Braude College

IRO INTERNATIONAL RELATIONS OFFICE

STUDY ABROAD PROGRAMS AT BRAUDE COLLEGE OF ENGINEERING ISRAEL

>>>

WELCOME TO BRAUDE COLLEGE

Braude College strives for excellence in teaching and research in the fields of engineering and the sciences. We achieve this by empowering the individual and by establishing strong ties with industry, academia and the community.

Braude College plays an important role in the development and prosperity of the Galilee and its communities, attracting a diverse range of students from around the country, many of whom choose to live and work in the region following graduation.

We are committed to our mission: upgrading productivity in classic/traditional industry. In collaboration with our commercial partners, Braude College has established the Galilee Center for Innovation and Advanced Manufacturing in Israel, a national hub providing industries with diagnostic and consulting services in various fields of engineering.

At Braude College, students develop a toolbox of skills which prepares them for lifelong learning and for their futures as engineers in a fast-changing technological world. This toolbox includes teamwork, critical thinking, and the ability to communicate their ideas in English as well as in Hebrew. Through investing substantial resources in training, in improved teaching methods, and in student support systems, our college has created an environment that is both nurturing and challenging for our students. A firm dedication to high academic standards ensures the quality of our graduates, providing them with the education and skills they need to meet their personal and professional goals in the fields of engineering most highly in demand today.

We look forward to welcoming you to Braude College for your Study Abroad experience and wish you every success.

Professor Arie Maharshak, President

CONTINENT

REGION

Western Asia
Middle East

SIZE

22,000 km²

NEIGHBORING COUNTRIES

Lebanon
Syria
Jordan
Egypt
Palestinian Authority

CAPITAL CITY

JERUSALEM

City population
936,425

POPULATION

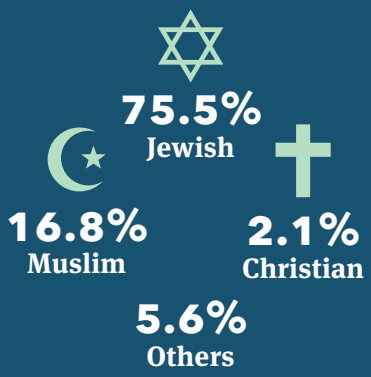
9,354,720

AVERAGE LIFE EXPECTANCY

81.28

LANGUAGEES

RELIGIONS



MONETARY UNIT

SHEKEL

INTERNATIONAL COUNTRY CODE

IL+972

CLIMATE

18°c - 30°c
hot and dry summers

6°c - 15°c
cool and mild winters

YEARLY RAINFALL

60 cm
(average) mostly in winter

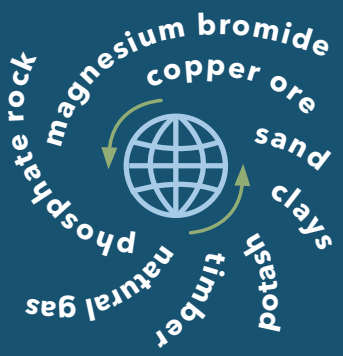
GEOGRAPHY

Coastal plain

Central mountains

Southern desert

NATURAL RESOURCES



INDUSTRY

electronics, plastics, wood and paper products, potash and phosphates, cement, food, beverages, tobacco, caustic soda, construction, metal products, chemical products, textiles, diamond cutting, footwear

AGRICULTURE

citrus,vegetables, cotton, poultry, beef, dairy products

ANIMAL LIFE

Jackal, Hyena, Wild boar, Gazelle, Fox, Deer

PLANT LIFE

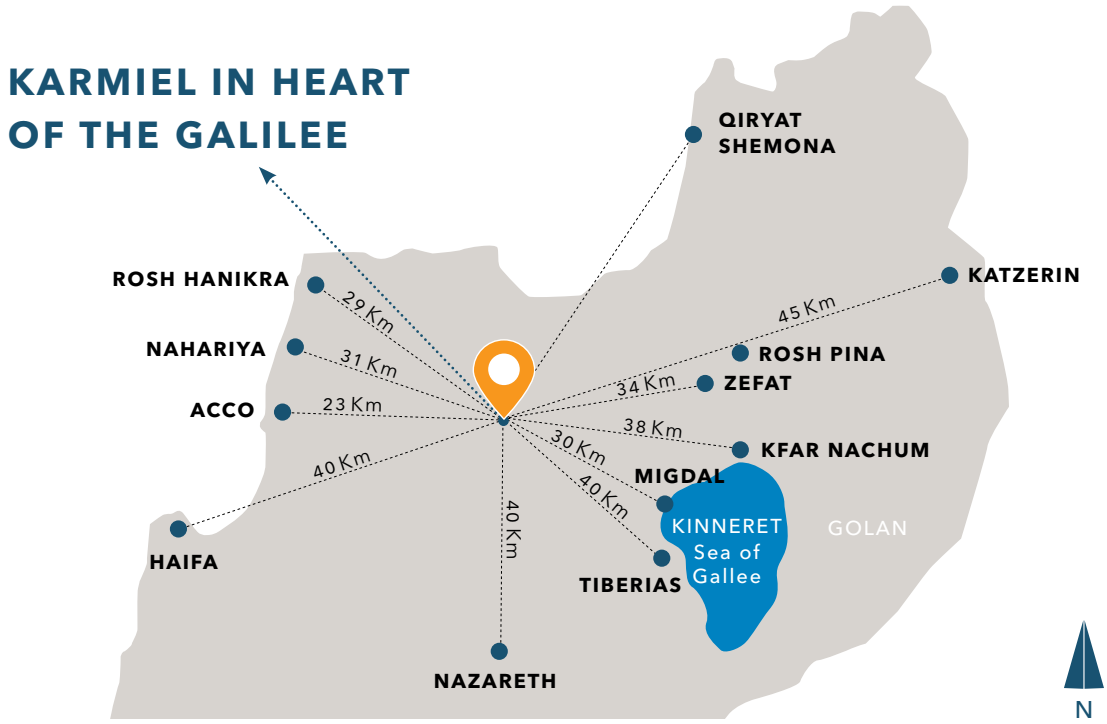
Vines, Fig, Olive Citrus trees, Banana Avocado, Palm, Oak Broom, Numerous Wildflowers

BIRD LIFE

Buzzard, Pelican Starling, Vultures


KARMIEL,ORT Braude
City, in the heart of the Galilee District
LEBANON
QIRYAT SHEMONA
GOLAN HEIGHTS
HAIFA
NAZARETH
SYRIA
MEDITERRANEAN SEA
NABLUS
TEL AVIV
MODI'IN
RISHON LEZION
RAMALLAH
JERICHO
ASHDOOD
JERUSALEM
ASHKELON
GAZA CITY
GAZA STRIP
SDEROT
HEBRON
KHAN YUNIS
BEER SHEBA
JORDAN
NEGEV DESERT
EGYPT
EILAT
TABA
AQABA
N
Travel Advice:
Do not enter
Km 0 40 80
Miles 0 25 50

GALILEE



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 all visitors.

BRAUDE COLLEGE OF ENGINEERING IN KARMIEL

Braude College, based in the city of Karmiel, is a leading engineering institution in northern Israel. Established in 1987, the beautifully landscaped college has some 3,000 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, mechanicalengineering, software engineering, applied mathematics and industrial engineering and management.

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.

BRAUDE COLLEGE DEPARTMENTS

MECHANICAL ENGINEERING

Mechatronics
-
Polymers
-
Bio-Mechanics
-
Design and Manufacturing

ELECTRICAL & ELECTRONIC ENGINEERING

Computers
-
Signal Processing Communication
-
Devices & Systems

SOFTWARE ENGINEERING

Algorithms
-
Signals and Communication
-
Software Engineering

BIOTECHNOLOGY ENGINEERING

Food
-
Bio-Molecular
-
Environmental

INDUSTRIAL AND MANAGEMENT ENGINEERING

Management and Services
-
Science and Technology
-
Information Systems
-
Management

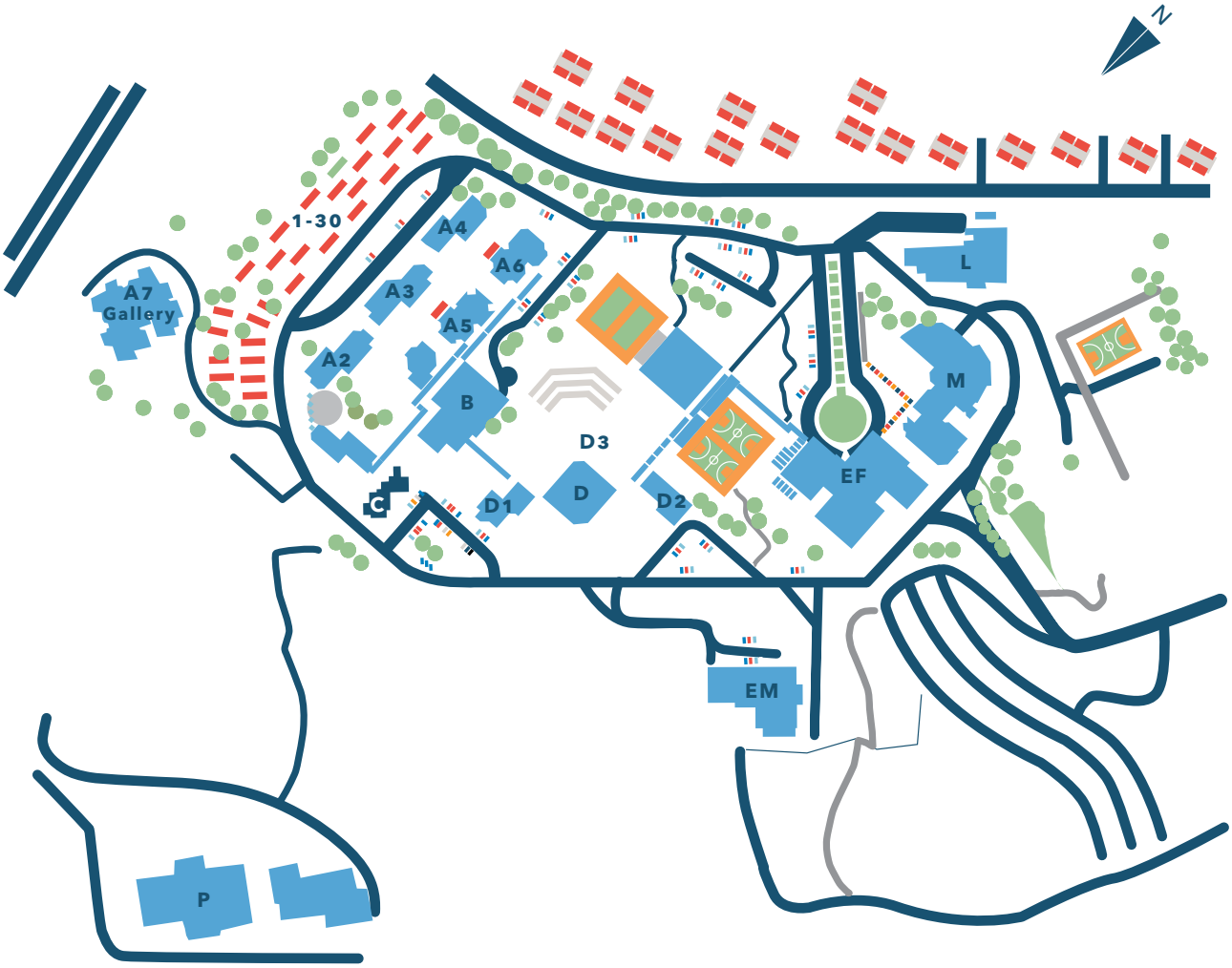
OPTICAL ENGINEERING

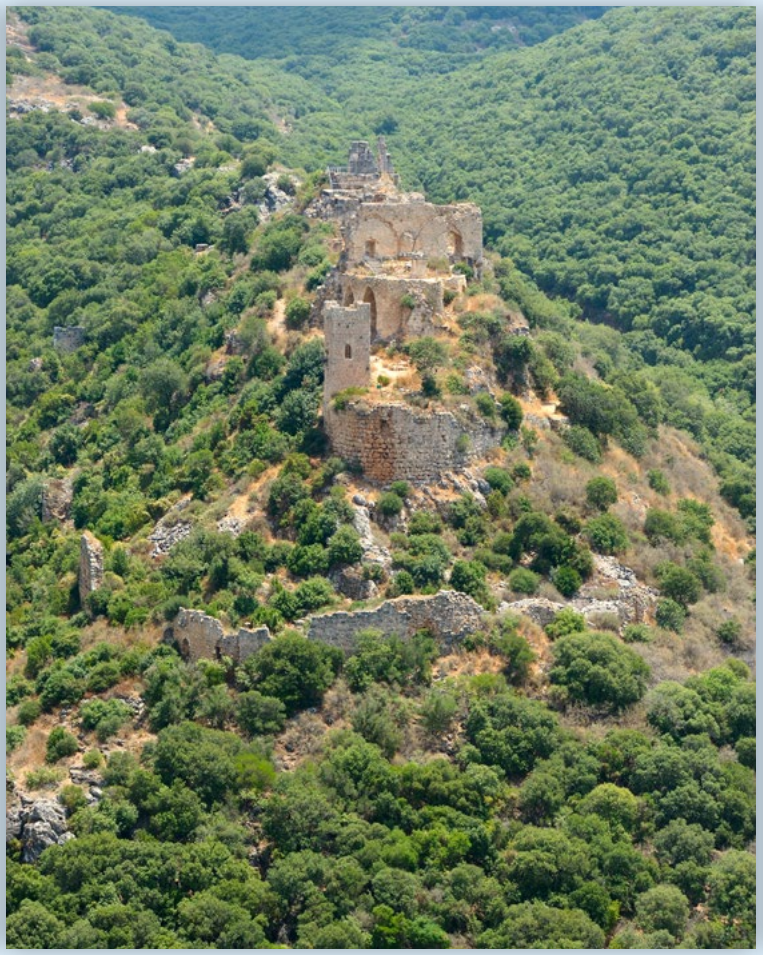
APPLIED MATHEMATICS

GENERAL STUDIES

BRAUDE COLLEGE
MAP

A	Student Dormitory
B	Dean of Students
C	Staff dormitories
D	Mechanical and Biotechnology Engineering
M	Software and Industrial & Management Engineering
EM	Student Dormitory
L	Classrooms
P	Optical Engineering






STUDY
ABROAD
PROGRAMS
AT BRAUDE
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SPRING SEMESTER AT BRAUDE

Braude College welcomes international students during the spring semester which comprises 13 weeks of study followed by the exam period.

From over 70 academic courses available in English, students can build a personal study program in which they will benefit from expert faculty, a strong support network, small study groups and personal attention.

Our program combines theory with practical laboratory experience and exposure to local high-tech industries.

You will complete projects related to leading Israeli companies and learn from real-world engineering challenges and valuable professional contacts. You will enjoy an extensive series of stimulating academic field trips and extra-curricular activities, all designed to enable you to experience Israeli society and cultures first-hand.

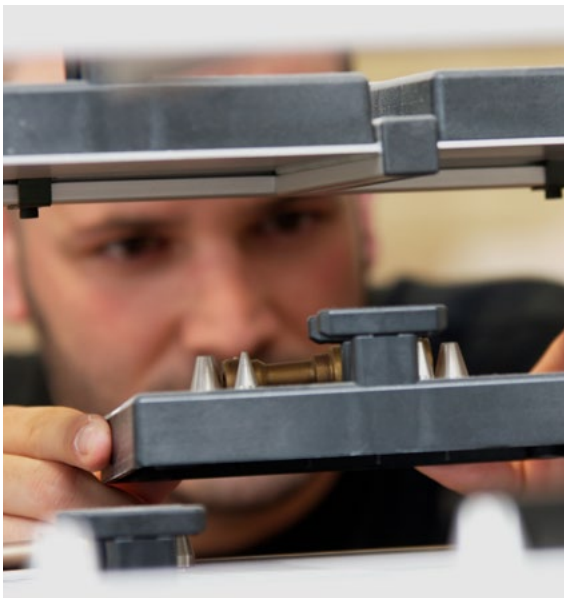
ERASMUS + SPRING SEMESTER

As part of the Erasmus+ exchange program, Braude College is delighted to welcome international students from our partner universities in Europe to join our spring semester study abroad program.

The 13-week semester begins on 23rd February 2022. Studies end on 9th June with the exam period beginning on 10th June 2022. In building your Learning Agreement, you can choose from over 70 academic courses in English, and incorporate theory with practical laboratory work.

As part of your studies, you will complete projects that relate to real-world engineering challenges and gain valuable professional experience.

As an Erasmus+ student at Braude, you will participate in field trips and exciting extra-curricular activities through which you well get to know Israeli society and culture.
You will live on campus with Israeli students and will have the option of an adoptive family from Karmiel to enable you to feel right at home.



ENGINEERING AND 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 on 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 13 weeks. They also take part in the unique Study in Advanced Industry program, in which they visit leading high-tech companies.

THE HEBREW UNIVERSITY OF JERUSALEM

Braude College

INTERNATIONAL RELATIONS OFFICE

JERUSALEM

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.

THE HEBREW UNIVERSITY OF JERUSALEM ROTHBERG INTERNATIONAL SCHOOL

The Hebrew University of Jerusalem is a multi-disciplinary 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 23,000 undergraduate, graduate and doctoral students. Its 1,000 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 2,500 students annually, from over 90 countries around the globe.

JERUSALEM-GALILEE
ENGINEERS PROGRAM

The program is divided into two sections:

1. 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

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

2. Spring semester at Braude College
The spring semester comprises 13 weeks of study followed by an exam period. Students can choose from more than 70 academic courses in English, and benefit from an expert faculty, strong support network, small study groups, and personal attention.

The projects related to leading Israeli companies which program participants are required to complete, 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

SUMMER INTERNSHIP AT BRAUDE

International students are invited to apply for an internship position in one of Braude's engineering departments. Interns benefit throughout their internship from expert and caring faculty.

Projects can be mainly practical or may be more research-based, but all encompass real-world engineering challenges and enable students to gain valuable experience and develop professional connections in the field. Interns can also register for courses offered in English during the spring semester.

As an intern at Braude, you will live on campus with Israeli students, and will join the spring semester international students in stimulating academic field trips and a wide variety of extra-curricular activities. The option of an adoptive family in Karmiel will help you to feel right at home and become familiar with Israeli culture and society close-up.

The program runs from May through September. You can investigate our researchers' fields of interest or apply directly to one of the internships published on the website.


OLYMPUS

THE COURSES

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BIOTECHNOLOGY – B.Sc.

41945 - BRIDGING THE GAP BETWEEN CLASSICAL TO MODERN MICROBIOLOGY

Academic hours: 39

Since microorganisms are a large and diverse group of microscopic-single celled organisms having dramatic influence on environmental and health-related aspects, it is necessary to learn this complexity to address modern scientific questions. This course will cover various topics to provide theoretical and technical tools to bridge classical microbiological knowledge to the practical science of today. We will learn about the principles of the genetic code, molecular microorganism-based bio-tools, evolutionary and phylogenetic analytical tools, and about model organisms for research and advanced molecular biology technologies. Furthermore, we will discuss microbial populations, and relationships of microorganisms and balanced environment and health settings. We will study pathogenic bacteria and viruses, clinical biology aspects, and the principles and main techniques of industrial-clinical microbiology. The course will also cover the complex microbial relationships within the human body and characterization methods of extreme microbial communities. We will address big-data bioinformatic tools to analyze complex microorganism-related niches. The course will include hands-on laboratories in which we will learn practical work-flow and techniques for diagnostic, identification, growth, and research in microbiology using Problem-Based-Learning (PBL) techniques.

41181 - IMMUNOLOGY

Academic hours: 26

Basic concepts of Immunology. The Innate and Acquired immune systems. Cells and tissues of the immune response. Antibody genetics and structure. Antibody classes and their specific functions. The T-cell receptor, its recognition of self and non-self antigens. The Major Histocompatibility Complex (MHC), its recognition of antigens and cooperation with the T-cell receptor. Humoral and cellular immunity. Cytokines. Mechanism of immune reactions against pathogens and tumor-specific antigens. Regulation of the immune response and autoimmunity.

BIOTECHNOLOGY – M.Sc.

43105 + 43114 - ADVANCED TECHNOLOGIES IN CELL AND TISSUE

Academic hours: 39

Tissue engineering is a key method in the practical aspects of regenerative medicine. Due to the importance of the field, it is

important to expose students to existing advanced technologies. The course deals with practical aspects of culturing and monitoring animal cells by using advanced tissue engineering methods. The course focuses on hands-on practice. Students will be exposed to common laboratory work: medium preparation and change, cells splitting, and routine culture of cell lines in the lab. During the laboratory work, students will practice tissue formation (cell differentiation) by using different types of cells seeded on various scaffolds\ hydrogels: Alginate, Matrigel matrix™ and a unique GAG mimetic hydrogel. Cultured cells features will be examined by morphology and by Immunostaining using specific cells markers.

43106 - DRUG DESIGN AND DEVELOPMENT

Academic hours: 39

The course aim is to provide a framework of basic drug design and development into which current and future drugs may be fitted. The difference between innovative and generic drugs will be discussed. Principles such as: methods for drug discovery, drug targets, the concept of Structure Activity Relationship (SAR) and Quantitative Structure Activity Relationship (QSAR) and optimization of the drug interactions with the target will be studied. Those principles will be applied in two computational laboratory exercises.

43103 - ADVANCED GENETIC ENGINEERING

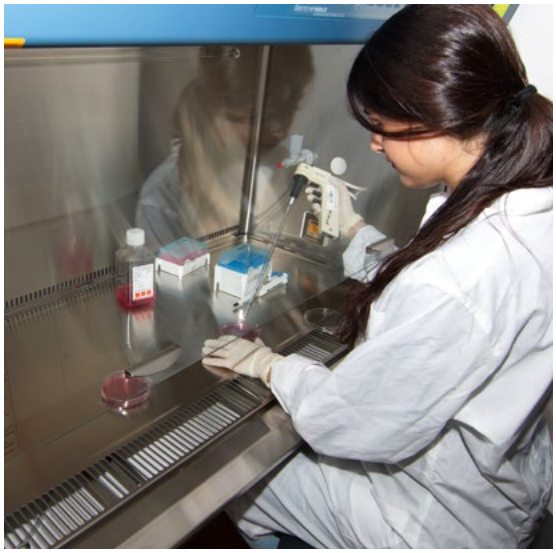
Academic hours: 26

Genetic engineering involves the genetic modification of an organism. The methods used include technologies that advance our ability to target genes, transplant specific gene targets, infect viral genes, and transfect synthetic genomic material. The course will focus on key technologies to this discipline such as PCR, qPCR, cell modification via gene editing (like CRISPR) and DNA/RNA transfections, next generation sequencing, bioinformatics, epigenetics, and single cell analysis. The course's objective is to introduce the technological challenges and solutions that advanced "genetic engineering" offers to the areas of diagnostics and translational medicine.

43501 - SCIENTIFIC AND BUSINESS COMMUNICATION IN ENGLISH

Academic hours: 26

Practice in written and spoken technical, scientific and business English. The course includes basic and essential English grammar and vocabulary, summary writing, scientific and technical reporting, meeting agenda composition, significance and execution of minute taking, audience-directed language (register), company presentation, composition of scientific protocols, verbal and written presentation of original research/ business proposals.



43104 - PROTEIN AND PEPTIDE TECHNOLOGIES

Academic hours: 39

Study of a range of technologies for the fractionation and purification of proteins and peptides, their identification and uses. Emphasis on the physicochemical properties of proteins and peptides, properties that determine the choice and application of technologies for their fractionation and purification. Advanced methods of recombinant protein and peptide production. The influence of Genomics on the identification of functional proteins. The principles and practice of Proteomics in the discovery, characterization and production of proteins. Applications and implications of high throughput technologies.

ELECTRICAL AND ELECTRONICS ENGINEERING

31910 - INTRODUCTION TO CONTROL

Academic hours: 52

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 are: introduction and foundations, feedback control fundamentals, loop transfer function fundamentals, linear SISO systems, and tracking design with uncertain plants. Expected outcome of the course: students will be able to design continuous-time SISO LTI control systems that satisfy practically relevant system performance specifications in frequency domain.

31651 - IMAGE PROCESSING

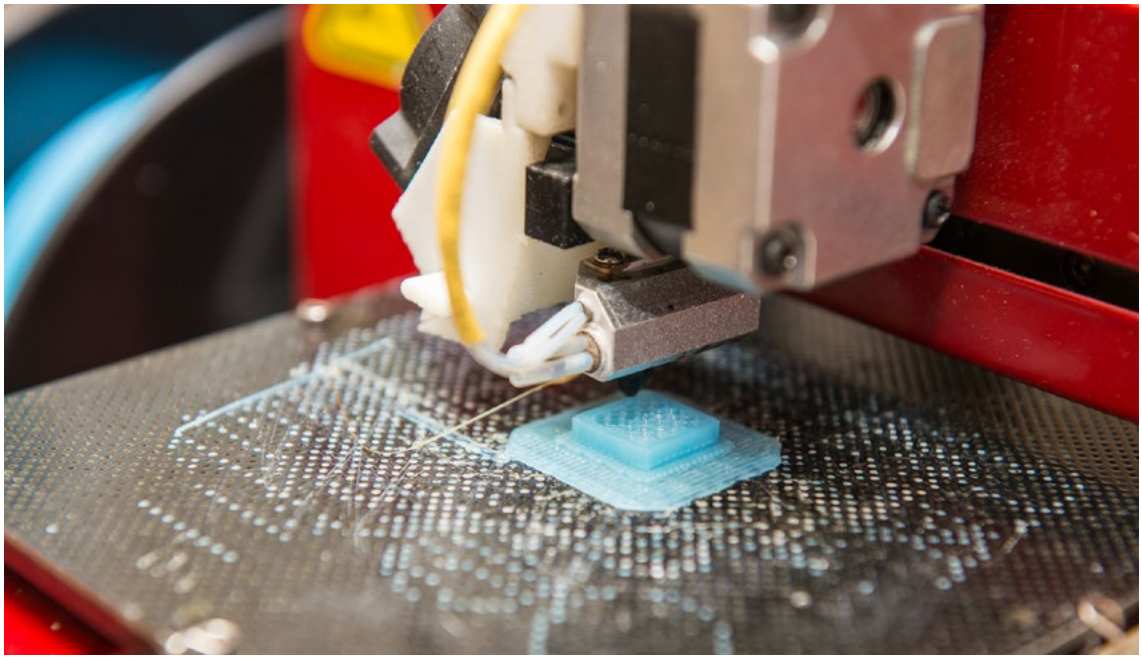
Academic hours: 78

Basic properties of the human visual system. Pixel. Computer presentation of the Gray and RGB images as arrays. Creating a set of synthetic test images by using C and C++. Contrast and brightness. Pixel-to-pixel operations: contrast stretch, automatic min-max contrast stretch, histogram equalization. Usage of LUT and pointers for fast implementation of pixel-to-pixel operations. Geometrical transformations: scaling, rotation, affine transform. Image registration. Median filtration. Filtration by convolution. Gaussian filter. Usage of FFT for image processing. Unsharp masking. Edge detectors. Usage of MATLAB for fast prototyping image processing systems. Design and properties of digital camera. In the frames of the course, laboratory, students implement a selection of the Image Processing algorithms by using Visual Studio (C, C++, C#, .NET).

31215 - MICRO-PROCESSORS

Academic hours: 78

This course provides an introduction to micro-processor based systems, inside architecture of 16 bit processor (Intel 8086). Principles of micro-processor programming in Machine Code, Assembly 8086 language and modular programming. Principle operation of RISC and CISC processors. Programming for Windows OS, based on DLL files. Advanced architecture of modern processors “Intel 32bit”, Pentium4- dual core, Pentium– pro and inside architecture of "Intel 64”, Itanium. Fundamentals of development of a micro-processor-based system, Pentium- main memory organization, virtual memory, paging mechanism, cache memory organization. Principles of serial communication, RS-232, USB. Detailed studies of computer I/O and

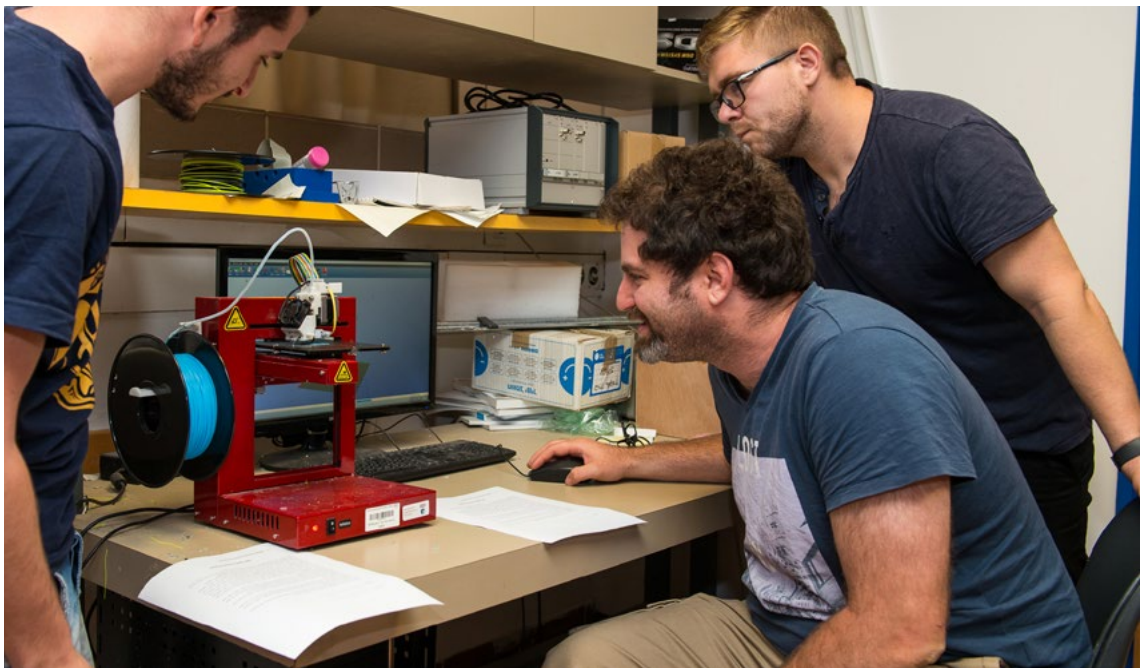


interrupt techniques, timers, parallel and serial interfaces. Laboratory activities provide the student with experience in developing the hardware and software required to incorporate microprocessors into systems in ASM86 language. PC peripherals including – keyboard, screen, drives, serial port and mouse.

31565 - REAL TIME DIGITAL SIGNALS PROCESSING

Academic hours: 39

Basic analog and digital signals. Examples of medical signals (ECG, EEG, EMG, ERG, PPG). “Arduino Due” board as software defined signal generator controlled by UART command. “EasyStart Kit – PIC32MX7” board as fast prototype board for RT-DSP algorithms test. Practical aspects of the signal’ acquisition by using ADC: pre-amplifiers, anti-aliasing filters, usage of timers and interrupts. Usage of TFT screen to present graphs of the signals and textual information. Basic DSP algorithms and their practical implementation: filtration by convolution and by using FFT, normalized correlation, autocorrelation, median filtration. In the frames of the course “Arduino Due” board and “EasyStart Kit – PIC32MX7” board are used to create working prototypes of RT-DSP systems: “Spectrum Analyzer”, “Medical signals smart monitor”, “Filtration of audio signals” and others.



31090 - ANALOG INTEGRATED CIRCUITS DESIGN LAB

Academic hours: 65

Analog CMOS integrated circuits design focuses on the basic building blocks including current source/mirror, single stage amplifiers, differential stage amplifier. The lab experiments involve hands-on design using state of the art CAD tools. Lectures complement the experiments providing theoretical background.
The course follows the design cycle: from specification definitions, through architecture selection and basic design, to fine-tuning providing precise simulations. Simulation employing CAD tools of performance parameters such as gain, frequency response, stability, voltage span, operating point, slew rate and offset.
To conclude the course, the students will be given independent design tasks (mini-projects) to implement the techniques studied.

31261 - OPERATING SYSTEMS

Academic hours: 52

This course is an introduction to the vast world of Operating Systems. We will review the history and current trends in Operating Systems. Review the hardware needs, main

memory, cache memory, basic allocation schemes, disks and file systems, i/o, system calls, interrupts, processes. We will learn parallel computing, communication between processes, deadlocks and starvation problems. Different shells and hands-on experience in Linux, using Bash and Python scripts.

31840 - POWER ELECTRONICS COURSE

Academic hours: 39

Introduction: applications of power electronics. Power switches: ideal and real. Power diodes. Single phase uncontrolled rectifiers. Three-phase uncontrolled rectifiers. Thyristors. Single phase controlled rectifiers on thyristors. Three-phase controlled rectifiers on thyristors. Power transistors. IGBT. DC/DC converters. Inverters.

31890 - DYNAMICAL SYSTEM MODELLING AND SIMULATION

Academic hours: 52

The subject matter of this course covers two distinct but interlinked areas of knowledge or expertise: dynamical system modelling and numerical simulation of dynamical systems. Students will learn to derive mathematical models by applying the 'law of conservation' to various common processes with lumped parameters. Students will analyze the transient behavior of these models in a laboratory-type environment, where they will use numerical simulation methods to solve a model's non-linear state differential equations.

31430 - DISCRETE SYSTEMS AND NETWORKS

Academic hours: 39

Discrete time signals and systems. Energy and power signals. Classification of digital systems: static/dynamic, time-variant/ time-invariant, linear/non-linear, causal/ non-causal and BIBO stable/non BIBO stable. LTI systems and convolution in discrete time. Stability and causality of an LTI system. Linear difference equations with constant coefficients. Zero Input Response (ZIR) and Zero State Response (ZSR). General and particular solutions to homogeneous difference equations. General and particular solutions to non-homogeneous difference equations. The bilateral Z transform: definition, Region of Convergence (ROC), properties, well-known transform pairs. The inverse Z transform: definition, three methods of calculation, the importance of the ROC. Transfer function of an LTI system. Rational transfer functions, poles and zeros, pole-zero plots. Realness, stability and causality of an LTI system in Z domain. The Discrete Time Fourier Transform (DTFT): definition, properties, well-known transform pairs, examples of application.

31695 - OBJECT ORIENTED PROGRAMMING

Academic hours: 52

The course will provide concepts in the Object Oriented Paradigm, and will review practical tools used for Object Oriented Programming. The topics of the course will include the following concepts: abstract data types (ADT), overloading, encapsulation, classes, objects, inheritance, multiple inheritance, polymorphism, generic programming, casting and more. We will also discuss practical programming skills such as efficient programming, libraries, and top-down design. Each frontal lecture is followed by lab work where students practice the new concepts and skills, and during the semester there will be 2-4 projects.

31440 - INTRODUCTION TO DIGITAL SIGNAL PROCESSING

Academic hours: 39

Sampling and digital signals. Fourier transforms for analog and digital signals. Discrete Fourier Transform (DFT). Fast Fourier Transform (FFT) algorithm to calculate the DFT. Spectral analysis using windows. Digital filters and continuous phase representation. Generalized Linear Phase (GLP) filters. The four types of GLP filters: properties and comparison. Introduction to filter design: filter types and specifications. Finite Impulse Response (FIR) filter design: the window method. The bilinear transform. Frequency transforms. Infinite Impulse Response (IIR) filter design. Principles of multi-rate digital signal processing systems. Decimation and interpolation filter design.

31471 - SIGNAL PROCESSING LABORATORY

Academic hours: 52

In the framework of the signal processing laboratory, students will attend lectures and complete assignments in different fields: audio signal processing, image processing, biological signal processing, computer vision, object recognition and tracking in video, deep learning, communication and control. The working environment is Matlab.

31476 - MATLAB APPLICATIONS IN ELECTRONICS

Academic hours: 52

MATLAB programming applications, advantages and disadvantages, MATLAB working environment. MATLAB coding fundamentals: matrix programming, data types, loops and control statements, writing scripts and functions, efficiency considerations of coding. Matrix calculations: transposing and inverting matrices, solving linear equation systems, finding eigenvalues and eigenvectors, calculating trace and determinant. Solving equations with symbolic variables, finding

analytic solutions to differential equations, analytic transforms. Reading from files and writing to files, file system operations. Plotting graphs in MATLAB. Statistical processing of data in MATLAB: calculating standard deviation, variance, co-variance and correlation, calculating histograms, linear and polynomial regression. Working with audio signals: reading and writing, playing, recording, practical and ideal filtering, generating synthetic signals. Reading and writing image files, basic operations on images. Applications of image processing: contrast and brightness adjustment, Look-Up Tables (LUTs), filtering and noise removal, sharpening, edge detection, binarization. Graphical User Interface (GUI) in MATLAB: writing applications.

31281 - PYTHON PROGRAMMING

Academic hours: 52

Python language for quick and easy development of algorithms and programs: in this course, you will learn an Object-Oriented Programming language, based on the C language. Data structures used in the language, input/output, modules, packages, special libraries, GUI, advanced material, packaging, version control system.

31632 - DATA STRUCTURES & ALGORITHMS

Academic hours: 52

Based on prior knowledge from previous courses, learn data structures and advanced algorithms used in engineering and electrical engineering in particular. Covering complexity costs, general search and sort algorithms, strings and different data structures and algorithms utilizing these structures. Advanced data structures: trees, graphs and algorithms like minimum path, spanning trees and more. Pattern matching and text compression, greedy algorithms.

GENERAL STUDIES

11416 - WATER/WASTE CYCLE

Academic hours: 26

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 (where possible) 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 various water treatment sites, students are exposed to solutions for a better future.

11370 - ETHICS OF THE FATHERS

Academic hours: 26

Ethics of the Fathers or in Hebrew: " Pirkei Avos ", literally Chapters of Our Fathers, is a section of the Mishna, one of the most fundamental works of Jewish Oral Law. The Mishna was authored in the third century C.E. and discusses laws and customs of virtually all areas of Judaism, ranging from holidays, dietary laws, Temple service, to marriage and divorce, and civil law. It records opinions of scholars from the five centuries preceding the Mishna's writing. Pirkei Avos is the only section, or tractate, of the Mishna which is devoted exclusively to the ethical and moral statements of the Sages. For this reason, it is usually referred to in English as Ethics of Our Fathers. The tractate consists of six chapters.

11877 - ETHICS IN SCIENCE AND ENGINEERING

Academic hours: 26

Engineers and technologists encounter ethical challenges and answer to several ethical codes on a daily basis and through all the professional stages of their career. Moreover, the products and artifacts they produce have an ethical effect on the users of such articles as well as on societal moral perspectives and agreements. One purpose of this class is to study, through readings of ethical theories as well as technological reports and discussions, the basic ethical principles of engineering and the main ethical obligations and challenges that face professionals through their work in a technological industrious environment. In addition, the impact of technological artifacts on societal and personal moral and ethical perspectives and behaviors will be debated based on former examples. In the last part of the course, students will be asked to evaluate the ethical putative outcomes of advanced and innovative technologies based on their current academic stage and former insights from the class and argue for fair ethical solutions for such moral challenges. During the course, students will discuss issues of accountability, responsibility sharing, obligations, risk assessment, trust, fair access, privacy by design and ethics by design.

11899 - ADVANCING GLOBAL HEALTH THROUGH ENGINEERING

Academic hours: 26

This course is open to students of electrical, mechanical, software, biomedical and industrial engineering, and is designed to provide them with platforms to develop

skills in interdisciplinary teamwork, lateral thinking, problem-solving, and communication with each other, with health personnel, and with the community. Thus, class discussion and work in the community form an essential part of learning and assessment on the course. In addition, students are encouraged to take a broad world view in terms of the benefits to communities of functioning and well-maintained engineering projects (the bigger picture for sustainable projects) while at the same time honing memory skills and the attention to detail necessary in all engineering tasks.

11874 - EMBRACING DIVERSITY

Academic hours: 26

This course is an online course entitled Embracing Diversity that targets undergraduate and graduate students, and aims to expose students to diversity in four modules:

a. Multiculturalism:
b. Disability and Accessibility
c. Facial Appearance
d. Gender and Sexual Orientation

Students will be exposed to diversity's different dimensions using diverse technological tools.

INDUSTRIAL ENGINEERING AND MANAGEMENT

51302 - INTRODUCTION TO MARKETING

Academic hours: 39

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. Students will be exposed to the basic principles, perspectives, concepts, theories and models that have been crystallized into the contemporary science of marketing.

51605 - INTRODUCTION TO ECONOMICS FOR ENGINEERS

Academic hours: 26

The course introduces students to the basic concepts of microeconomics, 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, government intervention in competitive markets.

51223 - MANAGING AND INITIATING IN HIGH TECHNOLOGY FIRMS

Academic hours: 26

With the acceleration of technological development and increased global competition, many firms discover that the main way to create and maintain a sustainable competitive advantage is by innovation. The management of technology, innovation and intrapreneurship within established firms is a new academic discipline, which has emerged in recent years and includes management tools and models. This course deals with the various aspects of initiating and implementing innovation in established high-tech firms: strategic, functional, organizational and behavioural. The course presents theoretical models along with practical case studies. This course aims to equip participants with state-of-the-art methods and tools to: discover customers unmet needs through "Jobs to be done Thinking®" and more specifically applying outcome driven innovation methodology; and how to transform an established firm Business model for renewed growth.

51419 - CROSS-CULTURAL MANAGEMENT

Academic hours: 39

The globalization process in today's world has created cross-cultural interactions and revealed the similarity and differences between cultures. The purpose of this course is to provide knowledge and understanding of the impact of culture on management practice. Specifically, we will evaluate the effect of culture on teams' behaviors; communication, human resource management practices; leadership and negotiation, and we will examine how to adapt proper managerial practices in different cultural settings. At the end of the course student will: Develop an awareness of cultural difference in the international environment; be familiar with cultural characteristics of different countries and different work settings; be familiar with different managerial practices and their adaptation to the different cultural environments.

51113 - CASES IN INDUSTRIAL ENGINEERING

Academic hours: 39

This course is about integrating three concepts in a real-world context: problem-solving, creativity, and modelling. Problem-solving is a critical skill to develop and nurture. Due to the increasing complexity of challenges creativity has become a necessity rather than an advantage. To fully utilize the two in a systematic way, modelling is adopted. Via real-world case studies, we will identify, formulate, analyze, and validate models to solve the challenges stemming from these case studies, utilizing tools, and practicing techniques through which the above-three concepts are materialized. More specifically, the modelling approach will be the vehicle through which we capture the essence of the dynamics of the major problem at hand, and creativity will aid in developing and soliciting innovative solutions at the various stages of the problem-solving process. Advanced Excel will be the platform via which these models will be developed. The course requires working in teams.

51422 - INTRODUCTION TO BEHAVIORAL SCIENCE

Academic hours: 26

Behavioral science is a branch of the sciences which is concerned with the study of human behavior. Behavioral science looks at individuals and their behavior along with the behavior of societies and groups, and at processes which can contribute to specific behaviors. Learning behavioral science is an important part of becoming a team or project manager. More and more, professions and organizations are explicitly endorsing the necessity of engineers being skilled and well-trained in these areas. This course will focus on human personality, motivation and other work attitudes, learning, perceptions, stereotypes

and discrimination, burnout and stress. The theories and insights of major studies will be discussed, while emphasising their relevancy to organizations and industry. Required reading: Greenberg, J., Baron, R.A. (2000). Behavior in organizations: Understanding and managing the human side of work. Prentice Hall International, Inc. (eighth edition).

MATHEMATICS

201022 - APPROXIMATION THEORY

Academic hours: 52

The course focuses on the approximation of real-valued continuous functions by some simpler class of functions, such as algebraic polynomials. Some of the topics that will be investigated include: Chebyshev polynomials, least square problems, projection methods, iInterpolation (for example: Lagrange, Chebyshev, Hermite), Remez's algorithm, and Padé approximant. These and more related topics will be practiced using Chebfun (an open-source package for computing).

201015 - MODERN ALGEBRA

Academic hours: 52

Groups, subgroups. Abelian group, cyclic group. Generators of a group. Order of an element. Normal subgroups, cosets, index of a subgroup. Lagrange's theorem. Quotient group. Homomorphism, kernel, isomorphism theorem. Applications. Rings, zero divisors, integral domains, ideals. Principal ideals, maximal ideals. Quotient ring. Isomorphism theorem. Fields, extension fields. Finite fields. Algebraically closed fields, significance in linear algebra. Factorization of polynomials over various fields. Algebraic number, transcendental number.

201178 - INTRODUCTION TO OPTIMIZATION

Academic hours: 52

In this course we will get familiar with linear and nonlinear optimization problems with applications arising in various fields of engineering and life sciences. We will introduce classical and modern computational methods along with their convergence analysis and MATLAB implementations. Introduction: examples of linear and nonlinear models in image processing and data science. Linear programming. Graphical solutions in two variables: the simplex method and duality. Convex optimization: sets and functions, first and second characterizations of convex functions, orthogonal projection. Numerical methods: Gradient and Newton methods. Karush–Kuhn–Tucker (KKT) optimality conditions. Duality: Lagrangian and dual problem.

MECHANICAL ENGINEERING

22210 - INTRODUCTION TO MANUFACTURING PROCESSES

Academic hours: 39

The course gives students a basic acquaintance with various manufacturing processes starting with selection and ordering materials to final product manufacturing together with exposure to techno-economic considerations and production in a competitive environment. After completing this course, students should be able to plan manufacturing operations and acceptance testing and to prepare a routing chart that includes all the operations performed during production.

22253 - INDUSTRIAL AUTOMATION

Academic hours: 52

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 activities include interaction with ladder diagrams; text based and object-oriented programing to demonstrate the revolution and evolution of automation.

22635 - TRANSPORT PHENOMENA LABORATORY

Academic hours: 26

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

22481 - BIOMATERIALS

Academic hours: 65

The biomaterials course is intended to introduce 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 bond, materials structures and the resulting chemical and physical properties of metals, ceramics, polymers and composite materials.

22950 - INTRODUCTION TO POLYMERS AND PLASTICS

Academic hours: 39

This course begins with 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.

22521 - VIBRATION THEORY

Academic hours: 52

This course lays the foundation for analyzing vibrating systems and understanding some physical phenomena unique to systems undergoing harmonic excitation. The course introduces basic concepts through simple single degree-of-freedom systems. Two degree-of-freedom systems are used to introduce more complex behaviors not present in single degree-of-freedom systems, and finally expands to multi degree-of-freedom systems and introductory continuous systems. Topics of the course include: kinematics of vibrations and harmonic motion; unforced and forced single degree-of freedom systems motion, steady state and transient response, resonance, vibration based sensors, vibrating base and vibration isolation; Lagrange equations and their use in developing equations of motion for multi degree of freedom systems; unforced and forced motion of multi degree-of-freedom systems and dynamic damping; introduction to modal analysis; introduction to vibrating continuous systems – vibrating string, longitudinal vibration in a rod, vibrating beam.

22746 - INTRODUCTION TO FLIGHT MECHANICS

Academic hours: 39

The purpose of the course is to introduce students to the aerial sciences. The course gives the background and an introduction to the mechanics of flight utilizing basic tools from the fields of dynamics and fluid mechanics to introduce a complex mechanical application. Topics of the course include: background and introduction to mechanics of flight. Basic aerodynamics: principles and foundational equations of fluid motion, various flow regimes and their classification, standard atmosphere, Introduction to airfoil theory, aerodynamic forces and moments, finite wing corrections. A survey of aeronautical propulsion methods. Performance of aerial vehicles: straight level flight, take-off and landing, climb and glide, turns, flight envelope.

22610 - FLUID MECHANICS

Academic hours: 65

Introduction. Hydrostatics: manometers, forces on immersed bodies. Fluid dynamics: Integral conservation laws, Bernoulli equation, differential conservation Laws, Navier-Stokes and Euler equations. External flows around immersed bodies: boundary layers, potential flow, lift, drag, wing profiles. Internal flows: Laminar flow in ducts and pipes, turbulent flow in pipes. Flow measuring devices. Pumps. Dimensional analysis and similarity. Introduction to compressible flow.

22861 - INTRODUCTION TO MECHATRONIC SYSTEMS

Academic hours: 65

This course is an overview of mechatronic systems. Students study principles of microcontroller, microcontroller programming, digital and analog I/O, theory of measuring systems, sensors for measuring: force, displacement, temperature, acceleration. Actuators: DC brush and brushless motors, stepper motors, modelling a position control system, introduction to signal processing, design and implementation of digital position controller,

and autonomous mechatronic system. The course includes a laboratory segment.

22985 - ENGINEERING BIOMATERIALS AND IMPLANTABLE DEVICES

Academic hours: 39

This interdisciplinary course provides an introduction to materials used in medical applications and covers the principles of materials science and cell biology underlying the design and performance of implantable devices. The course focus is on orthopaedic and cardiovascular implants, on mechanisms underlying wound healing and tissue remodelling following implantation, and on materials variables that control implant biocompatibility and clinical performance. Materials-related implant failures and serious medical device recalls are reviewed. The course uses a combination of lectures and student presentations.

22768 - FUNDAMENTALS OF COMBUSTION PROCESSES

Academic hours: 39

Introduction. Ideal combustion: chemical species balance. Adiabatic flame temperature. Equilibrium combustion: Gibbs function. Equilibrium condition. Equilibrium constant. Chemical kinetics: rate equation. Chemical mechanism. Characteristic combustion time. Reactors: constant volume reactor. Constant pressure reactor. Well-stirred reactor. Premixed flames: flame speed. Ignition. Combustion limits. Flame holding. Diffusion flames. Droplet evaporation: d-squared law. Gas turbine combustors. Internal combustion engine combustors. Rocket engines. Heterogeneous combustion.

22835 - CHARACTERISTICS AND APPLICATIONS OF CERAMIC MATERIALS

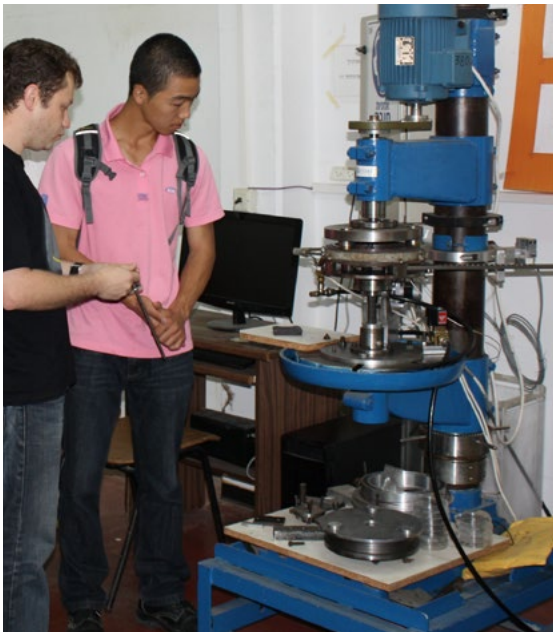
Academic hours: 39

Atomic bonding and crystal structures of ceramic materials, atomic defects, including intrinsic and extrinsic point defects and defect reactions. Binary and ternary phase diagrams in ceramic systems. Processing of advanced ceramics and glasses including solid and liquid phase sintering and constrained sintering, densification versus coarsening processes. Mechanical properties of ceramics and glasses; statistical fracture theory; time-dependent fracture; thermal shock; creep behaviour, toughening mechanisms in ceramics. Ceramic materials for electro-optical applications; ceramic semiconductors.

22501 - KINEMATICS AND THEORY OF MECHANISMS

Academic hours: 52

Kinematics: motion of a point mass, cartesian, natural, cylindrical and spherical coordinate systems and formulation of kinematic properties in various systems. Rigid body



kinematics: simple motion, complex motion, planar motion, instantaneous center of rotation. Motion about a fixed point, spatial free body motion. Theory of mechanisms: basic mechanisms and definitions, kinematic analysis of mechanisms – velocity and acceleration. Kinematics of gear transmissions, cam Mechanisms.

22836 - ROCKET PROPULSION

Academic hours: 39

The course explores the main features of rocket motors, integrating a broad spectrum of scientific fields involved in the preliminary design of motors based on chemical propulsion. The main topics include: An introductory historical and conceptual review of rocket propulsion, a classification of propulsion vehicles as well as the definition of the parameters needed to evaluate rocket motor performance. The equation of motion and the prediction of the rocket's trajectory, including the simulation of a single-stage rocket flight (a basic knowledge of Matlab program is required). One stage and multiple-stage rockets. Theory of nozzles: basic review of compressible fluid dynamics, nozzle geometry design. Thermochemistry and combustion principles, a review of solid and liquid propellants and their energetic performance. Design characteristics and internal ballistics of solid and liquid propellant motors. The course offers the student the knowledge needed to design the draft of an actual rocket motor (motor type, trajectory prediction, choice of propellant, combustion chamber and nozzle geometry design), according to mission requirements and goals. The course includes a visit to a propulsion lab and the experience of a hybrid rocket motor firing test.

23200 - OPTIMIZATION METHODS FOR ENGINEERING

Academic hours: 39

Understanding the main concepts of optimization and the benefits in using optimization in engineering design. Familiarization with different optimization methods and the way they can be used to solve various problems in the field of engineering.

22846 - ANALYTICAL SOLUTIONS IN FLUID MECHANICS

Academic hours: 39

Flow in a narrow gap between surfaces subjected to flux sources is very common in the industry of desalination plants, heat transfer devices and more. The analytical solution can be achieved by the analogy to electric problems. These results will be validated by experimental tests and software. The course includes: viscus dynamic flow in the Euclidean space and applying it into a potential flow on a manifold, Poisson equation, 3 geometries of manifolds: spheres, cones and cylinders. Conformal mapping: stereographic projection, Appolonius, rays. Boundary values conditions, sources and images.

22784 - MODELLING AND FABRICATION OF MICRO MECHANICAL SYSTEMS

Academic hours: 39

This is an introductory course to the field of micro mechanical systems (also known as Micro Electro-Mechanical Systems-MEMS). Micro system is characterized by its micro scale dimension (1 micron) and by the potential of manufacturing mechanical and electronic components on the same substrate. The aim of the course is to expose students to the field of modelling and fabrication of micro mechanical systems (MEMS). The course deals with applying engineering principles to obtain the desired mechanical and other physical properties of micro systems. The course will include the following subjects: introduction to modelling and fabrication of micro systems; micro beams and mechanical springs that determine the mechanical stiffness of floating micro systems; electrostatic micro sensors and micro actuator; piezo-electric and piezo-resistive micro sensors and actuators; micro thermal sensors and actuators; and micro fabrications processes such as lithography, deposition and etching.

22967 - MEASURING PROPERTIES OF MATERIALS – PBL

Academic hours: 26

Most student laboratories are structured in a standard format, in which the experimental procedures are defined by a manual. Students are expected to follow instructions as they perform the laboratory task. This course is designed as a Problem-Solving Laboratory (PBL), in which a team of students receive a task of measuring properties of materials, but they are not given instructions as to how to perform the measurements. The students are requested to measure: density, heat capacity, viscosity, surface tension, coefficient of thermal expansion, and modulus of elasticity, of various materials using simple and basic measuring devices.

22954 - SELECTED TOPICS IN ISRAELI INDUSTRIES

Academic hours: 26

This course introduces students to leading industries in Israel, highlighting these industries' uniqueness 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.

22968 - INDUSTRY 4.0 - ADVANCED MANUFACTURING TECHNOLOGY

Academic hours: 52

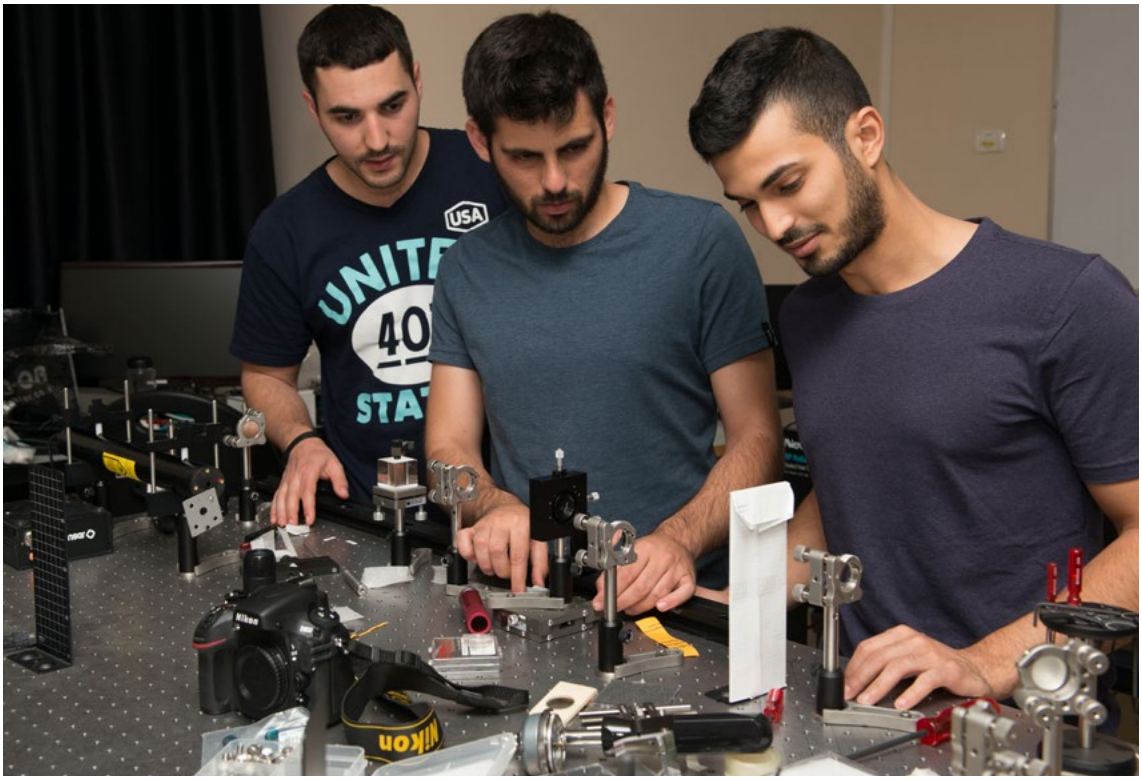
The main objective is to become acquainted with various aspects related to "Industry 4.0", including efficiency and productivity, process chains, optimization, sensors and automation, sustainability, biologicalisation, energy and resources, digitization, and the use of data in the world of new manufacturing systems, conventional processes, and advanced technologies like AM, EDM, ECM, Waterjet, and Laser in industry. In addition, students will acquire up-to-date knowledge on industrial and scientific developments, new materials, powder materials, composite, and micro-machining.

OPTICAL ENGINEERING

391310 - LIGHT SOURCES AND LASERS

Academic hours: 52

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 many relevant exercises relating to technical problems and solutions which will be carried out during the practical sessions.

391525 - OPTICAL IMAGING SYSTEMS

Academic hours: 39

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-limited 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 problems on imaging systems characterization, analysis and design are addressed. The course includes theoretical problems for homework and numerical tasks.

31715 - OPTICAL COMMUNICATION SYSTEMS COMPONENTS

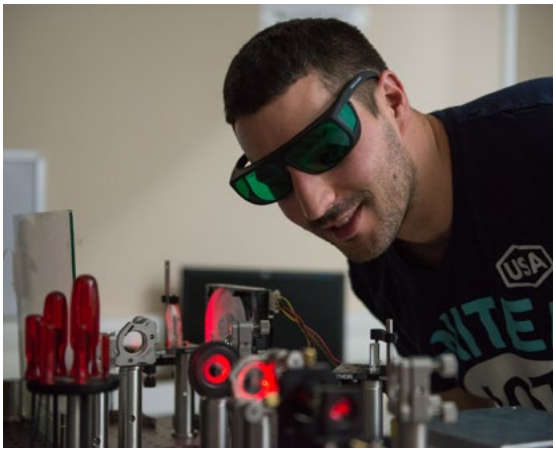
Academic hours: 52

This course provides a basic understanding in the physics of optical fiber and in optical fiber communication technologies, and provides basic tools for designing and applying components in optical communication systems.

11213 - PHYSICS 3 FOR MECHANICAL ENGINEERING

Academic hours: 52

Special Relativity Theory: Michaelson-Morley experiment, principles of special relativity, Lorentz transformation, Doppler effect. Relativistic dynamics. Introduction to quantum theory: Quantum hypothesis, distributions. The photoelectric effect, the Compton effect. X Radiation, production and uses, Bragg scattering. The hydrogen spectrum, a Bohr model for the atomic structure. Quantum theory: the wavy properties of matter, the principle of



uncertainty. History of quantum theory: the Periodic Table. Lasers: Einstein coefficients. Radioactivity: types of radiation, half-life. Laboratory: discrete oscillatory oscillation, black body radiation, photoelectric effect, spectroscopy, Snell's law, blurring and diffraction in light.

391360 - THERMAL AND STATISTICAL PHYSICS

Academic hours: 39

Definitions of thermodynamic properties, random walk, Braunian motion, ideal gas-state function, distribution of velocities and energies, particle statistics: Fermi-Dirac, Bose-Einstein, Maxwell-Boltzmann, study of processes, 1st law, Information and its definition, evaluation of disorder, second law of thermodynamics, Periodic processes, Thermodynamic potentials: Gibs, Helmholz, enthalpy, chemical potential' applications: magnetism, superconductor.

SOFTWARE ENGINEERING

61966 - SEMINAR IN MACHINE LEARNING

Academic hours: 39

The course is an introduction to machine learning and deep learning concepts and algorithms. Today, Convolution Neural Networks (CNN) are in great use in many systems and are developed for classification and regression purposes. Subjects of this course include: supervised learning, generalization and overfitting, optimization methods, computer vision, CNN basics, CNN architectures and current advanced topics. The course will include lectures and seminars given by students on papers from leading scientific journals.

61993 - TOPICS IN ALGORITHMIC GAME THEORY

Academic hours: 39

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 areas: 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.

61967 - SEMINAR IN RANDOMIZED ALGORITHMS

Academic hours: 39

Randomized algorithms use randomness for making certain decisions. Randomized algorithms are in use in all fields of computer science and software engineering, and often allow us to solve certain problems simply and efficiently. The course consists of two main parts: in the first part, the lecturer will give several introductory lectures on the subject. In the second part, students will be given relevant literature and, under the guidance of the supervisor, will present it to the class.

61963 - INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Academic hours: 39

The course will provide an introduction to the fundamental concepts techniques of Artificial Intelligence, and the basic idea of agents, and multi agent systems in a wide

range of decision making. Topics covered in the course include: problem solving and search methods, logic and knowledge representation, reasoning and decision-making in uncertainty conditions, and supervised machine learning. The course combines the theoretical foundations of artificial intelligence with hands-on experience using methods, techniques and tools used to build intelligent systems.

61994 - DEEP LEARNING FOR COMPUTER VISION

Academic hours: 39

The course is an introduction to deep learning, concepts and algorithms of this field of machine learning and its implementation using advanced modern neural networks. Subjects in this course include: introduction to python, computer vision, neural networks, architectures, objects detection, visualization, and image classification.

61970 - SEMINAR IN AUTOMATA AND COMPUTABILITY

Academic hours: 78

The course introduces classical and main computational models and their relation to formal languages. The course discusses the expressive power and, more interestingly, the limitations of these models, and introduces the main computational classes. The first part of the course discusses regular languages and their properties and models, namely deterministic and nondeterministic finite automata, and regular expressions. Then, the broader class of context-free languages is introduced, along with their models of stack automata and context-free grammars. The second part of the course concentrates on computability theory, and introduces Turing machines and their variants, computational classes, decidable and undecidable languages, recursively enumerable languages, and reductions between languages.

61985 - ANDROID DEVELOPMENT LAB

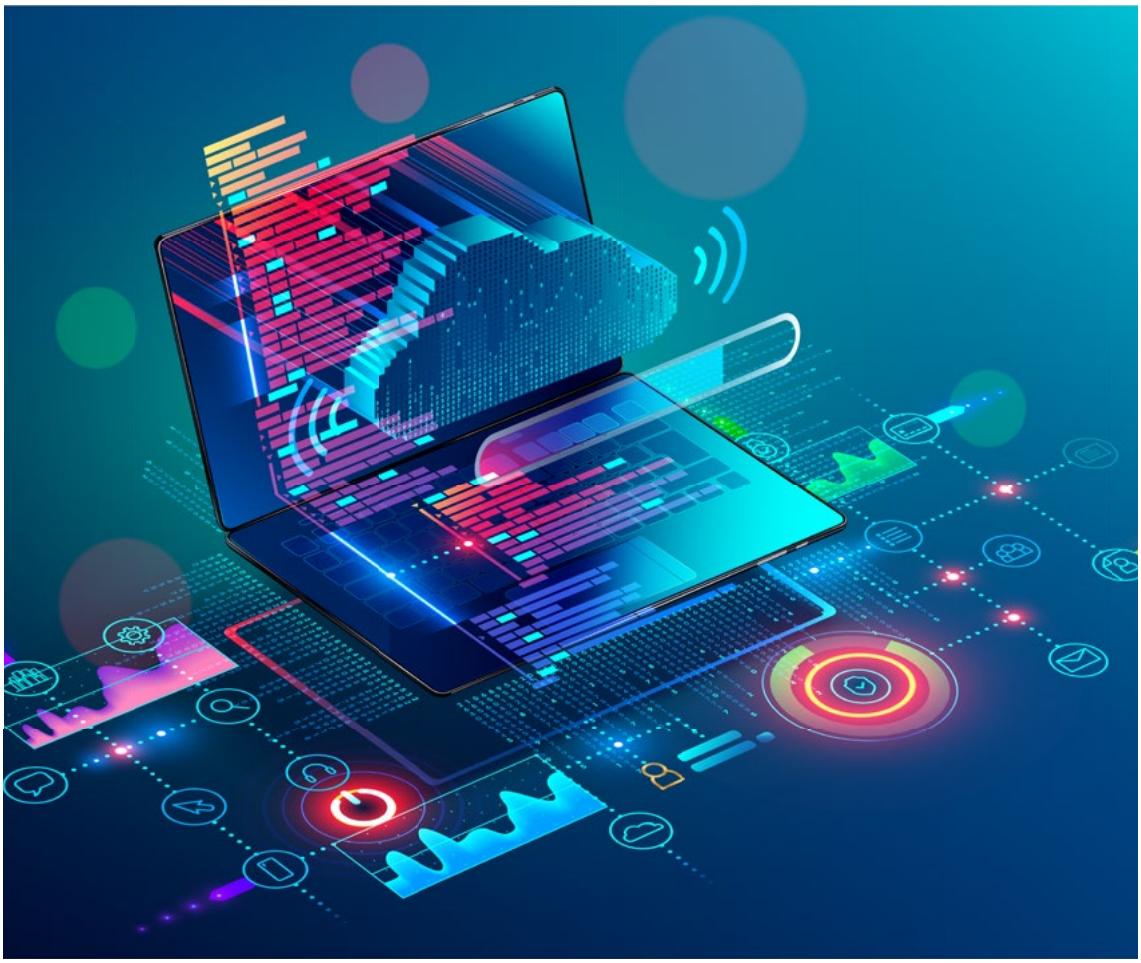
Academic hours: 39

This lab-based course will introduce students to the mobile software developing arena. Students will become acquainted with the Android OS architecture and master the development of interactive and responsive UI components for mobile devices while taking into consideration various localization and target devices constraints. Among other topics, we will cover layout designs (declarative & imperative), fragments, inter- and intra- communication methods within/ between mobile applications, and practice various methods to persist app and user data. As part of the lab evaluation, you will have the opportunity to design and develop your own application to practice and demonstrate the course topics.

61958 - INFORMATION THEORY

Academic hours: 39

This course is about how to measure, represent, and communicate information effectively. The first part of the course introduces basic concepts in the field: What are entropy and mutual information, and why are they so fundamental to data representation and communication? The second part of the course focuses on applications of information theory in different areas, such as gambling and data compression, error detection and error correction, channel capacity and Shannon channel coding theorem, stock market. Relations to probability and statistics, algebraic coding theory and neural networks are considered.



61979 - CLOUD COMPUTING

Academic hours: 39

Students will learn various concepts in the area of cloud computing, including cloud models (private, public, hybrid), and cloud services (SAAS, PAAS, IAAS). We will discuss the implications of using cloud computing from different aspects, such as the economic aspect, maintaining data privacy, and cloud migration. The course will also include practical assignments, developing a web-based cloud application in a commercial framework. The application will be implemented using common programing languages. The application will be deployed in a cloud environment. The course will also include reading assignments, where students will analyze academic papers addressing contemporary issues in cloud computing research. Upon completion of the course, students will be able to build and deploy a cloud application, using commercial frameworks.

61997 - SEMINAR IN DISTRIBUTED COMPUTING

Academic hours: 39

The seminar focuses on algorithmics in distributed systems and networks. The aim is to study basic topics and techniques related to design and analysis of Al algorithms in non-faulty networks, and algorithms and impossibility results in faulty networks. Within faulty networks the seminar also considers self-stabilizing systems. In addition, basic concepts concerning online algorithms and approximation algorithms in networking problems are addressed.

61968 - SEMINAR IN ADVANCED ALGORITHMS

Academic hours: 39

The seminar is dedicated to selected topics in algorithms. In the first part of the course, the classes will be delivered by the lecturer. Afterwards, students will read relevant academic papers and prepare presentations that will be given in class. The goals of the seminar are to expose students to advanced topics in the broad area of algorithms, as well as to provide them with skills in reading scientific papers and create presentations in the English language.

61961 - INFORMATION RETRIEVAL

Academic hours: 39

Information retrieval and analysis is one of the major skills required in contemporary software industry. The course deals with searching and retrieving information in data catalogs, especially information in the world wide web. Students will learn the theory behind different search methods, and common practices in the searching and processing of textual information. Students will build a web crawler for retrieving information from websites, and analyze the information retrieved.


BEYOND
the
CLASSROOM
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SECURITY

The safety and security of the students is taken very seriously. All students receive a comprehensive security orientation upon their arrival. Guards and security teams are on duty around the clock. All student activities, on and off campus, meet the strictest security requirement.

LEARNING FACILITIES

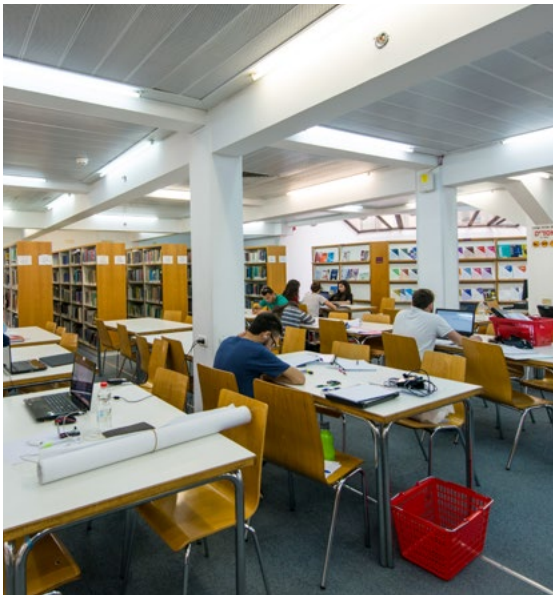
On campus, learning facilities are spacious and comfortable, equipped with today's most advanced technology, computerized libraries, up-to-date laboratories and computer labs. Free access to WiFi is enabled across campus.

HOUSING

During the spring semester at Braude, students will live on campus in spacious and comfortable dormitories, sharing living space with fellow international and Israeli students. Every dormitory unit has a kitchenette equipped with a refrigerator, a hot plate for cooking, and other basic kitchen accessories.

HEALTH INSURANCE

Braude College purchases health insurance coverage for students who participate in the Study Abroad Program.



SPORTS

Braude's sports facilities include a gym featuring aerobic and weight-training machines. A subscription to the Karmiel Country Club can be purchased for multiple entries to the indoor and outdoor swimming pools and tennis courts.

FOOD ON AND OFF CAMPUS

During week days there are several food services available for students on campus – vegetarian and meat based. On Friday afternoons and Saturdays, the food services are closed. For your convenience, we have provided the following price list of common food products that you may want to buy while living in the dormitories. As you might expect, the prices vary somewhat from store to store, and the lowest prices can be typically found in outdoor markets. Prices in supermarkets may be higher. The table below lists price ranges of typical products. Eating habits are personal, and every student manages their food consumption individually. However, from experience, we have noticed that students who used the kitchen in the dormitory unit during the study abroad program for cooking, spent between 220-280 USD per month for food. The information here is presented to help you budget your financial resources during the study abroad program.


45859

PRODUCTS	$
Milk (3% fat), (1 liter)	1.2-1.7
Loaf of Fresh Bread (500g)	1.1-1.9
Rice (white), (1kg)	1.7-2.3
Eggs (regular) (12)	3.0-3.7
Local Cheese (1kg)	6.2-9.9
Chicken Breasts (1kg)	5.5-8.8
Beef Round (1kg)	10.5-16.8
Apples (1kg)	1.5-2.6
Bananas (1kg)	1.2-1.8
Oranges (1kg)	0.8-1.5
Tomatoes (1kg)	0.7-1.4
Potatoes (1kg)	0.4- 0.9
Onions (1kg)	0.5-0.8
Lettuce (1 head)	0.8-1.4

If you are planning to travel in Israel during the program, you should consult with internet sites and experienced travelers in Israel, to gauge the cost of travelling in Israel.

HOW TO GET TO BRAUDE

Entering Israel

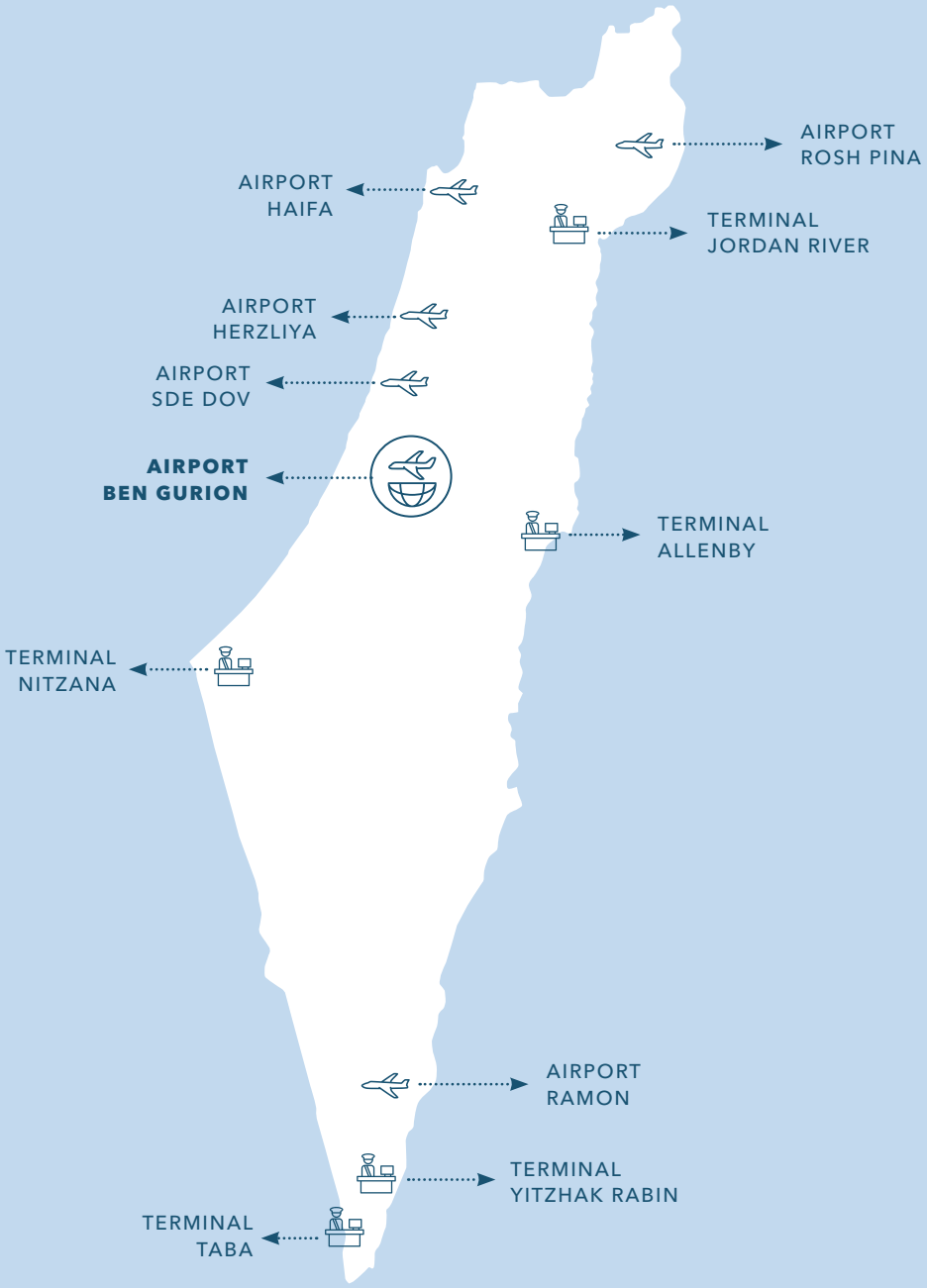
The best way to get to Israel is by air. The international airport of Israel is Ben Gurion Airport which is approximately a 2-hour train journey from Karmiel.

Train service

Information regarding the timetable and routes of all train services is available through **the Israel Railways information site** and by telephone: ***5770 or 972-3-5774000**

Bus service

Detailed information on travel times and service frequencies on various bus lines can be obtained from the **Egged site**.


AIRPORT
ROSH PINA
AIRPORT
HAIFA
TERMINAL
JORDAN RIVER
AIRPORT
HERZLIYA
AIRPORT
SDE DOV
AIRPORT
BEN GURION
TERMINAL
ALLENBY
TERMINAL
NITZANA
AIRPORT
RAMON
TERMINAL
YITZHAK RABIN
TERMINAL
TABA

DATES AND FEES

ERASMUS+ / SPRING SEMESTER
AT BRAUDE

Dates 21.02.2022 - 21.07.2022
Cost $4,330

JERUSALEM GALILEE ENGINEERS

Dates in Jerusalem 6.2.22 – 21.2.22
Dates in Karmiel 21.2.22 – 21.7.22
Cost $6,777

SUMMER INTERNSHIP

Dates May 2022 – July 2022 (10 weeks)
Cost $3,226

All sums are in US dollars.
A non-refundable registration fee of 80 USD is required.
This charge will be deducted from program fees.

FEES INCLUDE

• Housing + study trips • Health insurance • City Bus pass
• Tuition fees for academic courses are paid at the home institution

APPLICATION

Apply here for one of the Study Abroad programs at Braude.
Candidates are required to submit the following documents:

1. Letter of application
2. CV/resume
3. University transcript
4. Learning agreement

Please address all queries to:
Ms. Yael Chen, Administrator, International Relations Office
international@braude.ac.il
Tel: **972-4-9901971**

JGE Program
Please address all queries regarding JGE Program to representative in the relevant country:

UNITED STATES AND CANADA
hebrewu@hebrewu.com | **1 800 404 8622** or **1 212 607 8520**

ISRAEL AND OTHER COUNTRIES
rissummer@savion.huji.ac.il | **972 2 5882602**

* * Braude College reserves the right to make changes to the published programs * *

LOOKING FORWARD *to* SEEING YOU :)

Braude College

IR INTERNATIONAL RELATIONS OFFICE