الجامعة التقنية الشمالية
Northern Technical University

بكالوريوس هندسة تقنيات البناء والإنشاءات

Bachelor's degree in Building and Construction Techniques Engineering

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1. Vision and Mission Statement

Vision:

The department will be distinguished and a pioneer in the field of Building and Construction Techniques Engineering, providing the labor market with technical engineers who can keep up with and transfer accelerating technology in the field of building and construction, as well as create and find job opportunities outside the public sector for self-service and community service. These engineers will have a variety of skills, including the ability to provide safe and efficient designs, manage complex projects, and ensure the quality and compliance of their work. With the mission of producing knowledgeable and highly skilled technical engineers, the Department of Building and Construction Techniques Engineering will provide an education that is both current and progressive.

Mission:

preparing technical engineers with the ability to use modern technologies and methods in the design, implementation, and maintenance of all engineering projects; managing and operating production units specialized in the production of construction materials and construction systems; and having the ability to examine building and construction materials of all kinds. The ability to learn, self-develop, and obtain information from reliable sources, as well as develop and support the spirit of creativity, innovation, and development among students and graduates, these goals can only be accomplished with a well-rounded education that focuses on not just technical skills but also problem solving, communication, and collaboration, which are also essential.

2. Graduate Objectives

1. This specialty aims to provide a bachelor's degree in technical engineering as well as graduate technical engineering cadres (technical engineers) capable of designing, implementing, and maintaining all civil engineering projects.
2. The goal of this specialization is to grant a master's degree in the specialty (building materials) and graduate academic engineering cadres with advanced abilities in scientific research and field laboratory testing.

3. The department's goal is to issue a PhD degree in the field of building materials and to graduate engineering cadres capable of keeping up with scientific breakthroughs in the field of building materials while also giving solutions to local challenges related to this specialty.

3. General objectives of the department:

1. Conducting scientific research in several civil fields, with an emphasis on applied research, to keep up with scientific and technological growth.
2. Reaching out to the community by offering scientific courses in areas of specialty as well as continuing education courses will help building and construction employees at all levels.
3. Providing engineering consulting for various engineering projects as well as engineering designs for various projects.
4. Continuing communication with graduates contributes to their continuous growth and provides input to the department in developing curriculum to suit the job market.

4. Scientific and practical description:

- Design and supervise the construction of all engineering project work items, such as buildings, bridges, highways, airports, tunnels, dams, hydraulic facilities, factory building units, and prestressed concrete units.
- Carrying out all field, on-site, and laboratory testing (destructive and non-destructive) on all building materials and soil, interpreting the findings, and comparing them to standard requirements.
- Extensive use of computers in reading, creating, and executing construction and structural maps, calculating quantities and prices, and closing project contracts.
- Organizing and managing various construction projects using current techniques and the computer, as well as knowledge with professional construction procedures, as well as evaluating construction machines in terms of productivity, operating costs, and ways of usage.

- Working with current building materials and innovative local alternatives, as well as additives in concrete and soil stabilization operations for major projects.
- Upkeep and rehabilitation of buildings, roads, and other projects, as well as pollution management as an age-old concern.
- Extensive use of sophisticated surveying equipment to create topographic maps and profiles, divide land, establish road routes, and draw longitudinal and transverse sections.

5. Program Specification

Program code	BCE	ECTS	240
Duration	4 levels, 8 Semesters	Method of Attendance	Full Time

The Building and Construction Techniques Engineering Program Specification outlines the knowledge and skills required for individuals who are interested in pursuing a career in the building and construction industry. The program focuses on developing technical expertise in the areas of building design, construction techniques, project management, and building maintenance. The program typically includes a mix of classroom lectures, practical training, and on-site field experience. Courses may cover topics such as building codes and regulations, building materials and construction methods, architectural design principles, structural engineering, project scheduling and budgeting, quality control and safety, and sustainability.

The program also emphasizes the development of technical skills such as blueprint reading, computer-aided design (CAD), surveying, estimating, and construction project management. Graduates of the program are expected to have the skills necessary to work as construction managers, project coordinators, building inspectors, estimators, and other technical roles in the construction industry.

Some key components of the Building and Construction Techniques Engineering program specification may include:

1. **Program Aims and Objectives:** The overarching goals of the program, such as to produce graduates who are capable of designing and managing construction projects in a sustainable and efficient manner.

2. **Learning Outcomes:** A list of the specific skills, knowledge, and competencies that students are expected to acquire through the program.
3. **Course Structure:** Details on the specific courses that make up the program, including their content, delivery methods, and any prerequisites or co-requisites.
4. **Assessment Methods:** Information on how student performance will be evaluated, including the types of assessments used (e.g. exams, essays, practical assignments) and the weighting of each assessment.
5. **Resources:** An outline of the facilities, equipment, and other resources required to deliver the program effectively.

Overall, a Building and Construction Techniques Engineering Program Specification serves as a guide for educators and institutions to develop and deliver a comprehensive curriculum that prepares students for a career in the building and construction industry.

6. Program Goals

The program goals of building and construction technical engineering typically include:

1. Developing an understanding of building materials, methods, and technologies: Students learn about the different types of building materials such as concrete, steel, wood, and masonry, and how they are used in construction.
2. Understanding construction codes and regulations: Students learn about the various building codes and regulations that govern construction practices in their local area. They also learn about safety standards and how to comply with them.
3. Learning project management skills: Students learn how to manage construction projects, including project planning, scheduling, budgeting, and resource allocation. They also learn about risk management and how to mitigate risks associated with construction projects.

4. Developing design skills: Students learn how to design buildings and structures that meet the needs of clients, while also complying with

building codes and regulations. They learn how to use design software such as AutoCAD and Revit.

5. Developing communication skills: Students learn how to effectively communicate with clients, contractors, and other stakeholders involved in a construction project. They also learn how to write reports, proposals, and other documents related to construction projects.
6. Gaining hands-on experience: Many programs include opportunities for students to gain practical, hands-on experience through internships, co-op programs, or other experiential learning opportunities.

Overall, the goal of building and construction technical engineering programs is to prepare students for careers in the construction industry by providing them with the skills and knowledge they need to succeed.

7. Student Learning Outcomes

The student learning outcomes of a Building and Construction Techniques Engineering program may vary depending on the specific goals and objectives of the program. However, some common learning outcomes may include:

1. **Knowledge of construction materials and methods:** Students should be able to demonstrate a strong understanding of various construction materials and methods, including their properties, advantages, and limitations.
2. **Ability to read and interpret blueprints:** Students should be able to read and interpret architectural and engineering drawings, including plans, elevations, sections, and details.
3. **Proficiency in construction software:** Students should be able to use various software applications commonly used in the construction industry, such as computer-aided design (CAD) software, project management software, and building information modeling (BIM) software.
4. **Knowledge of building codes and regulations:** Students should be familiar with local, state, and federal building codes and regulations, as well as industry standards and best practices.
5. **Project management skills:** Students should be able to plan, organize, and manage construction projects, including budgeting, scheduling, and resource allocation.

6. **Communication and teamwork:** Students should be able to effectively communicate with clients, contractors, architects, and other stakeholders, and work collaboratively in a team environment.
7. **Safety and sustainability:** Students should be aware of safety and sustainability considerations in the construction industry, including the use of green building materials and practices, and how to identify and mitigate potential hazards on a job site.

Overall, the student learning outcomes of a building and construction technical engineering program should prepare graduates for careers in the construction industry by providing them with the necessary knowledge, skills, and competencies to succeed.

8. Academic Staff

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8. Credits, Grading and GPA

Credits in the Building and Construction Techniques Engineering Department are following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 27 student workloads, including structured and unstructured workload.

Grading: Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50 - 100)	Excellent	90 - 100	Outstanding Performance
	Very Good	80 - 89	Above average with some errors
	Good	70 - 79	Sound work with notable errors
	Satisfactory	60 - 69	Fair but with major shortcomings
	Sufficient	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	(45-49)	More work required but credit awarded
	F – Fail	(0-44)	Considerable amount of work required
NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.			

Calculation of the Grade Point Average (GPA)

The GPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

GPA of 4-year B.Sc. degrees:

GPA = [(1st module score x ECTS) + (2nd module score x ECTS) + ……] / 240

9. Curriculum/Modules

Level 1 – First semester							
CODE	TITLE	T	P	C	ECTS	Bologna Content	Bachelor's degree in Building and Construction Techniques Engineering
BCE101	CONSTRUCTION MATERIALS-I	2	2	3	5		
BCE102	SURVEYING-I	2	2	3	5		
BCE103	ENGINEERING MECHANICS-I	3	0	3	5		
BCE104	ENGINEERING DRAWING	1	2	2	4		
BCE105	MATHEMATICS-I	3	0	3	4		
BCE106	ENGINERING PHYSICS	1	0	1	2		
BCE107	HUMAN RIGHTS and DEMOCRACY	1	0	1	2		
BCE108	ADVANCED ENGLISH SKILLS-I	2	0	2	3		
T: Theoretical, P: Practical, C: Credit		15	6	18	30		

Level 1 – Second Semester							
CODE	TITLE	T	P	C	ECTS	Bologna Content	Bachelor's degree in Building and Construction Techniques Engineering
BCE109	CONSTRUCTION MATERIALS-II	2	2	3	5		
BCE110	SURVEYING-II	2	2	3	5		
BCE111	ENGINEERING GEOLOGY	2	0	2	3		
BCE112	ENGINEERING MECHANICS-II	3	0	3	5		
BCE113	MATHEMATICS-II	3	0	3	4		
BCE114	DESCRIPTIVE GEOMETRY	1	2	2	3		
BCE115	COMPUTER PRINCIPLES	1	2	1	2		
BCE116	ADVANCED ENGLISH SKILLS-II	2	0	2	3		
T: Theoretical, P: Practical, C: Credit		16	8	19	30		

Level 2 – First semester

CODE	TITLE	T	P	C	ECTS	Bologna Content
BCE 201	CONCRETE TECHNOLOGY-I	3	2	3	5	
BCE 202	STRENGTH OF MATERIALS-I	3	0	3	5	
BCE 203	BUILDING CONSTRUCTION-1	2	0	2	4	
BCE 204	SURVEYING-III	2	3	3	5	
BCE 205	PROBABILITY & STATISTICS	2	0	2	3	
BCE 206	FLUID MECHANICS-I	2	0	2	3	
BCE 207	MATHEMATICS-III	3	0	3	5	
T: Theoretical, P: Practical, C: Credit		17	5	18	30	

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Level 2 – Second semester

CODE	TITLE	T	P	C	ECTS	Bologna Content
BCE 208	CONCRETE TECHNOLOGY-II	3	2	3	5	
BCE 209	STRENGTH OF MATERIALS-II	3	0	3	5	
BCE 210	BUILDING CONSTRUCTION-II	2	0	2	4	
BCE 211	SURVEYING-IV	2	3	3	5	
BCE 212	TECHNOLOGY of CONSTRUCTION MATERIALS INDUSTRY	2	0	2	3	
BCE 213	FLUID MECHANICS-II	2	0	2	3	
BCE 214	MATHEMATICS-IV	3	0	3	5	
BCE 215	PRACTICAL TRAINING	0	6	0	0	
T: Theoretical, P: Practical, C: Credit		17	5	18	30	

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Level 3 – First semester

CODE	TITLE	T	P	C	ECTS	Bologna Content
BCE 301	CONCRETE TECHNOLOGY-III	2	2	3	5	
BCE 302	REINFORCED CONCRETE	3	0	3	5	
BCE 303	STRACTURAL ANALYSIS-I	3	0	3	5	
BCE 304	SOIL MECHANICS	2	3	3	4	
BCE 305	CONSTRUCTION MANAGEMENT	2	0	2	3	
BCE 306	PAVEMENT ENGINEERING	2	2	3	4	
BCE 307	ENGINEERING ANALYSIS	3	0	3	4	
T: Theoretical, P: Practical, C: Credit		17	7	20	30	

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Level 3 – Second semester

CODE	TITLE	T	P	C	ECTS	Bologna Content
BCE 308	CONCRETE TECHNOLOGY-IV	2	2	3	5	
BCE 309	MASONRY BUILDINGS	3	0	3	5	
BCE 310	STRACTURAL ANALYSIS-II	3	0	3	5	
BCE 311	ADVANCED SOIL MECHANICS	2	3	3	4	
BCE 312	CONSTRUCTION EQUIPMENT	2	0	2	3	
BCE 313	ADVANCED PAVEMENT ENGINEERING	2	2	3	4	
BCE 314	NUMERICAL ANALYSIS	3	0	3	4	
BCE 315	PRACTICAL TRAINING	0	6	0	0	
T: Theoretical, P: Practical, C: Credit		17	7	20	30	

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Level 4 – First semester

CODE	TITLE	T	P	C	ECTS	Bologna Content	Bachelor's degree in Building and Construction Techniques Engineering
BCE 401	DESIGN REINFORCED CONCRETE BUILDINGS-I	3	0	3	4		
BCE 402	TRANSPORTATION ENGINEERING	2	3	4	4		
BCE 403	QUANTITY SURVEYING & ESTIMATING-I	2	0	2	3		
BCE 404	FOUNDATION ENGINEERING	3	0	3	4		
BCE 405	CONSTRUCTION DRAWING	0	3	2	2		
BCE 406	SUSTAINABLE CONSTRUCTION MATERIALS	2	2	3	3		
BCE 407	DESIGN OF STEEL STRUCTURES-I	3	0	3	4		
BEC 408	ENVIRONMENTAL ENGINEERING	2	2	3	4		
BCE 409	INNOVATIVE PROJECT- I	1	2	2	2		
T: Theoretical, P: Practical, C: Credit		18	12	25	30		

Level 4 – Second semester

CODE	TITLE	T	P	C	ECTS	Bologna Content
BCE 410	DESIGN REINFORCED CONCRETE BUILDINGS-II	3	0	3	4	
BCE 411	MATERIALS FOR HERITAGE BUILDINGS	2	2	3	4	
BCE 412	QUANTITY SURVEYING & ESTIMATING-II	2	0	2	3	
BCE 413	ADVANCED FOUNDATION ENGINEERING	3	0	3	4	
BCE 414	SAFETY IN CONSTRUCTION	0	3	2	2	
BCE 415	COMPUTER AIDED DESIGN OF STRUCTURE	1	3	3	3	
BCE 416	DESIGN OF STEEL STRUCTURES-II	3	0	3	4	
BEC 417	REPAIRS & REHABILITATION OF STRUCTURES	2	2	3	4	
BCE 418	INNOVATIVE PROJECT-II	1	2	2	2	
T: Theoretical, P: Practical, C: Credit		*18*	*11*	*24*	*30*	

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