

STUDY ABROAD IN ISRAEL



Jerusalem-Galilee | 2018  
Engineers



From the hilltop of Mount Scopus, the Hebrew University looks out over the spectacular panorama of Jerusalem. A city sacred to Judaism, Christianity and Islam, Jerusalem is a blend of past and present, ancient roots and modern innovations.

Jerusalem is well known for its abundant historical and holy sites, and fascinating tourist attractions. A thriving metropolis, Jerusalem is dotted with art galleries and museums, theaters and concert halls, archaeological sites and religious shrines. Throughout the year, the city hosts exciting festivals, exhibitions, international conferences, and other special events.

As the capital of Israel, Jerusalem is not only the home of the country's governing bodies, national memorials and cultural institutions, but also a political center of national and international significance.



Braude College is perched on a hill in the city of Karmiel, which divides the upper and lower Galilee. The Galilee is a mountainous region in the north of Israel, characterized by rocky hills, green fields and colorful wildflowers. Its relatively abundant water and fertile soil have made for thriving wildlife and thousands of years of human settlement.

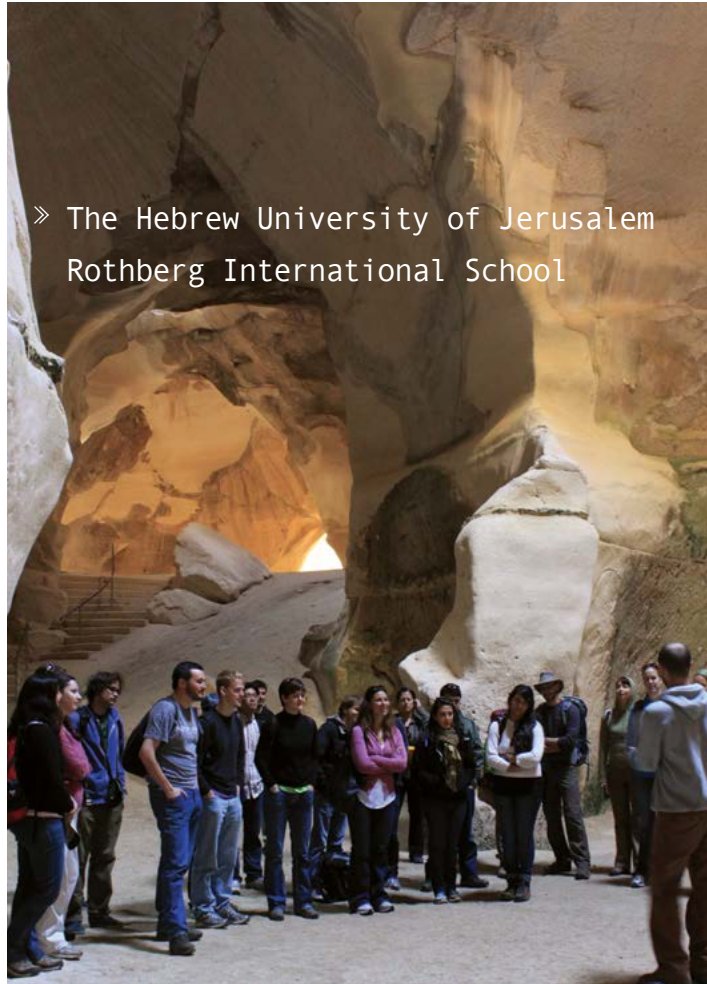
The Galilee houses a tapestry of ethnic communities. Alongside Jewish cities and towns, there are Arab, Druze, and Circassian villages. A hub of tourism, the Galilee offers antiquities, parks, nature reserves, and religious sites. The Galilee is also a center of arts and culture, and of industry. Numerous high-tech companies are located here, having drawn some of Israel's finest scientists to the region. The natural beauty, historical and archeological sites, cultural diversity, and innovative industries make the Galilee a fascinating region, with something to interest almost any visitor.



The Hebrew University of Jerusalem is a multidisciplinary institution of higher learning and research, and a scientific center of international repute. Ranked among the world's leading universities, the Hebrew University stresses excellence throughout its Faculties of Humanities, Social Sciences, Law, Science, Medicine, Dental Medicine, and Agriculture, Food and Environment.

The university has 22,000 undergraduate, graduate and doctoral students. Its 1,200 faculty members and alumni have been awarded numerous national and international prizes, including the Nobel Prize.

In 1955 the Hebrew University opened its first program for international students with 22 American students. Since then, the programs and courses for students from abroad have steadily expanded. Today, the Rothberg International School attracts more than 2,000 students annually, from over 90 countries around the globe.



» The Hebrew University of Jerusalem  
Rothberg International School



» Braude College

Braude College, based in the city of Karmiel, is a leading engineering institution in northern Israel. Established in 1987, the beautifully landscaped college has about 2,900 undergraduate and graduate students.

An academic, technological and scientific center in the Galilee, Braude College helps develop local high-tech industries.

Braude College offers B.Sc. degrees in biotechnology engineering, electrical and electronic engineering, industrial engineering and management, information systems engineering, mechanical engineering, software engineering, applied mathematics and optical engineering. The college confers M.Sc. degrees in biotechnology, software engineering, industrial engineering and systems engineering.

At Braude College, each student is valued, and receives personal attention from faculty and staff. Students also benefit from the college's connection with top-ranking industries.



## Engineering & More: Jerusalem-Galilee Engineers



Jerusalem-Galilee Engineers is an innovative program offered by the Hebrew University of Jerusalem and Braude College. The semester-long program, conducted in English, is designed for engineering students in their third or fourth year of studies. Participants take accredited courses in engineering and other academic subjects. Ample opportunities are available to become acquainted with the vibrant, multifaceted State of Israel, and its people.

The program begins with a two-week mini-semester at the Hebrew University of Jerusalem, where students take an introductory course in Israeli Society. The course includes stimulating study tours throughout Jerusalem and other parts of the country.

The program continues in Karmiel, the “capital” of the Galilee, at Braude College. At this topnotch technological institution, students study engineering courses for 16 weeks. They also take part in the unique Study in Advanced Industry program, in which they visit leading high-tech companies.



Jerusalem



Galilee



## Jerusalem-Galilee Engineers

The program is divided into two sections:

### » Mini-Semester at THE HEBREW UNIVERSITY OF JERUSALEM

The program begins in Jerusalem, with a two-week mini-semester designed to introduce the students to Israeli society and culture. Students participate in the following course:

#### **Introduction to Israeli Society**

**Academic hours:** 30

**Academic credits:** 2

**Tuition:** US \$1,250

This course examines historical, social and political aspects of contemporary Israeli society. After analyzing the ideologies and groups that played a major role in the formation of Israeli society, class discussion will focus on social and political issues which are at the center of current debate in the country.

### » Spring Semester in the Galilee at BRAUDE COLLEGE

The spring semester comprises 16 weeks, from March to July. Students benefit from an expert faculty, strong support network, small study groups, and personal attention. Required projects related to leading Israeli companies expose students to real-world engineering challenges and valuable professional contacts.

Braude College combines theory with practical laboratory experience and exposure to local high tech industries. Students will enjoy an extensive series of stimulating academic field trips and extra-curricular activities, designed to enable students to experience Israeli society and culture first-hand.



Jerusalem

Galilee





## Machine Learning

**Academic hours: 42**

The course deals with Machine Learning concepts. Among other topics, the course covers major models in the field: Supervised Learning, Reinforcement Learning, and Un-supervised Learning. Students will also be exposed to linear models including: SVM, Rule Learning and Distance Base Models.

## Topics in Algorithmic Game Theory

**Academic hours: 42**

Game theory deals with the analysis of strategic situations which involve players with conflicting goals, and attempts to answer

questions such as what is the best strategy for each participant and how to predict the outcome of a given game. The purpose of the course is to review a variety of topics related to the encounter between three fields: economics, game theory and computer science. The course will include lectures that develop the relevant theory and discuss the related practical applications. The course begins with a short introduction to game theory. We will then review a variety of classic topics and contemporary issues.

## Algorithms Design

**Academic hours: 42**

Algorithm design is a specific method for creating a mathematical process in solving problems. Techniques for designing and

implementing algorithm design include: problem definition, development of a model, specification of algorithm, designing an algorithm, checking the correctness of algorithm, analysis of algorithm, implementation of algorithm, program testing, documentation preparation. The course will include lectures, workshop and presentations by students.

## Modern Physics

**Academic hours: 84**

An introductory course to the field of modern physics, designed as a general overview for engineering students. The course includes the following topics: Special relativity, an introduction to quantum theory: Quantum Potential Well (used in Electronics), Harmonic

Oscillator (used in Radiation theory) Obstacles of Potential, Periodic Potentials, Angular momentum and The Hydrogen Atom. In addition to the lectures the student will also meet for practice classes and laboratory sessions.

## Industrial Automation

**Academic hours: 70**

In this introductory course, students learn about automation technologies and manufacturing systems. The rationale for utilizing automation is explored, along with the advantages of both hardware and software-based automation. Laboratory experience is also included in the course.



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## Light Sources and Lasers

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### Academic hours: 56

This course covers the fundamental physical processes of lasers, introduces relevant engineering, and explores a variety of specific laser systems. In the first part of the course, the principles and main features of black body radiation and incoherent sources are introduced. The main part of the course focuses on the physical principles, structure, and operation modes of optical lasers. Topics include absorption/emission and optical gain, population inversion in three and four-level systems, laser oscillator, resonator and beam propagation, modes structure and methods of mode-selection, Q switching, and phase locking. In addition, laser applications are addressed. The course also includes relevant exercises and solutions for technical problems undertaken in the practical sessions.

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## Optical Imaging Systems

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### Academic hours: 42

This course covers the basic principles of optical imaging systems. Starting from the fundamentals of the diffraction theory of light, the main features, limitations, and engineering aspects of imaging systems are covered. Topics include diffraction-limited imaging, optical modulation function and modulation contrast function, contrast-limited resolution and target acquisition, and noise-lim-

ited imaging and target acquisition. In addition, the effects of atmosphere, turbulence, and motion on image quality are treated. Furthermore, the structure and main characteristics of imaging devices are covered. In the practical sessions, relevant exercises on imaging systems characterization and design are solved.

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## Manufacturing Processes

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### Academic hours: 42

This course looks at manufacturing technologies from the shop floor perspective, along with professional literature, scientific/academic and trade magazines and technical databases. Students use analysis tools and decision-making methodologies to optimize production lines, and suggest manufacturing layouts and solutions for commercial/industrial systems.

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## Study in Selected Advanced Israeli Industries

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### Academic hours: 56

This course introduces students to leading industries in Israel, stressing industries unique to the country and those that are especially developed here. The course will cover technology, manufacturing, engineering practices and business considerations, and will include field trips to relevant plants.

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## Transport Phenomena Laboratory

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### Academic hours: 28

In this course the student acquires knowledge related to fluid mechanics and heat transfer, with emphasis on tools and measurement techniques. The lab sessions include experiments in: flow rate and regimes, pressure drops in pipes and devices, heat transfer (conduction, convection, and radiation), pumps, wind tunnel, and heat exchange systems.

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## Strength and Materials Laboratory

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### Academic hours: 28

The aim of this course is to teach the student experimental techniques, design of experiment, correct procedures of experimental work, result analysis, and presentation of the process and results. The course includes the following topics: torsion, hardness of materials, stress and strain, bending, stress concentration, thermal treatment and aging of metals, manual and computer aided and automated geometrical measurements.

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## Mathematical introduction into quantum informatics and quantum computing

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### Academic hours: 70

The course consists of introduction to informatics and to quantum mechanics, including an in-depth mathematical analysis of entropy, tensors, and infinite dimensional spaces. The course quantum mechanics concepts, and deals with evolution and measurement, projective measurements issues. Among other mathematical models, the students learn about quantum algorithms, quantum parallelism, the Deutsch – Jozsa algorithm, quantum Fourier transform and its applications. The course concludes with Quantum noise and quantum operations.

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## Biomaterials

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### Academic hours: 70

The biomaterials course is intended to introduce the students to the uses of artificial/synthetic materials in the human body for the purposes of aiding healing, correcting deformities, and restoring lost function. The course reviews basic concepts of chemical bonds, materials structures and the resulting chemical and physical properties of metals, ceramics, polymers and composite materials.



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## Rehabilitation Biomechanics

**Academic hours: 42**

The course surveys the field of rehabilitation engineering with an emphasis on human machine interface, sensory physical and cognitive applications, while implementing existing technologies. The course reviews different rehabilitation systems and design essentials of these systems. The course provides insight into activities of daily living (ADL), challenges of the disabled community, while reviewing the existing solutions offered. This hands - on course offers the students small scale projects intended for a real client, and they will develop and manufacture a tailor-made solution while implementing the knowledge gained during the course.

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## Ethics of the fathers

**Academic hours: 28**

This course will focus on main ideas and thoughts that were said by Jewish scholars almost 2000 years ago. although it was said so many years ago, it still applies to our life nowadays. Their sayings regard moral and appropriate behavior of a person between him and his friend, between him and G-d and morals regarding himself. Some fundamental ideas will be discussed such as free choice, reward and punishment and much more

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## Introduction to Economics for Engineers

**Academic hours: 28**

The course introduces students to the basic concepts of micro-economics, such as scarcity and choice of factors of production, decisions of producers and consumers in competitive and monopolistic markets and governmental intervention in these markets. In addition, the course provides some basic tools for economic feasibility analysis. The course includes the following topics: Factors of Production and Production Possibilities Curve, Costs of Production and Producer's Supply Function, Demand and Equilibrium in Competitive Markets, Monopoly, and Government Intervention in Competitive Markets.

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## Introduction to Polymers and Plastics

**Academic hours: 70**

This course begins with the terminology and concepts of plastics, and examines the molecular weight, structure and morphology of thermoplastic and thermoset polymers. It teaches properties of solid polymeric material and intermolecular interactions, along with evaluation methods of polymers and plastics. Polymeric elastomers and viscoelasticity analysis are also included.



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## Introduction to Marketing

**Academic hours: 42**

This course covers specific aspects that put marketing at the leading edge of the modern firm's activities: understanding customers' needs and designing a comprehensive approach aiming to fulfill these special needs. The students will be exposed to the basic principles, perspectives, concepts, theories and models that have been crystallized into the contemporary science of marketing.

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## Human Resource Management

**Academic hours: 30**

The course provides the knowledge and practical tools necessary for proper management of the human work force within an organization: planning, recruitment, staffing, performance evaluation systems, career development and work relations.

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## advanced methods for product engineering

**Academic hours: 28**

Growth is a critical factor for any company; yet, it is an elusive target as most firms hit a growth Plato. Numerous successful companies stumbled disastrously when they tried to peruse

opportunities for growth (McGrath and Macmillan, 2009). This course aims to equip students with state of the art methods and tools to accelerate an established firm growth through business model transformation (BMT). In particular the following topics will be learned: (1) Why most firm reach a "Growth Setback" stage?; (2) How to transform an established firm Business Model for renewed Growth; (3) How to create a business Model portfolio as a mean for renewing a firm growth; (4) How to discover customers unmet needs in established markets

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## Immunology

**Academic hours: 28**

The fundamentals of immunology are taught with attention being given to the singular scientific approach and conceptual development of this relatively new, but essential, discipline. This introductory course provides students with the knowledge and intellectual tools to understand immunology today and the challenges of immunology in the future.

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## Bioinformatics

**Academic hours: 28**

Life sciences have become in many aspects information technology. The exponential growth of biological data covers all areas of biology and biotechnology – from DNA, RNA and protein sequences

via comprehensive data on interactions between biomolecules to structures. The aim of the course is to teach the main concepts of computational visualization, analysis and prediction of sequence and structural biological data with a specific focus on proteins. The course will focus on presenting the field of bioinformatics tools and analysis in an applicative manner. As such, the course will include numerous topics studied a level sufficient to apply the studied tools on new sequence and structural data of interest.

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## Culturing Animal Cells

**Academic hours: 42**

The course deals with practical and theoretical aspects of culturing animal cells. On the practical side, students are exposed to common laboratory work related to animal cell cultures: sterility issues, thawing and freezing, splitting, daily follow-up, cell morphology, medium preparation and change, different cell lines (adherent, semi adherent and suspended), derivation of primary line, routine tests and more. The practical hands-on work in the lab is followed by a grounding in theoretical background and a discussion on medium combinations, serum free cultures, freezing and thawing aspects, cell lines, transformation, scale-up techniques, unique cell types such as stem cells, and the uses of animal cells in industry or clinics.

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## Introduction to Control

**Academic hours: 70**

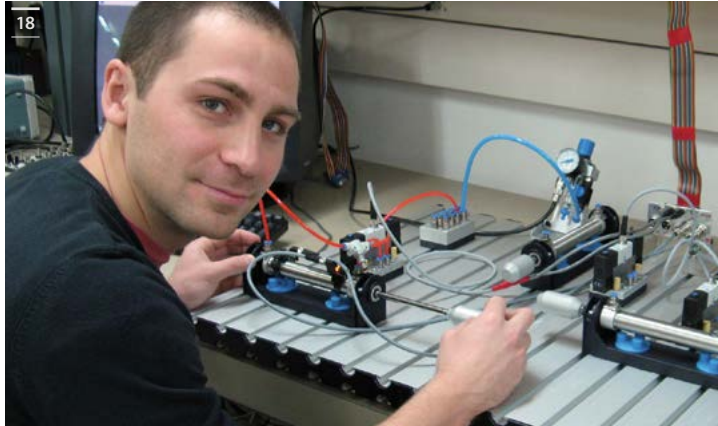
The subject matter of this course encompasses the fundamental principles and relevant techniques for designing continuous-time SISO LTI control systems that satisfy practically relevant system performance specifications. Topics of the course include: Introduction and foundations, feedback control fundamentals, loop transfer function fundamentals, linear SISO systems, and tracking design with uncertain plants. Expected outcome of the course: the student will be able to design continuous-time SISO LTI control systems that satisfy practically relevant system performance specifications in frequency domain.

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## Signals and Systems

**Academic hours: 42**

An engineer has to have a set of mathematical tools for the analysis and design of systems. Systems operate on and produce signals. Therefore both are studied together in this course. The course deals with the following: Signals (functions of time mostly); Systems; Differential equations with constant coefficients; LTI state equations; Application of Laplace transform; Feedback loops; Review of Fourier series; Application of Fourier transform.

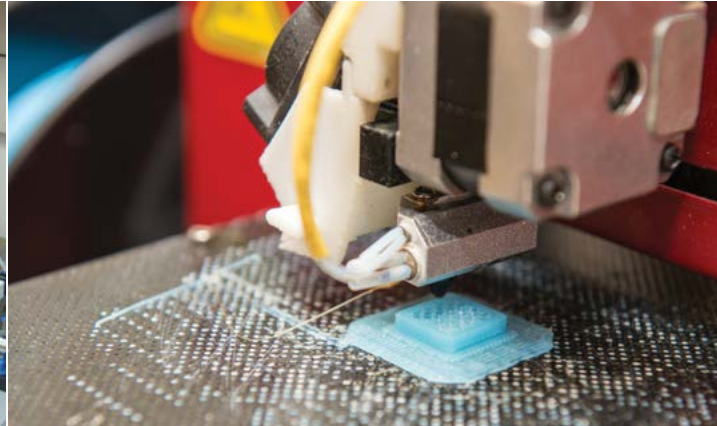


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## Water/Waste Cycle

**Academic hours: 28**

This course takes you on a journey to explore the exciting triangle of environment, water and energy in our emerging world. Lectures combined with field visits to institutions that practice these issues focus on: water management, water resources, desalination, wastewater treatment and reuse, and bio-energy production from waste in Israel. Through field trips to wastewater treatment sites, a desalination site, and a waste digester for electricity production, students are exposed to solutions for a better future.



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## Myths and Legends

**Academic hours: 28**

In this course we will explore a selection of myths and legends in text and film format. The course will discuss the development of these works over time and will consider the manner in which different cultural and critical approaches have been applied to them. We will discuss a variety of topics including: Greek and Egyptian myth (Perseus and Medusa, Osiris and Set), English legends (Robin Hood, King Arthur), historical legends (Cleopatra, Spartacus, Jack the Ripper), movie mythologies (Star Wars, Stargate, Lost), western myths (Atlantis, The Philosopher's Stone), and mythical creatures (Loch Ness Monster, Jersey Devil, Golem, Vampires and Werewolves, Yeti).



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## The Lean Startup

**Academic hours: 28**

Entrepreneurship has become an important ingredient of any engineer set of skills. This is relevant for working business, for a startup, for a big enterprise corporation, or even for a governmental office. The Lean Startup is an up-to-date state-of-the-art entrepreneurship concept, methodology and tools. Lean startup deals with the process of managing the progress in a startup, by identifying the riskiest assumptions of the business model, and validating them with customers and others, in an iterative manner. The goal is to find a viable business model as fast as possible, thus eliminating waste related to product development and marketing before a validation is performed in the marketplace.



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## Integrated Circuits Design Lab

**Academic hours: 70**

This course covers the design of analog CMOS integrated circuits, with focus on the basic building blocks. The lab experiments involve hands-on design using state of the art CAD tools common in the industry. The course follows the design cycle: from specification definitions, through architecture selection and basic design, to fine-tuning with exact simulations. To summarize the course the students will be given independent design tasks (mini-projects) to implement the techniques studied.





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## Basic Hebrew

Academic hours: 56

Tuition: US \$350

An introductory course in Hebrew for international students, focusing on speaking and elementary communication skills.

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## Sports

Academic hours: 2

Tennis, Basketball, Table Tennis, Aerobics, Karate, Pilates, Yoga, Kick-boxing, Feldenkrais, Chess, Spinning, Gym.



## » Beyond the Classroom

### HOUSING

In Jerusalem, students live in the modern Scopus Student Village, adjacent to the Hebrew University's Mt. Scopus campus. Each student receives a private air-conditioned bedroom in a suite with four other bedrooms, a living room, kitchen and bathroom facilities. Reasonably-priced meals and snacks may be purchased on campus or nearby. Braude's dormitories are modern, spacious, equipped with a kitchen, and comfortable. Study abroad students live alongside Israeli students. The cafeterias offer reasonably priced meals throughout the day.

### HEALTH INSURANCE

The Hebrew University and Braude College purchase health insurance coverage for students who participate in the Study Abroad Program.

### SECURITY

The safety and security of the students is taken very seriously. All students receive a comprehensive security orientation upon their arrival. At both the Hebrew University and Braude, guards and security teams are on duty around the clock. All student activities, on and off campus, meet the strictest security requirements.

### LEARNING FACILITIES

On both campuses, learning facilities are spacious and comfortable and equipped with today's most advanced technology. Computerized libraries, up-to-date laboratories and computer labs are available, and Wifi access is widely available.

### SPORTS

The Lerner Family Indoor Sports Complex, located near the Scopus Student Village, includes a semi-Olympic swimming pool, sauna, gym, weight room, spinning studio and aerobic fitness center. Adjacent to the complex are ten tennis courts. Monthly memberships

can be purchased at a discounted rate. Braude's modern sports facilities include a gym that features aerobic and weight-training machines, as well as tennis, basketball, volleyball courts, and a near-by swimming pool. Use of the sport facilities is free.

### VOLUNTEERING ACTIVITIES

While staying at Braude College students will have an opportunity to do various types of rewarding volunteer work within the community.





## » Application

For further assistance, contact the RIS student affairs representative in the relevant country:

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### UNITED STATES:

hebrewu@hebrewu.com  
1 800 404 8622 or 1 212 607 8520

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### CANADA:

admissions@cfhu.org  
1 888 HEBREWU or 1 416 485 8000

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### UNITED KINGDOM:

students@bfhu.org  
020 8349 5757

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### ISRAEL AND OTHER COUNTRIES:

rissummer@savion.huji.ac.il  
972 2 5881610 or 972 2 5882602

## » Programs

All candidates pay a non-refundable application fee of US \$80.

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### MINI-SEMESTER *(Part 1 in Jerusalem)*

Program Dates: 26.2 – 15.3.2018  
Tuition: US \$1250  
Housing: US \$450

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### SPRING SEMESTER *(Part 2 in Karmiel)*

Program Dates: 15.3 – 4.7.2018  
Housing + Study Trips: US \$3,580  
Meals in the dormitories (optional): US \$1415

Health Insurance coverage is included.  
No additional Tuition Fees for Engineering courses.

**For academic information regarding the Engineering Program contact:**

Samuel Gazit  
International Relations Office, Director  
Braude College  
sgazit@braude.ac.il  
Phone: 972 4 9901943, Fax: 972 4 9901886

This brochure is intended to provide general information and in no way constitutes a legal obligation on the part of the Hebrew University and Braude College.  
Printed in Israel, September 2017





THE HEBREW  
UNIVERSITY  
OF JERUSALEM



ROTHBERG  
INTERNATIONAL  
SCHOOL

 Braude College