through Prisms and Lenses:
- Deviation due to prism and minimum deviation.
  - Refraction through lenses.
  - Lens maker equation.
  - Converging lens, diverging lens and thin lens equation.
  - Formation of images by lenses.
  - Combination of lenses.
  - Magnification,
  - Power of a lens.
  - Uses of lenses:
    - simple microscope,
    - compound microscope and
    - Telescope
  - Human eye.

**Unit 4. Magnetism:**

**[10 Hours]**

- 4.1 Magnets and Magnetic fields:
- Magnetic poles, magnetic moment, magnetic axis, and magnetic meridian.
  - Magnetic field.
  - Coulomb's law for magnetism.
  - Magnetic field due to magnetic poles and bar magnets.
  - Intensity and flux density of magnetic field.
  - Neutral point.
  - Tangent law.
  - Deflection and oscillation magnetometer.
- 4.2. Earth's Magnetism:
- Horizontal and vertical components of earth's magnetic field.
  - Declination and angle of dip.
- 4.3. Magnetic properties of materials;
- Molecular and modern theory of magnetism.
  - Para magnetism and diamagnetism:
    - Permeability and
    - Susceptibility.
  - Intensity of magnetization.
  - Domain theory of ferromagnetism.
  - Hysteresis

**Engineering Physics Practical I****[30 Hours]**

1. Determine volume of hollow cylinder by using vernier calipers.
2. Determine density of a steel / glass ball by using screw gauge.
3. Determine thickness of glass plate using spherometer and calculate the area by using millimeter graph paper.
4. Determine the acceleration due to gravity by using simple pendulum.
5. Determine the magnetic movement of a bar magnet by using deflection magnetometer.
6. Determine the refractive index of the material of prism.
7. Determine specific heat capacity of solid by the method of mixtures.
8. Determine specific latent heat of ice by the method of mixtures.
9. Determine specific gravity of different solids by up thrust method.
10. Determine focal length of a converging lens by displacement method.

**Learning materials:**

1. References to be selected by the related lecturer(s) from among the texts available in the market that meet the content needs of this subject.
2. The related institute may develop its own textbook and approve from the related authority so as to have a prescribed textbook of this subject.

# Engineering Chemistry I

## EG 1105 SH

Year: I  
Semester: I

**Total: 6 hour /week**  
**Lecture: 3 hours/week**  
**Tutorial: 1 hours/week**  
**Practical: 3 hours/week**  
**Lab: 2 hours/week**

### *Course description*

This subject consists of three units related to general chemistry, language of chemistry, and system of classification necessary to develop background in chemistry that supports for the understanding and practicing related engineering works.

### *Course objectives*

After the completion of this subject, students will be able to explain the basic concepts related to the followings and apply them in the field of related engineering works:

1. General chemistry
2. Language of chemistry
3. System of classification

### *Course Contents*

<b>Unit: 1: General chemistry:</b>	<b>[8 Hours]</b>
1.1 Atom and molecule:	
▪ Definition	
▪ Dalton's atomic theory and modern position of the theory	
1.2 Atomic weight:	
▪ Definition	
▪ Determination of atomic weight by Dulong and Petit's method and Related numerical problems	
1.3 Molecular Weight:	
▪ Definition	
▪ Avogadro's hypothesis	
▪ Application of Avogadro's hypotheses ( Mol. Wt= $2 \times V.D.$ , in the deduction of atomicity of elementary gases $H_2$ , $Cl_2$ , $O_2$ , and $N_2$ )	
▪ Molecular weight determination by Victor Meyer's method and Related numerical problems	
1.4 Equivalent weight:	
▪ Definition	
▪ Equivalent weight of element, acid, base and salt	
▪ Equivalent weight determination by hydrogen displacement method and oxide method.	
▪ Numerical relation between equivalent weight, atomic weight and valency	
▪ Some related problems of equivalent wt. (From Hydrogen displacement method and oxide method)	

- 1.5 Simple mole concept:
- Mole of an atom
  - Mole of a molecule
  - Molar volume and
  - Simple calculation on mole concept

**Unit: 2: Language of chemistry: [4 Hours]**

- 2.1 Symbol:
- Definition
  - Significance (qualitative and quantitative)
- 2.2 Formula:
- Definition
  - Significance (qualitative and quantitative)
  - Concept of valency in terms of combining capacity with H<sub>2</sub>, O<sub>2</sub>, and Cl<sub>2</sub>
  - Variable valency (ref. Fe, Sn, Pb, Cu, Hg, S and N)
  - Radicals (electro- positive and electro - negative)
  - Writing a formula
- 2.3 Chemical equation:
- Definition
  - Types requisites
  - Significance and limitation
  - Balancing of chemical equation by hit and trial method and Partial equation method

**Unit: 3: System of classification: [33 Hours]**

- 3.1 Atomic structure:
- Subatomic particles (electron, proton and neutron)
  - Classical  $\alpha$  - rays scattering experiment
  - Rutherford's atomic model and its drawbacks
  - Bohr's atomic model (postulates only)
  - Composition of nucleus
  - Mass number and atomic number
  - Arrangement of electron (Bohr - Bury Scheme)
  - Concept of shell and sub shell,
  - Electronic Configuration and atomic structure of Some elements (Atomic no. 1 to 30)
  - Hund's rule
  - General idea of quantum number and Pauli's exclusion principle
- 3.2 Electronic theory valency:
- Assumptions
  - Types
  - Electrovalency eg. NaCl, MgO, CaS
  - Covalency eg. H<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>, CH<sub>4</sub>, H<sub>2</sub>O, NH<sub>3</sub>, C<sub>2</sub>H<sub>2</sub>
  - Coordinate co-valency eg. H<sub>2</sub>O<sub>2</sub>, SO<sub>2</sub>, O<sub>3</sub>, SO<sub>3</sub>)
  - Electronic dot structure of some compounds eg. H<sub>2</sub>SO<sub>4</sub>, CaCO<sub>3</sub>, K<sub>2</sub>SO<sub>3</sub>

- 3.3 Oxidation and reduction:
- Classical definition
  - Electronic interpretation
  - Oxidizing agent: Definition and eg  $O_2$ ,  $O_3$ , oxyacids, halogens,  $K_2Cr_2O_7$ ,  $KMnO_4$
  - Reducing agent: Definition and eg.  $H_2$ ,  $H_2S$  with some examples, auto-oxidation eg.  $H_2O_2$ ,  $HNO_2$ ,  $SO_2$
  - Idea of oxidation number
  - Balancing chemical equation by oxidation number method
- 3.4 Periodic table:
- Mendeleef's periodic law
  - Mendeleef's periodic table
  - Characteristics of groups and periods in the table
  - Advantages and anomalies of the periodic table
  - Modern periodic law
- 3.5 Electrolysis:
- Definition of electrolyte, non-electrolyte and electrolysis
  - Faraday laws of electrolysis,
  - Application of electrolysis (electroplating and electro refining)
  - Electrolysis of acidulated water
- 3.6 Activity and electrochemical series:
- Definition,
  - Action of water, acid and oxygen on metals.
- 3.7 Corrosion:
- Definition
  - Types
  - Direct and indirect method and prevention against corrosion
- 3.8 Acid, Base and Salt:
- Arrhenius concept of acid and base
  - Lowry and Bronsted concept of acid and base
  - Conjugate acid and base
  - Amphoteric nature of water
  - Lewis concept of acid and base
  - Preparation of acid and base (at least 2 -methods).
  - Properties of acid and base.
  - Definition of Salt
  - Types of salt (normal, acidic and basic)
  - Preparation of salt (at least 3 - methods)
  - Concept of hydrogen ion concentration, pH value and pH Scale
  - Buffer solution.
- 3.9 Volumetric analysis:
- Definition of titration (acidimetry and alkalimetry),
  - Indicator
  - End-point (neutralization point)
  - Standard solution (primary and secondary standard solution), Normal, Decinormal, Molar, Molal solution

- Requisites of primary standard substance
- Volumetric equation,
- Express the strength of solution Normality, Molarity, Molality, gram per litre and percentage and related numerical problems

### Engineering Chemistry Practical I

[30 Hours]

1. Simple Glass Working [6 Hours]
  - a. to cut the glass tube into three equal parts and round up their shape edges
  - b. to bore a hole through a cork
  - c. to bend the glass tubing into acute, obtuse and right angle
  - d. to draw a jet and capillary tube
  - e. to fit up a wash bottle
2. To separate sand and copper sulphate crystals in pure and dry state from the mixture of sand and copper sulphate [2 Hours]
3. To separate sand and calcium carbonate in pure and dry state from the mixture of sand and calcium carbonate [2 Hours]
4. To prepare pure water from supplied impure water by distillation and to test the purity of the sample prepared [2 Hours]
5. To neutralize dilute sulphuric acid with sodium carbonate solution, and to recover crystals of sodium sulphate [2 Hours]
6. To obtain pure and dry precipitate of barium sulphate by treating excess of dilute sulphuric acid with barium chloride solution [2 Hours]
7. To investigate the composition of water by electrolysis by using Hofmann's apparatus [2 Hours]
8. To determine the equivalent weight of reactive metal by hydrogen displacement method. [2 Hours]
9. To determine the pH of different unknown solution and using pH paper and universal indicator [2 Hours]
10. To prepare primary standard solution of sodium carbonate and to use it to standardize an approximate decinormal acid solution [2 Hours]
11. To standardize given unknown acid (Approx N/10) solution by preparing standard alkali solution. (Expression of strength in different ways) [2 Hours]
12. To standardize given unknown alkali (approximately N/10) solution with the help of by preparing standard acid solution. (Expression of strength in different ways) [2 Hours]
13. To carry out conductivity experiments on solids and liquids (CuSO<sub>4</sub>, Zn, Mg, Al, Fe, CCl<sub>4</sub>, C<sub>6</sub>H<sub>6</sub>, C<sub>2</sub>H<sub>5</sub>OH) [2 Hours]

#### Textbooks:

1. A Text book of Chemistry, Jha and Guglani
2. Foundations of Chemistry, Vol. 1, M.K. Sthpit and R.R. Pradhananga

#### Reference books:

1. Fundamentals of Chemistry, K.R. Palak
2. Inorganic Chemistry, Bahl and Tuli
3. A Text book of Engineering Chemistry, R.S. Sharma
4. A Textbook of Inorganic Chemistry, L.M. Mitra
5. Elementary practical chemistry, M.K Sthapit

***Other learning materials:***

1. Other references to be selected by the related lecturer(s) from among the texts available in the market that meet the content needs of this subject

**Note:** The related institute may develop its own textbook and approve from the related authority so as to have a prescribed textbook of this subject.

# Engineering Drawing I

## EG 1101 AR

Year: I  
Semester: I

Total: 5 hour /week  
Lecture: 1 hour/week  
Tutorial: hours/week  
Practical: 4 hours/week

### *Course description*

This course is designed to provide knowledge and skills on geometrical shapes, and its construction procedure, and interpretation of the views of objects by orthographic projection.

### *General objectives*

After the completion of this course students will be able to:

1. Handle drawing instruments and materials
2. Identify Geometrical construction and shape
3. Know the scale and its type and construction
4. Draw different types of engineering curves
5. Draw and interpret the multi view of solids with scale and dimensioning

### **Unit 1: Introduction of Engineering Drawing [2 Hours]**

- 1.1 Types of drawing: Engineering drawing and Artistic drawing and Engineering drawing define as Graphical language or universal language of engineering technical persons.
- 1.2 Introduction of drawing materials: drawing as drawing paper, drawing board, adhesive tape, pencil, eraser, sharpener etc.
- 1.3 Drawing tools like set square, compass divider etc.
- 1.4 Conventional line and its type and their uses and line weight
- 1.5 Drawing paper size and simple graphical symbols of civil works (at least 10 symbols).
- 1.6 Practical exercise of horizontal, vertical, inclined line using the Drawing tools and material with symbols and paper sizes. (Sheet No. 1)

### **Unit 2: Lettering, scales and dimensions [1 Hour]**

#### **2.1 Lettering**

- 2.1.1 Introduction of single stroke letter and their ratio between height and breadth.
- 2.1.2 Introduction of upper and lower case letter.
- 2.1.3 Introduction of Vertical and inclined (*italic*) letter (with inclined angle).
- 2.1.4 Practical exercise of letter writing using the guide lines of vertical and italic letter, (Sheet No 2).

#### **2.2 Scale [1.5 Hours]**

- 2.2.1 Introductions of scale and importance
- 2.2.2 Types of scale : full reducing and enlarge

2.3.3 Construction of scale using the representative factor.

### **2.3 Dimensioning**

**[1.5 Hour]**

2.3.1 Introduction of dimensioning.

2.3.2 Terminology of dimensioning: Dimension line, extension line, leaders line etc.

2.3.3 Termination of dimension line using arrowhead, slash and dot.

2.3.4 Dimensioning system: Aligned system, unidirectional system and base line dimensioning.

2.3.5 Principles of dimensioning.

2.3.6 Dimensioning pictorial views and orthographic view

### **Unit 3: Geometrical constructions**

**[2 Hours]**

**3.1 Geometric primitives** (*line, triangle, quadrilateral, regular polygons and circle and its Parts name*).

#### **3.2 Division**

3.2.1 Division of line: Bi-section of line, tri-section of line, division of line in any number of Parts and division of the line in proportionally

3.2.2 Division of circle: Division of circle in three, four, five, six, seven and eight parts.

3.2.3 Division of angle: bi-section and trisection.

3.2.4 Division of triangle and trapezium in any number of equal parts of area.

3.3 Construction of triangle, square and regular polygons.

3.4 Inscribing and describing of circle in/on triangle or polygons.

3.5 Tangency: open and crossed line tangent, Arc tangent - internal, external and combined Arc tangent.

### **Unit 4: Engineering Curve**

**[1 Hour]**

Introduction of following curves

4.1 Involute

4.2 Spiral

4.3 Cycloid

4.4 Helices

### **Unit 5: Conic- section**

**[1 Hour]**

5.1 Cone and its parts name

5.2 Introduction of sectional plane

5.3 Definition of conic section

5.4 Terminology of conic section after the cut by sectional plane (As ellipse, Parabola and Hyperbola)

### **Unit 6: Orthographic projection**

**[2 Hours]**

6.1 Theory of projection

6.2 Four quadrant

6.3 Introduction of co-ordinate or three dimensional axis

6.4 System of orthographic projection

6.5 Making of orthographic view

6.6 Analysis of object and its view

**Unit 7: Point and line projection**

**[0.5 Hour]**

7.1. Notation system on HP, VP and PP

7.2. Location of point /line i, e. where it is and projection

7.3. Position of line: Perpendicular to one plane and parallel to the other, parallel to both Plane and inclined to one or both planes.

**Unit 8: Plane projection**

**[0.5 Hour]**

8.1. Perpendicular to one plane and parallel to the other, perpendicular to both planes, Perpendicular to one plane and inclined to the other.

**Unit 9 Projection of solids**

**[2 Hours]**

9.1. Orthographic projection of geometrical solid I, e. prism, cylinder and cone in simple Position.( simple position means axis- perpendicular to one plane and parallel to other, Axis parallel to both planes.

9.2. Orthographic projection of different model or work pieces. (at least 10 to 15 model Pieces)

**Practical Exercise (Class work sheet)**

**Sheet No: 1**

**[5 Hours]**

1. Horizontal, vertical, inclined ( $45^\circ$ ,  $135^\circ$ ,  $30^\circ$ ,  $60^\circ$ ,  $120^\circ$ ,  $150^\circ$ ,  $75^\circ$ ,  $105^\circ$  degree) line and circle using the drawing tools,
2. Line type: visible (boarder), construction, dashed, (thick and thin), centre line, dimension, extension, leader line, section line, wavy line, continuous or short/break up line.

**Sheet No: 2**

**[4 Hours]**

1. Free hand lettering exercise on upper and lower case vertical letter using horizontal and vertical guide line (at least one set)
2. Free hand lettering exercise on upper and lower case inclined letter with numerical using the horizontal and vertical guide line (at least one set)
3. Free hand lettering exercise of upper case letter using horizontal guide line of different height letter of 10 to 3mm height
4. Symbol of general civil /electrical/ plumbing work
5. Schedule of paper size. (A0 to A4 size)

**Sheet No: 3**

**[2 Hours]**

1. Exercise on dimensional practice of Aligned, unidirectional and base line dimension
2. Exercise on scale construction

**Sheet No: 4**

**[7 Hours]**

1. Line- bisection, trisection, line division any number of parts, with proportional division, circle division in three, four five, six, seven and eight parts, area of triangle and trapezoid division any number of equal parts.

2. Construction of triangle by given side, Making of equilateral triangle, square and (Regular Polygons pentagon, hexagon, heptagon etc.)
3. Finding the centre of Arc, Making the circle touching the three points. Describing the circle on triangle, inscribing the circle in right angle triangle, Equilateral triangle, and scalene triangle, inscribing the circle in a sector.
4. Tangent from any point on circle, open and crossed line (belt) tangent. Arc Tangent-Internal, External and combined.

**Sheet No: 5**

**[4 Hours]**

1. Involutess- Line, triangle and circular involutes with tangent.
2. Spiral construction (mentioning the pole, vector radius, vector angle and Convolution)
3. Cycloid- Cycloidal curve with tangent
4. Helices- Cylindrical helix with pitch angle, conical helix.

**Sheet No: 6**

**[5 Hours]**

1. Ellipse: Concentric circle, oblong (Rectangle), Foci and Eccentricity method.
2. Parabola: Rectangle, offset, Tangent and Eccentricity method.
3. Hyperbola: Rectangle and Transverse axis method.

**Sheet No: 7**

**[4 Hours]**

1. Point projection- Point projection by given location by first and third angle projection (At least two exercise)
2. Line projection-perpendicular to one plane and parallel to other plane, parallel to both planes, parallel to both plane inclined to one or both planes.

**Sheet No: 8**

**[2 Hours]**

1. Plane of projection-Perpendicular to one plane and parallel to other, perpendicular to both the planes, perpendicular to one plane and inclined to other(At least three exercise)

**Sheet No: 9**

**[2 Hours]**

1. Solid projection-Orthographic projection of simple geometrical solid in first and third angle projection.

**Sheet No: 10**

**[10 Hours]**

1. Giving the object to analyze the view. And draw orthographic projection of flat, inclined and circular surfaced model (At least 15 exercise).

**References:**

- Luzzadar W. I Fundamental of Engineering drawing. Prentice-Hall of India
- S. Bogolyubov and A. Voinov, Engineering drawing. Mir Publishers, Moscow.
- S. K. Bogolyubov, Exercises in Machine Drawing. Mir publishers, Moscow.
- K. Venugopal Engineering Drawing and Graphics, New age international (p) Ltd. India
- Gill. P. S. Engineering Drawing, S. K. Kataria and sons India.
- M. B. Shah and B.C. Rana, Engineering Drawing, Pearson India,
- N. D. Bhatta and Panchal V.M. Engineering Drawing Charotar publishing House India.

# Workshop Practice I (Brick Laying)

EG 1102 CE

**Year: I**  
**Semester: I**

**Total: 5 hour /week**  
**Lecture: 1 hours/week**  
**Tutorial: hours/week**  
**Practical: 4 hours/week**

## Course description:

This course focuses on familiarization of brick laying theory and practical parts and its standard requirement to be used on to-days construction.

## Course objectives:

After the completion of this course students will be able to:

1. Identify major operation related to civil engineering works
2. Identify and select the tools and equipment required for bricklaying
3. Identify use and care of tools
4. Identify the safety rules

## Theory

### Unit 1 Introduction of Bricklaying [1 Hour]

- 1.1. History of Bricklaying
- 1.2. Importance of Bricklaying
- 1.3. Scope of Bricklaying
- 1.4. Types of Walling (Bricklaying)
- 1.5. Beauty of Bricklaying (Aesthetics of Bricklaying)

### Unit 2 Observation of safety precaution [1 Hour]

- 2.1. Use of protective clothing and equipments
- 2.2. Demonstration of scope working habits
- 2.3. Maintaining tools and equipment
- 2.4. Awareness of personal safety and safety of others in all aspects of works
- 2.5. Observation of workshops safety rules and regulations
- 2.6. Fire safety and electrical shocks protection

### Unit 3 Identifying Bricklaying materials [2 Hours]

- 3.1. Identifying Bricks in common use
- 3.2. Identifying Bricks in Chinese bricks
- 3.3. Identifying Bricks in hand made bricks
- 3.4. Identifying Bricks in 5% cement added sun aried soil bricks
- 3.5. Identifying various types of tiles used in flooring and paring outside of buildings
- 3.6. Identifying sand used in Bricklaying
- 3.7. Identifying Lime/Cement used in Bricklaying
- 3.8. Identifying Portland cement used in Masonry

- 3.9. Identifying water used in mixing Mortar/concrete
- 3.10. Identifying amount of water used in making mortar/concrete (proportioning of water used (cement: sand mortar)
- 3.11. Identification of amount of admixture mixed in Mortar/Concrete for water proofing/damp proof

**Unit 4 Proper use of hand tools [1 Hour]**

- 4.1. Bricklaying Hand tools e.g trowel, pointing trowel, plum bob, spirit level, and line and pin/corner block Mason's line. Straight edge/store rod, Gang rod, Club Hammer, Bolster and closer or bat gauge etc.

**Unit 5 Proper use of Bricklaying equipment/machines [1 Hour]**

- 5.1. Shovel, spade, wheel barrow, buckets, jugs, sponge, Hesign Rags, Foam Runner/Jointer, Mortar Boards, Mortar pan and Brooms for cleaning floor
- 5.2. Protective equipment e.g. Hand gloves Goggles ear plugs and Mask etc
- 5.3. Mortar mixer, electric drill and bits rope and nails
- 5.4. Bamboo and rope or
- 5.5. Tubular scaffolding pipe and fittings

**Unit 6 Constructing walls using Bricks; in lime, mortar English Bond [2 Hours]**

- 6.1. Building ½ Brick (4.5" thick wall) to stretcher Bond
- 6.2. Building 1 Brick (9" thick wall) to English Bond
- 6.3. Building 1.5 Brick (14" thick wall) to English Bond
- 6.4. Building 2 Brick (18" thick wall) to English Bond

**Unit 7 Constructing walls in various types of Bond [2 Hours]**

- 7.1. Flemish Bond-1 Brick thick, 1.5 Brick and 2 brick thick
- 7.2. Constructing cavity wall, 12" thick
- 7.3. Constructing rat trap bond 1 brick thick (9" thick wall)

**Unit 8 demonstrating various types of Bond [2 Hours]**

- 8.1. Function of Bond
- 8.2. Bond types
- 8.3. Design of Bond patterns
- 8.4. Designs of wall faces showing various wall textures
- 8.5. Design of wall faces using various types of bricks
- 8.6. Demonstrating wall cleaning methods

**Unit 9 Demonstrating various types of pointing [1 Hour]**

- 9.1. Mortar for pointing/Ratio and proportion
- 9.2. Pointing procedure
- 9.3. Pointing as the work proceeds
- 9.4. Pointing after the Brick work is completed
- 9.5. Types of pointing:

- (a) flush pointing
- (b) Struck joint or pointing
- (c) Weather struck and cut pointing
- (d) Rounded or tooled pointing
- (e) Recessed pointing
- (f) Tuck pointing
- (g) V-joint pointing
- (h) Beauty of pointing

**Unit 10 Curing walls** **[1 Hour]**

- 10.1. Curing wall both side by water pouring from top
- 10.2. Curing wall both side by sprinkling water at face
- 10.3. Covering wall by heavy rain, frost and dirty materials nearby building operation
- 10.4. Liquid curing in hot climate (Quarter)

**Unit 11 Building foundation footing courses wall (Square footing)** **[1 Hour]**

- 11.1. 2.5 Bricks\*2.5 Bricks square footing
- 11.2. 3.5 Bricks\*3.5 Bricks square footing
- 11.3. 3.0 Bricks\*3.0 Bricks square footing

**Practical**

**Project-1**

Identify/enumerate/ handle tools/equipments/materials related to bricklaying. **[3 Hours]**

**Project-2** **[5 Hours]**

- 2.1.Prepare workshop floor areas
- 2.2.Set out work area
- 2.3.Position materials/tools
- 2.4.Prepare mortar

**Project -3** **[5 Hours]**

- 3.1.Handle motor, pick up motor, handling brick trowel properly positioning yourself, layout line spread motor, furrow mortar, pick up bricks and lay bricks to line. Watch bond.

**Project -4** **[5 Hours]**

- 4.1.Lay stretcher bond wall making 4 bricks long and 6 courses high using gangue rod properly.

**Project -5** **[5 Hours]**

- 6.1.Build English bond wall 1 brick thick (9") up to 7 courses high to gauge and pointing to appropriate dimensions.

**Project -6** **[5 Hours]**

6.1. Build Flemish bond wall up to 6 courses high to gauge and pointing to appropriate dimensions.

**Project -7**

**[7 Hours]**

7.1. Build 1.5 brick thick (14") wall to English bond return corner of English bond. One end ranked back and other end completely stopped as per given dimensions, up to five courses high.

**Project -8**

**[5 Hours]**

8.1. Build a T-junction wall of English Bond pattern as per given dimensions up to 6 courses high.

**Project -9**

**[10 Hours]**

9.1. Construct cavity wall showing 3" thick cavity using butterfly wall ties providing cavity clean using cavity clean batten or board, dry bond only.

**Project -10**

**[10 Hours]**

9.1. Construct a rattrap bond wall making 9" thick (1 brick thick wall) up to 6 courses high showing internal trap clear, dry bond only.

**References:**

- W.G. Hash, A.L.O.B. M.R.S.H, Brick work vol 1, Senior lecturer in building Collage of Technology Southampton, England, Hutchinson Technical Education Press.
- गारो लगाउने प्रविधि- मोहनमान व्यञ्जनकार

# Tracing and Visualization I

EG 1102 AR

Year: I  
Semester: I

Total: 4 hour /week  
Lecture: hour/week  
Tutorial: hours/week  
Practical: 4 hours/week

## Course description:

This course intends to deals drafting equipments, simple drawings, drafting techniques, demonstration and handling of drawing. This course also covers relation with Architecture.

## Course objectives:

After the completion of this course students will be able to:

1. Understand the concept of tracing and visualization techniques.
2. Produce the new drawing from old but historical, importance drawing that must be preserved for future study.
3. Draw and develop of historical importance object (building and its element) in appropriate scale.

## Course Contents

### Practical

#### Unit 1: Preparation of standard sheets [2 Hours]

- 1.1 Prepare the standard drawing sheet: A<sub>0</sub>, A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub>, & A<sub>4</sub>
- 1.2 Draw the border line in the drawing sheet of 1.1
- 1.3 Draw the sheet title in the drawing sheet of 1.2

#### Unit 2: Drafting techniques and method in common practice [6 Hours]

- 2.1. Exercise in different types of lines and effects
  - a. Thick
  - b. Thin
  - c. Dark
  - d. Light
  - e. Center
  - f. Break
  - g. Hidden
  - h. Cutting plane
- 2.2. Exercise in hatching to show texture of different materials
  - a. Stone
  - b. Sand
  - c. Timber
  - d. Glass
  - e. Metal
  - f. Concrete
  - g. Brick
  - h. Earth
  - i. Marble
  - j. Liquid

**Unit 3: Architectural lettering and dimensioning:** [4 Hours]

- 3.1. Nepali lettering, freehand and using guide line
- 3.2. English lettering, freehand and instrumental letter writing
- 3.3. Different exercises in dimensioning of simple geometrical objects

**Unit 4: Preliminary tracing of given drawings** [24 Hours]

- 4.1 Exercise in tracing of building plan, (ground and first floor terrace and site plan), 4 sides' elevations and 2 sections (cross section and longitudinal roof section). Complete with dimensions and lettering.
- 4.2 Tracing of elevation of a traditional building.
- 4.3 Tracing of elevation of a traditional window including elements details.

**Unit 5: Topic on visualization** [24 Hours]

- 5.1 Development of elevations and sections from the given plan with doors, windows ventilators with dimensions and lettering.
- 5.2 Exercise in the visualized and developed single line drawing of a given sample building. (Most produce set of drawing: all plans, 4 side elevations, 2 section)

**Textbooks:**

1. Warrent J. Luzadder/Jon M. Dutt, Fundamentals of Engineering drawing.
2. Rendow yee, Architectural Drawing: A visual compendium of Types and methods.

**References:**

1. Sets of drawing produced by Architectural form
2. Sets of drawing produced by Department of Archeology,
3. Bernd Girod, marcus Adreas Magnor, Hans Peter Seidel, Vision Modelling and Visualization, IOS Press, BV, Amsterdam

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# Measured Drawing & Drafting I

## EG 1103 AR

**Year: I**  
**Semester: I**

**Total: 4 hour /week**  
**Lecture: hour/week**  
**Tutorial: hours/week**  
**Practical: 4 hours/week**

### Course description:

This course intends to provide knowledge and skills on freehand sketch of a simple object, measurement instruments, drawing of different objects in different scale (use of different scales), freehand sketch of modern residential buildings, measurement of buildings and dimensioning in the sketch and producing the drawing of the same buildings into the scale.

### Course objectives:

After the completion of this course students will be able to:

1. Understand the concept of measured drawing and drafting techniques.
2. Produce the complete set of drawings of existing building by using different techniques of measurement.

### Course Contents

#### Practical

#### **Unit 1: Sketching freehand of existing modern residential building [6 Hours]**

- 1.1 Plans (Ground floor, First floor, terrace)
- 1.2 Four side Elevations
- 1.3 Section through staircase
- 1.4 Details ( Door, window)

#### **Unit 2: Taking Measurements and Dimensioning the sketches of unit - I [6 Hours]**

- 2.1. Plans
- 2.2. Four side elevations
- 2.3. Floor height (most include every individual elements)
- 2.4. Opening details (doors, windows)

#### **Unit 3: Drawing to scale in studio from unit I & II: [40 Hours]**

- 3.1. Plans 12 hrs
- 3.2. Section 8 hrs
- 3.3. Elevation 8 hrs
- 3.4. Details (Doors, windows) 12 hrs

#### **Unit 4: Checking back for missing details in field and complete the drawing [8 Hours]**

**References:**

1. Engineering drawing and graphic technology, (author, Publisher's name & address, Year)
2. Technical Drawing
  - Frederice liesecke
  - Alva Mitchel
  - Henry lecil spences
  - Ivan levoy Hill
  - John thomas Dygdon
  - James E. Novak

## Second Semester

### **Subjects:**

- 1 EG 1201 SH Engineering Mathematics II
- 2 EG 1202 SH Engineering Physics II
- 3 EG 1203 SH Engineering Chemistry II
- 4 EG 1203 CE Workshop Practice II (Wood work)
- 5 EG 1201 AR Engineering Drawing II
- 6 EG 1204 CE Building Materials
- 7 EG 1211 CT Computer Application
- 8 EG 1202 AR Measured Drawing & Drafting II
- 9 EG 1203 AR Freehand Drawing & Composition I

# Engineering Mathematics II

## EG 1201 SH

Year: I  
Semester: II

Total: 4 hour /week  
Lecture: 3 hours/week  
Tutorial: 1 hours/week  
Practical: hours/week  
Lab: hours/week

### *Course description*

This subject consists of five units related to vectors; algebra; calculus; geometry; and statistics necessary to develop mathematical background helpful for the understanding and practicing the related engineering works.

### *Course objectives*

After the completion of this course, students will be able to:

1. Explain the concepts of vectors in plain and vectors in space and apply them in the field of the related engineering area
2. Explain the concepts of the complex numbers, linear inequalities and programming apply them in the field of the related engineering area.
3. Explain the concepts of determinants and matrices and apply them in the field of the related engineering area
4. Explain the concepts of determinants and matrices and apply them in the field of the related engineering area
5. Explain the concepts of applications of derivatives and areas of curves and apply them in the field of the related engineering:
6. Explain the concepts of coordinates in space and planes and apply them in the field of the related engineering area
7. Explain the concepts of statistics and apply them in the field of the related engineering area.

### *Course Contents*

#### **Unit 1. Vectors: [5 Hours]**

- 1.1. Vectors in plane, addition and subtraction.
- 1.2. Composition and decomposition of vectors.
- 1.3. Vectors in space.
- 1.4. The unit vectors  $i, j, k$
- 1.5. Product of two vectors-
  - dot product,
  - cross product,
- 1.6. Simple applications.

#### **Unit 2. Algebra: [15 Hours]**

- 2.1. Complex number in the form  $A+ ib$ .
- 2.2. Algebra of complex numbers.
- 2.3. Polar representation of complex numbers.
- 2.4. De Moivre's theorem and its applications
- 2.5. Linear inequalities and their graphs.
- 2.6. System of linear inequalities in two variables,

- 2.7. System of linear inequalities in two variables,
- 2.8. Linear programming: Problems involving two variables under given linear constraints
- 2.9. Determinants and matrices,
- 2.10 Algebra of matrices,
- 2.11 Properties of determinants,
- 2.12. Ad joint and inverse of matrices.
- 2.13. Solution of linear equations using crammers' rule
- 2.14. Row equivalent matrices
- 2.15. Idea of polynomial equations

**Unit 3. Calculus:** **[12 Hours]**

- 3.1. Applications of derivatives-
  - Tangents and normal to a curve taking slope as derivative
  - Maxima and minima of a function
  - Derivative as rate of change
- 3.2 Areas under curves:
  - Use of definite integral as limit of a sum to find areas under curves
  - Areas of closed curves and
  - Areas between curves.
- 3.3 Antiderivatives:
  - Curve tracing, maxima and minima
  - Rieman sums & integral
  - Application of fundamental theorem

**Unit 4. Geometry:** **[4 Hours]**

- 4.1. Coordinates in space,
- 4.2. Coordinates in planes.

**Unit 5. Statistics:** **[9 Hours]**

- 5.1. Statistics:
  - Introduction to statistics
  - Measures of Central Tendency
  - Measures of Dispersion
  - Moments, Skew ness and Kurtosis
  - Correlation and Regression
- 5.2. Probability:
  - Concept of Probability
  - Concept of conditioned probability
  - Concept of independent and dependent events
  - Concept of mutually exclusive events
  - Concept of theoretical probability distribution
- 5.3 Concept of normal curve and normal distribution
- 5.4. Concept of sampling, estimation and tests of significance

***Learning materials:***

1. A Text book of Statistics – B.C. Bajracharya
2. Elementary Statistics – H. C. Saxena
3. Statistical Methods – Mrigendralal Singh
4. References to be selected by the related lecturer(s) from among the texts available in the market that meet the content needs of this subject.
5. The related institute may develop its own textbook and approve from the related authority so as to have a prescribed textbook of this subject

# Engineering Physics II

## EG 1202 SH

Year: I  
Semester: II

Total: 6 hour /week  
Lecture: 3 hours/week  
Tutorial: 1 hours/week  
Practical: hours/week  
Lab: 2 hours/week

### *Course description*

This subject consists of four units related to electricity, waves, properties of matter, and modern physics necessary to develop background in physics that supports for the understanding and practicing the related engineering works.

### *Course objectives*

After the completion of this course, students will be able to:

1. Explain the basic concepts related to the electricity and apply it in the field of the related engineering area
2. Explain the basic concepts related to the waves and apply it in the field of the related engineering area
3. Explain the basic concepts related to the properties of matter and apply it in the field of the related engineering area
4. Explain the basic concepts related to the modern physics and apply it in the field of the related engineering area.

### *Course Contents*

#### **Unit 1. Electricity:**

**[16 Hours]**

- 1.1. Electrostatics:
  - Elementary charge, charging and induction.
  - Faraday's ice-pail experiment.
  - Idea of electric field
  - Lines of forces.
  - Coulomb's law.
  - Intensity of electric field.
  - Electrostatic potential, equipotential.
  - Surfaces.
  - Potential and field strength.
  - Potential gradient.
  - Action of point.
  - Van de Graaf generator.
  - Capacitors.
  - Different types of arrangement of capacitors.
  - Energy storage.
  - Action of dielectrics
- 1.2. Current electricity:
  - Basics:

- D.C. Current.
  - Strength of Current.
  - Potential difference across a conductor.
  - Ohm's law and its verification.
  - Resistance and resistivity.
  - Mechanical measurements:
  - Galvanometer.
  - Ammeter and voltmeter
  - Potentiometer and measurement of emf.
  - Wheatstone bridge
  - Kirchhoff's law and their use to analyze simple circuits.
  - Heating effect of current:
  - Joules law
  - The rate of heating from the concept of p.d.
  - Thermoelectricity:
  - See-beck effect
  - Peltier effect and
  - Thomson effect.
  - Chemical effect of current:
  - Faraday's law of electrolysis.
  - Accumulator.
- 1.3. Magnetic effect of current and electromagnetism:
- Magnetic forces and magnetic field of current:
  - Force experienced by charge moving in magnetic field.
  - Maxwell's corkscrew rule.
  - Force applied by magnetic field on current carrying conductor.
  - Torque on current carrying coil in magnetic field.
  - Theory of moving coil galvanometer.
  - Biot-Savart's Law
    - Field due to a long straight conductor and due to circular coil.
    - Force between two parallel conductors carrying current.
  - Ampere's law
    - Magnetic field due to the solenoid or toroid and long straight conductor.
  - Electromagnetic induction:
  - Faraday's law of electromagnetic induction and Lenz's law.
  - Phenomenon of self-induction.
  - A.C. generator.
  - D.C. generator.
  - Transformer.
- 1.4 Alternating current:
- Instantaneous and effective values of current and voltage.
  - Phase between current and voltage across different elements of circuit.
  - Capacitive and inductive reactance.

- Impedance.
- Resonance.
- Power in a.c. circuit

**Unit 2. Waves: [9 Hours]**

- 2.1. Wave motion:
- Wave motion.
  - Types of wave motion
  - Characteristics of wave motion
  - Wavelength, frequency and speed of waves
  - Speed of waves in different media.
  - Velocity of sound in air.
- 2.2. Wave phenomena:
- Sound waves.
  - Reflection of sound waves.
  - Interference of sound waves.
  - Diffraction of sound waves.
  - Beats and their formation.
  - Progressive waves.
  - Stationary waves.
  - Waves in strings and pipes: fundamental vibrations and overtones.
  - Intensity of sound.
  - Intensity level.
  - Inverse square law.
- 2.3. Physical optics:
- Interference of light waves and coherent sources.
  - Phase difference and path difference. Young's double slit experiment.
  - Distraction of light waves.
  - Huygen's principle.
  - Polarization and un polarized lights, polarization by reflection(Brewster's law)

**Unit 3. Properties of matter: [10 Hours]**

- 3.1 Elasticity:
- Elasticity, Hook's law, Young's modules, Bulk modulus.
  - Elasticity of shear.
- 3.2 Surface tension:
- Intermolecular attraction in liquid, surface tension.
  - Cohesion and adhesion, angle of contract.
  - Coefficient of surface tension and surface energy (Only introduction).
- 3.3 Viscosity:
- Stream line and turbulent flows.
  - Idea of liquid layer, Velocity gradient, Viscosity and its coefficient.

- Comparison of viscosity with solid friction, Viscous forces, Stoke's law, Terminal velocity, determination of coefficient viscosity, Viscous forces at higher relative velocities (qualitative).
- Temperature dependence of the coefficient of viscosity of liquid and gases.

**Unit 4. Modern physics: [10 Hours]**

4.1 Atomic physics:

- Photons, Photoelectric effect, Einstein's photoelectric equation and stopping potential for photoelectrons.
- Motion of charged particles in simultaneously applied electric and magnetic fields,  $e/m$  for electron, Milliken's oil drop experiment. Bohr model for hydrogen atom. Energy level diagrams and spectral series.
- X-rays: Production, nature and uses.
- Laser (introduction only)

4.2 Semiconductors:

- Energy states of valent electrons in solids, energy bands.
- Semiconductors, intrinsic and doped, p-type and n-type semiconductors.
- Majority and minority carries.
- Acceptors and donors, p-n junction, diode and depletion layer, forward and reverse bias.
- Rectifying property of diode, Transistor, transistor action and uses of npn transistor

4.3 Nuclear physics:

- Laws of radioactive disintegration: half life, mean life, and decay constant.
- Stable and radioactive nuclei.
- Binding energy.
- Fission and fusion.

**Engineering Physics Practical II: [30 Hours]**

1. Determine specific resistance of a wire.
2. Determine the frequency of A.C. mains.
3. Study current voltage characteristics of a junction diode.
4. Determine speed of sound by resonance air column method.
5. Determine Young Modulus.
6. Verify Ohm's law.
7. Determine force constant of a helical spring oscillation method.
8. Compare Emfs of two cells by using potentiometer.
9. Study characteristic curves of npn transistor.
10. Determine unknown resistance by Wheatstone bridge method.

***Learning materials:***

***Text books (For Both Parts I and II):***

1. Advanced level physics by Nelkon and Parker Vth and later editions
2. A textbook of physics, part I and part II by Gupta and Pradhan

***Supplementary text:***

1. College Physics by sears, Zemansky and Young, Fourth edition 1985

***Text book for laboratory work:***

1. Physics Practical Guide by U.P. Shrestha, RPB

***Text book for numerical problems:***

1. Numerical exercise in physics volume I and volume II, Prepared by Physics Dept., Pulchowk Campus, and published by Institute of Engineering.

***Other learning materials:***

1. References to be selected by the related lecturer(s) from among the texts available in the market that meet the content needs of this subject
2. The related institute may develop its own textbook and approve from the related authority so as to have a prescribed textbook of this subject.

# Engineering Chemistry II

## EG 1203 SH

Year: I  
Semester: II

Total: 6 hour /week  
Lecture: 3 hours/week  
Tutorial: 1 hours/week  
Practical: hours/week  
Lab: 2 hours/week

### *Course description*

This subject consists of three units related to nonmetals and their compounds; metals and their compounds; and organic compounds and synthetic materials necessary to develop background in chemistry that supports for the understanding and practicing related engineering works.

### *Course objectives*

After the completion of this subject, students will be able to explain the basic concepts related to the followings and apply them in the field of related engineering works:

1. Nonmetals and their compounds
2. Metals and their compounds
3. Organic compounds and synthetic materials

### *Course Contents*

**Unit: 1: Non-metals and their compounds:**

**[20 Hours]**

- 1.1 Water:
  - Source of water
  - Hard and soft water
  - Removal of temporary and permanent hardness of water
  - Water treatment of domestic and industrial purpose
- 1.2 Ammonia:
  - Lab preparation
  - Manufacture by Haber's process
  - Properties and uses
- 1.3 Nitric acid:
  - Manufacture by Ostwald's process
  - Properties and uses.
  - Nitrogen cycle
  - Fixation of Nitrogen
  - Chemical fertilizers
  - Oxides of nitrogen as pollutant (general concept)
  - Acid rain (due to oxides of nitrogen and oxide of Sulphur "Sulphur dioxide")
- 1.4 Halogens (Chlorine):
  - Lab preparation
  - Properties and uses
- 1.5 Hydrochloric acid:
  - Lab preparation

- Properties and uses
- 1.6 Hydrogen Sulphide:
  - Lab preparation
  - Properties and uses
- 1.7 Sulphuric acid:
  - Manufacture by contact process)
  - Properties and uses
- 1.8 Carbon and its compounds:
  - Allotropes of carbon (reference of diamond & graphite & their structure).
  - Oxides of carbon (Ref. carbon dioxide & carbon mono oxide as pollutants)-  
general idea only

**Unit: 2: Metals and their compounds: [15 Hours]**

- 2.1 General study of metals and their components:
  - Combined & free state of metals
  - Chemistry of Metallic Carbonates, Sulphates, Chlorides and Nitrates
- 2.2 Alkali metals:
  - General characteristics of Alkali metals
  - Properties & uses of sodium
- 2.3 Alkaline earth metals:
  - General characteristics of the Alkaline earth metals
  - Properties & uses of calcium
- 2.4 Aluminum:
  - Properties and uses
- 2.5 Coinage metals:
  - General properties of coinage metals
  - Properties and uses
- 2.6 Zinc:
  - Properties & uses
- 2.7 Iron:
  - Properties & uses
- 2.8 Lead:
  - Properties & uses
- 2.9 Alloys:
  - Definition
  - Purpose of making alloys
  - Composition,
  - Properties and uses of alloys of steel, aluminum, copper and zinc

**Unit: 3: Organic compounds and synthetic materials: [10 Hours]**

- 3.1. Organic compounds
  - Organic compounds:
    - Historical background, classification, and nomenclature
    - Functional groups and homologous series
  - Comparison of aliphatic and aromatic compounds

- Saturated hydrocarbon: Properties of Methane
- Unsaturated hydrocarbon: Properties of Ethylene and Acetylene
- Aromatic compounds: Properties of Benzene

### 3.2. Synthetic materials:

- Polymer and polymerization
  - Definition
  - Types of polymer
- Rubber:
  - Types (Natural and Synthetic )
  - Preparation and uses.
- Polyvinyl chloride (PVC):
  - Preparation and uses
- Polythene:
  - Preparation and uses

### Engineering Chemistry Practical II:

- |     |   |           |
|-----|---|-----------|
| 1.  | To compare the hardness of different types of water   | [2 Hours] |
| 2.  | To prepare Bakelite (resin) in the laboratory   | [2 Hours] |
| 3.  | To determine the condition in which corrosion takes place   | [2 Hours] |
| 4.  | To investigate the action of acids on some metals (Zn, Mg, Fe, Al, Sn & Cu)(acids:- HCl, H <sub>2</sub> SO <sub>4</sub> (dil.)& HNO <sub>3</sub> (dil)  | [2 Hours] |
| 5.  | To prepare and study the properties of hydrogen gas   | [2 Hours] |
| 6.  | To prepare and study the properties of ammonia gas  | [2 Hours] |
| 7.  | To prepare and study the properties of hydrogen Sulphide gas. (This gas should not be prepare individually in woulf bottle but in Kipp's apparatus commonly)  | [2 Hours] |
| 8.  | To detect the acid radicals (Cl <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> , SO <sub>4</sub> <sup>2-</sup> , CO <sub>3</sub> <sup>2-</sup> ) by dry and wet ways   | (4 Hours) |
| 9.  | To detect the basic radicals (Cu <sup>++</sup> , Al <sup>+++</sup> , Fe <sup>+++</sup> , Zn <sup>++</sup> , CO <sup>++</sup> , Ni <sup>++</sup> , Ca <sup>++</sup> , Ba <sup>++</sup> , Mg <sup>++</sup> )by wet ways | [6 Hours] |
| 10. | To detect the acid and basic radicals (complete salt analysis)  | [6 Hours] |

### Textbooks:

1. Foundations of chemistry, Vol-2, M.K. Sthapit and R.R. Pradhananga
2. A text Book of chemistry, Jha & Guglani
3. A text Book of Organic Chemistry, B.S. Bahl & Arun Bahl
4. Elementary qualitative analysis, M.K.Sthapit and C.B.Tuladhar
5. Elementary practical chemistry, MK.Sthapit

### Reference books:

1. Inorganic chemistry, Bahl & Tuli
2. Elementary Organic Chemistry, P.N. Bargava
3. Fundamentals of chemistry, K.R. Palak
4. A text Book of Inorganic Chemistry, L.M. Mitra

## **Workshop Practice II (Wood work)**

**EG 1203 CE**

**Year: I**  
**Semester: II**

**Total: 5 hour /week**  
**Lecture: 1 hours/week**  
**Tutorial: hours/week**  
**Practical: 4 hours/week**

### **Course description:**

This course focuses on familiarization of carpentry work and its tools and equipment required.

### **Course objectives:**

Completion of this course the students will be able to:

1. Understand/Identify the principles of carpentry works
2. Select and collect the hand tools required for conduction of carpentry works
3. Perform planing and joints making
4. Understand the theoretical knowledge on technology of wood and its conversion
5. Identify different types of wooden joints and their uses

### **Course Contents**

#### **Theory**

#### **Unit 1 Introduction of carpentry**

**[1 Hour]**

- 1.1. Introduction of handmade tools/equipment
- 1.2. The importance of tools/equipment in carpentry trade made of stones in storage
- 1.3. Types of carpentry trades as per
  - 1.3.1. Carpenter
  - 1.3.2. Joiner
  - 1.3.3. Cabinet and furniture maker
  - 1.3.4. Tree cutter and lumber products or (Producer)
  - 1.3.5. Wood working machine setter-operator
  - 1.3.6. Carpentry trade of to-day

#### **Unit 2 Wood as construction materials**

**[1 Hour]**

- 2.1. Temporary structure building
- 2.2. Structural medium(permanent structure)
- 2.3. Joinery works
- 2.4. Furniture making
- 2.5. Tools and tools handle making

- 2.6. Sport goods
- 2.7. Paper and cardboards
- 2.8. Plywood makings
- 2.9. Miscellaneous works

**Unit 3 The tree and its growth** [1 Hour]

- 3.1. Importance of trees
- 3.2. Enemies of tree
- 3.3. Conservation of forest
- 3.4. Plantation of a tree
- 3.5. How a tree grows
- 3.6. Kinds of trees
- 3.7. Soft wood trees
- 3.8. Hard wood trees
- 3.9. Characteristics of a good timber

**Unit 4 Methods conservations of lumber (Log)** [1 Hour]

- 4.1. Through and through sawn(T and T)
- 4.2. Tangential sawn
- 4.3. Quarter or rift sawn
- 4.4. Cross-sections of a Trunk

**Unit 5 Identify/enumerate hand/power tools** [1 Hour]

- 5.1. Different types of hand tools
- 5.2. Different types of power tools
- 5.3. The band saw
- 5.4. The circular saw
- 5.5. The joiner
- 5.6. The planer
- 5.7. The drill press
- 5.8. The wood lathe

**Unit 6 Perform timber seasoning** [1 Hour]

- 6.1. Definition of seasoning
- 6.2. Object of seasoning
- 6.3. Methods of seasoning
- 6.4. Calculation of moisture content to logs
- 6.5. Percentage of moisture content in a green logs

**Unit 7 Timber defects** [1 Hour]

- 7.1. The defects caused by shrinkage
- 7.2. The defects caused by nature(Natural)
- 7.3. The defects caused by man made
- 7.4. Definition of shrinkage and its reason

**Unit 8 Insects and wood borers** [1 Hour]

- 8.1. Define Borers?
- 8.2. Identify termites or white ants
- 8.3. Removal of termites
- 8.4. Reason of termites develops is home
- 8.5. Wood preservatives
- 8.6. Hot and cold both method
- 8.7. Pressure method
- 8.8. Reason of timber decay
- 8.9. Preservation of timber farm dampness
- 8.10. Definition of dampness
- 8.11. Changes of dampness
- 8.12. Defects caused by dampness

**Unit 9 Wood carvings** [1 Hour]

- 9.1. Definition of carvings
- 9.2. Procedure of carvings (How?)
- 9.3. Process of carvings(Method)
- 9.4. Illustration of ancient carving fundels and shutters

**Unit 10 Painting on wooden surfaces** [1 Hour]

- 10.1. Definition of wood primer
- 10.2. Definition of wood varnishes/enamel and chapra (French polish)
- 10.3. Identification of painting brushes/rollers
- 10.4. Safety precautions

**Unit 11 Simple and complicated wood joints** [1 Hour]

- 11.1. Function of joint
- 11.2. Types of joints(Lengthening, widening and framing joints)
- 11.3. Miscellaneous joints (Khichagatha sash and use of joint hangers)
- 11.4. Types of beam hangers
- 11.5. Use of gusset plates in framings of frame construction e.g.(Truss makings)
- 11.6. Uses and application of;
  - A. Lengthening joint [1 Hour]
    - a. Table scarf joint

- b. Spliced joint
- B. Widening joint [1 Hour]
  - a. Butt joint
  - b. Tongued and grooved joint
  - c. Dowel joint
  - d. Tongued and grooved joint with chips
- C. Framing joint [0.5 Hour]
  - a. Dovetail bridle joint
  - b. Tusk tenon joint
- D. Rail joint [0.5 Hour]
  - a. Stub mortise and tenon joint with hunch
  - b. Housing joint

**Unit 12 Identifying plywood making [1 Hour]**

- 12.1. Veneer slice cutting
- 12.2. Adhesives (glue) makings
- 12.3. Application procedure
- 12.4. Hot pressing
- 12.5. Core direction (90<sup>0</sup>)
- 12.6. Sanding
- 12.7. Their use and application

**Practical (60 Hours)**

- 1. Shave timber by hand to the size and shape (size making to the given dimensions)
- 2. Make cross half lap joint and its function
- 3. Make dovetail half lap joint and its function
- 4. Make mortise and tenon joint and its function
- 5. Make dovetail bridle joint and its function
- 6. Make a stopped housing joint and its function(stopped dado joint)
- 7. Make small stool
  - a. use of stool
  - b. materials selection
  - c. joints used
  - d. different component parts
  - e. work procedure
- 8. Apply finishing and varnish to the small stool
  - a. application procedure
  - b. glazing procedure
  - c. safety precaution

**पाठ्यपुस्तकहरु :**

1. Byanjankar, Mohan Man, The essential views in carpentry and masonry
2. स्थापित चिनकाजी तथा बैद्य, केशव दास, सिकर्मी व्यावसाय
3. सिलाकार, दोब्बरलाल, काष्ठकार्यको परिचय

# Engineering Drawing II

## EG 1201 AR

**Year: I**  
**Semester: II**

**Total: 4 hours /week**  
**Lecture: hour/week**  
**Tutorial: hours/week**  
**Practical: 4 hours/week**

### ***Course description:***

This course is designed to impart knowledge and skills drawing pictorial view (in isometric and oblique) of the solid, surface development and intersection between two elements.

### ***Course objectives:***

After the completion of this course, students will be able to:

1. Analyze/ draw the different orthographic projections
2. Analyze/Draw the different pictorial projections
3. Understand and draw surface development
4. Analyze/ draw intersection

### **Course Contents**

#### **Practical**

#### **Unit 1. Axonometric projection**

**[1 Hour]**

- 1.1. Types of axonometric projection,
- 1.2. Introduction of axonometric projection
- 1.3. Isometric and Oblique projection.

#### **Unit 2. Oblique Drawing**

**[0.5 Hour]**

- 2.1. Making of oblique drawing.
- 2.2. Measurement in receding axis.
- 2.3. Rules for placing object in oblique (Box method)
- 2.4. Cavalier and Cabinet projection.
- 2.5. Making of Angle, Circular arc in oblique drawing.

#### **Unit 3. Isometric Drawing**

**[0.5 Hour]**

- 3.1. Isometric Scale
- 3.2. Angle of receding axis
- 3.3. Isometric Drawing and Isometric projection.
- 3.4. Isometric and Non isometric line.
- 3.5. Making of angle, circular arc in isometric view.

**Unit 4. Projection of True length and shape of oblique line and shape** [0.5 Hour]

- 4.1. Introduction of oblique line
- 4.2. True length and angle to HP/VP of oblique line.
- 4.3. True shape of oblique plane.
- 4.4. Revolving method
- 4.5. Replacing Method

**Unit 5. Projection of intersection of line and plane.** [1 Hour]

- 5.1. Method of finding of intersection point.
- 5.2. Method of finding the seen and hidden part of line.
- 5.3. Method of finding the angle between plane and line.

**Unit 6. Projection of Intersection plane and plane** [0.5 Hour]

- 6.1. Line of intersection
- 6.2. Seen and hidden part of plane
- 6.3. Finding the dihedral angle between two planes.

**Unit 7. Projection of points and line on the surface of geometrical solids.** [0.5 Hour]

- 7.1. Finding the points and lines by generating method.
- 7.2. Finding the points and line by cutting plane method.

**Unit 8. Projection of intersection between line and geometrical solids.**

- 8.1. Projection of piercing point by generating method.
- 8.2. Projection of piercing point by cutting plane method.

**Unit 9. Section** [1.5 Hour]

- 9.1. Introduction of section and its needed
- 9.2. Sectional plane and sectional views
- 9.3. Projection of sectional views
- 9.4. Type of section- Longitudinal and cross section- Full section, half section, offset section, detail section etc.

**Unit 10. Projection of intersection between plane and simple geometrical solids and its Surface development with true shape of cut portion.** [0.5 Hour]

- 10.1. Introduction sectional plane and solid.
- 10.2. Understanding the development of surfaces.
- 10.3. Method of development
- 10.4. Method for development of cut surfaces.

**Unit 11. Projection of intersection between surfaces of solids. [1.5 Hour]**

- 11.1. Introduction about surfaces of solids
- 11.2. Type of cutting plane (Vertical/Horizontal projecting plane).
- 11.3. Determination of line/curve of intersection
- 11.4. After the intersection of two solids that shape will be occurring of touched at touched portion.

**Practical Exercise ( Class work sheet)**

**Sheet No. 1 [10 Hours]**

1. Exercise on model or work piece making the oblique view.
2. Exercise should do at six models on flat or inclined surfaces.
3. Exercise should do at six models on round and inclined/ flat surfaces.

**Sheet No 2 [12 Hours]**

1. Exercise on model or work piece making the isometric view.
2. Exercise should do at six models on flat or inclined surfaces.
3. Exercise should done at six model on round and inclined/ flat surfaces

**Sheet No 3 [1 Hour]**

1. Finding the true length of oblique line by revolving method. (At least three exercise on true length by revolving method)
2. Finding the true shape of oblique plane (Triangle) by replacing (Auxiliary view) method

**Sheet No 4 [3 Hours]**

1. Projection drawing of intersection of line a triangular plane showing the point of intersection,
2. Edge of given plane, true shape of plane and angle between plane and line (At least Two exercises should be done).

**Sheet No 5 [3 Hours]**

1. Projection drawing of intersection plane and plane (two triangular plane) showing line of intersection and dihedral angle between two plane. (At least three exercises should be done).

**Sheet No 6****[1 Hour]**

1. Projection drawing of pyramid and cone with line(s) and point(s) of the surface finding in HP or VP as missing in one plane.

**Sheet No 7.****[3 Hours]**

1. Projection drawing Exercise to be done of full section and half sectional view of model which has through hole (At least two exercise should done of this topic).

**Sheet No 8****[2 Hours]**

1. Exercise to be done on intersection between line and cylinder, pyramid cone, and sphere, showing the piercing points.

**Sheet No 9.****[10 Hours]**

1. Exercise on square prism, pentagonal prism, hexagonal prism, cylinder and cone cut by a vertical
2. Projecting plane (Inclined to HP and perpendicular to VP) with true shape.
3. Exercise on square, pentagonal, hexagonal, base pyramid, cone and sphere cut by a vertical projecting plane (inclined to HP and perpendicular to VP) with true shape.
4. Exercise on above mentioned pyramid and cone cut by a horizontal projecting plane (inclined to VP and perpendicular to HP)
5. Surface development of prism (Triangular, square, pentagonal, hexagonal base), cylinder at simple position (uncut state).
6. Surface development of pyramid and cone after the cut by sectional plane (truncated solid).

**Sheet No 10****[8 Hours]**

Projection drawing of intersection of two surface of two solid (intersection of two solids)

1. Vertical (right) prism and horizontal prism of different size.
2. Vertical (right) cylinder and horizontal cylinder of different size.
3. Vertical (right) cylinder and horizontal prism.
4. Vertical (right) cone and prism.
5. Vertical (right) Cone and cylinder.
6. Vertical (right) pyramid and prism..

**References:**

- Luzzadar W. I Fundamental of Engineering drawing. Prentice-Hall of India
- S. Bogolyubov and A. Voinov, Engineering drawing. Mir Publishers, Moscow.
- S. K Bogolyubov, Exercises in Machine Drawing. Mir publishers, Moscow.
- K. Venugopal Engineering Drawing and Graphics, New age international (p) Ltd. India
- Gill P. S. Engineering Drawing, S. K. Kataria and sons India.
- M. B. Shah and B.C. Rana, Engineering Drawing, Pearson India,
- N. D. Bhatta and Panchal V.M. Engineering Drawing Charotar publishing House India.

# **Building Materials**

## **EG 1204 CE**

**Year: I**  
**Semester: II**

**Total: 4 hours /week**  
**Lecture: 4 hours/week**  
**Tutorial: hours/week**  
**Practical: hours/week**

### **Course description:**

This course is designed to impart knowledge on most of the common engineering materials related to the construction of buildings.

### **Course objectives:**

After the completion of this course, students will be able to:

1. Familiarize with the commonly used building materials.
2. Understand application methods in building construction works.
3. Know the physical and chemical characteristics and properties of various building materials.

### **Course Contents**

#### **Theory**

#### **Unit 1: General introduction**

**[2 Hours]**

- 1.1 Introduction
- 1.2 Scope of study

#### **Unit 2: Rocks/Stones**

**[18 Hours]**

- 2.1. Formation and geological classifications of rock
- 2.2. Source of building stones
- 2.3. Quarrying, dressing & preservation of building stones.
- 2.4. Different types of stones and their uses in engineering field
- 2.5. Characteristics of major building stones (physical & chemical)
- 2.6. Availability and sources of stones in the country.
- 2.7. Artificial stones and their properties ( mosaic & terrazzo)
- 2.8. Comparison between natural and artificial stones

#### **Unit 3: Lime**

**[6 Hours]**

- 3.1. Its sources and manufacturing methods.
- 3.2. Its chemical composition
- 3.3. Types and uses
- 3.4. Storage of lime

**Unit 4: Cement:****[12 Hours]**

- 4.1 Composition of cement (OPC)
- 4.2 Manufacturing methods
- 4.3 Properties and types
- 4.4 Storage of cement
- 4.5 Different types of test (inductory)

**Unit 5: Mortars:****[6 Hours]**

- 5.1 Types of mortar ( mud, lime, cement)
- 5.2 Properties & uses of different types of mortar
- 5.3 Composition of ingredients in mortar (mud, lime, cement & composite)

**Unit 6: Aggregates:****[4 Hours]**

- 6.1 Fine aggregates
- 6.2 Coarse aggregates

**Unit 7: Cement concrete:****[12 Hours]**

- 7.1 Ingredient of cement concrete
- 7.2 Its type by mix design
- 7.3 Workability & W/C ratio
- 7.4 Placing, compaction & curing of concrete
- 7.5 PCC & RCC
- 7.6 Various tests of cement concrete (introductory).

**Textbooks:**

1. Gurcharan Singh, Building Materials

**References:**

1. Surendra Singh, Engineering Material,
2. D.N. Ghosh, Materials for construction,
3. S.V. Deoduar & S:K Singh, Civil engineering Materials,
4. Sushil Kumar, Engineering material,
5. Agrawal, B.K., Engineering material,
6. Chong, C.V.Y., Properties of Materials (1977). MacDonald and Evans Ltd. Estover, Plymouth, UK
7. Gupta, R. B., Material Science and Processes (1974). Satya Prakashan, Inc. Tech India Publication, New Delhi.

# Computer Application

## EG 1211 CT

Year: I  
Semester: II

Total: 4 hour /week  
Lecture: 2 hours/week  
Tutorial: hours/week  
Practical: 2 hours/week  
Lab: hours/week

### *Course Description:*

This course deals with the history of computer development, hardware components, Operating systems, Software applications, Computer networks and Internet. Students will learn classifications of computers, its architecture and software application installations, Peripheral devices installation, computer networks, internet and their use in various purposes.

### *Course Objectives:*

On completion of this course the students will be able to:

1. Understand the basic architecture of Computer.
2. Identify major components of computer and their role.
3. Understands the different Operating Systems like MS-DOS, Windows etc.
4. Use the different Software applications.
5. Understand the basic networking and Internet concept.

### **Course Content:**

#### **Theory**

<b>Unit 1</b>	<b>Introduction to Computers</b>	<b>[2 Hours]</b>
	1.1 History of computers	
	1.2 Generation and type of computers	
	1.3 Computer hardware and software	
<b>Unit 2</b>	<b>Hardware Components</b>	<b>[6 Hours]</b>
	2.1 Major blocks of a digital computer	
	2.2 Input devices like keyboard, mouse, joystick, scanner, light pen etc.	
	2.3 Output devices like monitor, printer, plotter, sound card, speaker etc.	
	2.4 Central Processing Unit	
	2.5 Memory Unit: RAM, ROM, PROM, EPROM	
	2.6 Auxiliary storage devices:	
	• Magnetic storage like floppy disk, hard disk, magnetic tape etc.	
	• Optical storage like CD-ROM, DVD	
	• Pen drive, flash memory card etc.	
<b>Unit 3</b>	<b>Introduction to Operating System Software</b>	<b>[6 Hours]</b>
	3.1 Importance and use of operating systems (OS)	
	3.2 Type of OS: MS-DOS, Windows, Unix, Linux	
	3.3 File management, device management and memory management by OS	
	3.4 MS-DOS system files: io.sys, msdos.sys, command.com, config.sys, autoexec.bat	

- 3.5 MS-DOS internal and external commands
- 3.6 Windows Operating System: Graphical User Interface and windows environment, file/folder management
- 3.7 Linux: GNU open source operating system

**Unit 4      Application Packages      [7 Hours]**

- 4.1 Text Editors (edit in DOS, notepad in Windows, vi editor in Linux)
- 4.2 Word Processing Package: Microsoft Word
- 4.3 Spreadsheet Package: Microsoft Excel
  - Entering data
  - Using formula
  - Basic calculations
  - Financial calculations
  - Charts
- 4.4 Concept of Database management system
- 4.5 Database management package: Microsoft Access
- 4.6 Presentation Package: Microsoft PowerPoint

**Unit 5      Utility Programs      [2 Hours]**

- 5.1 Computer virus and its removal (antivirus programs)
- 5.2 Multimedia: Audio, Video and Graphics

**Unit 6      Networks and Internet      [7 Hours]**

- 6.1 Brief Introduction of LAN, MAN, WAN
- 6.2 Topologies: Bus, Ring and Star
- 6.3 Hub, Switch, Modem
- 6.4 Network Cabling
- 6.5 NIC
- 6.6 Network OS
- 6.7 Client and server concept
- 6.8 File and print sharing
- 6.9 Email/Internet
  - World Wide Web (WWW)
  - ISP
  - Search Engines
  - Internet Client: Web browsers like Internet Explorer, Netscape Navigator, Mozilla Firefox etc.,
  - Email clients like Outlook Express, Netscape Mail etc.

### **Practical [30 Hours]**

1. Identification of major components of computer and familiarization with keyboard and mouse. (1 session)
2. Internal and External DOS commands (1 session)
3. Windows Graphical User Interface and file/folder management (1 session)
4. Microsoft Word (2 sessions)
  - a. Editing text
  - b. Formatting document
  - c. Creating tables
  - d. Creating graphics and word art
5. Microsoft Excel (3 sessions)
  - a. Editing worksheet
  - b. Data formatting and manipulation
  - c. Analysis of data(use of functions for calculation)
  - d. Charts/Data presentation
  - e. Import/Export data
6. Microsoft Access (2 sessions)
  - a. Creating and manipulating data tables
  - b. Query
  - c. Forms/Reports
7. Using Multimedia and Internet/Email (1 session)
8. Creating effective presentation using Microsoft PowerPoint (1 session)
9. Project Work (3 sessions)

The students will be assigned (individually or in group) a project work based on Microsoft Excel or Access. The students are required to prepare a short report in MS Word and prepare a short presentation in PowerPoint.

#### **Text Books:**

1. Rajaraman, "*Fundamentals of Computers*", Prentice-Hall of India

#### **References Books:**

1. B Ram, "*Computer Fundamentals*", Willey Eastern Publishers
2. S Saxena, "*A First Course in Computers*", Vikash Publishing
3. Winn Rosch, "Harware Bible"
4. Noel Kalicharan, "Introduction to computer Studies", Cambridge Low Price Edition
5. P.K Sinha, "Computer Fundamentals"

# Measured Drawing & Drafting II

EG 1202 AR

Year: I  
Semester: II

Total: 3 hour /week  
Lecture: hour/week  
Tutorial: hours/week  
Practical: 3 hours/week

## Course description:

This course intends to provide knowledge and skills on freehand sketch of any object, measurement instruments, drawing of different objects in different scale, freehand sketch of traditional building, measurement of the same building, dimensioning the sketch and producing the drawings of the same building into the scale.

## Course objectives:

After the completion of this course students will be able to:

1. Understand the concept of measured drawing and drafting techniques.
2. Produce the complete set of drawings of any building by using different techniques of measurement.

## Course Contents

### Practical

#### Unit 1: Sketch out the existing Traditional public building (Signal storey building)

[9 Hours]

- 1.1 Plans
- 1.2 Four side elevations
- 1.3 Sections
- 1.4 Details ( Doors, windows and stair)

#### Unit 2: Taking measurements and dimensioning of existing traditional public building sketch of unit I

[6 Hours]

- 2.1. Plans
- 2.2. Four side elevations
- 2.3. Sections
- 2.4. Opening details (doors, windows)
- 2.5. Stairs

#### Unit 3: Drawing to scale in studio from unit I & II:

[24 Hours]

- 3.1. Plans
- 3.2. Sections
- 3.3. Elevations
- 2.6. Details (doors, windows wall section)

**Unit 4: Check and verify the missing details in the drawing according to the field and complete the drawing [6 Hours]**

**References:**

1. K.Vegugopal, Engineering drawing and graphic, New Age International, New Delhi, India
2. Technical Drawing
  - a. Frederice liesecke
  - b. Alva Mitchel
  - c. Henry lecil spences
  - d. Ivan levoy Hill
  - e. John thomas Dygdon
  - f. James E. Novak
3. D. D. Adrews, Bill Blake, Measured and Drawn, English Heritage
4. Peter Swallow, Bavid Walt, Robert Asthon, Measurement and recording of Historic Building, London Donhead Publishers

# Freehand Drawing & Composition I

EG 1203 AR

**Year: I**  
**Semester: II**

**Total: 4 hour /week**  
**Lecture: hour/week**  
**Tutorial: hours/week**  
**Practical: 4 hours/week**

## Course description:

This course is designed to equip the students with knowledge and skills of free hand drawings and compositions with rendering using pencil.

## Course objectives:

After completion of this course students will be able to:

1. Understand the concept of freehand drawing and compositions
2. Draw free hand lines, basic shapes using pencil.
3. Draw different compositions with rendering using pencil.

## Course Contents

### Practical

#### Unit 1: Introduction (Knowledge)

**[4 Hours]**

- 1.1 Introduction of Free Hand drawing and composition
- 1.2 Introduction of Free Hand perspective
- 1.3 Introduction of Colour theory
- 1.4 General knowledge of drawing materials as pencil, paper, pencil color etc.

#### Unit 2: Free Hand Drawing of Line and Shape

**[15 Hours]**

- 2.1 Free Hand exercise of different lines – Horizontal, Vertical, Inclined, Curve, Dash, etc.
- 2.2 Free Hand exercise of different simple geometrical 2D forms – Circle, Square, Rectangular, Triangle,

**Unit 3: Free Hand Drawing of Basic Form****[15 Hours]**

3.1 Free Hand exercise of Interpenetration different forms - Circle, Square, Rectangular, Triangle, etc.

3.2 Free Hand exercise of Individual 3D objects - Sphere, Cube, Cuboids, Pyramid, etc.

**Unit 4: Composition of Basic Form****[14 Hours]**

4.1 Composition of simple geometrical 2D forms – Triangle, Circle, Square, etc.

4.2 Composition of simple geometrical 3D forms – Cube, Sphere, cuboids, etc.

**Unit 5: Rendering with tonal value****[12Hours]**

5.1 Rendering with Tone exercise pencil (Tint & Tones)

5.2 Rendering exercise with light, shade and shadow in Sphere, Cube, Cylinder, etc.

**References:**

1. Easy to Draw – Still life, Adarsh Enterprises, New Delhi, India
2. Easy to Draw – Landscapes, Adarsh Enterprises, New Delhi, India
3. Easy to Draw –Wonders of the world and monuments, Adarsh Enterprises, New Delhi, India
4. The essentials of Drawing – Peter Gray, Arcturus Publishing, London, UK
5. Drawing for Pleasure – Valerie C. Douet, Search Press, Kent, UK
6. Quick and clever Drawing – Michael Sanders, David & Charles, UK
7. Country Landscapes, Terry Harrison, Search Press, Kent, UK
8. Perspective, Milind Mulick, Jyotsna Prakashan, Pune,India

# Second Year

(Third and Fourth Semesters)

# Third Semester

## Subjects:

- |   |            |                                   |
|---|------------|-----------------------------------|
| 1 | EG 2101 AR | Computer Aided Drafting (CAD) I   |
| 2 | EG 2104 SH | Engineering Mathematics III       |
| 3 | EG 2102 AR | Surveying I                       |
| 4 | EG 2103 AR | Freehand Drawing & Composition II |
| 5 | EG 2104 AR | Perspective                       |
| 6 | EG 2105 AR | Architectural Model Making I      |
| 7 | EG 2108 CE | Building Materials II             |
| 8 | EG 2109 CE | Building Construction I           |
| 9 | EG 2106 AR | Building Services I               |

# Computer Aided Drafting (CAD) I

EG 2101 AR

Year: II  
Semester: I

Total: 5hour /week  
Lecture: 1 hour/week  
Tutorial: hours/week  
Practical: 4 hours/week

## Course Description:

This course intends to provide knowledge and skills on drawing basic two dimensional drawings as geometrical shapes and curves through computer aided drafting (Auto CAD)

## Course objectives:

After completion of this course students will be able to:

1. Use the functions and commands of Auto CAD program
2. Create and modifying basic two dimensional geometrical shapes & curves.

## Course Contents:

### Theory

#### Unit 1: Introduction to the course [2 Hours]

- 1.1 Introduction to Auto CAD
- 1.2 Overview of a PC, peripherals input and output devices
- 1.3 Auto CAD interface
- 1.4 Auto CAD terminology

#### Unit 2: Starting a new drawing/opening an existing drawing [2 Hours]

- 2.1. Setting up a drawing starting from scratch using wizard
- 2.2. Setting up a working area through LIMITS
- 2.3. Setting up a working area through MVSETUP
- 2.4. Save/save as drawing

#### Unit 3: 2D coordinate systems in Auto CAD [2 Hours]

- 3.1. Specifying points on Auto CAD screen using
  - 3.1.1 Absolute coordinate system
  - 3.1.2 Relative coordinate system
  - 3.1.3 Polar coordinate system
- 3.2. Viewing objects
  - 3.2.1 Zooming/panning
  - 3.2.2 Undo, Redo, Oops
- 3.3 Regen, Regenall

**Unit 4: Drawing commands:** [2 Hours]

- 4.1 Points Line construction line, multi line
- 4.2 Poly line, Ray, Polygon, Rectangle

**Unit 5: Modify commands:** [2 Hours]

- 5.1 Object selection methods
- 5.2 Erase, copy, mirror
- 5.3 Move, Rotate, offset, array, trim, break, stretch, extend,

**Unit 6: Modify Commands:** [3 Hours]

- 6.1 Chamfer, fillet, scale, lengthen
- 6.2 Direct distance entry
- 6.3 Object tracking, grid, ortho, polar (status bar)
- 6.4 Function keys.

**Unit 7: Computer graphics fundamental** [2 Hours]

- 6.1. Raster image/vector image
- 6.2. Block/wblock
- 6.3. Text
- 6.4. Dimensioning

**Practical**

**Unit 1: Open and start new drawings:** [5 Hours]

- 1.1 Auto CAD screen
- 1.2 Setting up new drawing
- 1.3 Save/save as the drawing

**Unit 2: Design and draw followings:**

- 2.1. Draw lines using coordinate system -----10 hrs
- 2.2. Lab-1 using draw commands-----15 hrs
- 2.3. Lab -2 using modify commands----- 15 hrs
- 2.4. Lab -3 draw one room building ----- 15 hrs

**References:**

1. Alf Yarwood, Introduction to Auto CAD 2006
2. Ellen Finkelstin, Auto CAD 2000 Bible, IDG Books India (P) Ltd., 3583 Om Bhawan, 4<sup>th</sup> Floor, Netaji Subas Marg, Daryaganj, New Delhi,
3. George Omura, Mastering Auto CAD 2007 and Auto CAD LT 2007, BPB Publications, India
4. Sham Tickoo, Auto CAD 2005 for Engineers and Designers, Dreamtech Press

# Engineering Mathematics III

## EG 2104 SH

Year: II  
Semester: I

**Total: 4 hour /week**  
**Lecture: 3 hours/week**  
**Tutorial: 1 hours/week**  
**Practical: hours/week**  
**Lab: hours/week**

### *Course description:*

This course consists of Partial Derivative, Differential equations, infinite series, Fourier series, and Elementary Group Theory necessary to develop mathematical background.

### *Course objectives:*

After completing this course the student will able to:

1. Provide the basic mathematical idea for the analysis of electronic circuits
2. Help in the development of program for the technical applications

### *Course Contents:*

#### **Unit 1 Partial Derivative**

**[8 Hours]**

- 1.1 Functions of more than one variables
- 1.2 Partial derivative, partial differential coefficient.
- 1.3 Partial derivative of first and higher order.
- 1.4 Homogeneous function and Euler's Theorem on homogeneous functions.
- 1.5 Composite function, Derivative of composite functions.  
(Total differential coefficient)

#### **Unit 2 Differential Equations**

**[10 Hours]**

##### **2.1 Ordinary differential Equations**

- 2.1.1 Differential Equation and its order and degree.
- 2.1.2 Differential Equations of first order and first degree,
- 2.1.3 Differential Equations with separate variables,
- 2.1.4 Homogeneous and exacted differential Equations

##### **2.2 Partial differential Equations (PDF)**

- 2.2.1 Basic concepts, definition and formation
- 2.2.2 General solution of linear PDF of first order ( $Pp + Qq = R$  form)

**Unit 3 Infinite Series:****[11 Hours]**

- 3.1 Definitions of sequence and infinite series,
- 3.2 Condition for convergence of an infinite series,
- 3.3 Geometric series.
- 3.4 Test of convergence. (p-test, D' alembert's ratio test, Cauchy radical test or root test)
- 3.5 Power series and its interval of convergence,
- 3.6 Expansion of functions using Taylor's and Maclaurin's theorems.

**Unit4. Fourier series:****[8 Hours]**

- 4.1 Periodic function,
- 4.2 Even and odd function
- 4.3 Trigonometric series
- 4.4 Fourier series of the functions of period  $2\pi$ ,
- 4.5 Euler's formula,

**Unit5. Elementary Group Theory****[8 Hours]**

- 5.1. Binary operation, Binary operation on sets and their properties.
- 5.2. Definition of group
- 5.3. Group whose elements are not number
- 5.4. Finite, Infinite group and Abelian group
- 5.5. Elementary properties of group.

**Reference books:**

1. Thomas and Finney, *Calculus and Analytical Geometry*, Narosa Publishing House, New Delhi, 1990.
2. E. Kreyszig, *Advanced Engineering Mathematics*, Wiley-Easter Publication, New Delhi, 1990.
3. Chandrika Prasad, *Mathematics for Engineer*, Prasad Mudranalaya, Allahabad, 1996.
4. E. Kreyszig, *Advanced Engineering Mathematics*, Wiley-Easter Publication, New Delhi, 1990.
5. A.V. Oppenheim, *Discrete-Time Signal Processing*, Prentice Hall, India Limited, 1990.
6. K. Ogata, *Discrete-Time Control System*, Prentice Hall, India Limited, 1993.

# Surveying I

EG 2102 AR

**Year: II**  
**Semester: I**

**Total: 6 hours /week**  
**Lecture 2 hours/week**  
**Practical: 4 hours/week**

## Course description:

This course focuses on familiarization of different surveying techniques and handling of surveying equipment. The different surveying techniques include linear, angular, vertical measurements, and plotting skills.

## Course objectives:

After completing this course the student will be able to:

1. Understand distance measurement techniques.
2. Apply basic surveying techniques and plotting of plan and map.

## Course Contents:

### Theory

#### Unit 1 Introduction

[6 Hours]

- 1.1 Definition of surveying
- 1.2 Primary division of survey
- 1.3 Principles of surveying
- 1.4 Difference between plan and map
- 1.5 Scales and their types

#### Unit 2 Linear Distance Measurement

[6 Hours]

- 2.1 Introduction of Chain, Tape, Ranging rod, Arrow
- 2.2 Methods of distance measurement on horizontal and sloping ground
- 2.3 Ranging a line
- 2.4 Errors in distance measurement and Precision in distance measurement
- 2.5 Tape correction

#### Unit 3 Chain Surveying

[8 Hours]

- 3.1 Principles of chain surveying
- 3.2 Perpendicular offsets, Oblique offsets, Setting 3.4.5 right angle
- 3.3 Procedures of chain surveying
  - 3.3.1 Reconnaissance survey
  - 3.3.2 Selection of survey stations
  - 3.3.3 Referencing and marking of stations
  - 3.3.4 Double line field Book
- 3.4 Detailing
- 3.5 Conventional symbols
- 3.6 Plotting

**Unit 4 Compass Survey****[10 Hours]**

- 4.1. Meridians, Bearings, Magnetic declination
- 4.2. Whole circle bearing system, Quadrantal bearing system, Fore bearing and Back bearing
- 4.3. Prismatic and Surveyor's compass
- 4.4. Calculation of angles from bearing and bearing from angles,
- 4.5. Angular error, Angular precision
- 4.6. Local attraction, detection and correction of local attraction
- 4.7. Field procedure of compass survey
- 4.8. Booking
- 4.9. Plotting and graphical adjustment of traverse
- 4.10. Errors in compass

**Practical Field Works:**

1. Care and handle instrument. [8 Hours]
2. Perform linear distance measurement on plane and sloping ground. [12 Hours]
3. Perform chain triangulation and detailing. [12 Hours]
4. Perform compass traversing and detailing. [20 Hours]

Evaluation (Viva + Instrumentation + Objective test)

[8 Hours]

**Text Book:**

1. Dr. BC Punmia, " Surveying " Vol I, Laxmi Publication New Delhi

**Reference Books:**

1. SK Duggal, " Surveying" Vol I and II, Tata MC Graw Hill Publishing
2. N Basnet and M Basnet, " Basic Surveying – I", Benchmark Education Support Pvt. Ltd.,Tinkune Kathmandu

# Freehand Drawing & Composition II

## EG 2103 AR

**Year: II**  
**Semester: I**

**Total : 3 hours/week**  
**Lecture: hours/week**  
**Tutorial: hours/week**  
**Practical: 3 hours/week**

### Course description:

This course intends to provide knowledge and skills of free hand drawing and composition with rendering using pencil and pencil color.

### Course objectives:

After completion of this course students will be able to:

1. Understand the concept of freehand drawing and compositions
2. Draw free hand drawing and composition using pencil and pencil color.
3. Draw different compositions with rendering using pencil and pencil color.

### Course Contents:

#### **Unit 1: Free Hand Drawing of Basic Form [9 Hours]**

- 1.1 Free Hand exercise – Simple manmade forms of box, bottle, table, chair, etc.
- 2.2 Free Hand exercise – Simple natural forms of tree, human figures, etc.

#### **Unit 2: Composition of Basic Form [12 Hours]**

- 2.1 Composition of Manmade objects – box, bottle, etc.
- 2.2 Composition of Natural objects – flower, fruit, etc.

#### **Unit 3: Rendering with tonal value [12 Hours]**

- 3.1 Rendering exercise with light, shade and shadow in individual manmade and natural forms
- 3.2 Rendering with pencil colour in composition of manmade and natural forms

#### **Unit 4: Free Hand drawing of simple exterior and interior views [12 Hours]**

- 4.1 Free Hand exercise of Interior view with Rendering in Pencil colour
- 4.2 Free Hand exercise of Exterior view with Rendering in Pencil colour

**Reference books:**

1. Easy to Draw – Still life, Adarsh Enterprises, New Delhi, India
2. Easy to Draw – Landscapes, Adarsh Enterprises, New Delhi, India
3. Easy to Draw –Wonders of the world and monuments, Adarsh Enterprises, New Delhi, India
4. The essentials of Drawing – Peter Gray, Arcturus Publishing, London, UK
5. Drawing for Pleasure – Valerie C. Douet, Search Press, Kent, UK
6. Quick and clever Drawing – Michael Sanders, David & Charles, UK
7. Country Landscapes, Terry Harrison, Search Press, Kent, UK
8. Perspective, Milind Mulick, Jyotsna Prakashan, Pune,India

# Perspective

## EG 2104 AR

**Year: II**  
**Semester: I**

**Total: 5 hours /week**  
**Lecture: 1 hours/week**  
**Tutorial: hour/week**  
**Practical: 4 hours/week**

### Course description:

This course is designed to equip the students with knowledge and skills of perspective drawings (media for expression of architectural design in 3 dimensional approaches) work of 1 points 2 points and 3 points vanishing perspective drawing (pictorial view) work.

### Course objectives:

After the completion of this course students will be able to:

1. Understand basic concept of perspective
2. Draw a visual media for design presentation
3. Know application methods in building design and graphic works.

### Course Contents:

#### Theory

<b>Unit 1: Perspective Drawing as Pictorial View</b>	<b>[1 Hour]</b>
1.1 Definition/Terminology	
1.2 Uses and importance	
1.3 Basic principles	
<b>Unit 2: One point Vanishing (Parallel) Perspective:</b>	<b>[4 Hours]</b>
2.1. Definition/Terminology	
2.2. Uses and importance	
2.3. Basic principles	
<b>Unit 3: Two-point Vanishing (Angular) Perspective:</b>	<b>[4 Hours]</b>
3.1. Definition/Terminology	
3.2. Uses and importance	
3.3. Basic principles	
<b>Unit 4: Comparison between 1 point &amp; 2 point Vanishing Perspective Drawing:</b>	<b>[4 Hours]</b>
<b>Unit 5: Freehand Perspective Sketching and Sciagraphy:</b>	<b>[1 Hour]</b>

**Unit 6: Three point Vanishing Perspective (oblique) view (introductory only)**  
**[1 Hour]**

**Practical:**

**Unit 1: Perspective Drawing as Pictorial View: [4 Hours]**

1.1 Draw line drawing of simple plane geometrical figure (Square, rectangle and circle) in perspective form

1.1.1 Plan, elevation \_\_\_\_\_ 1 sheet

**Unit 2: Draw One Perspective View of: [14 Hours]**

2.1. Simple, Cube, Prism, Pyramid, Cylinder and Cone \_\_\_\_\_ 2 Sheets

**Unit 3: Draw Two point Perspective View of: [16 Hours]**

3.1. Simple, Cube, Prism, Pyramid, Cylinder and Cone \_\_\_\_\_ 2 Sheets

3.2. Simple Single Storey residential building with flat/slop roof \_\_\_\_\_ 1 sheet

**Unit 4: Draw Comparison perspective drawing: [16 Hours]**

4.1 Simple, Cube, Prism, Pyramid, Cylinder and Cone \_\_\_\_\_ 2 Sheets

4.2 Simple Single Storey residential Building with flat/slop roof \_\_\_\_\_ 1 sheet

**Unit 5: Draw Freehand Sketch: [6 Hours]**

5.1 1- Point Perspective of an interior of a room ----- 1 Sheet

5.2 1 and 2 point perspective of an opening (door, arch, window, ventilator)  
- 1 Sheet

**Unit 6: Draw Three point Vanishing Perspective drawing: [4 Hours]**

6.1 Simple, Cube, Prism, Pyramid, Cylinder ..... 2 Sheets

**Textbook:**

1. N.D. Bhatt (1994)Engineering Drawing, Charotar Publishing House, Court Road and Gujarat India, Latest edition
2. Singh Guruchoran, and Jagdish, Technical Drawing,
3. K. L. narayana & P. Kannaiah, (1988), Engineering Drawing & Graphic Technology, Tata MC Graw Hill Publishing Company Ltd., New Delhi, India

**References:**

1. Ching Frank, Architectural Graphics, Engineering Graphics
2. Nicholas T. Dines, Landscapes Perspective Drawing,
3. Rebert W. Gill, Penandika Rendesiry,
4. Tom Porter & Sue Goodman, Graphic Technology
5. Francis D.V. Ching, Drawing, A creative Process,
6. Frederick Giesecke, Technical Drawing

# Architectural Model Making I

EG 2105 AR

**Year: II**  
**Semester: I**

**Total: 4 hours /week**  
**Lecture: hours/week**  
**Tutorial: hour/week**  
**Practical: 4 hours/week**

## Course description:

This course intends to equip students with knowledge and skills on making model of different objects.

## Course objectives:

After the completion of this course students will be able to:

1. Understand the concept of making architectural models.
2. Perform different shapes modeling.
3. Enable to make model as a visual media.

## Course Contents:

### **Unit 1: Model making Materials and practice: [1 Hour]**

- 1.1 Introduction ( demonstration of models)
- 1.2 Uses of Models
- 1.3 Different types of material & their uses and importance

### **Unit 2: Workshop and Hand equipment: [3 Hours]**

- 2.1. Anticutter, metal ruler, their different using techniques
- 2.2. Adhesive material, their different using techniques of joints
- 2.3. Painting brushes, Colours, exercise in a chart of black & white colour different tone.

### **Unit 3: Surface Development: [8 Hours]**

- 3.1. Cube
- 3.2. Cylinder
- 3.3. Cone
- 3.4. Pyramid
- 3.5. Prism
- 3.6. Sphere

### **Unit 4: Modeling of Simple Geometric Solids: [8 Hours]**

- 4.1 Cube -Modelling of simple plain surface with 6 cm sides

- 4.2 Cylinder - Modelling of simple plain surface cylinder with 6 cm diameter base & 12cm height
- 4.3 Cone - Modelling of simple plain surface of cone with 6 cm diameter base & 12cm height
- 4.4 Pyramid - Modelling of simple plain surface of Pyramid of 6cm side base & 12cm height

**Unit 5 : Modeling of Complex Shapes:**

**[12 Hours]**

- 5.1 Composition of Cube
- 5.2 Composition of Cylinder & cubes
- 5.3 Composition of pyramid Cone

**Unit 6 : Simple Building :**

**[28 Hours]**

- 6.1 A single storey residential building with interior (drawings should be provided)

**Text Books:**

- 1. Fuller Moore, Model builder's Notebook, Mc-graw hall publishing company
- 2. Rolf Janke, Architectural Modells, Architectural Book publishing co.
- 3. Helper, Jenson. Interior design fundamentals,

**References:**

- 1. Technical drawing - FRederick E. Giesecke.
- 2. Colour Drawing - Michael E. Doyle
- 3. Rendering with pen and ink, The Thames and Thomson Maunal
- 4. Magazines- Inside Outside, A+D, Interior Design, Society interior

# **Building Materials II**

## **EG 2108 CE**

**Year: I**  
**Semester: II**

**Total: 4 hours /week**  
**Lecture: 4 hours/week**  
**Tutorial: hour/week**  
**Practical: hours/week**

### **Course description:**

This course imparts knowledge on engineering materials used in construction works. It also deals few modern materials used in interior design and decoration works.

### **Course Objectives:**

After the completion of this course students will be able to:

1. Familiarize with commonly used building materials.
2. Understand application methods in building construction works.
3. Understand the physical and chemical characteristics as well as properties of building materials.

### **Course Contents:**

#### **Theory**

#### **Unit 1: Ferrous and non ferrous metal**

**[12 Hours]**

- 1.1 Ferrous metal, types & uses
- 1.2 Non ferrous metal, types & uses
- 1.3 Corrosion and protection of ferrous metal

#### **Unit 2: Alloys**

**[12 Hours]**

- 2.1. Steel and its Alloys
- 2.2. Uses of steel
- 2.3. Market forms of steel
- 2.4. Alloys of non ferrous metal

#### **Unit 3: Building finishes (Floor/wall)**

**[18 Hours]**

- 3.1. Floor Finishes
  - 3.1.1 Punning (mud and cement)
  - 3.1.2 Mosaic (cast in situ, and precast)
  - 3.1.3 Tiles (clay, cement, and vinyl)
  - 3.1.4 Stones (marble, granite, flagstone)

- 3.1.5 Wooden (strip, board & parqueting)
- 3.2. Wall Finishes
  - 3.2.1 Plastering ( mud, lime and cement)
  - 3.2.2 Punning ( mud, lime and cement)
  - 3.2.3 Wood paneling, wall papering
  - 3.2.4 Cladding ( stone and tile)
  - 3.2.5 Metal sheeting and Glazing

**Unit 4: Building Finishes (Roofing Materials/ceiling materials): [6 Hours]**

- 4.1 Tiling ( clay, ceramic and slate)
- 4.2 Sheeting ( AC sheet, C.GI sheet & fiber Glass)

**Unit 5: Painting/Varnishing: [8 Hours]**

- 5.1 Constituent of paint/varnish
- 5.2 Types of paint/varnish
- 5.3 Characteristics and uses
- 5.4 Application Techniques

**Unit 6 : Miscellaneous (Introductory) [4 Hours]**

- 6.1. Glass and plastic
- 6.2. Asphalt and Bitumin
- 6.3. Surkhi and slag

**Textbooks:**

- 1. Gurcharan Singh, Building Materials

**References:**

- 1. Surendra Singh, Engineering Material
- 2. D.N. Ghosh, Materials for construction,
- 3. S.V. Deoduar & S:K Singh, Civil engineering Materials,
- 4. Sushil Kumar, Engineering material,
- 5. B.K Agrawal, Engineering material,

# **Building Construction I**

## **EG 2109 CE**

**Year: II**  
**Semester: I**

**Total: 4 hours /week**  
**Lecture: 2 hours/week**  
**Tutorial: hour/week**  
**Practical: 2 hours/week**

### **Course description:**

This course is designed to provide knowledge and skill in Building Construction techniques such as foundation, wall with DPC and floor with DPC. It intends to provide skills and knowledge on preparing drawings and sketches of building components.

### **Course objectives:**

After the completion of this course student will be able to:

1. Identify the different components of buildings.
2. Understand the concept of building construction techniques.
3. Follow the steps of construction systematically.

### **Course Contents:**

#### **Theory**

#### **Unit 1: Introduction**

**[2 Hours]**

- 1.1. Definition, rule within architectural context
- 1.2. Construction materials, elements, tools & techniques
- 1.3. Development, evolution of building technology
- 1.4. Classifications of building, elements & structural system

#### **Unit 2: Foundation (Substructure):**

**[10 Hours]**

- 2.1. Definition, purpose and function
- 2.2. Simple soil mechanics
  - 2.2.1 Types of soil, properties and bearing capacities
  - 2.2.2 Methods of improving bearing capacity of soil
  - 2.2.3 Soil explanation/investigation (test pit)
- 2.3 Loading on foundation- live load, dead load, & other loads.
- 2.4 Simple spread foundation
  - 2.4.1 Elements, concrete bed, footing courses, foundation masonry
  - 2.4.2 Empirical methods for design of footing
  - 2.4.3 Construction details
  - 2.4.4 Types of foundation (shallow foundation only)

**Unit 3: Dampness:** [4 Hours]

- 3.1. Definition, causes and ill effects
- 3.2. Importance of damp prevention
  - 3.2.1 Damp proofing materials & their application in buildings
  - 3.2.2 Damp proofing methods & types

**Unit 4: Wall/Masonry:** [6 Hours]

- 4.1 Solid load bearing wall ( stone/brick/concrete block)
- 4.2 Construction Methods ( bonding systems)
- 4.3 Features (Lintels, sills, jambs, their functions and construction techniques)

**Unit 5: Floors:** [8 Hours]

- 5.1 Definition and functions
- 5.2 Classifications (solid & suspended)
- 5.3 Materials for floor, elements, functions & construction.
- 5.4 Use of damp proof membrane and floor finishes.

**Practical**

**Unit 1:** Draw the Conventional representation of different types of construction materials and line diagram to show various structural system (load bearing/framed) [1 Sheet]  
[2 Hours]

Unit 2: Draw the plan, elevation and section of: [10 Hours]

- 2.1. One room/One storey/load bearing building [1 sheet]
- 2.2. Trench plan for One room/One storey/load bearing building
- 2.3. Trench section for One room/One storey/load bearing building
- 2.4. Foundation (strip) One room/One storey/load bearing building
- 2.5. Necessary details for One room/One storey/load bearing building [2 sheets]

Unit 3: Draw the Blow up wall section showing horizontal damp proof layer for 2:1  
[1 sheet] [6 Hours]

Unit 4: Draw an isometric/oblique view of brick/stone concrete block wall [1 sheet]  
[6 Hours]

Unit 5: Draw the typical cross section of a solid ground floor for 2.1 and also draw the typical cross section of a suspended timber ground floor for 2.1 with necessary details. [2 sheets] [6 Hours]

**Textbooks:**

1. Sushil Kumar (1991) Building construction, Standard Publishers and Distributors, Nai Sadak, Delhi, India, latest edition
2. Punmia B.C. Dr., *Building Construction* (Latest Edition).
3. Kumar Sushil *Building Construction* (Latest Edition).
4. Sharma S.K. & Kaul B.K., *Building Construction* (Latest Edition).
5. Singh Gurucharan, *Building Planning & Design* (Latest Edition)

**References:**

1. S.P Arora and Dr. S.P. Bindra, Building construction,
2. JT Grundy, Construction Technology,
3. R. Chudley, Construction Technology,
4. Horald King and Denzil Nield, Building Techniques,
5. JK Mckay, Building Construction,
6. W.B. Mckay, Building Construction,
7. S. Arthanari, A,G Augustine and others, Building Technology & Valuation,
8. Department of Urban Development, Nepal Building Code
9. Arya A.S., Masonry and Timber Structure including Earth (Latest Edition)
10. Jain, Plain Cement Concrete, Vol I & II (Latest Edition)
11. Kumar Sushil, Reinforced Concrete Structure(Latest Edition)
12. Punmia B.C. Dr., Reinforced Concrete Structure, Vol. I & II (Latest Edition)
13. व्यञ्जनकार मोहनमान, गाह्रो लगाउने प्रविधि
14. चौधरी महेश कुमार, गाह्रो लगाउने प्रविधि

# **Building Services I**

## **EG 2106 AR**

**Year: II**  
**Semester: I**

**Total: 4 hours /week**  
**Lecture: 2 hour/week**  
**Tutorial: hour/week**  
**Practical: 2 hours/week**

### **Course description:**

This course intends to equip students with knowledge and skills on different services as drinking water installation from main supply to tapping places: communication and service pipe, domestic installation cold and hot water supply and domestic house drainage system (soil and waste water) and rain water disposal system

### **Course Objectives:**

After the completion of this course students will be able to:

1. Understand the concept of different services of buildings.
2. Design and draw service drawing (water supply and sanitation work) for a residential building.

### **Course Contents:**

#### **Theory**

**Unit 1: Water supply system** **[4 Hours]**

- 1.1 Introduction
- 1.2 Objective of water supply
- 1.3 Water supply and public health

**Unit 2: Introduction to water source:** **[6 Hours]**

- 2.1. Water cycle
- 2.2. Type of source
- 2.3. Services connection
- 2.4. Appurtenances
- 2.5. Rain water harvesting.

**Unit 3: General principle of water supply:** **[6 Hours]**

- 3.1. Water requirement standards for various types of building.
  - 3.1.1 Fire demand
  - 3.1.2 Per capita demand
  - 3.1.3 Design period
  - 3.1.4 Population forecasting

**Unit 4: Storage and distribution of water supply in the building and pipes used:** [4 Hours]

- 4.1 Types of pipe used for distribution
- 4.2 Distribution of cold water and hot water in plumbing system
- 4.3 Localized water heating system.

**Unit 5: Disposal system and sanitary sewage:** [6 Hours]

- 5.1 Soil and waste pipe
- 5.2 One pipe system fully vented
- 5.3 Two pipe system fully vented
- 5.4 Single stack system

**Unit 6: Drainage system:** [4 Hours]

- 6.1 Soil water and waste water drain
- 6.2 manhole, grease trap Septic tank, soak pit,

**Practical**

**Unit 1: Material and size used in plumbing system:** [2 Hours]

- 1.1 Pipe, pipe size, pipe fitting
- 1.2 Pipe line symbol
- 1.3 Room measurement for sanitary apparatus

**Unit 2: Bath room layout:** [2 Hours]

- 2.1 Layout plan
- 2.2 Elevation and section
- 2.3 Details as necessary

**Unit 3: Kitchen layout:** [2 Hours]

- 3.1. Kitchen layout plan

**Unit 4: Roof plan layout** [2 Hours]

- 4.1. Roof tank installation
- 4.2. Hot water cylinder installation
- 4.3. Layout of rain water pipe

**Unit 5: Miscellaneous detail: (1:20)** [22 Hours]

- 5.1 Septic tank (plan and section)
- 5.2 Soak pit ( plan and section)
- 5.3 Grease trap , manhole (plan and section)
- 5.4 Apron drain (section)

- 5.5 Sedimentation tank (plan and section)
- 5.6 Filtration tank (plan and section)
- 5.7 Underground water tank

**Textbooks:**

- 1. Adreas Bachann & Heinz Waldrogel, Drinking Water Installation and Drainage requirements in Nepal, Kathmandu, Mechanical Training Centre (MTC), Balaju
- 2. Birdie, G.S. & Birdie, J.S. Water supply and sanitary engineering

**References:**

- 1. Adreas Bachmann and Heinz wald Jogel, Drinking Water installation and Drainage Requirements in Nepal, MTC, Balaju
- 2. Peter Burberry, Environment and services, New York
- 3. Sanitary and Plumbinf Design Requirements, Ministry of Physical Planning and Works
- 4. G.S. Bridge, J.S. Bridie, Water supply and Sanitary Engineering, Dhanpat Rai and Sons, India
- 5. Louis S. Nielgen, Standard Plumbing Engineering Design, MC Graw-Hill Book Company, New Delhi, India

# Fourth Semester

## **Subjects:**

1	EG 2201 AR	Computer Aided Drafting (CAD) II
2	EG 2202 AR	Surveying II
3	EG 2203 AR	Graphics and Presentation I
4	EG 2206 SH	Social Studies
5	EG 2204 AR	Architectural Model Making II
6	EG 2207 CE	Building Construction II
7	EG 2205 AR	Building Services II
8	EG 2206 AR	Working Drawing I
9	EG 2207 AR	Building Design I

# Computer Aided Drafting (CAD) II

EG 2201 AR

Year: II  
Semester: II

Total: 5 hours /week  
Lecture: 1 hour/week  
Tutorial: hour/week  
Practical: 4 hours/week

## Course description:

This course intends to impart students with a broad introduction into 2D computer aided design and drafting with a focus on architectural drawings. This course deals as intensive introduction to the use of a CAD program for the development of working drawings.

## Course objectives:

After the completion of this course students will be able to:

1. Create more accurate drawings in less time than traditional drafting method.
2. Use presentation their represent a design.

## Course Contents:

### Theory

#### Unit 1: working with blocks and annotation [4 Hours]

- 1.1 creating and inserting blocks
- 1.2 Creating text style/adding text style in a drawing
- 1.3 Creating dimension style
- 1.4 Editing text/dimension

#### Unit 2: Features [3 Hours]

- 2.1. Layer concept/loading line type
- 2.2. Match properties
- 2.3. Changing properties of the objects

#### Unit 3: Hatching [1 Hours]

- 3.1 Hatching
  - 3.1.1 Edit Hatches

#### Unit 4: Attributes: [2 Hours]

- 4.1 Creating a title block with attributes

#### Unit 5: Inquiry Commands: [2 Hours]

5.1 Distance/ID/Area/list/DB list

5.2 Massprop

**Unit 6: Working in layout tabs**

**[3 Hours]**

6.1. Model space

6.2. Paper space

6.3. plotting

**Practical**

**Unit 1: Architectural drawing**

**[45 Hours]**

- Complete a set of working drawing through Auto CAD

**References:**

1. Alf Yarwood, Introduction to Auto CAD 2006
2. Ellen Finkelstin, Auto CAD 2000 Bible, IDG Books India (P) Ltd., 3583 Om Bhawan, 4<sup>th</sup> Floor, Netaji Subas Marg, Daryaganj, New Delhi,
3. George Omura, Mastering Auto CAD 2007 and Auto CAD LT 2007, BPB Publications, India
4. Sham Tickoo, Auto CAD 2005 for Engineers and Designers, Dreamtech Press

# Surveying II

## EG 2202 AR

**Year: II**  
**Semester: II**

**Total: 6 hours /week**  
**Lecture: 2 hours/week**  
**Practical: 4 hours/week**

### **Course description:**

This course focuses on familiarization of different surveying techniques and equipment. The different surveying techniques include area, volume, coordinate system, and graphical and analytical method of mapping.

### **Course objectives:**

After the completion of this course students will be able to:

1. Apply modern survey techniques
2. Use modern survey instruments for surveying, constructions and map making procedures.

### **Course Contents:**

#### **Unit 1 Leveling**

**[16 Hours]**

- 1.1 Introduction
- 1.2 Principles of leveling
- 1.3 Technical terms: Bench Mark, Datum, Parallax
- 1.4 Instruments used in leveling
- 1.5 Temporary adjustment of level
- 1.6 Methods for booking and reducing of level
- 1.7 Fly leveling
- 1.8 Profile leveling and Cross sectioning
- 1.9 Reciprocal leveling
- 1.10 Errors in leveling
- 1.11 Error adjustment in closed circuit

#### **Unit 2 Plane Tabling**

**[6 Hours]**

- 2.1 Definition and principles
- 2.2 Accessories used in plane tabling
- 2.3 Orientation of plane tabling
- 2.4 Radiation and Intersection methods of plane tabling
- 2.5 Advantages and disadvantages of plane table surveying

#### **Unit 1 Contouring**

**[8 hours]**

- 1.1 Definition – Contour, Contour interval, Horizontal equivalent, Index contour
- 1.2 Characteristics of contours
- 1.3 6 Uses of contour maps
- 1.4 Methods of interpolation of contours
- 1.5 Criteria for selection of contour interval

**Practical Field Works:**

- |   |            |
|---|------------|
| 1. Perform leveling   | [8 Hours]  |
| 2 Perform fly leveling  | [8 Hours]  |
| 3. Perform profile leveling and cross sectioning                          | [8 Hours]  |
| 4. Perform Contouring on a sloped ground by indirect method (Grid method) | [12 Hours] |
| 5. Perform plane tabling and detailing                                    | [12 Hours] |
| 6. Perform evaluation (Viva + Instrumentation + Objective Test)           | [12 Hours] |

**Textbooks:**

1. Dr. BC Punmia, "Surveying"- Vol I & II, Laxmi Publication New Delhi

**Reference Books:**

1. SK Duggal, "Surveying" Vol I & II, Tata MC Graw Hill Publishing
2. N Basnet & M Basnet, "Basic Surveying I", Benchmark Education Support Pvt, Ltd, Tinkune Katmandu
3. N Basnet & M Basnet, " Basic Surveying II", Published by D. Shrestha & R. Shrestha, Rajmati Press, Lalitpur

# Graphics & Presentation I

EG 2203 AR

Year: II  
Semester: II

Total: 4 hours /week  
Lecture: 1 hours/week  
Practical: 3 hours/week

## Course description:

This course intends to provide knowledge and skills on drawings presentation techniques in the graphical manner. It mainly deals with elements of form, interpretation of graphical form, tone and principle of composition.

## Course objectives:

After the completion of this course students will be able to:

1. Understand the concept of drawing presentation techniques
2. Draw lines, shapes and forms
3. Interpenetrate various geometrical forms
4. Make an arrangement of tones and tonal chart
5. Make a composition of principles of designs and elements

## Course Contents:

### Theory

#### Unit 1: Introduction and elements of forms: [3 Hours]

- 1.1 Importance of the study
- 1.2 Scope of the study
- 1.3 Natural forms
- 1.4 Artificial/manmade forms

#### Unit 2: Element of forms: [3 Hours]

- 2.1 Geometrical forms
- 2.2 Plane forms
- 2.3 Solid forms
- 2.4 Prismatic forms
- 2.5 Pyramidic forms

#### Unit 3: Interpenetration of geometrical forms: [3 Hours]

- 3.1 Simple forms of interpenetration
  - 3.1.1 Two solids of Interpenetration
  - 3.1.2 One polyhedron and one solid of revolution

**Unit 4 Tone:**

**[2 Hours]**

- 4.1 Light, medium and dark tones
- 4.2 Flat and graded tones

**Unit 5: Principles of composition:**

**[4 Hours]**

- 5.1 Proportion , Balance, Rhythm
- 5.2 Unity, point of emphasis, Harmony
- 5.3 contrast, monotony

**Practical [45 Hours]**

- 1. Draw Natural forms ----- 1 sheet
- 2. Draw mad made (artificial) forms -----1 sheet
- 3. Draw two dimensional plane forms ----- 1 sheet
- 4. Draw three dimensional forms ----- 1 sheet
- 5. Draw prismatic and pyramidal forms ----- 1 sheet
- 6. Interpenetrate the solid forms ----- 1 sheet
- 7. Make a composition of dark, medium and low tones ----- 1 sheet
- 8. Make a tonal chart of 9 grades ----- 1 sheet
- 9. Make a composition of two principles ----- 1 sheet
- 10. Make a composition of point of interest in interior furniture ----- 10 sheets

**Textbooks:**

- 1. Halse, Architectural rendering,
- 2. Michael E. Doyle, Colour drawing,
- 3. Karki, Madhura, Graphic and presentation,
- 4. Magazine, Architectural record,

**References:**

- 1. Karki, Madhura, Graphic and presentation, Lab manual, IOE pulchok Campus
- 2. Karki, Madhura, Arts and Graphics, Lab manual, IOE pulchok Campus

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## सामाजिक अध्ययन

ई.जी. २२०६ एस.एच.

वर्ष : दोस्रो

सेमेष्टर : दोस्रो

जम्मा : २ घण्टा/ हप्ता

प्रवचन : २ घण्टा/ हप्ता

विशेष : घण्टा/ हप्ता

प्रयोगात्मक : घण्टा/ हप्ता

प्रयोगशाला : घण्टा/ हप्ता

### पाठ्यक्रमको परिचय

सामाजिक अध्ययन विषयको पाठ्यक्रमको मूल उद्देश्य नेपालको वस्तुस्थिति विशेषतः भौगोलिक जानकारी संक्षेपमा दिई प्राविधिक विद्यार्थीहरूलाई नेपालका विविध पक्षबाट परिचित गराउनु हो। सामाजिक अध्ययनको पाठ्यक्रम डिप्लोमा इन्जिनियरिङ तहमा पढ्ने विद्यार्थीहरूका लागि इतिहास, संस्कृति, भूगोल, अर्थशास्त्र, राजनीतिशास्त्र, समाजशास्त्र, मानवशास्त्र, जनसंख्या शिक्षा, वातावरण शिक्षा आदिका विषयवस्तुलाई एकीकृत गरी निर्माण गरिएको छ।

### पाठ्यक्रमको उद्देश्य

यस पाठ्यक्रमको अध्ययनपछि मध्यम स्तरीय प्राविधिक विद्यार्थीहरू निम्नलिखित विषयमा सक्षम हुनेछन् :

- क) विश्वमानचित्रमा नेपालको परिचय दिन।
- ख) नेपाल शब्दको उत्पत्तिबारे जानकारी दिन।
- ग) सामाजिक विज्ञान-मानव र समाजको सामान्य जानकारी दिन।
- घ) नेपालको आर्थिक व्यवस्थाको विशेषताहरूसहित कृषि, व्यापार, उद्योग, यातायात, सञ्चारको सामान्य परिचय दिन।
- ङ) नेपालको छिमेकी तथा मित्रराष्ट्र भारत र चीनसँगको सम्बन्धको छोटकरीमा परिचय तथा असंलग्न परराष्ट्र नीति, संयुक्त राष्ट्रसंघ, सार्कबारे छोटकरीमा जानकारी गराउन।
- च) नेपालको शासन व्यवस्थाका प्रमुख अङ्गहरू र संविधान, विकेन्द्रीकरणको सामान्य परिचय दिन।
- छ) सामाजिक तथा सांस्कृतिक परिवर्तनसम्बन्धी जानकारी दिन।
- ज) वातावरण, सामाजिक सेवा र सामुदायिक विकास, सामाजिक अनुसन्धान, जनसंख्या शिक्षासम्बन्धी सामान्य जानकारी दिन।

१.	<b>सामाजिक अध्ययन तथा सामाजिक विज्ञानको परिचय</b>	४
	क) सामाजिक अध्ययनको अर्थ, क्षेत्र, महत्व	२
	ख) सामाजिक अध्ययनको सामाजिक विज्ञानसँग सम्बन्ध	
	ग) सामाजिक अध्ययनको अन्य विषयसित सम्बन्ध	
	घ) सामाजिक अध्ययन र सामाजिक विज्ञानबीच भिन्नता	
	ङ) समाजशास्त्र र ग्रामीण समाजशास्त्रको परिचय	१
	च) समाजशास्त्रको प्रकृति र वैज्ञानिक पद्धति	
	छ) सामाजिक विज्ञान र भौतिक विज्ञानबीचको अन्तर	
	ज) विज्ञान र इन्जिनियरिङ	१
	झ) विज्ञान र प्रविधि	
	ञ) विज्ञान र धर्म	
	ट) विज्ञान र समाज	
२.	<b>मानव र समाज</b>	२
	क) समाज, संस्कृति र व्यक्तित्व, बानी, परम्परा र फेसन	१
	ख) जाति, भाषा, धर्म, पेसा, रहनसहन र चाडपर्व	१
	ग) समाजमा महिलाहरूको स्थिति	
३.	<b>सामाजिक तथा सांस्कृतिक परिवर्तन</b>	४
	क) सामाजिक तथा सांस्कृतिक परिवर्तनका अर्थ	१
	ख) सामाजिक तथा सांस्कृतिक परिवर्तनका सिद्धान्तहरू	
	ग) सामाजिक परिवर्तनको विशेषताहरू	१
	घ) सामाजिक र सांस्कृतिक परिवर्तनका कारक तत्वहरू	
	ङ) औद्योगिकीकरण र सामाजिक परिवर्तन	१
	च) ग्रामीण सामाजिक जनजीवनमा प्रविधिको प्रभाव	
	छ) औद्योगिक र ग्रामीण समाजका विशेषताहरू	१
	ज) सहरीकरण	
४.	<b>वातावरण र पर्यावरण</b>	१
	क) वातावरण र पर्यावरणको अर्थ	
	ख) वातावरण संरक्षणको आवश्यकता र महत्व	
५.	<b>सामाजिक सेवा र सामुदायिक विकास</b>	२.५
	क) सामुदायिक विकास परियोजनाको अर्थ र उद्देश्य	१
	ख) सामुदायिक विकास कार्यक्रम	
	ग) जनसहभागिता र सामुदायिक विकास	०.५
	घ) सामाजिक सेवाको अर्थ, क्षेत्र र उद्देश्य	१

	ड) सामाजिक कार्यकर्ताको अर्थ, प्रकार, गुण र भूमिका	
६.	<b>सामाजिक अनुसन्धान</b>	२
	क) परिभाषा, प्रकृति, उद्देश्य र प्रकार	०.५
	ख) सामाजिक अनुसन्धानका प्रेरकताहरू	१.५
	ग) सामाजिक अनुसन्धानका प्रमुख चरण	
	घ) सामाजिक अनुसन्धान प्रतिवेदन तयार गर्ने ढाँचा	
७.	<b>हाम्रा स्रोतहरू</b>	२
	क) मानवशक्ति	१
	ख) जलस्रोत	
	ग) भूमि	
	घ) वनसम्पदा	०.५
	ड) खनिजशक्ति	
	च) सौर्यशक्ति	०.५
	छ) वायुशक्ति	
८.	नेपाल शब्दको उत्पत्ति	१
९.	विश्वमानचित्रमा नेपाल	१
१०.	<b>आर्थिक अवस्था</b>	२
	क) कृषि, व्यापार, उद्योग, यातायात र सञ्चारको महत्व	१
	ख) आर्थिक व्यवस्थाका विशेषताहरू	१
	कृषिजन्य अर्थव्यवस्था, मिश्रित अर्थव्यवस्था, साभ्ना अर्थव्यवस्था, योजनाबद्ध विकास	
११.	<b>परराष्ट्र नीति</b>	३
	क) नेपालको असंलग्न परराष्ट्र नीतिको अर्थ	१
	ख) नेपालको परराष्ट्र नीतिका विशेषताहरू	
	ग) नेपाल भारत सम्बन्ध	०.५
	घ) नेपाल चीन सम्बन्ध	०.५
	ड) संयुक्त राष्ट्रसंघ र नेपाल	१
	च) सार्क र नेपाल	
१२.	<b>शासन व्यवस्था</b>	३.५
	क) व्यवस्थापिका	०.५
	ख) कार्यपालिका	०.५
	ग) न्यायपालिका	०.५
	घ) संविधान, संविधानसभा, अन्तरिम संविधानको छोटो परिचय	१
	ड) नेपाल अधिराज्यको संविधान २०४७ को विशेषताहरू	०.५
	च) विकेन्द्रीकरण, महत्व, आवश्यकता र विशेषताहरू	०.५

१३.	<b>जनसंख्या शिक्षा</b>	२
	क) जनसंख्या शिक्षाको परिचय	१
	ख) जनसंख्या शिक्षाको उद्देश्यहरू	
	ग) जनसंख्या वृद्धि र नियन्त्रण	१

### पाठ्यपुस्तक

१. सामाजिक अध्ययन, सिद्धीश्वरमान श्रेष्ठ, डा. राजेन्द्रप्रसाद अधिकारी, सावित्री श्रेष्ठ, अक्षलोक, प्रकाशन, काठमाडौं ।

### सन्दर्भ पुस्तक

१. नेपाल अधिराज्यको संविधान २०४७, कानून, न्याय तथा संसदीय व्यवस्था मन्त्रालय, कानून किताब व्यवस्था समिति, काठमाडौं, २०४७ ।
२. नेपाल अधिराज्यको संविधान २०४७ : एक टिप्पणी, खिमलाल देवकोटा, निरन्तर प्रकाशन, काठमाडौं, २०५८ ।
३. नेपाल परिचय, सिद्धीश्वरमान श्रेष्ठ, प्रा. श्यामकृष्ण जोशी, सावित्री श्रेष्ठ, अक्षलोक प्रकाशन, काठमाडौं, २०६५/०६९ ।
३. नेपालको अन्तरिम संविधान २०६३ ।
४. नेपालको सरकार र प्रशासन, सिद्धीश्वरमान श्रेष्ठ, अक्षलोक प्रकाशन, काठमाडौं, २०५० ।
५. नेपाली बृहत् शब्दकोष, नेपाल राजकीय प्रज्ञा-प्रतिष्ठान, काठमाडौं, २०५२ ।
६. नेपाली महिला र जनआन्दोलन २०६३, सावित्री श्रेष्ठ, अक्षलोक प्रकाशन, २०६३ ।
७. प्रश्नोत्तर नेपाल परिचय, सावित्री श्रेष्ठ, सिद्धीश्वरमान श्रेष्ठ, निरन्तर प्रकाशन, काठमाडौं, २०५०, २०५८ (तेस्रो संस्करण) ।
८. वातावरण शिक्षा स्रोत सङ्गालो, राष्ट्रिय संरक्षण कार्यनीति कार्यान्वयन आयोजना, काठमाडौं, २०५० ।
९. महत्वपूर्ण राजनीतिक शब्दज्ञान, सिद्धीश्वरमान श्रेष्ठ, अक्षलोक प्रकाशन, काठमाडौं, २०५५, २०५८, २०६६ ।
१०. मुद्रा, बैङ्किङ, राजस्व, अन्तर्राष्ट्रिय व्यापार तथा नेपालको अर्थव्यवस्था, महेश्वरमान श्रेष्ठ, रत्न पुस्तक भण्डार, काठमाडौं, २०५१ ।
११. राजनीतिशास्त्रको परिचय, सिद्धीश्वरमान श्रेष्ठ, निरन्तर प्रकाशन, काठमाडौं, २०५०, २०५८ (दोस्रो संस्करण) ।
१२. सामाजिक अनुसन्धान प्रविधि, प्रभाकर लाल दास, श्री जय नारायण, सप्तरी, २०५४ ।
१३. सामाजिक अध्ययन (हेल्थ साइन्स), सिद्धीश्वरमान श्रेष्ठ, सावित्री श्रेष्ठ, अक्षलोक प्रकाशन, काठमाडौं, २०६७ ।

# Architectural Model Making II

EG 2204 AR

**Year: II**  
**Semester: II**

**Total: 5 hours /week**  
**Lecture: hours/week**  
**Tutorial: hours/week**  
**Practical: 5 hours/week**

## Course description:

This course is designed to provide knowledge and skills on making model of complex building. It deals with model of complex building and topographical model of site.

## Objectives:

After the completion of this course students will be able to:

1. Understand the concept of models and models making.
2. Make models of complex building and topographical site.
3. Enable to make models as visual media.

## Course Contents:

### Unit 1: Model for More Complex Building Examples:

[55 Hours]

- 1.1 Model of single of multistoried residential building. (The drawings of residential building for modeling are provided or worked out in building design subjects). Introduction of landscape.
- 1.2 Model of more complex or a project standard. (Hostel or school building, the drawings of above buildings for modeling are provided or worked out in building design subject)

### Unit 2: Topographical Model of sites:

[20 Hours]

- 2.1. Contour model of sites ( Drawing should be provided)

## Textbooks:

1. Fuller Moore, Model builder's Notebook, McGraw - hall publishing company
2. Rolf Janke, Architectural Models, Architectural Book publishing co.
3. Helper, Jenson. Interior design fundamentals

**References:**

4. Frederick E. Giesecke. Technical drawing
5. Michael E. Doyle, Colour Drawing
6. The Thames and Thomson Manual, Rendering with pen and ink
7. Magazines- Inside Outside, A+D, Interior Design, Society interior

# **Building Construction II**

## **EG 2207 CE**

**Year: II**  
**Semester: II**

**Total: 5 hours /week**  
**Lecture: 2 hours/week**  
**Tutorial: hours/week**  
**Practical: 3 hours/week**

### **Course description:**

This course intends to provide knowledge and skills building construction work such as upper floor, staircase and doors and windows of timber. It also focuses preparing building drawings.

### **Course Objectives:**

After the completion of this students will be able to:

1. Familiarize with construction of building and their components.
2. Understand the various details for an application in construction works.
3. Draw complete building drawing sets

### **Course Contents:**

#### **Theory**

#### **Unit 1: Timber Floors** **[8 Hours]**

- 1.1. Upper Floor types
  - 1.1.1 Single
  - 1.1.2 Double
  - 1.1.3 Triple
- 1.2. Definition, Elements and construction details of upper floor

#### **Unit 2: Timber Roofs** **[10 Hours]**

- 2.1. Single Roof types
  - 4.1.1 Lean to Roof and double lean to roof
  - 4.1.2 Collar and couple roof
  - 4.1.3 Scissor and close couple roof
- 2.2. Definition, elements and functions of single roof
- 2.3. Construction methods and joinery details
- 2.4. Skylight (roof light)
  - 2.4.1 Definition, Functions, elements and construction details

#### **Unit 3: Timber staircase:** **[6 Hours]**

- 3.1 Definition materials and layout
- 3.2 Proportioning and design principles

- 3.3 Construction method and joinery details
- 3.4 Types
  - 3.4.1 Single flight (straight)
  - 3.4.2 L - shape (Quarter turning)

**Unit 4: Timber door, Window and ventilator: [6 Hours]**

- 4.1 Definition, elements and types
- 4.2 Construction Method and joinery details

**Practical**

**Unit 1: Timber Floors: [10 Hours]**

- 1.1. Single Floor : Plan, section & detail \_\_\_\_\_ 1 sheet
- 1.2. Double Floor : Plan, section & detail \_\_\_\_\_ 1 sheet
- 1.3. Triple Floor : Plan, section & detail \_\_\_\_\_ 1 sheet

**Unit 2: Timber Roots: [15 Hours]**

- 2.1. Lean to/Double lean to roof: elevation, section, detail ----- 1 sheet
- 2.2. Collar/couple roof: elevation, section. detail ----- 1 sheet
- 2.3. Scissor/ close couple roof: elevation, section, detail ----- 1 sheet
- 2.4. Roof, light for slope roof: Plan, section, detail ----- 1 sheet
- 2.5. Key elevation and isometric view of various roof ----- 1 sheet

**Unit 3: Timber staircase: [10 Hours]**

- 3.1. Single flight timber stair: Plan, elevation, section, detail ----- 1 sheet
- 3.2. L- shape timber stair: Plan, elevation, section, detail ----- 1 sheet
- 3.3. Dog logged timber stair: Plan, elevation, section, detail ----- 1 sheet

**Unit 4: Timber Door, window & ventilator: [10 Hours]**

- 4.1 Timber Panel/Flush Door: elevation, section, detail ----- 1 sheet
- 4.2 Timber casement/Sash Window: elevation, section, detail ----- 1 sheet
- 4.3 Timber (hinged/Pivoted) Ventilator : elevation, section, detail ----- 1 sheet

**Textbooks:**

- 1. Sushil Kumar, Building construction, Standard Publisher Distributers, nai Sadak, Delhi, India
- 2. B.C. Punmia, Building construction,

**References:**

1. S.P Arora and Dr. S.P. Bindra, Building construction,
2. JT Grundy, Construction Technology,
3. R. Chudley, Construction Technology
4. Horald King & Denzil Neild, Building Techniques
5. W.B. Mckay, Building Construction
6. JK Mckay, Building Construction,
7. S. Arthanari, A,G Augustine and others, Building Technology & Valuation,

## **Building Services II**

### **EG 2205 AR**

**Year: II**  
**Semester: II**

**Total: 4 hours /week**  
**Lecture: 2 hours/week**  
**Tutorial: hours/week**  
**Practical: 2 hours/week**

#### **Course description:**

This course is designed to provide knowledge and skills on electrical system and design of the illumination, power circuits, safety and protection as per standard requirement.

#### **Course objectives:**

After the completion of this course students will be able to:

1. Understand the basic concept of electric system
2. Know safety and protection of electric system.
3. Design the illumination and power circuit.

#### **Course Contents:**

##### **Theory**

#### **Unit 1: Basic concept of electricity** **[4 Hours]**

- 1.1. Concept of electric current and voltage
- 1.2. Electric circuit
  - 1.2.1 Open and short circuits
  - 1.2.2 Series and parallel circuits
- 1.3. Resistance
- 1.4. Ohm's law and Kirchhoff's law
- 1.5. Electric power and energy

#### **Unit 2: Electric supply system** **[4 Hours]**

- 2.1. Single and three phase A.C. circuits
- 2.2. Electric distribution system
- 2.3. Transformer
- 2.4. Service panels (MDB, SDB)

#### **Unit 3: Artificial lighting system** **[4 Hours]**

- 3.1. Introduction
- 3.2. Terms used in lighting system
- 3.3. Laws of illumination
- 3.4. Various types of light sources

**Unit 4: Design of lighting sources** [6 Hours]

- 4.1 Lumen intensity for different occupancies
- 4.2 Methods of lighting calculation
- 4.3 Street and flood lighting

**Unit 5: Safety and protection** [4 Hours]

- 5.1. Fuses, MCB and MCCB
- 5.2. Earthing
- 5.3. Methods of earthing

**Unit 6: Electric wiring** [8 Hours]

- 6.1. General rules of wiring
- 6.2. Types of wiring system
- 6.3. Determination of light and power sub-circuits
- 6.4. Determination of size of cables
- 6.5. Calculation of ratings of MCB and MCCB

**Practical**

- 1. Identify to wiring accessories:** [4 Hours]
  - Switches, sockets, luminaries, distribution board, fuse, MCB, MCCB etc and their application
- 2. Prepare drawing of commercial or apartment building for electrical layout** [6 Hours]
- 3. Conduct market study and collecting informative brochures and specification on various electrical product** [2 Hours]
- 4. Design lighting, power and distribution board (light circuit design, power circuit design and detail design of distribution system)** [18 Hours]
5. Prepare a report.

**References:**

1. Jain & Jain, ABC of Electrical Engineering, Dhanpat Rai Publishing Company, New Delhi
2. Gupta, J.B., Electrical Installation, Estimating and Costing, S.K. Katari & Sons, New Delhi

# Working Drawing I

## EG 2206 AR

**Year: II**  
**Semester: II**

**Total: 5 hours /week**  
**Lecture: 1 hours/week**  
**Tutorial: hours/week**  
**Practical: 4 hours/week**

### Course description:

This course is designed to help students on explanation of working drawing. It deals on role of working drawing, relation between Architecture design drawing and working drawing, and development of ability in preparing working drawing.

### Course objectives:

After the completion of this course students will be able to:

1. Understand the concept of working drawing for construction.
2. Prepare a complete set of working drawing for construction purpose.

### Course Contents:

#### Theory

#### Unit 1: Introduction: [5 Hour]

- 1.1 Importance of working drawing
- 1.2 Preparation of drawing (step by step)
- 1.3 Necessary of details drawing
- 1.4 Check list: checking of drawing

#### Unit 2: Role of working drawing [5 Hours]

- 2.1. Preparation of contract document and specification with help of drawing
- 2.2. Coordination of working drawing and specification in site

#### Unit 3: Relation between architecture design and working drawing: [5 Hours]

##### Development of ability to prepare and understand working drawing

- 3.1. Necessary inner working process of actual construction work
- 3.2. Construction information (at site)

#### Practical

#### Unit 1: Measurement practice for working drawing [16 Hours]

- 1.1 Sketch the existing building for working drawing (small one storey building)
- 1.2 Measure the existing building and dimensioned the same
- 1.3 Draw the measured drawing in scale (1:50)
- 1.4 Prepare the complete set of working drawing of above measured drawing

**Unit 2: Working Drawing (two room houses): (1:50)**

**[16 Hours]**

2.1. Large scale work in construction detailing in plan and section

2.1.1 Floor plans (two room house/single storey)

- Ground floor plan
- Terrace plan

2.1.2 Four side elevations

2.1.3 Sections (cross & longitudinal)

**Unit 3: Working drawing of one residential building:**

**[28 Hours]**

3.1. Details of:

- Plans (Ground floor, First floor, terrace) (1:50)
- Elevations (4 sides) (1:50)
- Sections (cross & longitudinal) (1:50)
- Entrance/lobby (1:20)
- Details (floor details and wall section details) (1:20)
- Development of signal line drawing of a signal storey building for working drawing purpose (plan, elevations & section) (1:50)
- Checking drawing with the help of check list (Stage wise)

**References:**

1. Manual produced by Architectural form (complete drawing set),
2. Wakita/linde, The professional practice of architectural working drawing, John Wiley and Sons New York, Singapore
3. Tom Porter, Architectural working drawing, Charles Scribner and sons
4. Francis D.K. Ching, Building Construction, Pritoria Pictures of Building
5. R. Chudley, R Creeno Building Construction Hand Book, Pearson Prientic Hall

# Building Design I

EG 2207 AR

Year: II  
Semester: II

Total: 4 hours /week  
Lecture: 1 hours/week  
Tutorial: hour/week  
Practical: 3 hours/week

## Course description:

This course intends to provide knowledge and skills on the design and development of a single family residential building in an urban, village and rural context.

## Course Objective:

After the completion of this course students will be able to:

1. Identify and design functional spaces within a residence.
2. Inter-relate activities and spaces within a house.
3. Carry Program Formulation of need /requirement assessment of necessary spaces and their sizes.
4. Design circulation and linking elements within a building like hallway, corridors and staircase.
5. Arrange furniture and fixture layout of various rooms and spaces.
6. Understand and create flexibility of spaces within for multiple purposes.
7. Follow proper planning and orientation for warm spaces in winter and cool comfortable spaces for summer considering proper the natural light, cross ventilation and exterior views.

## Lesson Unit Name: Design of Single Family Residence

### Course Contents:

1. Program Formulation –Spatial need /requirements. **[4 Hours]**  
Overall introduction of Building Design and assessment of need requirement of the Project.
2. Preparation of Case Study & Design (Own House). **[8 Hours]**  
Consultation, preparation, and functional relation between activities; inter-relationship of spaces with the help of bubble diagrams etc.
3. Conceptual Design & circulation and movements of people **[4 Hours]**  
(based on anthropometry analysis). Preparation of room plans and corridor and hallway.
4. Micro -climate – Sun, wind, rain, humidity, precipitation. **[12 Hours]**  
Consider openings – doors & windows for light, cross ventilation & thermal comfort. Positive and negative effect and analysis of existing landscape elements of site & surroundings - Panoramic views, terrain, natural vegetation etc.

5. Preparation of Floor Plan - Considering proper living spaces and service, circulation and linking spaces like corridor and staircase. **[8 Hours]**
6. Cultural, Social and Traditional Values & Taste - Evolution of form in elevation. Development of sections. **[4 Hours]**
7. Revision of floor plan and design of functional & efficient spaces and development of sections & elevations. Technology – Availability of materials and appropriateness of construction method structure type massive or skeletal system. **[12 Hours]**
8. Preparation & Presentation of Final Design & Drawings **[8 Hours]**  
Ground Floor Plan with Site Plan, 4 Elevations & 2 Sections

**References:**

- Singh, Gurcharan & Singh Jagadish, Building Planning Designing and Scheduling
- Building Science and Planning
- Architecture & Town Planning, Dhanpat Rai & Sons
- Korn, Wolfgang, The Traditional Architecture of Kathmandu Valley Indian Architecture and Builder
- Fleming, John, Honour Hugh & Pevsner Nikolaus, Dictionary of Architecture
- A. Peter Fawcett, Architecture: Design Notebook, Architectural Press
- Nikolas Davies and Erkki Jokiniemi - Dictionary of Architecture and Building Construction
- Francis D.K. Ching - Visual Dictionary of Architecture, John Wiley & Sons
- Architecture: Form, Space, & Order - Francis D.K. Ching
- Selwyn Goldsmith – Universal Design, Architectural Press
- Donald Hepler & Paul Wallach - Architecture: Drafting and Design, McGraw-Hill
- Joseph De Chiara - Time-Saver Standards for Building Types, McGraw-Hill
- Donald Watson - Time-Saver Standards for Architectural Design Data, McGraw-Hill
- Magazine – Inside Outside, A+D, Interior Society- A magna Publications

Third Year  
(Fifth and Sixth Semesters)

# Fifth Semester

## **Subjects:**

1	EG 3101 SH	Technical Communication
2	EG 3102 SH	Society and Culture
3	EG 3108 CE	Workshop Practice III (Plumbing)
4	EG 3101 AR	Site Supervision
5	EG 3109 CE	Elementary Structure I
6	EG 3110 CE	Building Construction III
7	EG 3102 AR	Building Design II
8	EG 3103 AR	Working Drawing II
9	EG 3104 AR	Graphics & Presentation II
10	EG 3111 CE	Quality Surveying I (Specification)

# Technical Communication

## EG 3101 SH

**Year: III**  
**Semester: I**

**Total: 3 hours /week**  
**Lecture: 2 hours/week**  
**Tutorial: 1 hour/week**  
**Practical: hours/week**

### *Course description:*

This course deals with the study of technical communication practices used in engineering.

### *Course objectives:*

After the completion of this course students will be able to:

1. write technical documents such as reports, abstracts, articles and manuals
2. demonstrate knowledge of and familiarity with the nature of technical writing and the qualities of technical styles
3. apply the principles of letter writings to various types of technical communication
4. demonstrate a knowledge of writing various types of short reports
5. gather, analyze and organize needed data for writing formal report

### **Course Contents:**

**Units:**

**[30 Hours]**

1. Introduction to Technical writing
2. Information structure techniques in technical writings
3. Types of technical reports
4. Process and guidelines in technical writings
5. Abstract writing
6. Proposal writing
7. Technical report writing
8. Technical specification writing
9. Memo and Minutes
10. Speech writing
11. Business letters
12. Presentation with Graphic aids
13. Contemporary communication

#### 14. Communication skills

- (a) Writing
- (b) Self communication
- (c) Interviewing
- (d) Interpersonal (dialogue)
- (e) Interaction

#### **References:**

1. Meenakshi Raman, Sangeeta Sharma, Technical Communication: Principles and Practice, Oxford University Press, 2012
2. Peter Eliot Weiss, Robert Irish, Engineering Communication: from Principles to practice, Oxford University Press, USA, 2009
3. Dr. Gajanan Malviya, Prof.R. N. Sukla, Communications Skills, S. Chand group, New Delhi

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# Society and Culture

## EG 3102 SH

**Year: III**  
**Semester: I**

**Total: 2 hours /week**  
**Lecture: 2 hours/week**  
**Tutorial: hour/week**  
**Practical: hours/week**

### **Course description:**

This course imparts knowledge on social science which mainly covers the society and culture. It also focuses on social institutions like the family, kinship and marriage.

### **Course objectives:**

After the completion of this course students will be able to:

1. Understand society and culture.
2. Familiarize theoretical approaches in the society.
3. Explain various social institutions.
4. Conduct mini research and case studies.

### **Course Contents:**

#### **Unit 1 Introduction of Society and culture:**

**[3 Hour]**

##### 1.1. Society

- a. Meaning of society
- b. Origin and importance of society
- c. Nature and scope of society

##### 1.2. Culture:

- a. Meaning of culture
- b. Types of culture
  - i. Tangible culture
  - ii. Intangible culture
    - Folk culture
    - Performing arts
    - Belief to the nature and universe
    - Social system
    - Traditional skills and technology

#### **Unit 2 Major Theoretical approach in society**

**[3 Hours]**

- 2.1. Evolutionism: Theory and practice to Nepalese architecture
- 2.2. Diffusions: Theory and practice to the Nepalese architecture
- 2.3. Positivism: Theory and practice to the Nepalese architecture
- 2.4. Functionalism: Theory and practice to the Nepalese architecture
- 2.5. Structuralism: Theory and practice to the Nepalese architecture

**Unit 3 Social institutions****[4 Hours]**

- 3.1. Family
  - a. Meaning of Family
  - b. Types of Family
  - c. Function of family
  - d. Role of family to Nepalese society
- 3.2. Kinship
  - a. Meaning of kinship
  - b. Types of kinship
  - c. Role of kinship to Nepalese society
- 3.3. Caste and ethnicity
  - a. Meaning of caste and ethnicity
  - b. Characteristics of caste
  - c. Role of caste/ethnicity to Nepalese society
- 3.4. Marriage
  - a. Meaning of marriage
  - b. Types of marriage
  - c. Acculturation through marriage

**Unit 4 Individual and communities****[3 Hours]**

- 4.1. Meaning of communities
- 4.2. Characteristics of communities
- 4.3. Types of communities
  - a. Homogenous/rural communities
  - b. heterogeneous/urban communities
  - c. Rural urban contrast in Nepalese context
- 4.4. Guthi organization of Kathmandu valley, its role and importance in architecture

**Unit 5 Vernacular architecture****[3 Hours]**

- 5.1. Meaning
- 5.2. Types of indigenous construction materials
- 5.3. Methods and skills of proper using materials
- 5.4. Merits and demerits of indigenous construction materials

**Unit 6 Mini research****[6 Hours]**

- 6.1. Meaning, objectives and types of research
- 6.2. Tools and techniques of data collection
  - a. Social walking and rapport building
  - b. Observation: meaning, types, merits and demerits
  - c. Interview: meaning, types, merits and demerits
  - d. Focus group discussion (FGD), PRA/RRA
  - e. Questionnaire/schedule
- 6.3. Sampling method

- 6.4. Proposal writing
- 6.5. Report writing

**Unit 7: Case studies**

**[4 Hours]**

- 7.1. Arts and architecture of different ethnic community in the nation including field visit.

**Unit 8: Report writing with presentation on the relevant case studies**

**[4 Hours]**

**Note:** At least 3 days of site visit is necessary. It is necessary to observe the vernacular architecture of socio-cultural environment of different ethnic groups of different climates and geological strata in the context of Nepal

**Reference:**

- Beals and Hoijer (1997), An Introduction to Anthropology, Mac Millan Publication company, New York
- Carol R. Ember, Melvin Ember & Peter N. Peregrine (2002), Anthropology, Person Education, Indian edition, Delhi
- Gautam, R. and Thanpa A.K. (1993), Tribal Ethnography of Nepal Vol.I & II, Book Faith India, Delhi
- Jerard Toffin (2003), Kin to caste, Himal Publication, Lalitpur
- Jha, Makhan (1996), An introduction to Anthropology, Vikash Publishing House, New Delhi
- Rao, C.N.Shankar. (2004), Sociology, Primary Principles, S. Chand and Company Ltd., New Delhi
- Rebert, E.L., (1964), Handbook of Modern sociology,
- UNESCO, Handbooks of UNESCO for Culture
- खत्री, प्रेम कुमार (२०५५), उत्पत्ति : मानव सभ्यताको

## **Workshop Practice III (Plumbing)**

**EG 3108 CE**

**Year: III**  
**Semester: I**

**Total: 4 hours /week**  
**Lecture: 1 hours/week**  
**Tutorial: hours/week**  
**Practical: 3 hours/week**

### **Courses description:**

This part of the course focuses on familiarization of plumbing works related to civil constructions. It also includes basic knowledge and skills on welding and bar bending.

### **Course objectives:**

After the completion of this course students will be able to:

1. Apply operating systems of plumbing works;
2. Identify the tools and equipment required to plumbing works;
3. Perform simple pipe fittings works and
4. Prepare the PVC fittings.

### **Course Contents:**

#### **Theory**

#### **Unit 1 Introduction of Plumbing:**

**[1 Hour]**

- 1.1. History of plumbing.
- 1.2. Importance of plumbing
- 1.3. Plumbing and sanitary
- 1.4. Scope of plumbing

#### **Unit 2 Plumber's Hand Tools:**

**[2 Hours]**

- 2.1. Pipe wrench of size 9", 12", and up to 18" long.
- 2.2. Pair of footprints.
- 2.3. Stocks and dies, up to 2" diameter, replacement of cutters
- 2.4. Wrench chain
- 2.5. Hack's saw frame and blade
- 2.6. Measuring tape
- 2.7. Soldering iron
- 2.8. Tin snips
- 2.9. Rasp
- 2.10. Caulking iron
- 2.11. Adjustable wrench up to 12 long.

- 2.12. Claw hammers /Ball pin hammer/Claw hammer
- 2.13. Pipe cutter-use and care adjustment of cutting wheels.
- 2.14. Drilling machine and its bits.
- 2.15. Pipe vise
- 2.16. Bench vice
- 2.17. Spanners of various size
- 2.18. Folding rules metallic/steel
- 2.19. Try square, Vernier caliper joining elements: Nuts, bolts, washer, pins, screws and rivets and jute/pipe tape and lead.

**Unit 3 Galvanized/PPR/CPVC Pipe and fittings:**

**[2 Hours]**

- 3.1. Pipe nipples
- 3.2. Elbows
- 3.3. Tee
- 3.4. Cross
- 3.5. Reducing elbow
- 3.6. Reducing tee and reducing cross
- 3.7. Sockets
- 3.8. Reducing sockets
- 3.9. Lock nut
- 3.10. Plugs or caps
- 3.11. Flange unions (Gasket)
- 3.12. Gate valve (heavy and light)
- 3.13. Foot valve/Glove valve
- 3.14. Pipe tape
- 3.15. Float valve or ball valve.

**Unit 4 Pipe Threading to Dimension:**

**[2 Hours]**

- 4.1. Fixing pipe to pipe vice
- 4.2. Measuring pipe to millimeter
- 4.3. Measuring methods
- 4.4. Die holding/threading methods
- 4.5. Die checking/cleaning/oiling
- 4.6. Die tightening and loosening/fixing cutter
- 4.7. Checking accurate threading and its sharpness
- 4.8. Doing loosen the die fixing the pipe to die and repeat the threading twice for sharpness. (Repeat)

**Unit 5 Assembling the Threaded Pipe to Fittings with Pipe Tape as per Drawing:[2 Hours]**

- 5.1. Visualization of drawing in detail
- 5.2. Collecting the fittings

- 5.3. Collecting the threaded pipes in position
- 5.4. Fixing the fittings with pipe tape to pipe in position
- 5.5. checking the tightness/testing pipe joints
- 5.6. Adjusting measurement
- 5.7. Marking, laying, using chalk line to wall/floor/ceiling
- 5.8. Accurate pipe cutting with margin of necessary threads to pipe
- 5.9. Fixing pipe to pipe vice
- 5.10. Positioning techniques.

**Unit 6 Making up H.D.P fittings:**

**[2 Hours]**

- 6.1. Definition of HDP pipe and fittings
- 6.2. Collecting hot plate with power
- 6.3. Collecting HDP pipe with necessary diameters
- 6.4. using miter box cutting pipe to  $90^0$
- 6.5. Clean, trim and weld the two halves of pipe to form  $90^0$  elbow (L)
- 6.6. Making Tee
- 6.7. Making Wyes (Y)

**Unit 7 Introduction of Welding:**

**[2 Hours]**

- 7.1. Electric power needed for welding
- 7.2. Welding rods
- 7.3. Welding safety rules
- 7.4. Arc welding equipments, accessories and protective gear
- 7.5. Welding Techniques
- 7.6. Types of welding
- 7.7. Principles of gas opening and its use
- 7.8. Gas welding techniques
- 7.9. Forging techniques

**Unit 8 Bar Bending Works:**

**[1 Hour]**

- 8.1. Bars straight making methods
- 8.2. Bar tying methods.
- 8.3. Categories of bars, e.g. Mild steel bar T.O.R steel bar and TORKARI bars.
- 8.4. Making L(Hook) procedure to Hook making die and bench
- 8.5. Making 45 degrees crank procedure
- 8.6. Making chair to fix reinforcement methods
- 8.7. Making overlaps to steel bars.

**Unit 9 Fixing or Fastening Rods to Wire:**

**[1 Hour]**

- 9.1. Single knot tying to slab methods
- 9.2. Double knot tying to slab methods

- 9.3. Tying to beam methods
- 9.4. Tying to column methods
- 9.5. Checking tightness of stirrups to main bar loops
- 9.6. Making stirrups or rings

### **Practical [45 Hours]**

- |   |           |
|---|-----------|
| 1. Identify/enumerate/use hand tools and equipments   | [2 Hours] |
| 2. Demonstrate pipes, plates to shape and size.   | [2 Hours] |
| 3. File to clean pipe end (mouth).  | [2 Hours] |
| 4. Cut/thread G.I pipe to given dimensions.   | [3 Hours] |
| 5. Make nipples to appropriate standard.  | [2 Hours] |
| 6. Make and assemble using various pipes and fittings   | [4 Hours] |
| 7. Cut /join H.D.P. pipe and PVC pipe.  | [4 Hours] |
| 8. Make L, cross and T bends project of PVC pipe  | [4 Hours] |
| 9. Join PVC fittings with PVC pipe.   | [4 Hours] |
| 10. Install PPR pipe with fittings.   | [4 Hours] |
| 11. Install CPVC pipe with fittings.  | [4 Hours] |
| 12. Perform internal (below ground level) pipe layout and assembling fittings using pipe tape for water supply or sanitation works. | [5 Hours] |
| 13. Perform external (wall) pipe layout and joining fittings for water supply.  | [5 Hours] |

### **References:**

1. Birdie G.S., Birdie J.S. *Water Supply and Sanitary Engineering*,
2. Deolakar S.G., *Plumbing Design and Practice*, Tata Mc Graw-Hill Publishing Company Limited, 1994.
3. McConnell, Charles, *Plumbers and pipe Fitters Library, volume I, II, and III*, Macmillan Publishing Company, 1986.
4. Plumbing practice – book (vol. 1) by James D. Tailor, I.L.O. expert 1975.

# Site Supervision

EG 3101 AR

Year: III  
Semester: I

Total: 4 hours /week  
Lecture: 4 hour/week  
Tutorial: hour/week  
Practical: hours/week

## Course description:

This course is design to impart knowledge on the requirements of Site Supervision

## Course Objectives:

After the completion of this course the students will be able to

1. Understand the basic concept of site supervision
2. Know time and qualities along with the price that are the essentials in supervising a project
3. Learn to pursue the role of a supervising personal in accordance with the best practices of contract administration.

## Course Contents:

### Theory

#### Unit 1: INTRODUCTION

[4 Hours]

- 1.1 Introduction to Contract Administration
- 1.2 The Contract Document
- 1.3 Meaning of Supervision
- 1.4 Role of the Supervising Agent at site of work

#### Unit 2: SITE OFFICE

[4 Hours]

- 2.1. Site Office in Supervision of Works
- 2.2. Organization of Client, Consultant and Contractor
- 2.3. Roles of the Client, Consultant and Contractor and their Relationship
- 2.4. Clerk of works

#### Unit 3: FUNCTION

[6 Hours]

- 3.1. Reading drawings, specifications, bills of quantities and other contractual documents.
- 3.2. Site survey and layouts

- 3.3. Supervising Work of a Contractor
- 3.4. Duties and Responsibilities of a Site Supervisor
- 3.5. Site Order Book
- 3.6. Materials at Site Account
- 3.7. Muster Roll
- 3.8. Measurement Book
- 3.9. Running Bill and Final Bill
- 3.10. Quality Control
  - i. Samples of materials/products
  - ii. Shop Drawings
  - iii. Test Results
  - iv. Selection of source of materials
  - v. Material stock checks
- 3.11. Site Meetings – Decisions and issue of instructions

**Unit 4: Progress Monitoring** **[6 Hours]**

- 4.1 Working/construction program.
- 4.2 Bar Chart, Networking and S-Curve
- 4.3 Time keeping, daily site diary and monthly progress reports; progress/control
- 4.4 Monitoring – material/labour
- 4.5 Monitoring – project costs

**Unit 5: Payments** **[6 Hours]**

- 5.5 Measurements: measurement books
- 5.6 Approval of measurements
- 5.7 Guarantees
- 5.8 Deductions
- 5.9 Billing, checking of bills
- 5.10 Recommendation and approval

**Unit 6: Contractor's and Client's obligations** **[4 Hours]**

- 6.1 Client: Site possession and payments
- 6.2 Client: Non interference in day to day activities/progress
- 6.3 Contractor: Insurance for safety and site
- 6.4 Contractor: Project Completion
- 6.5 Contractor: Defects Liability Period.

**Unit 7: Site Visits****[30 hrs]**

The institutes are suggested to visit site office set construction site where owner, consultant and contractor involved. Students should prepare and present the supervision report.

**References:**

1. AIA Manual of Professional Practice
2. IIA Code of Ethics
4. Handbook for Users and Consultants ADB/Manila and other related documents related to procurement of services under ADB/Manila, World Bank/Washington and UN and other Bilateral Donor Agencies funded projects
5. Building Standards (Nepal) with revisions
8. National Building Codes
9. National Building Code of India
10. Relevant ISI Standards
12. Professional practice by Roshan Nanavati, Lakhani Book Depot, 1993.

# Elementary Structure I

## EG 3109 CE

**Year: III**  
**Semester: I**

**Total: 4 hours /week**  
**Lecture: 2 hours/week**  
**Tutorial: hour/week**  
**Practical: 2 hours/week**

### **Course description:**

This course consists of a study of the behavior of various simple structures under loading and methods to analyze simple structural components including trusses and beams.

### **Course Objectives:**

After the completion of this course students will be able to:

1. Calculate magnitude and direction of unknown forces of a body in equilibrium
2. Calculate centroids, moment of inertia and radius of gyration of simple Sections
3. Classify structural members and effects due to loadings
4. Calculate support reactions and member forces of a plane truss
5. Calculate axial and shear stress and strain and change in lengths
6. Calculate support reactions, axial forces, shear forces and bending moments of beams.
7. Draw axial force, shear force and bending moment diagrams of determinate beams

### **Course Contents:**

#### **Theory**

#### **Unit 1. Basic Principles of Force**

**[4 Hours]**

- 1.1 Introduction
- 1.2 Coplanar and non coplanar forces
- 1.3 Concurrent and non concurrent forces
- 1.4 Composition and components of forces
- 1.5 Parallel forces
- 1.6 Varignon's theorem
- 1.7 Concept of couple and moment
- 1.8 Equilibrium and equations of equilibrium
- 1.9 Free body diagram

**Unit 2. Geometrical Properties of Simple Sections** [4 Hours]

- 2.1 Centroid of an area
- 2.2 Moment of area
- 2.3 Moment of inertia
- 2.4 Parallel axis theorem
- 2.5 Polar moment of inertia
- 2.6 Section modulus
- 2.7 Section Modulus
- 2.8 Centroid and Moment of inertia of compound sections

**Unit 3. Internal effects of loading** [2 Hours]

- 3.1 Stability, determinate and indeterminate structures
- 3.2 Types of structural members [beams, columns, trusses, frames]
- 3.3 Concepts of internal forces [tension, compression, shear, bending, torsion]
- 3.4 Examples of tension, compression, shear, bending, torsion

**Unit 4. Plane truss** [4 Hours]

- 4.1. Introductions
- 4.2. Determinate plane truss
- 4.3. Determinations of reactions
- 4.4. Determination of member forces

**Unit 5. Simple Stress and Strain** [8 Hours]

- 5.1 Rigid bodies and deformable bodies
- 5.2 Concept of axial and shear stresses and strains
- 5.3 Types of stress [direct, shear, bending, torsion]
- 5.4 Hooke's law
- 5.5 Stress - strain diagrams
- 5.6 Ultimate strength, factor of safety and working stress
- 5.7 Determination of axial stress and strain of simple bars and struts
- 5.8 Determination of change in lengths
- 5.9 Design simple bars and composite columns [Reinforced concrete]

**Unit 6. Shear Force and Bending Moment** [8 Hours]

- 6.1 Structural supports and support reactions
- 6.2 Determinate and indeterminate structures
- 6.3 Types of determinate beams

- 6.4 Determination of beam reaction
- 6.5 Shear force and bending moment
- 6.6 Sign convention of shear force and bending moment
- 6.7 Calculation of axial force, shear force and bending moment in a beam with different loading
- 6.8 Drawing of axial force, shear force and bending moment diagrams of beams

### **Practical**

#### **Unit 1. Basic Principles of Force**

**[4 Hours]**

- Determine magnitude and direction of unknown forces of given system using free body diagrams and equations of equilibrium

#### **Unit 2. Geometrical Properties of Simple Sections**

**[4 Hours]**

- Calculate moment of inertia  $XX$ ,  $YY$  and  $ZZ$  axes of rectangular, circular “ I “ , “L”, “ T “ sections

#### **Unit 3. Internal effects of loading**

**[2 Hours]**

- Differentiate determinate and indeterminate structures

#### **Unit 4. Plane truss**

**[4 Hours]**

- Draw diagrams of plane truss with member forces from loaded determinate trusses

#### **Unit 5. Simple Stress and Strain**

**[8 Hours]**

- Calculate axial and shear stresses and strains and change in lengths of structural members with constant and composite cross sectional area

#### **Unit 6. Shear Force and Bending Moment**

**[8 Hours]**

- Draw diagrams for axial force, shear force and bending moment diagrams of determinate [cantilever, simply supported, over hang] beams with point load, udl and moments.

### **Text books/Reference books**

- Ashok K. Jain, Strength of materials and Structural Analysis, Nem Chand & Bros. Roorkee
- F. P. Beer & E. R. Johnston, Mechanics of Materials, McGraw-Hill Book Company New Delhi
- S. Timoshenko and D. H. Young, Elements of Strength of materials, East-West Press Private Limited New Delhi
- C S Reddy, Basic Structural Analysis, Tata McGraw-Hill Publishing Company Limited New Delhi
- Gokarna Bahadur Motra, A Text Book of Strength of Materials
- R. S. Lehri, A. S. Lehri, Strength of Materials, S. K. Kataria & Sons Delhi
- S. A. Bari, Elements of Structural Analysis, S. Chand and Company Ltd, New Delhi
- S S Bhabikatti, Structural Analysis Volume I, Vikas Publishing House Pvt Ltd Delhi

# **Building Construction III**

## **EG 3110 CE**

**Year: I**  
**Semester: II**

**Total: 6 hours/week**  
**Lecture: 2 hours/week**  
**Tutorial: hour/week**  
**Practical: 4 hours/week**

### **Course description:**

This course intend to provide knowledge and skills on building construction work such as foundation, walls, roofs, temporary construction, and doors and windows of special types both in knowledge and skills aspects.

### **Course Objectives:**

After the completion of this students will be able to:

1. Familiarize with construction of building and their components.
2. Understand the various details for an application in construction works.

### **Course Contents:**

#### **Theory**

#### **Unit 1: Foundation in Weak soil** **[6 Hours]**

- 1.1 Weak soil types & their problems
  - 1.1.1 Effect of rain, draught, cold etc.
- 1.2 Special foundation for weak soils
  - 1.2.1 Pile foundations cotton
  - 1.2.2 Foundation for black cotton soil
  - 1.2.3 Raft foundation
- 1.3 Design criteria for pile foundation and foundation for black cotton soil

#### **Unit 2: Special walls:** **[4 Hours]**

- 2.1. Definition & types
  - 2.1.1 Cavity wall
  - 2.1.2 Partition wall
  - 2.1.3 Curtain wall
- 2.2. Elements, construction detail of cavity, partition and curtain wall

#### **Unit 3: Roofs:** **[8 Hours]**

- 3.1. Timber Roof, Definition and Types
  - 3.1.1 Double roof
  - 3.1.2 Triple or framed roof (Trussed roof)
- 3.2 Steel roof (Trussed roof)
  - 3.2.1 Tubular
  - 3.2.2 Angle
- 3.3 Elements functions, construction methods & detail

**Unit 4: Temporary Construction works: [8 Hours]**

- 4.1 Definition types and functions
  - 4.1.1 Timbering of trenches for various soils.
  - 4.1.2 Formwork for concrete work
  - 4.1.3 Scaffolding
  - 4.1.4 Elements types, functions, construction methods and detail of Timbering of trenches, formwork for concrete and scaffolding

**Unit 5: Metal window (steel/Aluminum): [4 Hours]**

- 5.1 Terminology, elements & Functions.
- 5.2 Types & standards
- 5.3 Construction methods & joinery detail

**Practical**

**Unit 1: Foundation in weak soil [15 Hours]**

- 1.1 Draw typical RCC solid raft foundation: plan, section, detail ----- 1 sheet
- 1.2 Draw the typical strip foundation (brick/stone): plan, section, detail --- 1 sheet for black cotton soil
- 1.3 Draw the typical RCC pile (single/cluster): plan, section, detail --- 1 sheet for weak soil

**Unit 2: Special walls: [10 Hours]**

- 2.1. Draw the typical cavity wall (Brick/concrete block): plan, section, detail ----- 1 sheet
- 2.2. Draw the curtain and partition wall (brick/concrete block/glass block, panel etc): Elevation, section, detail ----- 1 sheet

**Unit 3: Roofs: [15 Hours]**

- 3.1. Draw the double timber roof: elevation, section, detail ----- 1 Sheet
- 3.2. Draw the triple timber roof: elevation, section, detail ----- 1 Sheet
- 3.3. Draw the steel roof truss with roofing materials: elevation, section, detail -- 2 Sheet

**Unit 4: Temporary Construction works:**

**[10 Hours]**

- 4.1 Draw the timbering of trenches for various soil: Selection & details ----- 1 sheet
- 4.2 Draw the form work for RCC slab/beam/column : Selection & details -- 1 sheet
- 4.3 Draw the timber scaffolding (Bricklayers/mason): elevation, section, details -- 1sheet

**Unit 5: Metal windows (Steel/Aluminum):**

**[10 Hours]**

- 5.1 Draw the typical steel window: elevation, section, details ----- 2sheet
- 5.2 Draw the typical aluminum (door/window/ventilation): elevation, section, details -- 1sheet

**Textbooks:**

1. Sushil Kumar (1991), Building construction, Standard Publisher and distributors, nai sadak, Delhi, India, Latest edition
2. B.C. Punmia, Building construction,

**References:**

1. S.P Arora and Dr. S.P. Bindra, Building construction,
2. JT Grundy, Construction Technology,
3. R. Chudely, Construction Technology,
4. Horald king & Denzil Nield, Building Techniques,
5. JK Mckay, Building Construction,
6. W.B. Mckay, Building Construction,
7. S. Arthanari, A,G Augustine and others, Building Technology & Valuation,
8. James E. Amiorse & other, Building construction,

## **Building Design II**

### **EG 3102 AR**

**Year: III**  
**Semester: I**

**Total: 5 hours /week**  
**Lecture: 1 hours/week**  
**Tutorial: hour/week**  
**Practical: 4 hours/week**

#### **Course description:**

This course imparts knowledge and skills on the designing and developing a fairly small building in an urban and rural context.

#### **Course objectives:**

After the completion of the course students will be able to:

1. Identify and design functional spaces of school building based on Literature Review and Case Studies of few existing Primary Schools.
2. Create inter-relationship of activities and spaces within the building.
3. Carry Program Formulation of need /requirement assessment of necessary spaces and their sizes.
4. Design circulation and linking elements within a building like hallway, corridors and staircase.
5. Arrange the Furniture and fixture layout of various rooms and spaces.
6. Understand and create flexibility of spaces within for multiple purposes.
7. Provide proper planning and orientation for warm spaces in winter and cool comfortable spaces for summer considering proper the natural light, cross ventilation and exterior views.

**Lesson Unit Name:    Design of Fairly Small Public Type Building**  
                                  (a) Primary School for 200 students (boys /girls)  
                                  (b) Canteen for 50-100 occupants (Time Problem Exam)

#### **Course Contents:**

1. Program Formulation –Spatial need /requirements. **[5 Hours]**  
Overall introduction of Primary School Building Design and need requirement assessment of the project.
2. Preparation of Case Study & Design **[10 Hours]**  
(based on some good examples of Primary School Academic /Administrative Building). Consultation, preparation, and functional relation between activities; inter-relationship of spaces with the help of bubble diagrams etc.
3. Conceptual Design & circulation movement of people (based on anthropometry **[10 Hours]** analysis). Preparation of reception, office, class rooms, laboratory, library, multipurpose hall, teachers' room recreation room and toilets plans and any other necessary areas etc.
4. Micro -climate – Sun, wind, rain, humidity, precipitation. **[10 Hours]**  
Consider openings – doors & windows for light, cross ventilation & thermal comfort. Site Analysis /SWOT Analysis. Positive and negative impacts and analysis of existing elements & landscape of site

& surroundings - Panoramic views, terrain, natural vegetation, flower & fauna etc.  
Consider Natural Calamities - earthquake, landslide, flood etc.

5. Preparation of Conceptual Floor Plan(s) & Site Plan [10 Hours]  
Considering proper class rooms, office, laboratory, library, multipurpose hall, teachers' room plans, recreation room and toilets and any other necessary areas and service, circulation and linking spaces like corridor and staircase. Consideration of indoor and outdoor sports/games.
6. Understanding the historical, social, cultural and traditional importance of buildings. [5 Hours]  
Consideration of style and evolution of form in preparation of elevations and sections development.
7. Finalization of Conceptual Floor Plan and functional & efficient uses of spaces. [10 Hours]  
Final Development of Sections & Elevations.
8. Technology – Availability of materials and appropriateness of construction method. [5 Hours]  
Structure type massive or skeletal system (Load Bearing and RCC Framed structures)
9. Preparation & Presentation of Final Design & Drawings [10 Hours]  
(Ground Floor Plan with Site Plan, 4 Elevations & 2 Sections)

**Time Problem Examination: (b) Design a Canteen** (Use any appropriate scale suggested by the Teacher)

Time: 6 Hrs.

Full Marks: 40

Pass Marks: 16

**Model Question:**

Design a Canteen building for 50 occupants (approx area of 300 - 450 sq. m.)

**It should have the following requirements:**

1. Dining hall with service area.
2. Kitchen with washing area
3. Store (Grocery: general + frozen food/vegetable etc.)
4. Store (utensil & accessories )
5. Staff Room including changing room
6. Bath Room (male/female)

**Required Drawings:**

1. Ground Floor Plan with Site Plan & Furniture Layout
2. Front Elevation
3. Cross Section -1
4. Presentation & Composition

**Allocated Marks**

25

5

5

5

**Total Marks 40**

**References:**

- Singh, Gurcharan & Singh Jagadish, Building Planning Designing and Scheduling
- Building Science and Planning
- Architecture & Town Planning, Dhanpat Rai & Sons
- Korn, Wolfgang, The Traditional Architecture of Kathmandu Valley Indian Architecture and Builder
- Fleming, John, Honour Hugh & Pevsner Nikolaus, Dictionary of Architecture
- A. Peter Fawcett, Architecture: Design Notebook, Architectural Press
- Nikolas Davies and Erkki Jokiniemi, Dictionary of Architecture and Building Construction
- Francis D.K. Ching, Visual Dictionary of Architecture, John Wiley & Sons
- Architecture: Form, Space, & Order, Francis D.K. Ching
- Selwyn Goldsmith, Universal Design, Architectural Press
- Donald Hepler & Paul Wallach, Architecture: Drafting and Design, McGraw-Hill
- Joseph De Chiara, Time-Saver Standards for Building Types, McGraw-Hill
- Donald Watson, Time-Saver Standards for Architectural Design Data, McGraw-Hill
- Magazines, Inside Outside, A+D, Interior Society, A magna Publications

# **Working Drawing II**

## **EG 3103 AR**

**Year: III**  
**Semester: I**

**Total: 6 hours/week**  
**Lecture: 1 hours/week**  
**Tutorial: hour/week**  
**Practical: 5 hours/week**

### **Course description:**

This course intends to equip students with knowledge and skills of preparation of working drawing, construction detailing in plan, elevations, section and individual building elements and its relation with detail estimating and specification, bill of quantities and supervision of construction.

### **Course objectives:**

After the completion of this course students will be able to:

1. Understand the concept of working drawing
2. Prepare bill of qualities of the building construction work
3. Supervise the construction at construction site.
4. Prepare a complete set of working drawing of a residential building

### **Course Contents:**

#### **Theory**

<b>Unit 1: Construction work:</b>	<b>[5 Hours]</b>
1.1 Site preparation	
1.2 Site improvement (site, plot) plan	
1.3 Lay out method	
1.4 Cross check of work	
<b>Unit 2: Detail estimating and specification</b>	<b>[5 Hours]</b>
2.1. Construction material	
2.2. Finishing materials	
2.3. Quantities	
<b>Unit 3: Construction management</b>	<b>[5 Hours]</b>
3.1. Working Schedule	
3.2. Supervision	
3.3. Work at site (team work)	
3.4. Immediate decision at site	

## **Practical:**

**Unit 1: Trench plan /foundation plan & section** **[10 Hours]**

- 1.1 Trench Plan/setting out (1:50)
- 1.2 Foundation footing plan (1:50)
- 1.3 Foundation footing section (1:20)
- 1.4 Blow up details of 1.2 & 1.3 (1:10 & 1:20)

**Unit 2: Plan (Scale 1:200/1:100)** **[10 Hours]**

- 2.1. Location map/site plan (1:200)
- 2.2. Floors plans (1:100)
- 2.3. Roof/ terrace plans (1:100)
- 2.4. Finishing schedule

**Unit 3: Elevations: (Scale 1:50)** **[10 Hours]**

- 3.1. Front, back and side elevations ( 4 side elevations)
- 3.2. Finishing schedule

**Unit 4: Building section (Scale 1:50)** **[5 Hours]**

- 4.1 Cross section
- 4.2 Longitudinal section
- 4.3 Finishing schedule

**Unit 5: Staircase plan, elevation and section:** **[10 Hours]**

- 5.1 Plan/section (1:20)
- 5.2 Sectional elevation with element such as handrail, baluster, blustered, steps and finishes etc. (1:10)

**Unit 6: Wall section:** **[10 Hours]**

- 1.1. Blow up detail of external/internal wall section from foundation footing to coping/ridge showing all necessary elements (1:20)
- 1.2. Blow up details such as sill, Lintel, cornice, coping etc (1:10)

**Unit 7: Opening Detail (1:20/1:10) with opening schedule** **[10 Hours]**

- 7.1 Main door: Elevation, section and blowup detail
- 7.2 Internal door: Elevation, section and blowup detail
- 7.3 Window: Elevation, section and blowup detail

**Unit 8: Kitchen/store/Dining:** **[5 Hours]**

- 8.1 Detail plan of above (1:20)
- 8.2 Details of kitchen counter, shelves wardrobes and other necessary details (1:10)

**Unit 9: Ceiling/terrace/roof (Scale 1:50/1:20)**

**[5 Hours]**

- 9.1 Bounded ceiling and false ceiling plan and sections and fixing details
- 9.2 Roof (pitch/flat/shell or dome) plan and section
- 9.3 Ridges, Eaves, Valley, Hips, Coping, Flashing, Skating with DPC etc. details include sound and thermal insulation materials
- 9.4 Checking drawing with the help of check list.

**References:**

1. Wakita/linde, The professional practice of Architectural working drafting, John Wiley & Sons, Nw York- Singapore
2. Ching, Frank, Architectural Graphic, Pritoria Pictures of Building
3. Tom Porter, Architectural working drawing, Charles Scribur & sons
4. A complete set of working drawing - From architectural Form,
5. Frank George Elaood, Problems in Architectural Drawing, The Manual art press

# Graphics & Presentation II

## EG 3104 AR

**Year: III**  
**Semester: I**

**Total: 4 hours/week**  
**Lecture: 1 hours/week**  
**Tutorial: hour/week**  
**Practical: 3 hours/week**

### Course description:

This course intends to provide knowledge and skills on drawings presentation and design communicating techniques in the graphical manner. It mainly deals with presentation techniques, interior development, graphic techniques, colour technique and different medium presentation techniques.

### Course objectives:

After the completion of this course students will be able to:

1. Identify and draw textures, trees, vehicle and human figures
2. Draw furniture layout
3. Understand the concept of colouring
4. Make an arrangement of colour scheme
5. Present drawing in different mediums

### Course Contents:

#### Theory and Practical

#### Unit 1: Presentation techniques: [12 Hours]

- 1.1 Types of textures and finishes
- 1.2 Types of trees & shrubs
- 1.3 Compose vehicle and its uses in various form
- 1.4 Human figures (two types)

#### Unit 2: Interior development for presentation: [8 Hours]

- 2.1. Furniture layout
- 2.2. Texture and its usage in interior
- 2.3. Isometric view of furniture

#### Unit 3: Graphic Techniques: [12Hours]

- 3.1. Pencil graphics techniques
  - 4.1.1 Simple elevation and section treatment
  - 4.1.2 Simple furniture layout
  - 4.1.3 Colour history
  - 4.1.4 Colour types

**Unit 4: Color Techniques****[16 Hours]**

- 4.1. Colour wheel of circle
- 4.2. Properties of colours
- 4.3. Colour scheme and types
- 4.4. Poster colours, pencil colours

**Unit 5: Presentation techniques in different medium****[12 Hours]**

- 5.1 1 set of drawings in pencil techniques
- 5.2 1 set of drawings in ink techniques
- 5.3 1 set of drawing in color techniques

**Design and draw followings:**

1. Draw textures ----- 1 sheet
2. Draw tree and shrubs ----- 1 sheet
3. Make a composition of vehicles ----- 1 sheet
4. Make a composition of human figures ----- 1 sheet
5. Make a simple interior layout plan ----- 1 sheet
6. Show a simple elevation ----- 1 sheet
7. Make a colour circle of 12 hue with primary, secondary, tertiary and quaternary --- 1 sheet
8. Make a chart of colour with 10 colours ----- 1 sheet
9. Draw tints and tones with Two colours ----- 1 sheet
10. Make a project with pencil and poster colour drawings-----2 sheet

**References:**

1. Tom poster & Goodman, Manual of graphic techniques,
2. Ching Frank, Architectural graphic
3. Rendering with pen and ink,

# Quantity Surveying I

## EG 3111CE

**Year: III**  
**Semester: I**

**Total: 2 hours/week**  
**Lecture: 2 hours/week**  
**Tutorial: hour/week**  
**Practical: hours/week**

### Course description:

This course focuses on familiarization of specification, bill of quantities, and costing of building works.

### Course objectives:

After the completion of this course the student will be able to:

1. Understand the specification, types of specification
2. Prepare bill of quantities and cost of building work

### Course Contents:

- |  |                  |
|--|------------------|
| <b>1 Introduction</b>  | <b>[2 Hours]</b> |
| 1.1. Definition of specification   |                  |
| 1.2. Purpose of specification  |                  |
| 1.3. Necessity of specification  |                  |
| <b>2 Specification Writing</b>   | <b>[8 Hours]</b> |
| 2.1 Techniques of specification writing  |                  |
| 2.2 Specification of construction materials (Cement, Sand, Aggregates, Brick, Iron bar, Timber, Roofing work)                      |                  |
| 2.3 Specification of workmanship (Brick masonry work, PCC work, RCC work, Filling work, Plaster work, Roofing work)                |                  |
| <b>3 Types of Specification</b>  | <b>[8 Hours]</b> |
| 3.1 General specification  |                  |
| 3.2 Detailed specification (Earth work, Brick masonry work, Form work, PCC work, RCC work, filling work, Plaster work)             |                  |
| <b>4. Analysis of rate</b>   | <b>[8 Hours]</b> |
| 4.1 Procedure of analysis of rate  |                  |
| 4.2 Factors affecting analysis of rate   |                  |
| 4.3 Preparing analysis of rate for building works (Earth work, Brick masonry work, PCC work, RCC work, filling work, Plaster work) |                  |

**5. Bill of Quantities**

**[4 Hours]**

- 5.1 Bill of quantities
- 5.2 Unit of item of works
- 5.3 Abstract of cost

**Reference Books:**

1. B. N. Dutta, Estimating and Costing
2. M. Chakraborty, Estimating and Costing

# Sixth Semester

## Subjects:

- 1 EG 32 19 EE Workshop Practice IV (Electrical)
- 2 EG 3201 AR Construction Management
- 3 EG 3208 CE Elementary Structures II
- 4 EG 3202 AR Computer Aided Drafting (CAD) III
- 5 EG 3203 AR Professional Management, Laws and Valuation
- 6 EG 3209 CE Building Construction IV
- 7 EG 3204 AR Working Drawing III
- 8 EG 32 01 MG Entrepreneurship Development
- 9 EG 3210 CE Quantity Surveying II
- 10 EG 3205 AR Project Work

## Workshop Practice IV (Electrical)

EG 3219 EE

Year: III  
Semester: II

Total: 4 hours /week  
Lecture: 1 hours/week  
Tutorial: hour/week  
Practical: 3 hours/week

### Course description:

This part of the course focuses on familiarization of electricity and its application. It intends to impart knowledge and skills on Electrical accessories, Electrical energy, Electric symbols, House appliances and building wiring.

### Course objectives:

After the completion of this course, students will be able to:

1. Understand the concept of electricity;
2. Identify electric symbols and accessories;
3. Identify tools/equipment and its safety requirement of wiring system;
4. Identify major components of electrical system and its installation procedure and
5. Connect lighting circuits and signal circuits.

### Course Contents:

	Theory	
<b>Unit 1 Introduction of electricity</b>		<b>[1 Hour]</b>
1.1. History of electricity		
1.2. Generation of electricity		
1.3. Scope of electricity		
1.4. Types of current		
<b>Unit 2 Fundamentals of electric circuits</b>		<b>[4 Hours]</b>
2.1. Definition of voltage, current, resistance and their relationship		
2.2. Types of conductors		
2.3. Types of circuits		
2.3.1. Series circuit		
2.3.2. Parallel circuit		
2.4 Measurement of current, voltage, resistance and power		
2.4.1. Ampere meter		
2.4.2. Volt meter		
2.4.3. Ohm meter		
2.4.4. Power meter/ Watt meter/Energy meter		
2.5 Related numerical problems on circuits		
<b>Unit 3 Electrical Energy Transformation</b>		<b>[2 Hours]</b>

- 3.1. Transformer, its function and application
- 3.2. Isolator, its function and application
- 3.3. Electric poles, its function and application
- 3.4. Safety and precautions

**Unit 4 Measuring Instruments and Protecting Devices**

**[1 Hour]**

- 4.1. Foot and meter/scale (Linear measuring instruments)
- 4.2. Vernier caliper/caliper
- 4.3. Standard wire gauge
- 4.4. Feeler gauge/radius gauge
- 4.5. Micrometer/voltmeter
- 4.6. Miniature Circuit breaker (MCB)
- 4.7. Fuses and fuse types
- 4.8. Check line with color chalk dust powder
- 4.9. Straightedge and line

**Unit 5 Source of Power**

**[2 Hours]**

- 5.1. Definition
- 5.2. D.C. system
- 5.3. A.C. system
- 5.4. Phases ( single and three phases lines)
- 5.5. Inverter system
- 5.6. Solar power system

**Unit 6 Electric Symbols**

**[1 Hour]**

- 6.1. Introduction
- 6.2. Types of symbols
- 6.3. Identification
- 6.4. Application

**Unit 7 Earthing**

**[2 Hours]**

- 7.1. Definition of electric shock
- 7.2. Effects of electric shock on human body
- 7.3. Levels of electric shock
- 7.4. Introduction of earthing
- 7.5. Function and application
- 7.6. Earthing methods and testing
- 7.7. Safety and precaution in earthing

**Unit 8 Electric Wiring Procedure**

**[2 Hours]**

- 8.1. Marking procedure and interpolation of wiring diagram
- 8.2. Setting out back ground on wall surface
- 8.3. Drilling holes for fixing wire and cables and switch boxes
- 8.4. Fixing accessories components or position
- 8.5. Installation of wires/cables to masonry wall by placing safety foundation

- 8.6. Fixing PVC insulated wires and cables branching boxes using clips and saddles
- 8.7. Fixing accessories on position

### **Practical**

**Project 1: Draw/interpret Drawings and Diagrams:** [3 Hours]

- 1.1 Simple electrical drawings
- 1.2 Free hand plan/schematic diagram
- 1.3 Layout diagram
- 1.4 Wiring diagram.

**Project 2: Connect Lighting Circuits on Board:**

- 1.1. With one-way switch one light and one socket [4 Hours]
- 1.2. With two-way switch two lights and two sockets [6 Hours]
- 1.3. With intermediate switches, two fluorescent lamps [5 Hours]
- 1.4. With multi-position switches and incandescent lamps [5 Hours]
- 1.5. With Dimmer switches and incandescent lamps. [6 Hours]
- 1.6. With time switches and lamps [4 Hours]

**Project 3: Connect the Following Signal Circuits:**

- 3.1. With electrical bell [4 Hours]
- 3.2. With electric door opener [4 Hours]
- 3.3. Ceiling fan with fan regulator [4 Hours]

**References:**

- 1. Introduction of Electricity Vol. I, by N.B. Malla
- 2. S. K. Malice, *Electric Trade Theory and Practical*

# Construction Management

## EG 3201 AR

**Year: III**  
**Semester: II**

**Total: 4 hours /week**  
**Lecture: 4 hours/week**  
**Tutorial: hour/week**  
**Practical: hours/week**

### **Course description:**

This course focuses on management of construction works. This course imparts knowledge on accounts, procurement of works, contract management, planning, scheduling, and managing construction works.

### **Course objectives:**

After the completion of this course students will be able to:

1. Acquire basic knowledge on management of construction works;
2. Plan and schedule different activities of construction project;
3. Plan and schedule resources required in construction project and
4. Understand basic knowledge of procurement/contract management.

### **Course Contents:**

#### **Unit 1: Introduction:**

**[4 Hours]**

- 1.1 Project Implementation
- 1.2 Need of Construction Management
- 1.3 Functions of Construction Management

#### **Unit 2: Project Planning and Scheduling:**

**[15 Hours]**

- 2.1 Definition of Planning
- 2.2 Steps in Planning
- 2.3 Importance of Planning
- 2.4 Construction Site Planning
- 2.5 Work Breakdown Structure
- 2.6 Bar Chart
- 2.7 Linked Bar Chart and Milestone Chart
- 2.8 Advantages of Construction Schedule
- 2.9 Preparation of Construction Schedule
- 2.10 Material Schedule
- 2.11 Labor Schedule
- 2.12 Equipment Schedule
- 2.13 Financial Schedule
- 2.14 S-Curve

- Unit 3: CPM and PERT:** [10 Hours]
- 3.1 Introduction to planned approaches in construction management
  - 3.2 Elements of Network
  - 3.3 Network Rules
  - 3.4 Definition of the Terms: Network Diagram, Activity, Event, Forward Pass, Backward Pass, Critical Path
  - 3.5 Determination of Critical Paths and Floats
  - 3.6 Introduction to PERT
- Unit 4: Contract Administration and Accounts:** [15 Hours]
- 4.1 Definition of Contract
  - 4.2 Contract Agreements
  - 4.3 Types of Contracts Agreements
  - 4.4 The Tender/Bid and Contract Documents
  - 4.5 Conditions of Contract
  - 4.6 Guarantees
  - 4.7 Project Completion
  - 4.8 Assets and Liabilities
  - 4.9 Relation between Owner, Consultant, and Contractor
  - 4.10 Disputes
- Unit 5: Quality:** [4 Hours]
- 5.1 Definition of Quality
  - 5.2 Characteristics of Quality
  - 5.3 Factors affecting Quality
  - 5.4 Stages of Quality Control
- Unit 6: Monitoring, and Control:** [4 Hours]
- 6.1. Introduction to Monitoring
  - 6.2. Purpose of Monitoring
  - 6.3. Introduction to Control
  - 6.4. Elements of Control: Quality, Cost, and Time
    - 6.4.1. Quality Control
    - 6.4.2. Cost Control
    - 6.4.3. Time/Schedule Control
- Unit 7: Construction Equipment:** [4 Hours]
- 7.1. Advantages of using Construction Equipment
  - 7.2. Equipment for Excavation
  - 7.3. Equipment for Concrete Mixing

7.4.Equipment for Transportation and Compaction

7.5.Equipment for Lifting of Materials and Parts

**Unit 8: Safety:**

**[4 Hours]**

8.1.Introduction to Accidents

8.2.Causes of Accidents

8.3.Importance of Safety

8.4.Safety Measures

**References:**

1. Adhikari, R. P., Construction Management.
2. Punmia, B. C., PERT and CPM.
3. Shrestha, S.K.; Adhikari, I. A text book of Project Engineering, Chandeswori Publication.
4. Dutta, B. N., Estimating and Costing.

# Elementary Structures II

## EG 3208 CE

**Year: III**  
**Semester: II**

**Total: 4 hours /week**  
**Lecture: 2 hours/week**  
**Tutorial: hours/week**  
**Practical: 2 hours/week**

### **Course description:**

This course is designed to introduce reinforced cement concrete and is a study of the basic design procedures and calculation in limit state method for simple structural components in reinforced cement concrete and structural steel.

### **Course Objectives:**

After the completion of this course students will be able to:

1. Design singly reinforced rectangular beams, slabs, short columns and isolated foundation of reinforced concrete
2. Draw detail drawings of RCC structures and prepare reinforcement schedule
3. Design beams, compression and tension members of steel structures
4. Draw details of steel structures [truss, beam- column and foundation]

### **Course Contents:**

#### **Theory**

#### **Unit 1.Introduction of Reinforced Concrete**

**[2 Hours]**

- 1.1 Properties of plain concrete
- 1.2 Grading of concrete
- 1.3 Reinforced concrete
- 1.4 Working stress method
- 1.5 Limit state method

#### **Unit 2.Reinforced Sections**

**[4 Hours]**

- 2.1 Behavior of a RC beam under loading
- 2.2 Stress and strain diagrams
- 2.3 Depth of neutral axis
- 2.4 Moment of resistance
- 2.5 Determination of reinforcement for a singly reinforced beam
- 2.6 Introduction to doubly reinforced beams , T beams and L beams

**Unit 3. Shear and bond****[4 Hours]**

- 3.1 Shear stress
- 3.2 Diagonal tension
- 3.3 Shear reinforcement to resist shear
- 3.4 Determination of area and spacing of stirrups
- 3.5 Bond strength and development length.

**Unit 4 Slabs****[4 Hours]**

- 4.1 Introductions
- 4.2 Design of one way rectangular slab
- 4.3 Design of two way rectangular slab

**Unit 5. Short Columns****[4 Hours]**

- 5.1 Short and long column
- 5.2 Design formula for a short column
- 5.3 Design of short rectangular column

**Unit 6. Foundations****[4 Hours]**

- 6.1 Introduction
- 6.2 Bearing capacity of soil
- 6.3 Depth of foundation
- 6.4 Tensile reinforcement
- 6.5 Design of wall footing
- 6.6 Design of isolated footings

**Unit 7. Steel Structure Connections****[4 Hours]**

- 7.1 Rolled steel sections
- 7.2 Riveted joint
- 7.3 Types of riveted joints
- 7.4 Efficiency of a joint
- 7.5 Design of riveted joint for axially loaded members
- 7.6 Welded joints
- 7.7 Types of welds
- 7.8 Design of fillet welds and butt welds

**Unit 8. Steel Structures****[4 Hours]**

- 8.1 Net sectional area of tension member
- 8.2 Design of axially loaded tension member

- 8.3 Strength of an axially loaded compression member
- 8.4 Design of axially loaded compression members
- 8.5 Design of beam section

### **Practical**

- Unit 1. Introduction of Reinforced Concrete** **[2 Hours]**
- Differentiate between working stress and limit state method
- Unit 2.Reinforced Sections** **[4 Hours]**
- Determine moment of resistance of singly reinforced sections, design singly reinforced beam sections, draw details of reinforcement and prepare reinforcement schedule
- Unit 3.Shear and bond** **[4 Hours]**
- Determine development lengths, draw stirrups
- Unit 4 Slabs** **[4 Hours]**
- Design one way and two way slabs and draw details of reinforcement and prepare reinforcement schedule
- Unit 5. Short Columns** **[4 Hours]**
- Design columns and draw details of reinforcement and prepare reinforcement schedule
- Unit 6. Foundations** **[4 Hours]**
- Design and draw wall footing and isolated footing
- Unit 7. Steel Structure Connections** **[4 Hours]**
- Design and draw details of connections with rivets and welds in steel structures]
- Unit 8. Steel Structures** **[4 Hours]**
- Design and draw steel structures [beams, compression and tension members

**Textbooks / References:**

- Ashok K. Jain, Reinforced Concrete, Nem Chand & Bros, Roorkee
- S.N.Sinha, Reinforced Concrete Design, Tata McGraw Hill.
- L S Negi, Design of Steel Structures, Tata McGraw Hill Education Private Limited New Delhi
- Venancio I. Besavilla Jr., Fundamentals of Structural Steel Design, New Basak Subd, Punta Princesa, Manila

# Computer Aided Drafting (CAD) III

## EG 3202 AR

**Year: III**  
**Semester: II**

**Total: 4 hours /week**  
**Lecture: 1 hours/week**  
**Tutorial: hour/week**  
**Practical: 3 hours/week**

### Course description:

This course is designed to help students in creating three dimensional drawing, modeling and explores the main features of auto CAD's 3D workspace.

### Course objectives:

After the completion of this course students will be able to:

1. Convert 2D objects to 3D object
2. Represent a design by creating solid primitives, solid or surface models

### Course Contents:

#### Theory

<b>Unit 1: Introduction</b>	<b>[1 Hours]</b>
1.1 Introduction to 3D	
1.2 Types of 3D models. (wire frame, surface, solid)	
1.3 3D coordinate system. (spherical, cylindrical)	
<b>Unit 2: Viewing objects</b>	<b>[3 Hours]</b>
2.1. Viewing 3D objects	
2.2. Isometric drawing	
<b>Unit 3: Modeling</b>	<b>[3 Hours]</b>
3.1. Region and 3D faces	
3.2. 3D solids (Box, cone, cylinder)	
3.3. 3D solid modeling	
3.1.1 Creating Extrude solids	
3.1.2 Boolean operations (Union, subtract, intersection)	
<b>Unit 4: Editing</b>	<b>[3 Hours]</b>
4.1 Editing and modifying 3D solids	
4.2 rotate 3D, mirror 3D, 3D array, Align	
4.3 Advanced modifying tools	

4.3.1 Fillet, chamfer, slice

**Unit 5: Adding materials:** [2 Hours]

**Unit 6: Lighting and Rendering** [3 Hours]

### **Practical**

**Design and draw the followings:**

1. Prepare a 3D model of a residential Building with assigning material and lighting [30 Hours]
2. Perform rendering. [15 Hours]

### **References:**

1. Alf Yarwood, Introduction to Auto CAD 2006
2. Ellen Finkelstin, Auto CAD 2000 Bible, IDG Books India (P) Ltd., 3583 Om Bhawan, 4<sup>th</sup> Floor, Netaji Subas Marg, Daryaganj, New Delhi,
3. George Omura, Mastering Auto CAD 2007 and Auto CAD LT 2007, BPB Publications, India
4. Sham Tickoo, Auto CAD 2005 for Engineers and Designers, Dreamtech Press

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# **Professional Management, Laws & Valuation**

## **EG 3203 AR**

**Year: III**  
**Semester: II**

**Total: 2 hours /week**  
**Lecture: 2 hours/week**  
**Tutorial: hour/week**  
**Practical: hours/week**

### **Course description:**

This course intends to familiarize students with the legal, economic and social issues related to working environment and practices. It focuses on the bye-laws for design, implementation and valuation of property. It deals with architecture engineering related job organization, presentations, business management, sales promotion, human relations and personnel management. Moreover, it also provide concept on audit procedures, efficiency studies and performance appraisal, billing, accounting, business correspondence, information storage and retrieval.

### **Course objectives:**

After the completion of this course students will be able to:

1. Acquaint students with the legal, economic and social issues related to working environment and practices
2. Understand laws and regulation related to design, implementation and valuation of property.
3. Acquire knowledge on architecture engineering job organization, presentations, business management, sales promotion, and human relations and personnel management.
4. Apply techniques of audit procedures, efficiency studies and performance appraisal, billing, accounting, business correspondence, information storage and retrieval.

### **Course Contents:**

#### **Unit 1: Ethics in Consulting A/E Services:**

**[4 hours]**

- 1.1. What is Ethics
- 1.2. Code of Conducts
- 1.3. Attaining best practices standards

**Unit 2: Consulting Office Management:**

**[4 hours]**

- 2.1. Understanding the procedures for the establishment of an Architectural Practice
- 2.2. Administration - Financial, office accounts and billing; and Personal Management
- 2.3. Personal Management Project Co-ordination Clients, Consultant and Project Managers
- 2.4. Office Automation Information Storage and Retrieval.

**Unit 3: Contracts and Agreements:**

**[4 hours]**

- 3.1. Understanding conditions of agreement- scope of work, comprehensive architectural services and, conditions of engagement, remuneration and professional fees.
- 3.2 The Terms of Reference and Scope of Works.
- 3.3. Professional Liabilities and Insurances /Securities

**Unit 4: Business Practices:**

**[4 hours]**

- 4.1. Design Audit & Efficiency Studies, Analysis for Special Efficiency of Buildings.
- 4.2. Best Practice and Quality Assurance
- 4.3. Proprietary rights

**Unit 5: Regulatory Controls:**

**[8hours]**

- 5.1. Understands the regulations in planning and designing of projects in controlled areas
- 5.2 Land use and Zoning
- 5.3. Design Standards and Easements
- 5.4. National Building Codes
- 5.5. Municipal Drawings
- 5.6 Demolition

**Unit 6: Valuation of Properties:**

**[6 hours]**

- 6.1 Introduction to property valuation/assessment
- 6.2. Property Assessment methods (Land, Building etc.)
- 6.3. Valuation assessment as per guidelines of the Nepal Rastra Bank

**References:**

1. AIA Manual of Professional Practice
2. IIA Standard for Establishing Fees
3. IIA Code of Ethics
4. Handbook for Users and Consultants ADB/Manila and other related documents related to procurement of services under ADB/Manila, World Bank/Washington and UN and other Bilateral Donor Agencies funded projects
5. GoN's Procurement Act and FAR (related to Consultant selection & procedures)
6. Town Planning acts of Nepal 1962v with revisions
7. Building Standards (Nepal) with revisions
8. National Building Codes
9. National Building Code of India
10. Ancient Monument Preservation Act (Nepal) 2013 BS with revisions
11. Relevant ISI Standards
12. Company Act (Nepal) 2021 with revisions
13. Professional practice by Roshan Nanavati, Lakhani Book Depot, 1993.

# **Building Construction IV**

## **EG 3209 CE**

**Year: III**  
**Semester: II**

**Total: 4 hours /week**  
**Lecture: 2 hours/week**  
**Tutorial: hour/week**  
**Practical: 2 hours/week**

### **Course description:**

This course intends to provide knowledge and skills on most of the building construction work such as temporary construction, staircase (concrete/metal) ceiling etc. It also focuses on practical drawing works.

### **Course objectives:**

After the completion of this students will be able to:

1. Familiarize with construction building and their components
2. Understand the various details for an application in construction works.

### **Course Contents:**

#### **Theory**

#### **Unit 1: Temporary construction works [8 Hours]**

- 1.1 Scaffolding
  - 1.1.1 Double scaffold
  - 1.1.2 Cantilever & other
- 1.2 Formwork for cement concrete (PCC/RCC)
  - 1.2.1 Salbs
  - 1.2.2 Beams
  - 1.2.3 Columns
- 1.3 Shoring
  - 1.3.1 Functions, types and construction methods and detailing
- 1.4 Use of shoring in underpinning works (foundation/wall)

#### **Unit 2: Staircase: [12 Hours]**

- 2.1. RCC (straight flight and turning)
- 2.2. Metal/steel ( ladder/spiral)
- 2.3. Functions, construction methods & detailing of RCC, metal/steel staircase

**Unit 3: Ceiling (Bonded/False)****[10 Hours]**

## 3.1. False ceiling

3.3.1 Under framing in wood

3.3.2 Finish plywood, planks and gypsum board etc.

**Practical****Unit 1: Temporary construction works****[8 Hours]**

1.1 Draw the double scaffold and cantilever scaffold: elevation, section, &amp; details - 1 Sheet

1.2 Draw the dead/flying/ raking shore: elevation, section, &amp; details ----- 1 Sheet

**Unit 2: Staircase:****[12 Hours]**

2.1 Draw the doglegged/open well staircase: Plan, elevation, section, &amp; details -- 1 Sheet

2.2 Draw the spiral stair (metal): Plan, elevation, section, &amp; details ----- 1 Sheet

2.3 Draw the decorative staircase: Plan, elevation, section, &amp; details ----- 1 Sheet

**Unit 3: False Ceiling****[10 Hours]**

## 3.1. Timber framing/metal framing

3.1.1 Draw the plan, section &amp; detail ----- 1 sheet

3.1.2 Draw the Fastening/fixing detail with gypsum, fiber glass, metal sheet, glass as finished materials ----- 1 sheet

**Textbooks:**

1. Sushil Kumar (1991), Building construction, Standard publisher and distributors, Nai sadak, Delhi, India, Latest edition
2. B.C. Punmia, Building construction,

**References:**

1. S.P Arora and Dr. S.P. Bindra, Building construction,
2. JT Grundy, Construction Technology,
3. R. Chudely, Construction Technology,
4. Horal king & Denzil Nield, Building Techniques
5. JK Mckay, Building Construction
6. W.B. Mckay, Building Construction,
7. S. Arthanari, A,G Augustine and others, Building Technology & Valuation,
8. James E. Amiorse & other, Building construction,

## **Working Drawing III**

### **EG 3204 AR**

**Year: III**  
**Semester: II**

**Total: 6 hours /week**  
**Lecture: 0 hours/week**  
**Tutorial: hour/week**  
**Practical: 6 hours/week**

#### **Course description:**

This course is designed to help students to acquire knowledge and skills on water supply and public health, sanitation, environment and public health, house plumbing and electrical lay out system.

#### **Course objectives:**

After the completion of this course students will be able to:

1. Understand the concept of Water supply and public Health, sanitation, environment and public health, House plumbing and electrical lay out system
2. Make a set of working drawing of water supply and drainage system and electrical layout system of residential and public building.

#### **Unit 1: Site plan**

**[6 Hours]**

- 1.1 Positioning the soil manhole, waste water manhole, grease trap, septic tank, soak pit, water reservoir tank at site plan.
- 1.2 Lay out diagram of water supply system and layout of drainage system at site plan

#### **Unit 2: Floor Plans**

**[28 Hours]**

- 2.1 Laying of sanitary appliances at kitchen and toilet
- 2.2 Connection of soil and waste water pipe line to sanitary appliances
- 2.3 Connection of cold and hot water pipe line to sanitary appliances
- 2.4 Plan of residential/public building showing electrical layout
- 2.5 Detailing of 2.4 including external lighting fixtures and distribution board

#### **Unit 3: Terrace Plan:**

**[6 Hours]**

- 3.1 Installing the cold water roof tank, hot water cylinder and solar panel
- 3.2 Positioning the rain water pipe at roof

#### **Unit 4: Bathroom and kitchen:**

**[15 Hours]**

- |     |                            |      |
|-----|----------------------------|------|
| 4.1 | Fixtures layout plan       | 1:20 |
| 4.2 | Elevations and section     | 1:20 |
| 4.3 | Details as necessary       | 1:10 |
| 4.4 | Hot/cold water pipe layout |      |

4.5 Soil/waste water pipe layout

**Unit 5: Manhole, septic tank, soak pit and grease trap (scale 1:20): [15 Hours]**

- 5.1 Plan and section of manhole
- 5.2 Plan and section of septic tank
- 5.3 Plan and section of soak pit
- 5.4 Plan and section of grease trap

**Unit 6: Schematic diagram: [20 Hours]**

- 6.1 Cold and hot water distribution line
- 6.2 Soil and waste water diagram
- 6.3 Rain water harvesting system installed building.
- 6.4 Drainage layout: combined and separate
- 6.5 Checking drawing with the help of check list

**References:**

1. Andreas Bachmann & Heinz Waldvogel, Drinking water installation and drainage requirement in Nepal, Mechanical Training Centre,(MTC) Balaju
2. Birdie, G.S. and Bridie I.S., water supply and sanitary engineering,
3. Ray Chandley Roger Grenno, Construction Technology Vol. I, Longman Scentific and Technical, London, New Delhi
4. Lestle Woolley, Sanitation details, London
5. William P. Spence, Architectural Working Drawing: Residential and Commercial Building, John Wiley and sons

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# **Entrepreneurship Development**

## **EG 3201 MG**

**Year: III**  
**Semester: II**

**Total: 5 hours /week**  
**Lecture: 3 hours/week**  
**Tutorial: hour/week**  
**Practical: 2 hours/week**

### **Course description**

This course is designed to provide the knowledge and skills on formulating business plan and managing small business. The entire course deals with assessing, acquiring, and developing entrepreneurial attitude; skills and tools that are necessary to start and run a small enterprise.

### **Course objectives**

After completion of this course students will be able to:

1. Understand the concept of business and entrepreneurship
2. Explore entrepreneurial competencies
3. Analyze business ideas and viability
4. Learn to formulate business plan with its integral components
5. Manage small business

### **Course Contents**

#### **Theory**

#### **Unit 1: Introduction to business & entrepreneurship** **[9 Hours]**

1. Overview of entrepreneur and entrepreneurship
2. Wage employment , self- employment and business
3. Synopsis of types and forms of enterprises
4. Attitudes, characteristics & skills required to be an entrepreneur
5. Myths about entrepreneurs
6. Overview of MSMEs (Micro, Small and Medium Enterprises) in Nepal

#### **Unit 2: Exploring and developing entrepreneurial competencies** **[10 Hours]**

1. Assessing individual entrepreneurial inclination
2. Assessment of decision making attitudes
3. Risk taking behavior and risk minimization
4. Creativity and innovation in business
5. Enterprise management competencies

#### **Unit 3: Business identification and selection** **[4 Hours]**

1. Sources and method of finding business idea(s)
2. Selection of viable business ideas
3. Legal provisions for MSMEs in Nepal

**Unit 4: Business plan formulation****[17 Hours]**

1. Needs and importance of business plan
2. Marketing plan
  - Description of product or service
  - Targeted market and customers
  - Location of business establishment
  - Estimation of market demand
  - Competitors analysis
  - Estimation of market share
  - Measures for business promotion
3. Business operation plan
  - Process of product or service creation
  - Required fix assets
  - Level of capacity utilization
  - Depreciation & amortization
  - Estimation office overhead and utilities
4. Organizational and human resource plan
  - Legal status of business
  - Management structure
  - Required human resource and cost
  - Roles and responsibility of staff
5. Financial plan
  - Working capital estimation
  - Pre-operating expenses
  - Source of investment and financial costs
  - Per unit cost of service or product
  - Unit price and profit/loss estimation of first year
6. Business plan appraisal
  - Return on investment
  - Breakeven analysis
  - Risk factors

**Unit 5: Small business management****[5 Hours]**

1. Concept of small business management
2. Market and marketing mix
3. Basic account keeping

### Practical

**Unit 1: Overview of business & entrepreneurship** [2 Hours]

1. Collect business information through interaction with successful entrepreneur

**Unit 2: Exploring and developing entrepreneurial competencies** [2 Hours]

1. Generate innovative business ideas

**Unit 3: Product or service identification and selection** [2 Hours]

1. Analyze business ideas using SWOT method

**Unit 4: Business plan formulation** [22 Hours]

1. Prepare marketing plan
2. Prepare operation plan
3. Prepare organizational and human resource plan
4. Prepare financial plan
5. Appraise business plan
6. Prepare action plan for business startup

**Unit 5: Small business management** [2 Hours]

1. Prepare receipt and payment account
2. Perform costing and pricing of product and service

**पाठ्यपुस्तक :**

- क) प्रशिक्षकहरूका लागि निर्मित निर्देशिका तथा प्रशिक्षण सामग्री, प्राविधिक शिक्षा तथा व्यावसायिक तालीम परिषद्, २०६९
- ख) प्रशिक्षार्थीहरूका लागि निर्मित पाठ्यसामग्री तथा कार्यपुस्तिका, प्राविधिक शिक्षा तथा व्यावसायिक तालीम परिषद् (अप्रकाशित), २०६९

**Reference book:**

- Entrepreneur's Handbook, Technonet Asia, 1981.

# Quantity Surveying II

## EG 3210 CE

**Year: III**  
**Semester: II**

**Total: 3 hours /week**  
**Lecture: 1 hours/week**  
**Tutorial: hour/week**  
**Practical: 2 hours/week**

### **Course description:**

This course focuses on familiarization of quantity surveying and estimating of building works.

### **Course objectives:**

On completing of this course the student will be able to:

1. Understand the procedures of estimating building works
2. Understand the types of estimation
3. Prepare the estimating of building works

### **Course Contents:**

#### **Theory**

- |   |                  |
|---|------------------|
| <b>1 Procedure of Estimating</b>                        | <b>[4 Hours]</b> |
| 1.1. Definition of estimate                             |                  |
| 1.2. Purpose of estimating                              |                  |
| 1.3. Unit of measurement                                |                  |
| 1.4. Area of building (Plinth area, Carpet area)        |                  |
| <b>2 Types of Estimates</b>                             | <b>[5 Hours]</b> |
| 2.1 Preliminary estimate                                |                  |
| 2.2 Unit rate estimate                                  |                  |
| 2.3 Plinth area estimate                                |                  |
| 2.4 Detailed estimate                                   |                  |
| 2.5 Revised estimate                                    |                  |
| <b>3 Methods of Estimating</b>                          | <b>[6 Hours]</b> |
| 3.1. Long wall and short wall method                    |                  |
| 3.2. Centre line method                                 |                  |
| 3.3. Methods of measurement of various works            |                  |
| 3.4. Methods of taking out quantities of building works |                  |
| 3.5. Preparation of detailed estimate                   |                  |

**Practical****[30 Hours]**

Taking out detailed quantities and preparing estimate for the following:

1. Perform estimate of a wall
2. Perform estimate of one room building with RCC flat roof
3. Perform estimate of steel reinforcement of footing, RCC beam, column and slab
4. Perform estimate of stone and brick masonry retaining walls
5. Perform estimate of septic tank and soak pit
6. Carryout approximate estimate of building works

**Reference Books:**

1. B. N. Dutta, Estimating and Costing
2. M. Chakraborty, Estimating and Costing

## **Project Work** **EG 3205 AR**

**Year: III**  
**Semester: II**

**Total: 4 hours /week**  
**Lecture: hours/week**  
**Tutorial: hour/week**  
**Practical: 4 hours/week**

### **Course description**

This course is designed to help students to apply knowledge and skills in developing a commercial building in an urban context.

### **Course Objective:**

After the completion of the course students will be able to:

1. Identify and design functional commercial and public spaces in an urban context
2. Inter-relationship of activities and spaces, circulation and linking elements within a building like corridors and staircase.
3. Prepare Program formulation: need /requirement assessment of necessary spaces.
4. Provide furniture and fixtures layout of various allocated areas and spaces.
5. Provide complete planning, designing and detailing (architectural, structural, electrical, water supply-sanitary & mechanical etc.) of self designed commercial building incorporating all necessary building services.
6. Prepare complete construction and contract documents (Contract document, specification, bill of quantities, and cost estimates etc.) to be prepared for the construction management of the project.
7. Understand complete Bye-laws and municipality requirement and its correct implementation for applying for a building permit prior to construction.

### **Course Contents:**

1. Program Formulation– Identification of site. **[4 Hours]**  
Complex building in urban context in a prime commercial area comprising of shops in the ground floor and rentable mixed use spaces in the upper floors.
2. Design Concept of shopping area and mixed use rentable spaces for multiple purposes. Provide functional relation between activities by bubble diagram and showing inter-relationship of spaces within. **[8 Hours]**
3. Site SWOT Analysis /Micro -climate – Sun, wind, rain, humidity, precipitation. Consider Natural Calamities - Earthquake, landslide, flood etc. **[4 Hours]**
4. Preparation of Site Plan and Conceptual Floor Plans with necessary amenities and circulation etc. Provisions for physically challenged people (ramps & elevators etc.). Provide proper openings for light/ventilation – entrances/exits. **[8 Hours]**
5. Preliminary Architectural Design & preparation of Floor Plans **[12 Hours]**

(Ground Floor, First Floor & Typical Floor Plans) considering proper rentable spaces and service, circulation and linking spaces like corridor and staircase. Provide proper open spaces, setback etc. considering Building Bye –Laws (GC, ROW, FAR, Ht of building etc.) Provide necessary exits for fire safety and services etc. Preliminary structural, electrical, water supply/sanitary & mechanical design & details.

6. Consultation and Development of Final Architectural Floor Plans, Sections & Elevations. Layout and details of toilet and pipe ducts etc. Preparation of draft Contract Documents (specification, bill of quantities, and cost estimates etc.). **[8 Hours]**
7. Consultation and Development of Final Designs & Drawings (structural, electrical, water supply-sanitary & mechanical etc.) **[8 Hours]**
8. Final Design Drawings (complete architectural, structural, electrical, water supply-sanitary & mechanical etc. drawings & details) and Contract Document (specification, bill of quantities, and cost estimates etc.). Submission of Final Project Report. **[8 Hours]**

**Required Drawings & Details to be submitted for The Final Presentation (Class Assessment 60+ Final Report submission and Viva 40)** (Drawings can be in any appropriate scale suggested by the Teacher)

**A. Architectural Drawings**

1. Location Plan, Site Plan, Ground Floor Plan (with necessary layouts)  
Typical Floor Plans or Different Upper Floor Plans (with necessary layouts)
2. Elevation 4 sides
3. Roof Plan
4. 2 Cross Section(one through the staircase)
5. Other necessary details (Toilet, Staircase etc.)

**B. Structural Drawings:**

1. Foundation Trench Plan/ Footing Plan
2. Footing Detail (Plan & Section)
3. Columns Layout Plan & Details (Floor wise)
4. Frames Sections with Beam Details
5. Floor Slabs (Plan & Section)
6. Staircase (Plan & Section)

**C. Water Supply-Sanitary drawings**

1. Water Supply-Sanitary Plans
2. Toilet Details

**D. Electrical Drawings**

Power / Light Layout Plans

**E. Contract Documents**

Cost estimates, specification and bill of quantities etc.

## References:

- Singh, Gurcharan & Singh Jagadish, Building Planning Designing and Scheduling
- Building Science and Planning
- Architecture & Town Planning, Dhanpat Rai & Sons
- Korn, Wolfgang, The Traditional Architecture of Kathmandu Valley Indian Architecture and Builder
- Fleming, John, Honour Hugh & Pevsner Nikolaus, Dictionary of Architecture
- A. Peter Fawcett, Architecture: Design Notebook, Architectural Press
- Nikolas Davies and Erkki Jokiniemi, Dictionary of Architecture and Building Construction
- Francis D.K. Ching, Visual Dictionary of Architecture, John Wiley & Sons
- Architecture: Form, Space, & Order, Francis D.K. Ching
- Selwyn Goldsmith, Universal Design, Architectural Press
- Donald Hepler & Paul Wallach, Architecture: Drafting and Design, McGraw-Hill
- Joseph De Chiara, Time-Saver Standards for Building Types, McGraw-Hill
- Donald Watson, Time-Saver Standards for Architectural Design Data, McGraw-Hill
- Magazine, Inside Outside, A+D, Interior Society, A magna Publications

## **Experts involved in Curriculum Development**

CTEVT would like to extend its heartfelt thanks to the following experts who contributed in the process of developing the curriculum of **Diploma in Architecture Engineering**.

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