

Academic description form

Course Description

The course provides teaching students the properties of construction materials, their standard specifications, & their related standard tests.

1.Educational institution	Northern Technical University / Mosul Technical Engineering College
2. Scientific Department / Center	Department of Building and Construction Technologies Engineering
3. Course Name/Code	Building Materials BCE 107
4. Available Attendance Forms	Compulsory
5. Semester / Year	Second semester/ First year
6. Number of Credit Hours (Total)	75 hours
7. The history of preparation of this description	4/4/2023
<u>8. Course Objectives</u>	
This course provides full knowledge about the building materials properties, standards and laboratory tests.	
<u>9. Course Outcomes, Analysis and Design Methods</u>	
<u>1.Cognitive Objectives</u>	
<ul style="list-style-type: none">✓ Understanding the characteristics of different building materials.✓ The ability of utilizing the proper building material according to the type of structure.✓ Understanding the installation methods of building materials.✓ Understanding the standards specification of building materials.	

2. Program Skills Objectives

- The skill of determining the suitable building material in work field.
- The skill of conducting the laboratory building material standards tests.
- The skill of conforming building material with specification standards

<u>3. Teaching and learning methods</u>					
<ul style="list-style-type: none"> ○ Lecture method using a whiteboard and a data show. ○ Forming working groups during the laboratory sessions to conduct the desired tests. ○ Preparation of seminars by students under the supervision of their lecturer. ○ Giving students assignments (H.W) to evaluate the students benefit from the lesson. ○ Conducting a scientific technical visit to an under construction visit ○ Forming groups to conduct a project during the course. ○ Attending online (web-based) sessions. 					
<u>4. Evaluation methods</u>					
<ul style="list-style-type: none"> ● Theoretical (Mid-term& final) exam ● Practical exam ● Reports (8 reports) ● Short exams (6 quizzes) ● Grades determined by seminars (3 seminars) ● Grades determined by assignments (4 home works) ● Grades determined by a group project ● Grades determined by laboratory team work 					
<u>5. Conscientious and value objectives.</u>					
<ul style="list-style-type: none"> ▪ Enable students to identify the physical and mechanical properties of the common building materials. ▪ Improving the student ability of selecting the suitable material that qualifies the requirements of the desired work. 					
<u>6. Teaching and learning methods</u>					
Student Groups / Case Studies / Preparation of Special Reports					
<u>7. Evaluation methods</u>					
Periodic exams / direct questions / special reports / weekly assignments					
<u>8. General and rehabilitative skills transferred)</u>					
<ul style="list-style-type: none"> ▪ Enabling the students to work as a laboratory field tester. ▪ Improving the students' skills enabling the establishment of a career based on the academic knowledge. 					
<u>Course Structure</u>					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Tests & Reports	theoretical	Demonstrates knowledge of the Water proofing materials: Classification, (Liquid, Rigid & semi-rigid water proofing materials), Types & uses.	Knowledge	4	1,2

Tests & Reports	theoretical	Demonstrates knowledge of the Polymers: Definition, Classification, Chemical composition, Uses.	Knowledge	2	3
Tests & Reports	theoretical	Demonstrates knowledge of the Epoxy: Definition, Properties, Types & uses.	Knowledge	2	4
Tests & Reports	theoretical	Demonstrates knowledge of the Steel: Composition & classification, Properties, Uses & standard tests.	Knowledge	2	5
Tests & Reports	theoretical	Demonstrates knowledge of the Metallic materials (nonferrous): Classification & use.	Knowledge	2	6
Tests & Reports	theoretical	<ul style="list-style-type: none"> ○ Demonstrates knowledge of the Timber (wood): Classification, Properties, Seasoning, Types of defect ○ Conducts Standard tests 	Knowledge	2	7
Tests & Reports	theoretical	Demonstrates knowledge of the Insulating materials: Types, Properties.	Knowledge	2	8
Tests & Reports	theoretical	Demonstrates knowledge of the Acoustical materials: Types, Properties.	Knowledge	2	9
Tests & Reports	theoretical	Demonstrates knowledge of the Protective coating (paints): Composition, Types	Knowledge	2	10
Tests & Reports	theoretical	Demonstrates knowledge of the Glass: Classification, Properties, and Uses.	Knowledge	2	11
Tests & Reports	theoretical	Demonstrates knowledge of the Bituminous materials (Asphalt): Sources & type, Chemical composition, Properties, Uses & conducts tests.	Knowledge	4	12,13
Tests & Reports	theoretical	Demonstrates knowledge of the Plastic: Properties & classification.	Knowledge	4	14,15
Tests & Reports	practical	Identifies and reads Standard specification for glass.	Knowledge	3	10
Tests & Reports	practical	Carries out Bituminous materials (Asphalt) tests: Softening point, Penetration , Flash point, &	Knowledge	6	12,13
Tests & Reports	practical	Identifies and reads Standard specification for plastics.	Knowledge	6	14,15

10. Infrastructure

1- Required textbooks	Building Materials
2- Main references (sources)	Construction materials reference book
3- Recommended books and references (scientific journals, reports)	<ul style="list-style-type: none">○ Civil engineering materials○ Construction materials their nature and behavior○ A textbook of building construction
Electronic references, websites	<ul style="list-style-type: none">○ www.cmogroup.com○ www.venveo.com○ www.buildforless.co.uk○ www.onlinebuilding.co.za

11. Course Development Plan

Develop curricula adapted to the labor market
Holding seminars and scientific conferences aimed at updating the curricula
Follow up on scientific developments in the field of specialization

Academic description form

Course Description

The course provides teaching students the properties of construction materials, their standard specifications, & their related standard tests.

1.Educational institution	Northern Technical University / Mosul Technical Engineering College
2. Scientific Department / Center	Department of Building and Construction Technologies Engineering
3. Course Name/Code	Construction Materials BCE 101
4. Available Attendance Forms	Compulsory
5. Semester / Year	First semester/ First year
6. Number of Credit Hours (Total)	75 hours
7. The history of preparation of this description	4/4/2023
<u>8. Course Objectives</u>	
This course provides full knowledge about the construction materials properties, standards and laboratory tests.	
<u>9. Course Outcomes, Analysis and Design Methods</u>	
<u>1.Cognitive Objectives</u>	
<ul style="list-style-type: none">✓ Understanding the characteristics of different construction materials.✓ The ability of utilizing the proper construction material according to the type of structure.✓ Understanding the installation methods of construction materials.✓ Understanding the standards specification of construction materials.	

2. Program Skills Objectives

- The skill of determining the suitable construction material in work field.
- The skill of conducting the laboratory construction material standards tests.
- The skill of conforming construction material with specification standards

<u>3. Teaching and learning methods</u>					
<ul style="list-style-type: none"> ○ Lecture method using a whiteboard and a data show. ○ Forming working groups during the laboratory sessions to conduct the desired tests. ○ Preparation of seminars by students under the supervision of their lecturer. ○ Giving students assignments (H.W) to evaluate the students benefit from the lesson. ○ Conducting a scientific technical visit to an under construction visit ○ Forming groups to conduct a project during the course. ○ Attending online (web-based) sessions. 					
<u>4. Evaluation methods</u>					
<ul style="list-style-type: none"> ● Theoretical (Mid-term& final) exam ● Practical exam ● Reports (8 reports) ● Short exams (6 quizzes) ● Grades determined by seminars (3 seminars) ● Grades determined by assignments (4 home works) ● Grades determined by a group project ● Grades determined by laboratory team work 					
<u>5. Conscientious and value objectives.</u>					
<ul style="list-style-type: none"> ▪ Enable students to identify the physical and mechanical properties of the common construction materials. ▪ Improving the student ability of selecting the suitable material that qualifies the requirements of the desired work. 					
<u>6. Teaching and learning methods</u>					
Student Groups / Case Studies / Preparation of Special Reports					
<u>7. Evaluation methods</u>					
Periodic exams / direct questions / special reports / weekly assignments					
<u>8. General and rehabilitative skills transferred)</u>					
<ul style="list-style-type: none"> ▪ Enabling the students to work as a laboratory field tester. ▪ Improving the students' skills enabling the establishment of a career based on the academic knowledge. 					
<u>Course Structure</u>					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Tests & Reports	theoretical	<ul style="list-style-type: none"> ● Demonstrates knowledge of the Physical properties & standard specification for construction materials. ● Ability to identify types of metallic materials, nonmetallic materials. 	Knowledge	2	1

Tests & Reports	theoretical	Demonstrates knowledge of the Clay bricks: Definition, Classification, Properties, and Types.	Knowledge	2	2
Tests & Reports	theoretical	Demonstrates Advantages & disadvantages of clay bricks	Knowledge	2	3
Tests & Reports	theoretical	Identifying clay brick types of defects, Standard specification.	Knowledge	2	4
Tests & Reports	theoretical	<ul style="list-style-type: none"> • Demonstrates knowledge of the Sand-lime brick: Properties. • Conducts the Standard tests & monitor the specification. 	Knowledge	2	5
Tests & Reports	theoretical	<ul style="list-style-type: none"> • Demonstrates knowledge of the Glass bricks, Concrete bricks: Properties. • Conducts the Standard tests & monitor the specification. 	Knowledge	2	6
Tests & Reports	theoretical	Demonstrates knowledge of the Concrete blocks: Types, Uses, Engineering properties, Standard specification.	Knowledge	2	7
Tests & Reports	theoretical	<ul style="list-style-type: none"> • Ability to identify the Cellular concrete blocks: Properties. • Monitoring and conducting Standard tests & specification. 	Knowledge	2	8
Tests & Reports	theoretical	Demonstrates knowledge and Definition of the Building stone:	Knowledge	2	9
Tests & Reports	theoretical	Demonstrates the classification of the Building stones.	Knowledge	2	10
Tests & Reports	theoretical	Demonstrates the uses and properties of the Building stones.	Knowledge	2	11
Tests & Reports	theoretical	Ability to identify the Bonding materials: Classification, Chemical composition, properties & uses of common bonding materials.	Knowledge	2	12
Tests & Reports	theoretical	Monitoring and conducting Standard tests & specification (Cement mortar, Cement lime mortar , Gypsum)	Knowledge	2	13
Tests & Reports	theoretical	Demonstrates knowledge of the Types, Properties of flooring materials (Tiles & concrete flags):	Knowledge	2	14

Tests & Reports	theoretical	Demonstrates knowledge standards tests & specification of flooring materials.	Knowledge	2	15
Tests & Reports	practical	Recognition of laboratory, Using of balances.	Knowledge	3	1
Tests & Reports	practical	Able to conduct and identify the Clay brick tests: Density, Dimension, Absorption, Compressive strength, Efflorescence, Analysis of soluble salts, Porosity.	Knowledge	9	2,3,4
Tests & Reports	practical	Able to conduct and identify the Sand-lime brick tests: (Density, Absorption, Compressive strength).	Knowledge	3	5
Tests & Reports	practical	Able to conduct and identify the Concrete bricks & block tests: (Density, Absorption, Compressive strength).	Knowledge	6	6,7
Tests & Reports	practical	Able to conduct and identify the Cellular concrete block tests: (Density, Absorption, Compressive strength).	Knowledge	3	8
Tests & Reports	practical	Able to conduct and identify the Bonding materials (gypsum) tests: Fineness, Standard consistency, Time of setting of gypsum, Compressive strength, Tensile strength of gypsum.	Knowledge	12	9,10, 11,12
Tests & Reports	practical	Able to conduct and identify Tile tests: (Dimension, Total absorption, Face absorption, Modulus of rupture).	Knowledge	9	13,14 ,15

10. Infrastructure

1 Required textbooks	Building Materials
2 Main references (sources)	Construction materials reference book
Recommended books and references (scientific journals, reports)	<ul style="list-style-type: none"> ○ Civil engineering materials ○ Construction materials their nature and behavior ○ A textbook of building construction
B Electronic references, websites	<ul style="list-style-type: none"> ○ www.cmogroup.com ○ www.venveo.com ○ www.buildforless.co.uk ○ www.onlinebuilding.co.za

11. Course Development Plan

Develop curricula adapted to the labor market

Holding seminars and scientific conferences aimed at updating the curricula

Follow up on scientific developments in the field of specialization

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	<i>Engineering Technical College</i>
3. Programme Title	Geology / First stage
4. Title of Final Award	B.A
5. Modes of Attendance offered	One hour weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	7/04/2024
9. Aims of the Programme	
1. Providing knowledge of Engineering geology to students	
2. Increase student's knowledge of the internal and external earth's crust	
3. Make students of scientific specializations value the importance of the materials, metals and resources	

A. Cognitive goals

A1. Introducing Engineering geology and earth crust.

A2. Understanding the earthquakes and how they happen.

A3. Understanding the meanings of Creep, talus, landslide, and rock falls.

B. The skills goals special to the programme

B1. Make students acquire the basic skills of Engineering geology.

B2. Develop all knowledge about internal and external earth materials.

B3. Develop the skill of answering questions.

Teaching and Learning Methods

Lecture, discussion, giving examples, gather information from online websites, illustrations and direct presentations from the lecturer.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

C. Affective and value goals

C1. Collaboration among students

C2. Sharing information

C3. Increase self-confidence

C4. Creating discussion among students

Teaching and Learning Methods

Using multimedia technology (aural and visual), curricula and extra-curricular assignments

Do group assignments

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Benefit from the scientific department program.

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
First Stage		The earth zones	Practical	Theoretical
		Geological process of internal and external origin		Theoretical
		Absolute and relative age of rocks		Theoretical
		Tectonic movements of earth crust		Theoretical
		Folding and faulting		Theoretical
		Earthquakes		Theoretical
		Weathering		Theoretical
		Water erosion		Theoretical
		Ground and surface water		Theoretical

		Swamps		Theoretical
		Rock- falls		Theoretical

13. Personal Development Planning

- Enriching the course by adding voice and conversation laboratories and using blended learning to increase students' linguistic information
- Benefiting from the curricula taught in foreign universities to improve the level of students
- Using the method of educational entertainment (Edutainment) to activate students' perception and prevent boredom in the lecture

14. Admission criteria .

15. Key sources of information about the programme

Engineering geology book

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1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Building and Construction Engineering Techniques
3. Programme Title	Plane Surveying/ First stage/First semester
4. Title of Final Award	B.A
5. Modes of Attendance offered	Five hours weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	09/04/2024
9. Aims of the Programme	
1. Providing knowledge of measuring	
2. Develop students' abilities of measuring and use tools of measurement	
3. Develop students' abilities in set up stations from map to field	
4. Make students of scientific specializations value the importance of calculation traverses areas using mathematical rules	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Cognitive goals

- A1. Introducing measurement and measuring tools.
- A2. Understanding the basic rules of area computation.
- A3. Understanding the types of errors in measuring
- A4. The ability to calculate the area of any traverse

B. The skills goals special to the programme

- B1. Make students acquire the basic skills on plane surveying
- B2. Develop measuring and calculation errors.
- B3. Develop the method of set up points and traverses.
- B4. Develop the skill of calculation errors in traverses.

Teaching and Learning Methods

Lecture, discussion, giving examples, gather information from online websites, illustrations and direct presentations from the lecturer.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

C. Affective and value goals

- C1. Collaboration among students
- C2. Sharing information
- C3. Increase self-confidence
- C4. Creating discussion among students

Teaching and Learning Methods

Using multimedia technology (aural and visual), curricula and extra-curricular assignments

Practical application of basic skills in measuring

Do group assignments

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Benefit from the scientific department program.

D2. Introducing the means of presentation in plane surveying

D3. Make the students acquire the basic skills of measuring.

D4. Enable the students to use mathematical rules in area calculation

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
First Stage/ first Semester	BCE 102	Plane Surveying	Practical	Theoretical
		Introduction to plane surveying	Practical	Theoretical
		Measurement and engineering tools of measuring	Practical	Theoretical
		Errors in measuring	Practical	Theoretical
		Set up a right angle using measuring tools	Practical	Theoretical
		Drawing scale	Practical	Theoretical
		Bench mark	Practical	Theoretical
		Set up points to field	Practical	Theoretical
		Obstacles	Practical	Theoretical
		Measuring in field with obstacles	Practical	Theoretical
		Traverses	Practical	Theoretical
		Types of traverses	Practical	Theoretical

		Errors in traverses	Practical	Theoretical
		Area of traverses	Practical	Theoretical
		Simpson's and trapezoidal methods	Practical	Theoretical
		Plane table	Practical	Theoretical

13. Personal Development Planning

- Enriching the course by using computer software of plane surveying
- Using the methods of traverse area computation and compare with the Geographic information

14. Admission criteria .

15. Key sources of information about the programme

An Introduction to Engineering Surveying by Koos landman, 2012

Introduction to Surveying by Michael Minchin, 2003

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	<i>Engineering Technical Collage</i>
3. Programme Title	Engineering Statistics / Second stage
4. Title of Final Award	B.A
5. Modes of Attendance offered	One hour weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	7/04/2024
9. Aims of the Programme	
1. Providing knowledge of Engineering Statistics for students	
2. Increase students 'knowledge about statistics analysis.	
3. Develop students' abilities in data analysis (group and ungroup data).	
4. Make students of scientific specializations value the importance of the data, Bayes theory, and central limit.	

A. Cognitive goals

- A1. Introducing Engineering Statistics.
- A2. Understanding the basic rules of Statistics.
- A3. Understanding the meanings of mean, median and mode.
- A4. The ability to practice the Engineering statistics program.

B. The skills goals special to the programme

- B1. Make students acquire the basic skills of Engineering Statistics.
- B2. Develop knowledge about data.
- B3. Develop statistics programming.
- B4. Develop the skill of answering questions.

Teaching and Learning Methods

Lecture, discussion, giving examples, gather information from online websites, illustrations and direct presentations from the lecturer.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

C. Affective and value goals

- C1. Collaboration among students
- C2. Sharing information
- C3. Increase self-confidence
- C4. Creating discussion among students

Teaching and Learning Methods

Using multimedia technology (aural and visual), curricula and extra-curricular assignments

Practical application of basic skills in Engineering Statistics.

Do group assignments

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Benefit from the scientific department program.

D3. Make the students acquire the basic skills of Engineering statistics.

D4. Enable the students to use statistics.

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
First Stage		Bayes theorem-Binomial	Practical	Theoretical
		Poisson and Normal distribution		Theoretical
		Central Limit theorem		Theoretical
		Law of large number		Theoretical
		ANOVA table		Theoretical
		T- test		Theoretical
		F- test		Theoretical
		Z- test		Theoretical
		Chi- square test		Theoretical

		LPP statement		Theoretical
		Graphical solution		Theoretical

13. Personal Development Planning

- Enriching the course by adding voice and conversation laboratories and using blended learning to increase students' linguistic information
- Benefiting from the curricula taught in foreign universities to improve the level of students
- Using the method of educational entertainment (Edutainment) to activate students' perception and prevent boredom in the lecture

14. Admission criteria .

15. Key sources of information about the programme

Engineering Statistics book

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Building and Construction Engineering Techniques
3. Programme Title	Surveying-1/ First stage/Second semester
4. Title of Final Award	B.A
5. Modes of Attendance offered	Five hours weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	09/04/2024
9. Aims of the Programme	
1. Providing knowledge of leveling	
2. Develop students' abilities of measuring the levels using tools of leveling	
3. Develop students' abilities in set up levels from map to field	
4. Make students of scientific specializations value the importance of calculation volumes using mathematical rules	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Cognitive goals

- A1. Introducing leveling and tools.
- A2. Understanding the basic rules of volume computation.
- A3. Understanding the types of errors in leveling
- A4. The ability to calculate the volume of cut and fill.

B. The skills goals special to the programme

- B1. Make students acquire the basic skills on leveling
- B2. Develop leveling and calculation errors.
- B3. Develop the method of set up levels for traverses.
- B4. Develop the skill of calculation volumes of cut and fill.

Teaching and Learning Methods

Lecture, discussion, giving examples, gather information from online websites, illustrations and direct presentations from the lecturer.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

C. Affective and value goals

- C1. Collaboration among students
- C2. Sharing information
- C3. Increase self-confidence
- C4. Creating discussion among students

Teaching and Learning Methods

Using multimedia technology (aural and visual), curricula and extra-curricular assignments

Practical application of basic skills in measuring

Do group assignments

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Benefit from the scientific department program.

D2. Introducing the means of presentation in plane surveying

D3. Make the students acquire the basic skills of leveling.

D4. Enable the students to use mathematical rules in volume calculation

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
First Stage/ Second Semester	BCE 107	Surveying 1	Practical	Theoretical
		Introduction to engineering surveying	Practical	Theoretical
		Leveling and tools of measuring levels	Practical	Theoretical
		Leveling in field	Practical	Theoretical
		Length measuring using leveling tools	Practical	Theoretical
		Types of bench marks	Practical	Theoretical
		Errors in leveling	Practical	Theoretical
		Contour Maps	Practical	Theoretical
		Engineering uses of geographic maps	Practical	Theoretical
		Leveling in field with obstacles	Practical	Theoretical
		Measurement of Angles	Practical	Theoretical
		Theodolite uses to angle measuring	Practical	Theoretical
		Errors of angle Measurement	Practical	Theoretical

		Volumes of cut and fill quantities	Practical	Theoretical
		Simpson's and trapezoidal methods	Practical	Theoretical
		Longitudinal and transverse projects	Practical	Theoretical

13. Personal Development Planning

- Enriching the course by using computer software of plane surveying
- Using the leveling tools to get levels for any part of university land and compare with the Geographic information

14. Admission criteria .

15. Key sources of information about the programme

An Introduction to Engineering Surveying by Koos landman, 2012

Introduction to Surveying by Michael Minchin, 2003

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Building and construction technology engineering department
3. Programme Title	English Language
4. Title of Final Award	B.A
5. Modes of Attendance offered	Two hours weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	7/04/2024
9. Aims of the Programme	
1. Identify advanced level of grammar structure.	
2. Criticize and interpret the advanced level of reading passages.	
3. Develop listening skills.	
4. Develop the ability to expand their vocabulary through multiple methods.	
5. Compose an essay by developing content, using specific grammatical structures and giving thematically related examples about the given topic.	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Cognitive goals

- A1. Introducing English language and some vocabularies, sentences and expressions.
- A2. Understanding the basic rules of the English language.
- A3. Understanding the meanings of vocabularies and their meaning in English language correctly.
- A4. The ability to practice the English language in their daily and scientific lives.

B. The skills goals special to the programme

- B1. Make students acquire the basic skills of English grammar
- B2. Develop listening and speaking skills.
- B3. Develop reading and writing skills.
- B4. Develop the skill of answering questions.

Teaching and Learning Methods

Lecture, discussion, giving examples, gather information from online websites, illustrations and direct presentations from the lecturer.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

C. Affective and value goals

- C1. Collaboration among students
- C2. Sharing information
- C3. Increase self-confidence
- C4. Creating discussion among students

Teaching and Learning Methods

Using multimedia technology (aural and visual), curricula and extra-curricular assignments

Practical application of basic skills in English grammar

Do group assignments

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Benefit from the scientific department program.

D2. Introducing the means of presentation (audio-visual) in English language

D3. Make the students acquire the basic skills of English language.

D4. Enable the students to use English

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
			Practical	Theoretical
First Stage	NTU 101	English Language		
		Narrative Tenses (Writing a story)	5	Theoretical
		Managing conversation: Agreeing, Disagreeing	3	Theoretical
		Listening conversations and reading a text	3	Theoretical
		Managing conversations on similarities and differences	3	Theoretical
		Future Forms (Reading an article), Adjective Clauses with Prepositions	3	Theoretical
		The Passive Structure	3	Theoretical
		Compound Nouns and Possessive's (Writing a paragraph)	5	Theoretical
		Listening of an interview, Pronouns and substitution	3	Theoretical

		Present and Past Irregular Plurals, Consonants, There was/were, Countable and Uncountable Nouns,	5	Theoretical
		Can for ability Could and Couldn't (Skills at work), Can for requests Adjectives and Adverbs	4	Theoretical
		Present Continuous and Adjectives (Describing People)	4	Theoretical
		Have to/ don't have to (Housework, home, school & work obligations)	4	Theoretical
		Offering and Inviting	3	Theoretical
		Be going to + infinitive for plans, Be going to weak forms: Maybe/perhaps	4	Theoretical
		Past Simple have to,	3	Theoretical

13. Personal Development Planning

- Enriching the course by adding voice and conversation laboratories and using blended learning to increase students' linguistic information
- Benefiting from the curricula taught in foreign universities to improve the level of students
- Using the method of educational entertainment (Edutainment) to activate students' perception and prevent boredom in the lecture

14. Admission criteria .

15. Key sources of information about the programme

New Headway Plus (Pre-Intermediate) , John and Liz Soars, Oxford (Student's Book)
New Headway Plus (Pre-Intermediate) , John and Liz Soars, Oxford (Workbook)
[https://elt.oup.com/student/headway/?cc=global&selLanguage=en.](https://elt.oup.com/student/headway/?cc=global&selLanguage=en)

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	<i>Technical Engineering College of Mosul</i>
3. Programme Title	Concrete Technology 1
4. Title of Final Award	B.Sc.
5. Modes of Attendance offered	Five hours weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	01/01/2024
9. Aims of the Programme	
<p>The student learns the physical and chemical analysis of the alternative to cement and other laboratory tests and the effectiveness of this basic element when used in concrete mixtures.</p> <p>The student learned how to manufacture cement and develop this industry by choosing the practical steps for production</p> <p>Cement</p> <p>The student learns about the different types of cement, its manufacture, and its formation and new types of cement</p> <p>Cement</p>	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

The student learns the physical and chemical analysis of the alternative to cement and other laboratory tests and the effectiveness of this basic element when used in concrete mixtures.

The student learned how to manufacture cement and develop this industry by choosing the practical steps for production

Cement

The student learns about the different types of cement, its manufacture, and its formation and new types of cement

Cement

Teaching and Learning Methods

Lecture, discussion, giving examples, gather information from online websites, illustrations and direct presentations from the lecturer.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

A. Affective and value goals

C1. Collaboration among students

C2. Sharing information

C3. Increase self-confidence

C4. Creating discussion among students

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
Second Stage	1st		Practical	Theoretical
		composition of c		
		Demonstrates kno co		
		Demonstrates kno co		
		C • Al		
		Correctly im Po • Able to iden		

		<p>Correctly implement manufacture of Portland cement; chemical analysis of Portland cement; major compounds in Portland cement.</p> <ul style="list-style-type: none"> • Able to identify the influence of composition upon characteristics of cement. 	
		<p>Demonstrates knowledge about properties of Portland cement: Fineness Consistency of cement paste ; Hydration reactions in cement paste; Hydration heat of Hydration ; setting and hardening of cement : time of setting , soundness strength of cement paste</p>	
		<p>Demonstrates knowledge about properties of Portland cement: Fineness Consistency of cement paste ; Hydration reactions in cement paste; Hydration heat of Hydration ; setting and hardening of cement : time of setting , soundness strength of cement paste , loss of ignition .</p>	
		<p>Demonstrates knowledge about properties of Portland cement: Fineness Consistency of cement paste ; Hydration reactions in cement paste; Hydration heat of Hydration ; setting and hardening of cement : time of setting , soundness strength of cement paste , loss of ignition .</p>	
		<p>Able to identify types of Portland cement: Ordinary; Modified; Rapid hardening Sulphate resisting. Other types: High strength; pozzolana – cement and pozzolana; Slag cement; Blast – Furnas - slag ; Masonry cement ; Expansive cement ; Aluminous cement ; White Portland ; Fly – ash ; Anti – bacterial ; Hydrophobic cement ; Natural cement .</p>	
		<p>Able to identify types of Portland cement: Ordinary; Modified; Rapid hardening Sulphate resisting. Other types: High strength; pozzolana – cement and pozzolana; Slag cement; Blast – Furnas - slag ; Masonry cement ; Expansive cement ; Aluminous cement ; White Portland ; Fly – ash ; Anti – bacterial ; Hydrophobic cement ; Natural cement .</p>	
		<p>Able to identify types of Portland cement: Ordinary; Modified; Rapid hardening Sulphate resisting. Other types: High strength; pozzolana – cement and pozzolana; Slag cement; Blast – Furnas - slag ; Masonry cement ; Expansive cement ; Aluminous cement ; White Portland ; Fly – ash ; Anti – bacterial ; Hydrophobic cement ; Natural cement .</p>	
		<p>Able to identify types of Portland cement: Ordinary; Modified; Rapid hardening Sulphate resisting. Other types: High strength; pozzolana – cement and pozzolana; Slag cement; Blast – Furnas - slag ; Masonry cement ; Expansive cement ; Aluminous cement ; White Portland ; Fly – ash ; Anti – bacterial ; Hydrophobic cement ; Natural cement .</p>	
		<p>Able to identify types of Portland cement: Ordinary; Modified; Rapid hardening Sulphate resisting. Other types: High strength; pozzolana – cement and pozzolana; Slag cement; Blast – Furnas - slag ; Masonry cement ; Expansive cement ; Aluminous cement ; White Portland ; Fly – ash ; Anti – bacterial ; Hydrophobic cement ; Natural cement .</p>	
		<p>Demonstrates knowledge about cement hydration, hydration products, strength</p>	

13. Personal Development Planning

- Benefiting from the curricula taught in foreign universities to improve the level of students
- Using the method of educational entertainment (Edutainment) to activate students' perception and prevent boredom in the lecture

14. Admission criteria .

15. Key sources of information about the programme

Properties of Concrete, Neville

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	<i>Technical Engineering College of Mosul</i>
3. Programme Title	Concrete Technology 2
4. Title of Final Award	B.Sc.
5. Modes of Attendance offered	Five hours weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	01/01/2024
9. Aims of the Programme	
<p>The student learns the physical and chemical analysis of the alternative to cement and other laboratory tests and the effectiveness of this basic element when used in concrete mixtures.</p> <p>The student learned how to manufacture cement and develop this industry by choosing the practical steps for production</p> <p>Cement</p> <p>The student learns about the different types of cement, its manufacture, and its formation and new types of cement</p> <p>Cement</p>	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

The student learns the laboratory physical and chemical properties required to ensure the effectiveness of the other important components of concrete, which is aggregate and water when used in concrete mixtures.

The importance of using admixtures for concrete and their effect on fresh Concrete. Also, the student learns the study of concrete in the fresh state and how to perform calculations of the quantities of its constituent materials

Cement

Teaching and Learning Methods

Lecture, discussion, giving examples, gather information from online websites, illustrations and direct presentations from the lecturer.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

- A. Affective and value goals
- C1. Collaboration among students
- C2. Sharing information
- C3. Increase self-confidence
- C4. Creating discussion among students

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
Second Stage	2nd	<div data-bbox="592 1354 899 1438" style="border: 1px solid black; height: 40px; margin-bottom: 5px;"></div> <div data-bbox="592 1438 899 2026" style="border: 1px solid black; padding: 5px;"> Demonstrates knowledge about CONCRETE AGGREGATES: Preliminary remarks ; general characteristics; data needed for proportioning mixtures; sampling aggregate; particle shape and texture; bond of aggregates; specific gravity; unit weight </div>	Practical	Theoretical

		<p>and voids;porosity and absorption, moisture content</p>		
		<p>Demonstrates knowledge about concrete – making materials – Portland Cement; basic constitutes of cement; chemical formulas and processes.</p>		
		<p>Demonstrates knowledge about concrete – making materials – Portland Cement; basic constitutes of cement; chemical formulas and processes.</p>		
		<p>Demonstrates knowledge about Handling and storing aggregates; Deleterious substances: organic impurities; alkali – aggregates reaction; alkali – carbonate reaction; thermal properties of aggregates.</p>		
		<p>Demonstrates knowledge about Handling and storing aggregates; Deleterious substances: organic impurities; alkali – aggregates reaction; alkali – carbonate reaction; thermal properties of aggregates.</p>		
		<p>Demonstrates</p>		

		<p>knowledge about WATER including Able to identify Mixing water; Curing water.</p>		
		<p>Demonstrates knowledge about ADMIXTURES : Accelerators : Retarders ; Water – Reducing Admixture; super plasticizers ;Workability admixtures ; Air – entraining Admixtures ; Expansion – producing Admixtures; Pozzolanic materials ;Bonding admixtures; Curing aids ; Water Proofer ; Coloring agents ; Surface hardeners .</p>		
		<p>Demonstrates knowledge about ADMIXTURES : Accelerators : Retarders ; Water – Reducing Admixture; super plasticizers ;Workability admixtures ; Air – entraining Admixtures ; Expansion – producing Admixtures; Pozzolanic materials ;Bonding admixtures; Curing aids ; Water Proofer ; Coloring agents ; Surface hardeners .</p>		

		<p>Demonstrates knowledge about ADMIXTURES : Accelerators : Retarders ; Water – Reducing Admixture; super plasticizers ;Workability admixtures ; Air – entraining Admixtures ; Expansion – producing Admixtures; Pozzolanic materials ;Bonding admixtures; Curing aids ; Water Proofer ; Coloring agents ; Surface hardeners .</p>		
		<p>Demonstrates knowledge about FRESH CONCRETE :Introduction; Properties of fresh concrete :(Workability; Consistency; Segregation; Bleeding; Unit weight). • Recognition of laboratory correctly execute Measurement of workability and Consistency .Factors affecting workability.</p>		
		<p>Demonstrates knowledge about FRESH CONCRETE : Introduction; Properties of fresh concrete :(Workability; Consistency; Segregation;</p>		

		<p>Bleeding; Unit weight).</p> <ul style="list-style-type: none"> • Recognition of laboratory correctly execute <p>Measurement of workability and Consistency .Factors affecting workability.</p>		
		<p>Demonstrates knowledge about Air – Entrainment; Correctly execute Measurement of Entrained – Air: (Volumetric; Gravimetric and Pressure methods) Unit weight; yield; Cement factor.</p> <ul style="list-style-type: none"> • Carries out Manufacture of concrete: Batching; Mixing ; Conveying ; Placing ; Compacting ; and Curing of concrete . 		
		<p>Demonstrates knowledge about Air – Entrainment; Correctly execute Measurement of Entrained – Air: (Volumetric; Gravimetric and Pressure methods) Unit weight; yield; Cement factor.</p> <ul style="list-style-type: none"> • Carries out Manufacture of concrete: Batching; Mixing ; Conveying ; Placing ; Compacting ; and Curing of concrete . 		
		<p>Demonstrates knowledge about Air – Entrainment;</p>		

13. Personal Development Planning

- Benefiting from the curricula taught in foreign universities to improve the level of students
- Using the method of educational entertainment (Edutainment) to activate students' perception and prevent boredom in the lecture

14. Admission criteria .

15. Key sources of information about the programme

Properties of Concrete, Neville

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Building and construction technology engineering department
3. Programme Title	SURVEYING-II BCE 204
4. Title of Final Award	B.A
5. Modes of Attendance offered	FIVE hours weekly
6. Accreditation	Bologna
7. Other external influences	
8. Date of production/revision of this specification	7/04/2024
9. Aims of the Programme	
1. Develop and strengthen students understanding of fundamental concepts of applied in Applied Surveying II, such as Built and Layout for construction and road projects including laying pipelines, open channels and sewers using theodolite, integrated station and GPS software	
2. Learn how to analyze and solve practical problems related to as Built and Layout of construction and road projects, including laying pipelines and open channels, using the theodolite device, the integrated station device, and GPS software.	
3. Developing the ability and qualifying students to use modern and advanced surveying equipment of various types in designing and implementing civil engineering projects.	
4. Understanding the importance of surveying in various engineering works and its applications.	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Cognitive goals

A1. Understanding fundamental concepts and principles in Surveying II.

A2. Analyzing and interpreting the problems that obstruct the scanning process in various businesses effectively.

A3. Applying mathematical equations and formulas to solve Surveying II problems.

A4. Evaluate data and experimental results related to the survey process

B. The skills goals special to the programme

B1. Develop skills in the surveying process using modern and advanced surveying equipment, including the ability to apply theoretical concepts to practical scenarios.

B2. Enhancing critical thinking skills to analyze problems encountered in the complex survey process and propose appropriate solutions to them.

B3. Improve communication skills to effectively convey ideas, solutions and analyzes related to the survey process through written reports, presentations and discussions.

B4. Enhancing teamwork and cooperation skills for group projects and field experiments in the surveying process for construction projects, roads, and laying pipelines and sewers.

Teaching and Learning Methods

Lectures, discussion, giving examples, illustrations and direct presentations from the lecturer, Problem-Solving Sessions, Group Projects, Guest Lectures and Industry Visits, Online Resources, Formative Assessment

Assessment methods

Written Examinations (Short exams)

Assignments and Homework

Group Projects

Computer-Based Assessments

Oral Presentations

Formative Assessment

Final Exams

A. Affective and value goals:

C1. Cultivating a collaborative spirit among students

C2. Encouraging the sharing of information

C3. Enhancing students' self-confidence by providing them with opportunities to participate in solving problems encountered in the survey process.

C4. Create discussions among students

Teaching and Learning Methods

- Student groups
- Preparing special reports

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

D. General and Transferable Skills for Surveying Program:

D1. Maximizing the benefits of the Surveying program to develop versatile skills applicable across scientific disciplines.

D2. Enabling students to apply the knowledge and skills acquired from the surveying subject in various academic and professional environments.

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
Second Stage	BCE 204	SURVEYING II	4	Theoretical
			3	Practical
1st		Demonstrates knowledge and carries out Field measurements by using total station. Correctly implement calculations, for certain projects	7	Theoretical and Practical
2nd		Demonstrates knowledge and carries out Field measurements by using total station. Correctly implement calculations, for certain projects	7	Theoretical and Practical
3rd		Demonstrates knowledge and correctly draw Horizontal Curves , Kinds , computations	7	Theoretical and Practical
4th		Demonstrates knowledge and correctly draw Horizontal Curves , Kinds , computations	7	Theoretical and Practical
5th		Demonstrates knowledge and correctly draw Vertical Curves, Kinds , Computations	7	Theoretical and Practical
6th		Carries out Setting out construction , small & large building	7	Theoretical and Practical
7th		Demonstrates knowledge and Correctly implement of Global Positioning System (GPS)	7	Theoretical and Practical
8th		Demonstrates knowledge and Correctly implement of Geographic Information system (GIS)	7	Theoretical and Practical

9th		Demonstrates knowledge and Carries out Tunnel surveying	7	Theoretical and Practical
10th		Demonstrates knowledge and Carries out Arial photogrammetric surveying	7	Theoretical and Practical
11th		Demonstrates knowledge and Carries out Arial photogrammetric surveying	7	Theoretical and Practical
12th		Demonstrates knowledge and Carries out Photogrammetric traditional surveying & Photogrammetric Instruments & Flight design	7	Theoretical and Practical
13th		Field measurements by using total station and calculations, for certain projects	7	Theoretical and Practical
14th		3D photogrammetric survey and laser scanner, both terrestrial and by drone (theory). Structure from Motion. Multi View Stereo. Software Agisoft Metashape (suggested)	7	Theoretical and Practical
15th		3D photogrammetric survey and laser scanner, both terrestrial and by drone (theory). Structure from Motion. Multi View Stereo. Software Agisoft Metashape (suggested)	7	Theoretical and Practical

13. Personal Development Planning

- Using the method of educational entertainment (Edutainment, such as some website that use animation to explain some complex aspects) to activate students' perception
- Benefiting from the curricula taught in foreign universities to improve the level of students
- Developing curricula appropriate to the labor market
- Follow up on scientific developments in the field of specialisation

14. Admission criteria .

15. Key sources of information about the programme

1. ENGINEERING SURVYING, W.SCHOFIELD AND M. BREACH, SIXTH EDITION, Copyright © 2007, W. Schofield and M. Breach. Published by Elsevier Ltd. All rights reserved

2. Elementary Surveying, An Introduction to Geometrics, Thirteenth Edition, **CHARLES D. GHILANI** The Pennsylvania State University, **PAUL R. WOLF** Professor Emeritus, Civil and Environmental Engineering, University of Wisconsin–Madison

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Building and construction technology engineering department
3. Programme Title	Fluid Mechanics
4. Title of Final Award	B.A
5. Modes of Attendance offered	Four hours weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	7/04/2024
9. Aims of the Programme	
1. Develop a solid understanding of fundamental concepts in fluid mechanics, including properties of fluids, characteristics of flow, and principles of fluid statics and dynamics.	
2. Learn to analyze and solve practical problems related to fluid flow in various settings, including pipelines and open channels.	
3. Gain skills in applying mathematical equations and principles to model and predict fluid behavior in engineering applications.	
4. Develop the ability to interpret and utilize data obtained from experiments and simulations to make informed engineering decisions.	

5. Cultivate critical thinking and problem-solving skills necessary for addressing complex fluid mechanics problems in real-world scenarios.
6. Understand the importance of fluid mechanics in various engineering disciplines and its applications in design, construction, and optimization of engineering systems.
7. Foster an appreciation for the historical development and ongoing advancements in the field of fluid mechanics, and the impact of these advancements on engineering practice and technology.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Cognitive goals

- A1. Understanding fundamental concepts and principles in fluid mechanics.
- A2. Analyzing and interpreting fluid mechanics problems effectively.
- A3. Applying mathematical equations and formulas to solve fluid mechanics problems.
- A4. Evaluating experimental data and results in the context of fluid mechanics principles.

B. The skills goals special to the programme

- B1. Develop problem-solving skills specific to fluid mechanics, including the ability to apply theoretical concepts to practical scenarios.
- B2. Enhance critical thinking skills to analyze complex fluid flow phenomena and propose appropriate solutions.
- B3. Improve communication skills to effectively convey ideas, solutions, and analyses related to fluid mechanics through written reports, presentations, and discussions.
- B4. Enhance teamwork and collaboration skills for group projects and laboratory experiments in fluid mechanics.

Teaching and Learning Methods

Lectures, discussion, giving examples, illustrations and direct presentations from the lecturer, Problem-Solving Sessions, Group Projects, Guest Lectures and Industry Visits, Online Resources, Formative Assessment

Assessment methods

Written Examinations (Short exams)
Assignments and Homework
Group Projects
Computer-Based Assessments
Oral Presentations
Formative Assessment
Final Exams

A. Affective and value goals:

- C1. Cultivating a collaborative spirit among students
- C2. Encouraging the sharing of information
- C3. Promoting self-confidence in students by providing opportunities for them to actively engage with fluid mechanics concepts and problem-solving techniques.
- C4. Create discussions among students

Teaching and Learning Methods

- Student groups
- Preparing special reports

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

D. General and Transferable Skills for Fluid Mechanics Program:

D1. Maximizing the benefits of the fluid mechanics program to develop versatile skills applicable across scientific disciplines and industries.

D2. Empowering students to apply acquired knowledge and skills from the Fluid Mechanics program in diverse academic and professional environments, fostering adaptability and lifelong learning.

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
Second Stage	BCE 213	Fluid Mechanics	Practical	Theoretical
		SI Units, dimensions, symbols, abbreviations	8	Theoretical
		properties of fluids	8	Theoretical
		Characteristics of flow	8	Theoretical
		Fluid static	8	Theoretical
		Hydrostatic forces on planes	8	Theoretical
		Kinematics of fluid flow.	8	Theoretical
		Classification of types of flow, Continuity equation	8	Theoretical
		Energy equation for steady flow	8	Theoretical

		Steady flow in pressure conduits	8	Theoretical
		Equation for conduit friction	8	Theoretical
		Compute friction factor; empirical equations for pipe flow	8	Theoretical
		Minor head losses	8	Theoretical
		Solution of practical pipeline problems; pipeline with pumps.	8	Theoretical
		Fluid measurements	8	Theoretical
		Open channels	8	Theoretical

13. Personal Development Planning

- Using the method of educational entertainment (Edutainment, such as some website that use animation to explain some complex aspects) to activate students' perception
- Benefiting from the curricula taught in foreign universities to improve the level of students
- Developing curricula appropriate to the labor market
- Follow up on scientific developments in the field of specialisation

14. Admission criteria .

15. Key sources of information about the programme

1. Rajput, R.K., 2004. (A textbook of fluid mechanics and hydraulic machines). S. Chand Publishing
2. Douglas, J.F. et al; 2011 (Fluid Mechanics). Prentice Hall.
3. Crowe, C.T. et al; 2009 (Engineering Fluid Mechanics). 9th ed. John Wiley & Sons.
4. White, F. M.; 2011 (Fluid Mechanics).7th ed. McGraw-Hill, New York.
5. Chaudhry, M. H.; 2008 (Open-Channel Flow).2nd ed. Springer Science+Business Media, LLC.

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Business Management Technique
3. Programme Title	BUILDING CONSTRUCTION / Second stage
4. Title of Final Award	B.A
5. Modes of Attendance offered	Three hour weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	
9. Aims of the Programme	
The course aims to identify methods of constructing buildings, including soil tests, types of foundations, construction of walls, and wooden molds	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Cognitive goals

- A1 Know how to conduct field and laboratory soil tests
- A2. Knowing the types of foundations and how to create them
- A3. Learn about the methods of building walls and how to create them
- A4. Identify the types of thermal and sound insulators used in buildings
- A5. Identify the types of slip form and methods of creating them

The skills goals special to the programmer

- B1. On-site inspection skill
- B2. The skill of establishing and building foundations
- B3. The skill of constructing and building the building structure

Teaching and Learning Methods

Lecture, discussion, giving examples, gather information from online websites, illustrations and direct presentations from the lecturer.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

B. Affective and value goals

- C1. Enabling students to deal with the work site and implementation

Teaching and Learning Methods

Using multimedia technology (aural and visual), curricula and extra-curricular assignments

Practical application of basic skills in English grammar

Do group assignments

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Developing students' skills and preparing them to place them in the field of public employment or the private sector.

D2. Developing personal skills to develop students and establish their own projects.

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
Second Stage		Building construction	Practical	Theoretical
		Carries out Site investigation, phases of site and soil investigation.		Theoretical
		Conducts the Standard tests concerning Methods of soil investigation, open-pit, boring and auger, standard and cone test methods		Theoretical
		<ul style="list-style-type: none"> • Computes Bearing capacity. • Uses correctly Calculation and determination in filed and laboratory. Monitors and conducts Increasing of bearing capacity and its relation with foundation design.		Theoretical
		Conducts the Standard tests concerning		Theoretical

		Excavation and filling work, cut and fill, shoring system, angle of repose, failure of embankment, layers of filling.		
		Able to identify and correctly implement Types of foundations, excavation, shoring system, reinforcing and concrete casting, drying of site work.		Theoretical
		Able to identify and correctly implement Types of foundations, excavation, shoring system, reinforcing and concrete casting, drying of site work.		Theoretical
		Able to identify Pile foundations, bored and driven piles, sheet piles, capping of piles.		Theoretical
		<ul style="list-style-type: none"> • Recognition of laboratory about Masonry stone work. • Able to identify stone building types and specifications. • Correctly implement building under ground level, above ground level. Correctly draw preparation of stone building.		Theoretical
		<ul style="list-style-type: none"> • Able to identify Brick and block works. • Correctly implement British and Flemish arrangements. Carries out procedure to construct walls, connections between old and new walls.		Theoretical
		Demonstrates knowledge about Hollow cavity walls, their specifications and components, reinforced walls.		Theoretical

13. Personal Development Planning

14. Admission criteria .

15. Key sources of information about the programme

- Building construction handbook / Merritt
- 2- Building technology /Boyer
- 3- construction planning, equipment, and methods/ R.L Peurifoy
- 4- construction methods and management / S,w.Nunnlly

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

The student must know the advanced theories in mathematics and its applications in construction engineering.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	
3. Programme Title	Numerical Analysis/ Third stage
4. Title of Final Award	B.A
5. Modes of Attendance offered	Three hours weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	8/04/2024
9. Aims of the Programme	
1. Learn the alternative ways of using numerical methods to solve nonlinear equations, perform integrations, and solve differential equations.	
2. Learn the fact that numerical methods offer approximate but credible accurate solutions to the problems that are not readily or possibly solved by closed-form solution methods.	
3. Learn the fact that numerical solutions are available to the users only at the preset solution points, and the accuracy of the solution is largely depending on the size of the increments of the variable selected for the solutions.	
4. Become familiar with the value of commercially available numerical solution software packages such as Mathematica and Matlab.	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Cognitive goals

A1. Demonstrates knowledge about numerical methods, numerical methods in nonlinear equations.

A2. Demonstrates knowledge and correctly implement numerical methods in linear algebra, system of linear equations.

A3. Demonstrates knowledge numerical methods for differential equation.

A4. Correctly execute application of numerical methods in Matlab program.

B. The skills goals special to the programme

B1. Make students able to solve any nonlinear equation.

B2. Make students able to solve any linear system equations.

B3. Make students able to solve differential equations.

B4. Make students know the advanced theories in mathematics & its applications in construction engineering.

Teaching and Learning Methods

Lecture, discussion, giving examples, gather information from online websites, illustrations and direct presentations from the lecturer.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

C. Affective and value goals

C1. Collaboration among students

C2. Sharing information

C3. Increase self-confidence

C4. Creating discussion among students

Teaching and Learning Methods

Using curricula and extra-curricular assignments.

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Benefit from the scientific department program.

D2. Introducing the means of presentation (audio-visual).

D3. Make the students acquire the basic skills magmatic operations.

D4. Enable the students to use magmatic operations in construction application

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
			Practical	Theoretical
Third Stage		Numerical Analysis		
		Correctly implement the solution of equations by iteration: fixed- point method, Newton – Raphson method		Theoretical
		Correctly implement Interpolation: linear interpolation, quadratic interpolation, Newton's forward difference formula, Newton's backward difference formula, Lagrange interpolation		Theoretical

		numerical integration & differentiation.		Theoretical
		numerical methods in linear algebra, system of linear equations, Gauss elimination, Lu factorization, Cholesky method, Gauss Jordan elimination		Theoretical
		Correctly implement Inverse matrix by elimination method, system of linear equations solution by iteration: Gauss - Seidel Iteration, Jacobi method iteration		Theoretical
		Eigen value & Eigen vector		Theoretical
		numerical methods for differential equation, Euler method, Modified Euler method, Runge-Kutta method -4th order		Theoretical
		application of numerical methods in Matlab program		Theoretical

13. Personal Development Planning

- Enriching the course by adding voice and conversation laboratories and using blended learning to increase students' linguistic information
- Benefiting from the curricula taught in foreign universities to improve the level of students
- Using the method of educational entertainment (Edutainment) to activate students' perception and prevent boredom in the lecture

14. Admission criteria .

15. Key sources of information about the programme

1. Advanced engineering mathematics / Erwin kreyszig.
2. Applied mathematics for engineering and physicists / pipes and harvill.
3. Numerical methods for engineers / S.C. Chapra and R. P. Canale.

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This programme specification outlines the objectives, structure, and methodologies for the advanced pavement engineering course, ensuring students acquire the necessary knowledge and skills to excel in the field of pavement engineering while fostering their personal and professional development through PDP activities.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Engineering Technical College of Mosul, Building and Construction Tech. Department
3. Programme Title	Advanced Pavement Engineering
4. Title of Final Award	B.A
5. Modes of Attendance offered	3 hours weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	7/04/2024
9. Aims of the Programme	<p>Advanced Pavement Engineering programme aims to equip students with comprehensive knowledge and skills in asphalt pavement construction, design principles, drainage systems, and maintenance practices. Emphasizing both flexible and rigid pavement designs, the programme prepares students to identify distresses, execute construction techniques, and implement effective maintenance and rehabilitation strategies. Through practical experiences, theoretical learning, and personal development planning, students will develop the expertise necessary to contribute to the development and management of resilient and sustainable pavement infrastructure.</p>

10. Learning Outcomes, Teaching, Learning and Assessment Methods

Upon successful completion of the Pavement Engineering: Construction and Maintenance programme, students will be able to:

- A. Demonstrate knowledge and proficiency in asphalt pavement construction techniques, including placing, spreading, operation of pavers and rollers, conducting field tests, and controlling leveling and thickness.
- B. Identify the organizational standard of state roads and bridges and understand their roles in pavement engineering projects.
- C. Understand the principles of flexible pavement design, including methods such as the AASHTO design method and the use of design charts.
- D. Execute and solve examples in AASHTO structural design, applying the principles and methods learned in the course.
- E. Demonstrate knowledge of rigid pavement design principles, including understanding layers, forms, joints, reinforcing, and techniques for controlling leveling, finishing, and minimizing pumping.
- F. Understand drainage systems in pavement engineering, including the design and implementation of culverts, siphons, ditches, and filters.
- G. Monitor and conduct highway maintenance and rehabilitation activities, including identifying distresses in flexible and rigid pavements and managing asphalt additives effectively.

Teaching and Learning Methods

Lecture, discussion, giving examples, gather information from online websites, illustrations and direct presentations from the lecturer.

Advanced Pavement Engineering also employs a variety of teaching, learning, and assessment methods to ensure the achievement of learning outcomes. These include:

Lectures and Tutorials: Delivery of theoretical knowledge through lectures and tutorials, focusing on asphalt pavement construction, design principles, drainage systems, and maintenance practices.

Laboratory and Field Work: Practical laboratory sessions and fieldwork to demonstrate construction techniques, conduct field tests, and gain hands-on experience in pavement engineering practices.

Guest Lectures and Industry Visits: Inviting guest speakers from industry and organizing visits to construction sites and maintenance facilities to provide real-world exposure and insights into pavement engineering projects and practices.

Project Work: Individual and group projects focusing on real-world pavement engineering challenges, encouraging critical thinking, problem-solving, and teamwork skills.

Personal Development Planning (PDP): Integration of PDP activities throughout the programme, including goal setting, reflection on learning experiences, career planning, and skills development. Students will engage in self-assessment, receive feedback, and create action plans to enhance their personal and professional growth.

Assessment methods

Assessment methods include written examinations, coursework assignments, laboratory reports, project presentations, and dissertations. These assessments aim to evaluate students' knowledge, analytical skills, practical abilities, and communication skills across various aspects of advanced pavement engineering.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
Level three, 2 nd semester		asphalt pavement construction techniques		Theoretical
		organizational standard of state roads and bridges		Theoretical
		flexible pavement design		Theoretical
		rigid pavement design		Theoretical
		drainage systems in pavement engineering		Theoretical
		highway maintenance and rehabilitation		Theoretical
		distresses in flexible and rigid pavements		Theoretical
		managing asphalt additives.		Theoretical

12. Personal Development Planning

- Personal Development Planning (PDP): Integration of PDP activities throughout the programme, including goal setting, reflection on learning experiences, career planning, and skills development. Students will engage in self-assessment, receive feedback, and create action plans to enhance their personal and professional growth.

14. Admission criteria .

15. Key sources of information about the programme

Traffic and Highway Engineering FOURTH EDITION, Nicholas J. Garber Lester A. Hoel, University of Virginia

Traffic and Pavement Engineering, Ghazi G. Al-Khateeb, University of Sharjah, UAE and Jordan University of Science and Technology, Jordan

The Handbook of Highway Engineering, Edited by T. F. Fwa

SORB, Standard Organization for Roads and Bridges

Decision description form

Course Description

The course provides the development of an understanding of the performance and design methodology of basic concrete structural elements including the analysis and design of reinforced concrete. Provide the general principles to be known to understand how to distribute forces and stresses (tensile and compressive forces, shear and torsional forces) in the various reinforced concrete elements (beams, column, slab) and design the dimensions and rebar of these concrete elements in accordance with the requirements of the American Concrete Code ACI-318-19.

1. Educational institution	Northern Technical University / Mosul Technical Engineering College
2. Scientific Department / Center	Department of Building and Construction Technologies Engineering
3. Course Name/Code	Fundamentals of Reinforced Concrete BCE 302
4. Available Attendance Forms	Mandatory
5. Semester / Year	Third stage
6. Number of Credit Hours (Total)	60 hours
7. The history of preparation of this description	1/4/2023
<u>8. Course Objectives</u>	
This course provides learning of the general principles of the analysis and design of reinforced concrete members under the specifications of the American Concrete Code ACI-318-19.	
Understanding the technical foundations: The aim of the decision is to provide a profound understanding of the technical fundamentals for the analysis and design of reinforced concrete structures.	
Develop the skills of analysis and design of concrete elements. Including concrete beams single & double, analysis and design of shear, torsion forces and short columns.	
Understand the mechanical requirements and developments lengths of steel reinforcing connections in civil engineering works.	
Understand the requirements of the serviceability required in the design of concrete elements, such as deflections and crack width of the permitted incision to reach the best limit of the structures throughout its service life.	
<u>9. Course Outcomes, Analysis and Design Methods</u>	
<u>1. Cognitive Objectives</u>	
✓ Understanding the principles of analysis of reinforced concrete elements.	
✓ Know how to distribute forces and stresses in different concrete elements.	
✓ Understanding the design methods of concrete elements.	

- ✓ Understand the mechanism and needs of the installation lengths of rebar necessary in civil engineering work
- ✓ Understand the requirements of the general service of the concrete members and the acceptable limits of the deflections and the width of the crack throughout the service life of the concrete structures.

2. Program Skills Objectives

- The skill of analyzing forces and stresses in various concrete elements.
- The skill of designing concrete structures.
- The skill of understanding the requirements of rebar lengths and the mechanism of their distribution in the various concrete elements.
- Skill of understanding the requirements of the general service of concrete structures.

3. Teaching and learning methods

- Lecture method and use of interactive whiteboard-
- Forming discussion groups during lectures to discuss lecture topics.
- Ask students a set of thinking questions during lectures containing words such as what, how, when and why for the purpose of a deep understanding of the lecture and how to benefit from the lecture in the practical aspect.
- Giving students homework that requires the application of the cognitive things they learned during the lecture.

4. Evaluation methods

- Theoretical Tests
- Reports and Studies
- Daily exams with questions of their own solution
- Grades specified by homework

5. Conscientious and value objectives.

- Enable students to solve problems related with the analysis and design of reinforced concrete elements.
- Enables students to understand why and how different concrete structures are selected and how rebar is distributed.

6. Teaching and learning methods

Student Groups / Case Studies / Preparation of Special Reports

7. Evaluation methods

Periodic exams / direct questions / special reports / weekly assignments

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

D1- Developing the skills of students and preparing them to engage them in the field of public service or the private sector.

D2- Developing personal skills to develop students and establish their own projects.

Course Structure

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Tests & Reports	theoretical	Clarification of knowledge about the analysis of structures and materials	Knowledge	4	1
Tests & Reports	theoretical	Clarification of knowledge about flexible analysis and design single-reinforcing beams	Knowledge	4	2
Tests & Reports	theoretical	Clarification of knowledge about flexible analysis and design single-reinforcing beams	Knowledge	4	3
Tests & Reports	theoretical	Clarification of knowledge about flexible analysis and design double-reinforcing beams	Knowledge	4	4
Tests & Reports	theoretical	Clarification of knowledge about the analysis of structures and materials	Knowledge	4	5
Tests & Reports	theoretical	Clarification of knowledge about flexible analysis and design double-reinforcing beams	Knowledge	4	6
Tests & Reports	theoretical	Clarification of knowledge about shear in concrete beams	Knowledge	4	7
Tests & Reports	theoretical	Clarification of knowledge about shear in concrete beams.	Knowledge	4	8
Tests & Reports	theoretical	Clarification of knowledge about torsion in concrete beams	Knowledge	4	9
Tests & Reports	theoretical	Clarify knowledge about Bond , Anchorage and developments length	Knowledge	2	10
Tests & Reports	theoretical	Clarify knowledge about Bond , Anchorage and developments length	Knowledge	2	11
Tests & Reports	theoretical	Clarification of knowledge about torsion in concrete beams.	Knowledge	4	12
Tests & Reports	theoretical	Clarify knowledge about short columns	Knowledge	4	13
Tests & Reports	theoretical	Clarify knowledge about short columns	Knowledge	4	14
Tests & Reports	theoretical	Clarify knowledge about service requirements	Knowledge	4	15

10. Infrastructure

1 Required textbooks	Reinforced concrete design: a practical approach.
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2 Main references (sources)	ACI 318M-19 Metric
Recommended books and references (scientific journals, reports)	Reinforced Concrete: Mechanics and Design 6th ed. by James K Wight (Author), James G MacGregor (Author)
B Electronic references, websites	Websites for the design of concrete members

11. Course Development Plan

Develop curricula adapted to the labor market
Holding seminars and scientific conferences aimed at updating the curricula
Follow up on scientific developments in the field of specialization
Create files to apply the cognitive skills of designing various reinforced concrete elements.

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This programme specification outlines the objectives, structure, and methodologies for the Pavement Engineering: Construction and Materials course, ensuring students acquire the necessary knowledge and skills to excel in the field of pavement engineering with a focus on construction techniques and materials.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Engineering Technical College- Mosul
3. Programme Title	Pavement Engineering/ Level Three (1 st semester)
4. Title of Final Award	B.A
5. Modes of Attendance offered	Five hours weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	7/04/2024

9. Aims of the Programme

The Pavement Engineering programme aims to provide students with a comprehensive understanding of the construction techniques and materials used in pavement engineering. Emphasizing practical skills and theoretical knowledge, the programme prepares students to identify, analyze, and implement various components of pavement construction, including sub-grade and sub-base works, base materials, soil stabilization techniques, CBR test, and asphalt mixtures. Through hands-on experience and theoretical learning, students will develop the expertise necessary to contribute effectively to the design, construction, and maintenance of resilient and sustainable pavement infrastructure.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

Upon successful completion of the Pavement Engineering: students will be able to

- A. Identify and assess sub-grade and sub-base conditions, perform grading, cut and fill sections, and conduct leveling and compaction procedures essential for pavement construction projects, in addition to the soil engineering for highway design and Soil surveys for highway construction.
- B. Implement base works, including macadam and untreated base materials, and apply soil stabilization techniques to enhance pavement performance and durability, considering factors such as frost action in soil.
- C. Carry out soil tests in highway constructions, particularly the California Bearing Ratio (CBR) test, to evaluate soil strength and suitability for pavement applications.
- D. Identify various bituminous materials, including descriptions, types, characteristics, and uses in pavement construction projects.
- E. Understand the properties and applications of cutback and emulsion bituminous materials, including their types, characteristics, and uses in pavement engineering.
- F. Identify prime and tack coats, understand their specifications, applications, and testing methods in pavement construction projects.
- G. Demonstrate knowledge of tests for asphalt materials, including physical, rheological, and durability tests, and correctly implement asphalt mixtures (hot, warm, and cold mix) in pavement construction.
- H. Monitor and conduct asphalt content determination using Marshal and Superpave methods, prepare job mixtures in laboratory and plant settings, and apply them effectively in the field.

Teaching and Learning Methods

The Pavement Engineering programme employs a variety of teaching, learning, and assessment methods to ensure the achievement of learning outcomes. These include:

Lectures and Tutorials: Delivery of theoretical knowledge through lectures and tutorials, focusing on construction techniques, material properties, and best practices in pavement engineering.

Laboratory Sessions: Practical laboratory sessions to demonstrate soil testing methods, asphalt material testing, and mixture preparation techniques, allowing students to gain hands-on experience and develop technical skills.

Field Trips and Site Visits: Visits to construction sites, asphalt plants, and pavement testing facilities to provide practical exposure and insight into industry practices related to pavement construction and materials.

Project Work: Individual and group projects focusing on real-world pavement engineering challenges, encouraging critical thinking, problem-solving, and teamwork skills.

Seminars and Workshops: Guest lectures, seminars, and workshops conducted by industry experts to expose students to current trends, innovations, and best practices in pavement engineering and materials.

Assessment methods

Assessment methods include written examinations, coursework assignments, laboratory reports, and project presentations. These assessments aim to evaluate students' knowledge, analytical skills, practical abilities, and communication skills across various aspects of pavement construction and materials engineering.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
Level Three (1 st semester)		Soil engineering for highway design	Practical	Theoretical
		Soil surveys for highway construction	Practical	Theoretical
		Sub-grade and Subbase works	Practical	Theoretical
		soil stabilization techniques	Practical	Theoretical
		soil tests in highway constructions	Practical	Theoretical
		bituminous materials	Practical	Theoretical
		properties and applications of cutback and emulsion	Practical	Theoretical
		tests for asphalt materials	Practical	Theoretical
		Marshall mix design	Practical	Theoretical
		Superpave mix design	Practical	Theoretical

12. Personal Development Planning

- Personal Development Planning (PDP): Integration of PDP activities throughout the programme, including goal setting, reflection on learning experiences, career planning, and skills development. Students will engage in self-assessment, receive feedback, and create action plans to enhance their personal and professional growth.

13. Admission criteria .

14. Key sources of information about the programme

Traffic and Highway Engineering FOURTH EDITION, Nicholas J. Garber Lester A. Hoel, University of Virginia

Traffic and Pavement Engineering, Ghazi G. Al-Khateeb, University of Sharjah, UAE and Jordan University of Science and Technology, Jordan

The Handbook of Highway Engineering, Edited by T. F. Fwa

SORB, Standard Organization for Roads and Bridges

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Building & Construction Tech. Engg. Dept , Engineering Technical College / Mosul
3. Programme Title	Environmental Engineering BCE 312 / Third stage
4. Title of Final Award	B.A
5. Modes of Attendance offered	Four hours weekly, Compulsory
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	4/04/2024

9. Aims of the Programme

Environmental engineering focuses on designing and developing technological solutions to preserve and protect the environment, as well as enhancing the quality of life within it. The objectives of environmental engineering encompass a diverse range of aspects, including:

1. Understanding Technical Fundamentals: The course aims to provide a deep understanding of the technical foundations of environmental issues, pollutants, their types, and methods for their treatment in water, air, and soil.
2. Development of Design and Development Skills: The course includes learning how to design water and air treatment units, as well as methods for measuring

pollutants and their concentrations.

3. **Conservation of Natural Resources:** Aimed at utilizing natural resources sustainably and efficiently, such as water, air, soil, and energy.
4. **Pollution Reduction:** Working on developing technologies to reduce harmful emissions and pollution resulting from industries, transportation, agriculture, and other human activities.
5. **Waste Management:** Striving to develop effective methods for managing solid, liquid, and hazardous waste, including reducing and recycling it.
6. **Design of Environmentally Friendly Cities:** Aiming to design and develop cities in a way that minimizes their environmental impact, such as using innovative building designs and improving public transportation.
7. **Public Awareness:** Aimed at raising public awareness about the importance of environmental preservation and promoting sustainable behaviors.
8. **Clean Technology:** Seeking to develop and utilize clean technologies that minimize the negative environmental impacts of industrial and production processes.
9. **Environmental Impact Assessment:** Aiming to estimate and evaluate the environmental impacts of industrial and developmental projects and guiding them towards sustainability.

These are some of the key objectives of environmental engineering, primarily seeking to achieve a balance between human needs, environmental respect, and preservation for current and future generations.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

The cognitive objectives of studying environmental engineering include:

1. **Understanding the Relationship between Humans and the Environment:** Aiming to comprehend the complex relationship between human activities and their impact on the environment, and designing engineering solutions to mitigate this impact.
2. **Scientific Study of Environmental Factors:** Aimed at conducting in-depth scientific studies of various environmental factors such as water, air, soil, and ecosystems, and understanding the impact of natural and human factors on them.
3. **Development of Technical and Engineering Skills:** Working on enhancing the technical and engineering skills necessary for designing and implementing various environmental solutions, such as designing water and air treatment systems, and waste management.
4. **Promotion of Scientific Research:** Encouraging scientific research in diverse areas related to the environment and environmental technology, contributing to the development of new and innovative solutions to environmental challenges.
5. **Deepening Understanding of Sustainability:** Focused on enhancing understanding of the concept of sustainability and the necessity of its application in engineering design and environmental project management.
6. **Dissemination of Research and Knowledge to the Community:** Aiming to transfer research and scientific knowledge to the community and raise awareness about the importance of environmental protection and the implementation of sustainable practices.

In summary, the cognitive objectives of studying environmental engineering aim to equip students with the knowledge and skills necessary to understand and address contemporary environmental challenges using innovative and sustainable scientific and engineering methods.

The skills goals special to the programme

1. **Engineering Design Skills:** Developing the ability to design and develop engineering solutions for environmental problems, such as designing water and air treatment systems and waste management solutions.
2. **Research and Analysis Skills:** The ability to conduct scientific research and analyze data related to pollution and environmental impacts to develop effective solutions.
3. **Modeling and Simulation Skills:** The ability to use software and computer tools to model and simulate environmental phenomena to assess the impacts of human activities and predict environmental changes.

4. Communication Skills: The ability to communicate effectively with colleagues, clients, and the public in general, whether in presenting reports or providing advice on environmental projects.
5. Leadership and Management Skills: The ability to lead teams and coordinate environmental projects skillfully, including resource planning, time management, and financial budgeting.
6. Teamwork Skills: The ability to work effectively within multidisciplinary teams to solve complex environmental problems.
7. Evaluation and Economic Analysis Skills: The ability to estimate the costs and benefits associated with implementing environmental projects and analyze the economic aspects of environmental decisions.
8. Problem-Solving Skills: The ability to analyze complex problems in the field of the environment and develop creative and sustainable solutions for them.

In summary, the skills objectives in the study of environmental engineering aim to equip students with the necessary skills to work effectively in the field of protecting and improving the environment and developing sustainable engineering solutions to environmental challenges.

Teaching and Learning Methods

- Utilization of advanced analytical tools -
- Integration of experimental data and utilization of statistical analysis -
- Development of predictive models for environmental phenomena, which facilitate the forecasting and optimization
- The construction of the hypothesis requires a critical approach and analytical thinking that contain words such as "what," "how," "why," and "wherefore."
- Assessment of hypotheses and formulations based on empirical evidence with a scientific rigor.

Assessment methods

1. Comparative Analyses
2. Comparative Evaluations
3. Interpretations and Findings
4. Synthesized Implementations with robust empirical substantiations derived from multi-faceted perspectives

9. Affective and value goals

10. Awareness of Social Responsibility: Encouraging students to develop an awareness of the importance of social responsibility towards the environment and society, and the necessity of contributing to its protection and improvement.
11. Care for Natural Life: Promoting the value of respect and appreciation for biodiversity and natural life, and recognizing the importance of preserving it for the benefit of current and future generations.
12. Interaction with the Natural Environment: Encouraging students to positively interact with their surrounding environment and motivating them to participate in nature conservation activities and environmental awareness.

13. Environmental Justice: Enhancing the value of environmental justice and ensuring fair distribution of environmental benefits and burdens among all members of society, including social and economic aspects.
14. Commitment to Sustainability: Reinforcing the value and commitment to the principles of sustainability and sustainable development, and the necessity of applying them in all aspects of daily life and engineering activities.
15. Positive Impact on the Environment: Encouraging students to develop their technical skills and knowledge to make a positive impact on the environment through their projects and engineering activities.
16. Working to Improve Quality of Life: Focusing on the value of improving the quality of life in communities by preserving a clean and healthy environment and providing a suitable environment for living and thriving.

In summary, the emotional and values objectives in the study of environmental engineering aim to enhance awareness and commitment to environmental and social values, and to motivate students to contribute to building a better future for the environment and the communities in which they live.

Teaching and Learning Methods

Student Cohorts / Case Studies / Preparation of Special Report

Assessment methods

- Periodic Examinations, Direct Questions, and Preparation of Special Reports:

D. General and Transferable Skills (other skills relevant to employability and personal development)

Studying Environmental Engineering provides a diverse range of general and transferable skills that enhance employability and contribute to personal development. Among these skills are:

1. **Problem-Solving Skills:** Students learn to analyze complex environmental issues and apply engineering and scientific concepts to develop effective and sustainable solutions.
2. **Critical Thinking Ability:** Developing the capacity for critical and analytical thinking to evaluate data and information and make informed decisions in the environmental field.
3. **Communication Skills:** Enhancing the ability to communicate effectively with colleagues, clients, and the public, whether through writing, public speaking, or digital communication channels.
4. **Teamwork Skills:** Cultivating the ability to work effectively within multidisciplinary teams to achieve common goals in the environmental field.
5. **Cultural and Social Interaction:** Introducing students to cultural diversity, values, and effective engagement in a multicultural work environment.
6. **Project Management:** Developing the necessary skills for planning, organizing, and executing environmental projects effectively, including resource management and budgeting.
7. **Continuous Learning and Professional Development:** Encouraging students to continue learning and develop their skills throughout their lives through training courses, practical experiences, and interaction with the scientific and professional community.
8. **Leadership Skills:** Providing opportunities to develop leadership and motivation skills, enabling students to take on responsibility and make difficult decisions in the environmental field.

In summary, studying Environmental Engineering contributes to the development of a comprehensive set of general and transferable skills that enhance employability and contribute to personal development in various fields.

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
Third Stage	BCE 312	Environmental Eng.	Practical	Theoretical

Week	Hours	Required Learning Outcomes	Unit/Topic	Name Teaching Method	Assessment Method
First	4	Knowledge and Practical Application	Quantity Estimation of water	Theoretical Practical	Examinations and Reports
Second	4	Knowledge and Practical Application	Quantity Estimation of water	Theoretical Practical	Examinations and Reports
Third	4	Knowledge and Practical Application	Quantity Estimation of water	Theoretical Practical	Examinations and Reports
Fourth	4	Knowledge and Practical Application	Water quality	Theoretical Practical	Examinations and Reports
Fifth	4	Knowledge and Practical Application	Water quality	Theoretical Practical	Examinations and Reports
Sixth	4	Knowledge and Practical Application	Aeration and Filtration	Theoretical Practical	Examinations and Reports
Seventh	4	Knowledge and Practical Application	Aeration and Filtration	Theoretical Practical	Examinations and Reports
Eighth	4	Knowledge and Practical Application	Aeration and Filtration	Theoretical Practical	Examinations and Reports
Ninth	4	Knowledge and Practical Application	Disinfection	Theoretical Practical	Examinations and Reports
Tenth	4	Knowledge and Practical Application	Disinfection	Theoretical Practical	Examinations and Reports
Eleventh	4	Knowledge and Practical Application	Distribution system	Theoretical Practical	Examinations and Reports
Twelfth	4	Knowledge and Practical Application	Distribution system	Theoretical Practical	Examinations and Reports
Thirteenth	4	Knowledge and Practical Application	Distribution system	Theoretical Practical	Examinations and Reports
Fourteenth	4	Knowledge and Practical Application	Air pollution	Theoretical Practical	Examinations and Reports
Fifteenth	4	Knowledge and Practical Application	Air pollution	Theoretical Practical	Examinations and Reports

13. Personal Development Planning

- Designing curricula that are tailored to meet the demands of the job market.
- Conducting scientific seminars and conferences aimed at updating academic curricula. Tracking scientific developments in the field of specialization.

14. Key sources of information about the programme

- Principles of Environmental Engineering & Science (Student's Book)
- Wastewater Engineering_ Treatme - Inc. Metcalf (Primary References (Sources))

PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Building and Construction Engineering
3. Programme Title	Design of Reinforced Concrete Structures / BCE 401
4. Title of Final Award	
5. Modes of Attendance offered	Four hours weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	8/04/2024

9. Aims of the Programme

The course aims to achieve the following objectives:

1. Students will leverage their existing knowledge of reinforced concrete design to comprehend the intricacies of reinforced concrete behavior and effectively design practical reinforced concrete components.
2. The course endeavors to furnish students with a profound comprehension of the fundamental principles governing the design process, aligning with the stipulated codes for structural designs of both regular and prestressed reinforced concrete elements.
3. By addressing these objectives, the course aims to equip students with the necessary skills and insights to tackle real-world challenges in reinforced concrete design with confidence and competence.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Cognitive goals

- Apply the basic requirements of the American Concrete Institute ACI 318 design specification.
- Introduction and material properties
- Design methods (working stress and ultimate strength methods)
- Apply the concepts of strain compatibility and equilibrium concepts to determine the strength of RC members
- Learn the concepts of prestressing in reinforced concrete elements

B. The skills goals special to the programme

- Design of slender columns.
- Design of reinforced concrete slabs (one way and two-way)
- Design of all types of reinforced concrete ceilings (supported by beams and flat slab without beams)
- Design of prestressed concrete elements.
- Deflection calculations and limits

Teaching and Learning Methods

- Explanation using various modern presentation tools
- Lecture method and use of the interactive whiteboard
- Form discussion groups during lectures for discussions that require thinking and analysis
- Asking students a set of thinking questions during lectures that contain words such as what, how, and what Until and why
- Giving students homework that requires self-explanations in causal ways.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

C. Affective and value goals

- Enable students to solve problems related to ordinary reinforced concrete structures.
 - Enable students to solve problems related to prestressed reinforced concrete structures.

Teaching and Learning Methods

Seminar / Technical Visit /case studies/preparing special reports

Assessment methods

Periodic exams / direct questions / preparing special reports

11. Programme Structure					
Assessment method	Learning Method	Course or Module Title	Required learning outcomes	Hrs.	Week
Exams and assignments	Theoretical	Demonstrates knowledge of the Slender columns : <ul style="list-style-type: none"> Define the slender column , Concentrically loaded columns. Compression plus bending ACI criteria for non-sway frames versus sway frames ACI moment magnifier method for non-sway frames ACI moment magnifier method for sway frames Second-order analysis for slenderness effects. 	Theoretical knowledge and application	4	1 st
Exams and assignments	Theoretical			4	2 nd
Exams and assignments	Theoretical	Able to Analysis and design of slabs <ul style="list-style-type: none"> knowledge of the types of slabs , Design of one-way slabs, temperature and shrinkage reinforcement , Behavior of two-way edge supported slabs, and two-way column supported slabs , Direct design method for column supported slabs, depth limitation of the ACI code, Equivalent frame method , Shear design in flat plates and flat slabs , The Openings in slabs. 	Theoretical knowledge and application	4	3 rd
Exams and assignments	Theoretical			4	4 th
Exams and assignments	Theoretical			4	5 th
Exams and assignments	Theoretical			4	6 th
Exams and assignments	Theoretical			4	7 th
Exams and assignments	Theoretical			4	8 th
Exams and assignments	Theoretical	Demonstrate Knowledge about tie and Strut models: <ul style="list-style-type: none"> The Strut and tie methodology , The ACI provisions for strut and tie models, and their applications. 	Theoretical knowledge and application	4	9 th
Exams and assignments	Theoretical			4	10 th
Exams and assignments	Theoretical	Demonstrates knowledge of the Concrete building systems: <ul style="list-style-type: none"> Shear walls, ACI code provisions for shear wall design. Stair design Earthquake resistant design principles 	Theoretical knowledge and application	4	11 th
Exams and assignments	Theoretical			4	12 th
Exams and assignments	Theoretical	Demonstrates knowledge of the Prestressed Concrete:	Theoretical knowledge	4	13 th
Exams and assignments	Theoretical			4	14 th

Exams and assignments	Theoretical	<ul style="list-style-type: none"> • Demonstrates knowledge of the Principles of prestressed concrete, • Demonstrates knowledge of the Methods of prestressing , • Demonstrates knowledge of the prestressing steel, and concrete for prestressed construction. 	and application	4	15 th
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13. Personal Development Planning

- Developing curricula in accordance with updated requirements of local and international codes
- Holding scientific seminars and conferences aimed at updating school curricula
- Follow up on scientific developments in the field of specialization

14. Admission criteria .

15. Key sources of information about the programme

Design of Prestressed Concrete - Arthur H. Nilson

ACI 318-19 Building Code Requirements for Structural Concrete

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Building and Construction Engineering Techniques
3. Programme Title	Design of Steel Structures/ Fourth stage/First semester
4. Title of Final Award	B.A
5. Modes of Attendance offered	Five hours weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	09/04/2024
9. Aims of the Programme	
1. Providing knowledge of Steel sections	
2. Develop students' abilities in design of steel structures	
3. Develop students' abilities in types of sections used in each part of steel structure	
4. Make students of scientific specializations value the importance of the steel structures as common type of constructions used nowadays	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Cognitive goals

A1. Introducing steel sections and structures.

A2. Understanding the basic rules design steel structures.

A3. Understanding the types of loads, design rules and sections that used in design of steel structures.

A4. The ability to design steel structures safe and economic.

B. The skills goals special to the programme

B1. Make students acquire the basic skills on steel structures

B2. Develop analysis and design of steel parts.

B3. Develop the method of design and sections used.

B4. Develop the skill of choose the safe and economical steel sections.

Teaching and Learning Methods

Lecture, discussion, giving examples, gather information from online websites, illustrations and direct presentations from the lecturer.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

C. Affective and value goals

C1. Collaboration among students

C2. Sharing information

C3. Increase self-confidence

C4. Creating discussion among students

Teaching and Learning Methods

Using multimedia technology (aural and visual), curricula and extra-curricular assignments

Practical application of basic skills in steel design

Do group assignments

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Benefit from the scientific department program.

D2. Introducing the means of presentation in steel structures

D3. Make the students acquire the basic skills of design of steel structures.

D4. Enable the students to use steel sections locally available in design of steel structures

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
			Practical	Theoretical
Fourth Stage/ first Semester	BCE 406	Design of Steel Structures		
		Introduction to steel structures		Theoretical
		Types of steel sections used in steel constructions		Theoretical
		Methods of load calculations in steel structures		Theoretical
		Methods of steel structures design		Theoretical
		Tension Members		Theoretical
		Design of tension members		Theoretical
		Steel plate as tension member		Theoretical
		Compression members		Theoretical
		Buckling in compression members		Theoretical
		Design of compression members		Theoretical

		Steel Beams		Theoretical
		Lateral torsional buckling		Theoretical
		Design of steel beams		Theoretical
		Welded and bolted connections		Theoretical
		Steel column base plate		Theoretical

13. Personal Development Planning

- Enriching the course by using computer software of design steel structures
- Using the methods of design steel structures for any concrete construction inside the university and compare the significant cost and time

14. Admission criteria .

15. Key sources of information about the programme

Steel Design, by William T Segui, 5th edition, 2013

Simplified Design of Steel Structures by James Amborse, 1997

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Technical Engineering Collage/Mosul
3. Programme Title	ADVANCED FOUNDATION ENGINEERING / Fourth stage
4. Title of Final Award	
5. Modes of Attendance offered	Four hour weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	7/04/2024
9. Aims of the Programme	
1. Providing knowledge to the student on how to conduct all the detailed steps to complete field investigations for various engineering projects, starting from the survey until drafting the final report.	
2. Introducing the student to how to calculate the bearing capacity (B.C.) of the soil that supported different types of shallow foundations using different B.C. equations and by site loading tests under various site conditions.	
3. Teaching the student what deep foundations are, what are the types of piles, and the advantages and disadvantages of each type, and how to calculate the bearing capacity of piles in cohesive and cohesionless soils using theoretical equations or by site loading tests.	

4. How to calculate the different types of lateral earth pressure which can be applied on the retaining walls at different boundary condition

5. Types of retaining walls and the characteristics of each type, in addition to the detailed steps for designing concrete retaining walls.

6. Introducing the student to the soil settlement , what its types are, and how to calculate each type.

7. Design of group piles in terms of: Calculating the group's bearing capacity, Group efficiency, design the group piles cap and how to calculation the settlement of group pile at different site condition.

A. Cognitive goals

- A1- Learn about on-site investigation and how to conduct and record it
- A2-Identify the basic function of the foundation
- A3-What are the types of foundations and how to design them?
- A4-What is the lateral earth pressure, its types, and how to calculate each type
- A5- Designing different foundations
- A6-Types of soil settlement under foundations and how to calculate each type

B. The skills goals special to the programme

- B1-Providing the student with knowledge of the importance of site investigations before starting to design and implement any project
- B2-Estimating the bearing capacity of the different types of soil that the engineer may encounter on the site
- B3-Learn about the different types of foundations and how to best suit them
- 4- Estimating in advance the expected soil settlement

Teaching and Learning Methods

Lecture, discussion, giving examples, Collective solutions to classroom examples (tutorials), illustrative films, illustrations and direct presentations from the lecturer.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

C. Affective and value goals

- C1. Collaboration among students
- C2. Sharing information
- C3. Increase self-confidence
- C4. Creating discussion among students

Teaching and Learning Methods

Using multimedia technology (aural and visual), curricula and extra-curricular assignments

Field visits to engineering project sites under construction to learn how to select, design and implement different types of foundations

Do group assignments.

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Benefit from the scientific department program.

D2. Introducing the means of presentation (audio-visual) about foundation engineering

D3. Make the students acquire the basic skills in choose and design different types of foundation.

D4. Enable the students Conduct site investigations.

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests and homework.

11. Program Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
			Practical	Theoretical
Fourth Stage	BCE 409	ADVANCED FOUNDATION ENGINEERING		
		Advanced site investigation		28
		Estimated bearing capacity of soil		16
		Design shallow foundation		12
		Deep foundation		24
		Types and how to choose and design deep foundations		24
		lateral earth pressure		4

		Types and how to choose and design retaining walls	8
		types of soil settlement And its danger to buildings	8
		How to estimate different types of soil settlement	12
		Design of group piles	8
		Estimate settlement of group piles	8

13. Personal Development Planning

- Enriching the course by Frequent field visits to engineering project sites in which the methodological components of the foundations subject are implemented
- Using the method of educational entertainment (Edutainment) to activate students' perception and prevent boredom in the lecture

14. Admission criteria .

15. Key sources of information about the programme

Soil Mechanics and Foundations, **JOHN WILEY & SONS, INC (THIRD EDITION)**
Principles of Foundation Engineering, BRAJA M. DAS (Seventh Edition)
FOUNDATION ANALYSIS AND DESIGN, Joseph E. Bowles, RE., S.E.
DESIGN OF REINFORCED CONCRETE FOUNDATIONS, P.C.Varghese

PROFESSIONAL ETHICS

HIGHER EDUCATION PERFORMANCE REVIEW: PROFESSIONAL ETHICS REVIEW

PROGRAMME SPECIFICATION

Teaching a professional ethics course to university students represents the right beginning for any society that seeks to raise the level of ethical practice among professionals. Commitment to professional ethics is an integral part of its correct practice.

This course will enable all students in the various professional situations they will be exposed to and the optimal ethical behavior towards these professional situations after their graduation.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Building & Construction Engineering Department
3. Programme Title	Professional Ethics/ Second stage
4. Title of Final Award	
5. Modes of Attendance offered	Two hour weekly
6. Accreditation	BEC 414
7. Other external influences	
8. Date of production/revision of this specification	7/04/2024
9. Aims of the Programme	
1. Developing students' true conviction of the importance of moral commitment, developing their moral judgment skills and their preparations for moral commitment at work after graduation.	
2. Understanding technical foundations: This course aims to introduce Northern Technology students to professional ethics according to their technical specialization.	
3. Developing design and development skills: The student acquires all the professional ethical rules that enhance their commitment to them, in order to enable them to solve the ethical problems that they will face in their expected	

field of work after graduation.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Cognitive goals

1. Knows the concept of ethics and the general rules of ethics, in addition to moral values.
2. Knows the importance of work and its behaviors.
3. Knows the concept of profession and craft.
4. Knows the acceptable level of professional ethics.
5. Recognizes unethical behavior in the profession, including: administrative corruption, bribery, and fraud at work.

B. The skills goals special to the programme

1. Skill of a professional engineer.
2. The skill of ethical continuing education and training.
3. The skill of professional excellence, quality of performance, developing one's skills, and raising the level of its technical engineering performance.
4. The skill of learning to support other professions related to the engineering profession.

Teaching and Learning Methods

- Explaining ethical concepts using dialogue and discussion.
- Forming discussion groups during lectures for discussion, which require thinking and reasoning. The situations they are expected to be exposed to when working and the optimal ethical behavior towards these situations.
- Use brainstorming and role-playing techniques.
- Conduct actual research and provide home activities.

Assessment methods

- 1- Theoretical tests.
- 2- Reports and studies.
- 3- Daily exams.
- 4- Specific grades with homework

C. Affective and value goals

- 1- Enabling students to consolidate the concept of professional ethics and apply them when working.
- 2- Enabling students to solve the problems they face when working with an ideal ethical concept.

Teaching and Learning Methods

- a. Student groups.
- b. Case studies.
- c. Preparing special reports

Assessment methods

- a. Daily exams.
- b. Direct questions.
- c. Preparing special reports

D. General and Transferable Skills (other skills relevant to employability and personal development)

- 1- Developing their skills and abilities in dealing with ethical issues and preparing them to be placed in the field of public employment or the private sector.
- 2- Developing students' personal skills, ensuring everyone's rights, preventing wrong practices, respecting human life and well-being, while preserving the environment and adopting sustainable development initiatives when establishing their own projects.

11. Programme Structure

Level/Year	Required learning outcomes	Course or Module Title	Credit Hours	
first	1. The concept of morality and its origin 2. General rules of ethics 3. Sources of morality	Ethics	Practical	Theoretical
Second	1. Moral values 2. The importance of morals	Ethics		Theoretical
Third	1. Work and its importance 2. Action behaviors 3. The concept of profession	Work and profession		Theoretical
Forth	1. What is professional ethics 2. Positive outcomes of commitment to professional ethics 3.Characteristics and qualities of professional ethics	Professional ethics		Theoretical
Fifth	1. Honesty at work 2. Honesty at work 3. Advice at work	Values and professional ethics		Theoretical
Sixth	1. Justice at work 2. Good dealing 3. Mastery of work	Values and professional ethics		Theoretical
Seventh	1. Administrative corruption 2. Types of administrative corruption 3. Treating administrative corruption	Patterns of unethical behavior in the profession		Theoretical
Eighth	1. Bribery 2. Types of bribery	Patterns of unethical		Theoretical

	<ul style="list-style-type: none"> 3. The difference between a gift and a bribe 4. Reasons for bribery 	behavior in the profession		
Ninth	<ul style="list-style-type: none"> 1. The concept of fraud 2. Manifestations of fraud in job performance 	Cheating at work		Theoretical
Tenth	<ul style="list-style-type: none"> 1. Method of establishing professional ethics 2. Levels of building and consolidating professional ethics 3. Means and methods of establishing professional ethics 	Means and methods of consolidating the values of professional ethics		Theoretical
Eleventh	<ul style="list-style-type: none"> 1. Engineering ethics 2. The professional or professional 3. Professional engineer 	Ethics of engineering professions		Theoretical
Twelfth	<ul style="list-style-type: none"> 1. The basic foundations of the code of ethics for the engineering profession 2. The engineer's relationship with himself and his colleagues 3. The engineer's relationship with his organization 4. The engineer's relationship with the employer 5. The engineer's relationship with his engineering work 	Charter of Ethics for the Engineering Profession of the Union of Arab Engineers		Theoretical
Thirteenth	<ul style="list-style-type: none"> 1. The role of the engineer and his relationship with society 2. The engineer's relationship with the environment, sustainable development, and public health and safety 3. The engineer's relationship with laws, legislation, regulations, and labor and workers' laws 4. The engineer's relationship with the issues of the homeland, the nation, and humanitarian issues 	Charter of Ethics for the Engineering Profession of the Union of Arab Engineers		Theoretical

Fourteenth	<ol style="list-style-type: none"> 1. The importance of participating in continuing education and training ethically 2. The engineer's rules of conduct that the engineer must adhere to in the field of education and continuing training 	Engineer ethics in continuing education and training		Theoretical
Fifteenth	<ol style="list-style-type: none"> 1. The engineer's rules of conduct that the engineer must adhere to towards his subordinates in the field of continuing education and training 2. The engineer's rules of conduct that the engineer must adhere to regarding engineering unions in the field of continuing education and training 3. The engineer's rules of conduct that the engineer must adhere to towards training centers in the field of continuing education and training 	Engineer ethics in continuing education and training		Theoretical

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This programme specification outlines the objectives, structure, and methodologies for the Transportation Engineering course, ensuring students acquire the necessary knowledge and skills to excel in the field of transportation engineering while fostering their personal and professional development through PDP activities.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Engineering Technical College of Mosul, Building and Construction Tech. Department
3. Programme Title	Transportation Engineering – Level Four, 1 st semester
4. Title of Final Award	B.A
5. Modes of Attendance offered	3 hours weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	7/04/2024

9. Aims of the Programme

The Transportation Engineering programme aims to provide students with comprehensive knowledge and skills in planning, design, and management of transportation systems, including highways, railways, and airports. Emphasizing theoretical concepts and practical applications, the programme prepares students to understand the principles of transportation engineering and apply them to address contemporary transportation challenges. Through hands-on experiences, fieldwork, and personal development planning, students will develop the expertise necessary to contribute to the development of safe, efficient, and sustainable transportation infrastructure.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

Upon successful completion of the Transportation Engineering programme, students will be able to:

1. Demonstrate knowledge of fundamental concepts in highway engineering, including highway survey and location, functional classification, and the hierarchy of functional systems.
2. Understand the characteristics of drivers, pedestrians, and vehicles, and their impact on highway engineering components and design.
3. Apply principles of geometric design to design highway facilities, considering factors such as traffic volume, speed, and safety.
4. Analyze cross-sectional elements of highways, including travel lanes, shoulders, medians, barriers, curbs, gutters, guardrails, sidewalks, and side slopes.
5. Evaluate highway alignments and alternatives using topographic terrain maps, understanding points of inflection and horizontal curve types.
6. Design horizontal curves, including simple circular curves, compound curves, reversed curves (S-curves), and spiral curves (transition curves), considering minimum turning radius and superelevation concepts.
7. Design vertical curves, including crest and sag curves, ensuring adequate under-crossing clear distance and minimum length and grades.
8. Understand special facilities for heavy vehicles on steep grades, including climbing lanes and emergency escape ramps.
9. Analyze traffic flow elements, including speed-flow-density relationships, gap and gap acceptance, and queuing theory.
10. Evaluate capacity and level of service (LOS) for highway segments, two-lane highways, freeways, multilane highways, and signalized intersections.
11. Analyze traffic volumes, counting methods, traffic volume correction factors, average annual daily traffic (AADT), average daily traffic (ADT), and design hourly volume (DHV).
12. Understand traffic loads and their impact on pavements, including equivalent single axle load (ESALs), tandem axle load, tridem axle loads, load damage factor, growth factor, and stresses on pavements.
13. Understand principles of railway engineering, including railway cross-section elements, embankments, and specifications.
14. Understand principles of airport engineering, including airport orientations, runway and taxiway specifications, signals, and marking.

Assessment methods

Assessment methods include written examinations, coursework assignments, laboratory reports, and project presentations. These assessments aim to evaluate students' knowledge, analytical skills, practical abilities, and communication skills across various aspects of transportation engineering.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
Level four		Introduction to highway engineering		Theoretical
		Highway engineering components		Theoretical
		Geometric Design		Theoretical
		the Cross sectional elements		Theoretical
		Intersection and Inter changes		Theoretical
		Highway alignments and alternatives		Theoretical
		Vertical and horizontal alingment		Theoretical
		superelevation concepts		Theoretical
		Special facilities for heavy vehicle on steep grades		Theoretical
		Principles of capacity and level of service (LOS)		Theoretical
		Principles of railway engineering		Theoretical
		Principles of airport engineering		Theoretical
		Highway drainage		Theoretical

13. Personal Development Planning

- Personal Development Planning (PDP): Integration of PDP activities throughout the programme, including goal setting, reflection on learning experiences, career planning, and skills development. Students will engage in self-assessment, receive feedback, and create action plans to enhance their personal and professional growth.

14. Admission criteria .

15. Key sources of information about the programme

Traffic and Highway Engineering FOURTH EDITION, Nicholas J. Garber Lester A. Hoel, University of Virginia

Traffic and Pavement Engineering, Ghazi G. Al-Khateeb, University of Sharjah, UAE and Jordan University of Science and Technology, Jordan

The Handbook of Highway Engineering, Edited by T. F. Fwa

SORB, Standard Organization for Roads and Bridges

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	Ministry of Higher Education and Scientific Research – Northern Technical University
2. University Department/Centre	Building & Construction Eng. Department
3. Programme Title	COMPUTER AIDED DESIGN OF STRUCTURE / fourth stage
4. Title of Final Award	B.A
5. Modes of Attendance offered	Five hour weekly
6. Accreditation	
7. Other external influences	
8. Date of production/revision of this specification	1/04/2024
9. Aims of the Programmer	<p>1-This course provides a summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve. Demonstrating whether he has made the most of the learning opportunities available. It must be linked to the program description.</p> <p>2-Understanding the technical foundations: Introducing the student to the concept of engineering structural designs for buildings using computer programs (Stadium Pro program) and other programs in the same field, in addition to designing foundations using the Saif program.</p> <p>3- Developing design and development skills: The course includes learning how to analyze and structurally design all types of structures using the latest programs and</p>

methods, including programs such as (STAAD.pro, CONCAD, SAFE, CSI Bridge, Prokon, Epanet, AutoCAD Land Development Desktop AutoCAD Land Development Desktop) ..

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Cognitive goals

- Knowledge of ways to deal with engineering programs for analysis and design
- Knowing how to analyze and design different buildings
- Knowing ways to read and analyze analysis and design data
- Preparing an integrated report using the program and producing it in an integrated manner

B. The skills goals special to the programmer

- Learn most of the design principles using the computerized method
- Acquire knowledge, experience and skill in computer programs

Teaching and Learning Methods

- Lecture, discussion, giving examples,
- Using various modern presentation tools in explanation –
- Managing the lecture in an applied manner similar to the work reality to attract the student to the lecture
- Assigning the student to assignments, assigning daily grades to the assignments, and interacting during the lecture
- Forming practical groups during lectures to complete the required tasks and effective participation among group members.

Assessment methods

Monthly exams, extra-curricular assignments and daily student activities (daily assignments and participation)

C. Affective and value goals

- C1. Learn most of the design principles using the computerized method
- C2. Acquire knowledge, experience and skill in computer programs

Teaching and Learning Methods

Using multimedia technology (aural and visual), curricula and extra-curricular assignments

Practical application of basic skills in English grammar

Do group assignments

Assessment methods

- Daily and monthly exams
- Extra-curricular activities
- Assignments for students set by the instructor.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Developing students' skills and preparing them to place them in the field of public employment or the private sector.

D2. Developing personal skills to develop students and establish their own projects.

Teaching and Learning Methods

Theoretical explanation and cooperative discussion

Assessment Methods

Theoretical tests , Practical work, Practical tests and homework.

11. Programme Structure

Level/Year	Course or Module Code	Course or Module Title	Credit Hours	
Fourth Stage	BCE 415	Introduction to the General description of the STAAD. Pro ,structural program ,Start the Programs Create a new Structure	Practical	Theoretical
		Create the Model (Beam, Column, Slab or plate, wall or surface and solid) using Graphical Interface.	Practical	Theoretical
		Create the Model (Beam, Column, Slab or plate, wall or surface and solid) using Graphical Interface.	Practical	Theoretical
		Menus bar (file, edit, view, tools)	Practical Practical	Theoretical
		Menus bar (select, geometry, ... help)	Practical	Theoretical
		Application examples of structural engineering in STAAD. pro program (analysis and design of concrete beam, column, slab, shear walls and	Practical	Theoretical

		multi-story building subjected to floor load, wind load, earthquake load temperature load and pre-stress load)		
		Application examples of structural engineering in STAAD. pro program (analysis and design of concrete beam, column, slab, shear walls and multi-story building subjected to floor load, wind load, earthquake load temperature load and pre-stress load)	Practical	Theoretical
		analyse and design of foundation (isolated, strip raft and pile footing using STAAD.pro and STAAD. foundation programs)	Practical	Theoretical
		analyze and design of foundation (isolated, strip raft and pile footing using STAAD.pro and STAAD. foundation programs)	Practical	Theoretical
		analyze and design of steel structure	Practical	Theoretical
		analyze and design of steel structure	Practical	Theoretical

13. Personal Development Planning

- Enriching the course by adding voice and conversation laboratories and using blended learning to increase students' linguistic information
- Benefiting from the curricula taught in foreign universities to improve the level of students
- Using the method of educational entertainment (Edutainment) to activate students' perception and prevent boredom in the lecture

14. Admission criteria .

15. Key sources of information about the programme

1-STAAD Pro Tutorial For Beginners

2-STAAD.Pro manuals

3-[STAAD.Pro Learning Resources - RAM | STAAD | ADINA Wiki - RAM | STAAD | ADINA - Bentley Communities](#)