

**Faculty**

*Chair*

ASHUTOSH BAGCHI, PhD *Carleton University*, PEng; Professor

*Associate Chair*

HUA GE, PhD *Concordia University*, APEG (B.C.); Associate Professor

*Professors*

HASHEM AKBARI, PhD *University of California, Berkeley*  
ANDREAS K. ATHIENITIS, PhD *University of Waterloo*, ing.; *Provost's Distinction*  
ZHI CHEN, PhD *University of Regina*, APEGS  
MARIA ELEKTOROWICZ, PhD *Warsaw Technical University*, ing.; *Provost's Distinction*  
KHALED GALAL, PhD *McMaster University*, PEng  
KINH H. HA, DEng *Sir George Williams University*, ing.  
FARIBORZ HAGHIGHAT, PhD *University of Waterloo*, PEng; *Provost's Distinction*  
ADEL M. HANNA, PhD *Technical University of Nova Scotia*, ing.; *Provost's Distinction*  
SAMUEL LI, PhD *Norwegian Institute of Technology*, APEG (B.C.)  
OSAMA MOSELHI, PhD *Concordia University*, ing.; *Provost's Distinction*  
CATHERINE MULLIGAN, PhD *McGill University*, ing.  
MICHELLE NOKKEN, PhD *University of Toronto*, PEng  
THEODORE STATHOPOULOS, PhD *University of Western Ontario*, ing.; *Provost's Distinction*  
MOHAMMED ZAHEERUDDIN, PhD *University of Alberta*, PEng  
RADU G. ZMEUREANU, PhD *Concordia University*, ing.

*Distinguished Professors Emeriti*

DOREL FELDMAN, PhD *University of Iasi*  
RICHARD W. GUY, PhD *University of Liverpool*, PEng  
OSCAR A. PEKAU, PhD *University of Waterloo*, ing.; *Provost's Distinction*  
AMRUTHUR S. RAMAMURTHY, PhD *Purdue University*, ing.; *Provost's Distinction*

*Professors Emeriti*

SABAH TOMA ALKASS, PhD *Loughborough University*, PEng; *Provost's Distinction*  
BALA ASHTAKALA, PhD *University of Waterloo*  
HORMOZ B. POOROOSHASB, PhD *University of Cambridge*

*Associate Professors*

CIPRIAN ALECSANDRU, PhD *Louisiana State University*, PEng  
LUIS AMADOR, PhD *University of New Brunswick*, PEng  
ANJAN BHOWMICK, PhD *University of Alberta*, APPEGA  
LAN LIN, PhD *University of Ottawa*  
MD. SAIFUR RAHAMAN, PhD *University of British Columbia*  
LUCIA TIRCA, PhD *Technical University of Civil Engineering, Bucharest*, ing.  
LIANGZHU WANG, PhD *Purdue University*  
ZHENHUA ZHU, PhD *Georgia Institute of Technology*  
ATTILA M. ZSAKI, PhD *University of Toronto*, PEng

*Assistant Professors*

CHUNJIANG AN, PhD *University of Regina*, APEGS  
SANG HYEOK HAN, PhD *University of Alberta*  
BRUNO LEE, PhD *Eindhoven University of Technology*  
JOONHEE LEE, PhD *University of Nebraska*  
BIAO LI, PhD *University of Calgary*  
FUZHAN NASIRI, PhD *University of Regina*  
ALI NAZEMI, PhD *University of Birmingham*  
MAZDAK NIK-BAKHT, PhD *University of Toronto*, PEng  
AHMED SOLIMAN, PhD *Western University*, PEng

*Extended Term Appointments*  
JASSIM HASSAN, PhD *University of Calgary*  
SHAHIN KARIMIDORABATI, PhD *University of Waterloo*

*Affiliate Professor*  
ROBERT REIMERS, PhD *Vanderbilt University*

*Affiliate Associate Professors*  
ALI BAHLOUL, PhD *Université du Havre*  
LALEH YERUSHALMI, PhD *McGill University*

*Affiliate Assistant Professors*  
ANNAMARIA BUONOMANO, PhD *University of Palermo, Italy*  
JOSÉ AGUSTIN CANDANEDO, PhD *Concordia University*  
KATHERINE D'AVIGNON, PhD *École Polytechnique de Montréal*  
SHAMEEN JAUFFUR, PhD *McGill University*

*For the complete list of faculty members, please consult the Department website.*

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## Location

*Sir George Williams Campus*  
Engineering, Computer Science and Visual Arts Complex, Room: EV 006.139  
514-848-2424, ext. 3200  
514-848-2424, ext. 7800

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## Objectives

**Building Engineering**, as a discipline, encompasses the body of knowledge which pertains to all phases in the life-cycle of a constructed facility, namely conception, planning, design, construction, operation, and disposal. Concordia has a unique undergraduate program leading to a BEng in Building Engineering designed to meet the needs of the construction industry for engineers familiar with the overall design of built facilities. In addition to the basic engineering sciences, the program emphasizes the fundamentals of building materials, structural analysis and design, building services (acoustical, heating, lighting, air conditioning), economics, and project management. The student also has available certain electives which will be of use in the design of various phases of a building. Students who complete all but one of their 200- and 300-level courses with a sufficiently high standing may apply through the Associate Dean, Student Academic Services to enter a combined program leading to the joint award of both a BEng and an MEng degree in Building Engineering. It is expected that those who aspire to leadership roles within the building industry will enter such a combined program. The combined program requires a further 12 months of full-time study, after which graduates will not only have obtained further grounding in the basics, but will also have specialized in one of four branches: Building Science, Building Environment, Building Structures, Construction Management. For details of the graduate component, refer to the School of Graduate Studies Calendar.

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### 71.50.1 Course Requirements (BEng in Building Engineering)

The program in Building Engineering consists of the Engineering Core, the Building Engineering Core, and one of the options listed below. The normal length of the program is 119 credits.

#### **Engineering Core for Building Engineering (29 credits)\***

See §71.20.5. Students in BEng (Bldg) must successfully complete BLDG 482 instead of ENGR 392.

\*Note: The Engineering Core credits for students in the Building Engineering program are reduced from 30.5 credits to 29 credits since Building Engineering students are not required to take ENGR 202 (1.5 credits) in their program.

<b>Building Engineering Core</b>		<i>Credits</i>
BCEE 231	Structured Programming and Applications for Building and Civil Engineers	3.00
BCEE 342	Structural Analysis I	3.00
BCEE 344	Structural Design I	3.00
BCEE 345	Structural Design II	3.00
BCEE 371*	Surveying	3.00
BCEE 451	Construction Engineering	3.00
BLDG 212	Building Engineering Drawing and Introduction to Design	3.00
BLDG 341	Building Engineering Systems	3.00
BLDG 365	Building Science	3.50

BLDG 366	Acoustics and Lighting	3.50
BLDG 371	Building Service Systems	3.50
BLDG 390	Building Engineering Design Project	3.50
BLDG 463	Building Envelope Design	3.00
BLDG 471	HVAC System Design	4.00
BLDG 476	Thermal Analysis of Buildings	3.00
CIVI 321	Engineering Materials	3.75
CIVI 432	Soil Mechanics	3.50
ENGR 242	Statics	3.00
ENGR 243	Dynamics	3.00
ENGR 244	Mechanics of Materials	3.75
ENGR 251	Thermodynamics I	3.00
ENGR 311	Transform Calculus and Partial Differential Equations	3.00
ENGR 361	Fluid Mechanics I	3.00
		74.00

\*Summer course to be taken before entering second year of BEng program.

### Option Course Requirements

Students must complete a minimum of 16 credits from one of the following options: A or B. Option A is designed for students interested in careers in building energy efficiency, HVAC systems and indoor environment. Option B is tailored for students wishing to pursue careers in building design, building structures, and construction engineering and management.

#### 1. Option A — Building Energy and Environment

Students must complete the following compulsory course from the Option Core and a minimum of 12 credits from the Option Electives.

Option A – Core		<i>Credits</i>
BLDG 490A	Capstone Building Engineering Design Project	4.00
Option A – Electives		<i>Credits</i>
BLDG 465	Fire and Smoke Control in Buildings	3.00
BLDG 472	Building Energy Conservation Technologies	3.00
BLDG 473	Building Acoustics	3.00
BLDG 474	Building Illumination and Daylighting	3.00
BLDG 475	Indoor Air Quality	3.00
BLDG 477	Control Systems in Buildings	3.00
BLDG 498	Topics in Building Engineering	3.00
ENGR 411	Special Technical Report	1.00
ENGR 412	Honours Research Project	3.00

Note: Students from Option A may choose one course from Option B electives.

#### 2. Option B — Building Structures and Construction

Students must complete the following compulsory course from the Option Core and a minimum of 12 credits from the Option Electives.

Option B – Core		<i>Credits</i>
BLDG 490B	Capstone Building Engineering Design Project	4.00
Option B – Electives		<i>Credits</i>
BCEE 343	Structural Analysis II	3.00
BLDG 462	Modern Building Materials	3.00
BLDG 478	Project Management in Construction	3.00
BLDG 492	Construction Processes	3.00
BLDG 498	Topics in Building Engineering	3.00
CIVI 435	Foundation Design	3.00
CIVI 453	Design of Reinforced Concrete Structures	3.50
CIVI 454	Design of Steel Structures	3.50
ENGR 411	Special Technical Report	1.00
ENGR 412	Honours Research Project	3.00

Note: Students from Option B may choose one course from Option A electives.

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## Objectives

**Civil Engineering** is concerned with the creation of systems of constructed facilities which play an important role in sound economic growth of society. It is also concerned with the development of technologies to combat pollution of air, water, and soil. Civil engineers are responsible for the design of foundations and superstructures of common structures such as buildings, bridges, dams, tunnels, wharves, as well as many unusual structures such as rocket installations, containment vessels for nuclear reactors, supports for radio telescopes, frameworks for aircraft. In addition, they are concerned with the engineering aspects of water resources; transportation facilities; planning metropolitan areas, and conducting and managing their public facilities. In dealing with environmental problems, civil engineers perform vital functions such as monitoring and controlling air, water, and soil quality, assessing the impact of technological changes on the environment, and developing innovative waste reduction technologies.

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### 71.50.2 Course Requirements (BEng in Civil Engineering)

The program in Civil Engineering consists of the Engineering Core, the Civil Engineering Core, and one of the options listed below. The normal length of the program is 119 credits.

#### Engineering Core (30.5 credits)

Civil Engineering Core		Credits
BCEE 231	Structured Programming and Applications for Building and Civil Engineers	3.00
BCEE 342	Structural Analysis I	3.00
BCEE 343	Structural Analysis II	3.00
BCEE 344	Structural Design I	3.00
BCEE 345	Structural Design II	3.00
BCEE 371*	Surveying	3.00
BCEE 451	Construction Engineering	3.00
CIVI 212	Civil Engineering Drawing and Introduction to Design	3.00
CIVI 231	Geology for Civil Engineers	3.00
CIVI 321	Engineering Materials	3.75
CIVI 341	Civil Engineering Systems	3.00
CIVI 361	Introduction to Environmental Engineering	3.50
CIVI 372	Transportation Engineering	3.00
CIVI 381	Hydraulics	3.50
CIVI 390	Civil Engineering Design Project	3.50
CIVI 432	Soil Mechanics	3.50
CIVI 490	Capstone Civil Engineering Design Project	4.00
ENGR 242	Statics	3.00
ENGR 243	Dynamics	3.00
ENGR 244	Mechanics of Materials	3.75
ENGR 251	Thermodynamics I	3.00
ENGR 311	Transform Calculus and Partial Differential Equations	3.00
ENGR 361	Fluid Mechanics I	3.00
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		73.50

\*Summer course to be taken before entering second year of BEng program.

#### Option Course Requirements

Students must complete a minimum of 15 credits from one of the following options: A, B or C. Option A is designed for students interested in careers in structural, geotechnical, and transportation engineering. Option B is tailored for students wishing to pursue careers in environmental engineering. Option C is designed for students interested in construction engineering and management.

Option A – Civil Infrastructure		Credits
BCEE 452	Fundamentals of Finite Element Analysis of Structures	3.00
BCEE 455	Introduction to Structural Dynamics	3.00
CIVI 435	Foundation Design	3.00
CIVI 437*	Advanced Geotechnical Engineering	3.00
CIVI 453	Design of Reinforced Concrete Structures	3.50
CIVI 454	Design of Steel Structures	3.50
CIVI 471	Highway and Pavement Design	3.00
CIVI 474*	Transportation Planning and Design	3.00

CIVI 498	Topics in Civil Engineering	3.00
ENGR 411	Special Technical Report	1.00
ENGR 412	Honours Research Project	3.00

Note: Students may choose one course marked with \* from Option B or C.

Option B – Environmental *Credits*

CIVI 382*	Water Resources Engineering	3.50
CIVI 464*	Environmental Impact Assessment	3.00
CIVI 465	Water Pollution and Control	3.50
CIVI 466	Engineering Aspects of Chemical and Biological Processes	3.00
CIVI 467*	Air Pollution and Emission Control	3.00
CIVI 468	Waste Management	3.00
CIVI 469*	Geo-Environmental Engineering	3.50
CIVI 483*	Hydrology	3.00
CIVI 484*	Hydraulic Engineering	3.50
CIVI 498	Topics in Civil Engineering	3.00
ENGR 411	Special Technical Report	1.00
ENGR 412	Honours Research Project	3.00

Note: Students may choose one course marked with \* from Option A or C.

Option C – Construction Engineering and Management (CEM) *Credits*

BCEE 464	Project Cost Estimating	3.00
BCEE 465	Construction Planning and Control	3.00
BCEE 466	Simulations and Design of Construction Operations	3.00
BLDG 478*	Project Management for Construction	3.00
BLDG 491	Labour and Industrial Relations in Construction	3.00
BLDG 492	Construction Processes	3.00
BLDG 493	Legal Issues in Construction	3.00
CIVI 440*	Computer Applications in Civil Engineering Practice	3.00
CIVI 498	Topics in Civil Engineering	3.00
ENGR 411	Special Technical Report	1.00
ENGR 412	Honours Research Project	3.00

Note: Students may choose one course marked with \* from Option A or B.