TECHNION INTERNATIONAL
Israel Institute of Technology

Technion - Neubauer American Study Abroad Program

Spring Semester

NEUBAUER FAMILY FOUNDATION

General

Technion – Israel Institute of Technology

Technion – Israel Institute of Technology, consistently ranked among the world's top science and technology research universities, is Israel's first university. Since its founding in 1912, the institute has educated generations of engineers, architects, and scientists who have played a key role in laying the State of Israel's infrastructure and establishing its crucial high-tech industries.

Technion has 18 academic departments in engineering, natural sciences, medicine and architecture, as well as 60 research institutes and centers. There are currently close to 14,000 students at the Technion (~9,300 BSc, ~2,800 MSc, ~1,000 PhD, and ~ 660 MD). Technion graduates have brought the unique skills and penchant for innovation which helped conceive and consolidate the modern State of Israel – commonly acknowledged to be the "Start-up Nation."

Technion graduates drive Israel's high-tech economy: Technion graduates make up the majority of Israeli-educated scientists and engineers, constituting more than 70% of the country's founders and managers of high-tech industries. Technion graduates founded and/or lead two-thirds of Israeli companies on NASDAQ.

Technion's impact is not confined to Israel, it is also the first Israeli university to establish a presence overseas: In 2011, a partnership between Cornell University and Technion won a prestigious international competition to establish a new applied science institute in New York City, leading to the founding of the Jacobs Technion-Cornell Institute (JTCI). In 2013, Technion announced the establishment of the Technion–Guangdong Institute of Technology (TGIT) adjacent to Shantou University in southern China, which will grant undergraduate and graduate Technion degrees.

Technion International is in charge of all the university's academic relations with over 200 universities worldwide and serves all incoming international students and scholars on campus, a population that surpassed the 1,000 mark in 2014.

About the Neubauer Family Foundation
Headed by Joseph Neubauer and Jeanette Lerman-Neubauer, the Neubauer Family Foundation operates as a non-profit organization. The charitable foundation supports and grants funds for arts, culture, music, human services and educational institutions in communities in Philadelphia, Pennsylvania and Illinois. The Foundation has also directed financial resources worldwide, including Jewish museums in Berlin and Warsaw, and in Israel, funding research fellowships for national security studies.

Neubauer American Study Abroad Program

In September 2014, the Technion and the Neubauer Family Foundation established the Neubauer American Study Abroad Program ("the Neubauer Program") with the objective of attracting American students to spend a significant period at Technion and in Israel and to expose them to its academic excellence as well as its innovative and entrepreneurial ecosystem. American students will study in classes with Israeli students and enjoy a variety of extracurricular activities as will be detailed.

Neubauer American Study Abroad Program - Overview

The program is designed to prepare students to excel in their future academic and professional careers. Students study in classes with Israeli peers and live on campus.

The Neubauer Program will be given at the Spring Semester.

Schedule of Program

Subject	General Dates	2015/2016 Dates
Internships Commencement	January	January (flexible)
Academic Classes	March-July	March 13th 2016 – July
Summer Internships (Optional)	July-August	July-August (flexible)

Academic Tracks

We offer three Focused Semester Tracks – each one consists of academic courses and extracurricular activities. **Students are invited to choose a study track or simply choose course options and activities listed online**. Additional courses are offered in history and archeology, and basic Hebrew.

Neubauer Engineering and Science Track: Academic courses are offered in a variety of engineering and science areas and can be taken as part of a student's engineering academic track.

Related Extracurricular Activities: Entrepreneurial activities, professional and research internships, weekly lectures, trips and social events.

Neubauer Entrepreneurship and Innovation Track: Academic courses introduce the entrepreneurial ecosystem and the Israeli-Technion model. The core of the semester will consist of a project to assist students to develop an idea into a business plan or a start-up company.

Related Extracurricular Activities: 3-Day Start-up Boot-Camp, visiting start-up companies and meeting technology entrepreneurs, personal mentoring in an accelerated environment, and professional internships.

Neubauer Introduction to Medicine Track: Designed for students on premed/health tracks, this program offers courses in medicine-related subjects such as: Intro to Medical Research, Intro to Clinical Research, Emergency Medicine, Intro to Psychology, Medicine and Jewish Heritage, and History of Medicine. Basic science courses are also offered.

Related Extracurricular Activities: Hospital tours, Magen David Adom (MDA) volunteering, army medical training, clinical research experience, participating in real-life clinical settings, research internships with Technion faculty, and professional internships at medical/biomedical companies.

Internships

In addition to and as part of the Neubauer Program, students are invited to take an internship for a minimum of 8 weeks (200 hours). Internships can be taken prior to, during (to a certain extent) and following the Spring Semester.

Professional Internships at high-tech, start-up or engineering companies. Professional Internships can last from 8 weeks up to a full year, and provide excellent work experience in the Israeli entrepreneurial ecosystem. Internships will be provided mainly in the Haifa area (Caesarea-Yokneam)

Research Internships with Technion faculty facing real-life scientific challenges. Research internships can last from 8 weeks up to a full year, and provide excellent research experience in cutting-edge laboratories.

All internships are unpaid. Professional internships will be granted academic credit beginning in 2016.

Extracurricular Activities and Experience

All extracurricular activities and experiences are open to students enrolled in a Neubauer Program and include:

- Studying in classes with Israeli students
- Trips around Israel – Jerusalem, Dead Sea, Tel-Aviv Jaffa, Golan Heights and the North of Israel
- Lectures and cultural activities – weekly lectures by entrepreneurs and cultural lectures about Israeli literature, cinema, politics, geography, history and culture providing the full 360 about Israel
- 3-Day Start-up Boot Camp
- Social activities like: celebrating holidays, Shabbat dinners, movie nights etc.

Program Costs

Application Fee - $50 (non-refundable)

Semester Tuition (without Internship) - $9,000

Semester Tuition (with Internship) - $10,500

Estimated Living Expenses (including housing and health insurance): $4,000 (per semester, not including internship duration)

*Please note that tuition fees do not cover applicants' airfare to and from Israel.

**Prices are subject to change due to Technion decision, fluctuations in market prices and currency exchange rates

Neubauer Internship/Co-op Program

The program is designed to prepare students to excel in their future career and ~~to~~ get a taste of the Israeli and Technion unique entrepreneurial economy.

We offer students of all backgrounds, mainly: engineering, science, pre-med and business, the opportunity to participate in an 8-26 week Internship/Co-op experience.

Professional Internship – Working in a commercial company of different sizes (from a one-man start-up to a multinational organization operating in Israel). Most companies will be in the high-tech, medical devices, biotechnology, media, water and environment, internet or other industry sectors common to the Israeli economy.

Internship roles may include: engineering, development, business development, marketing or other.

Laboratory Internship – Working in a Technion laboratory with Technion faculty on investigating real-life scientific challenges.

Technion Internship/Co-op Programs may count towards the Co-op requirement of your degree and will be accredited Technion academic credits. You may take the internship as part of a Technion academic semester or as a stand-alone program.

Extracurricular Activities – Includes trips around Israel, working and studying with Israeli students, laboratory and research experience, working at start-up companies and meeting technology entrepreneurs. Students may also take 1 Technion academic course during their internship.

Students will receive on-campus or off campus housing (depending on the location of the internship), which are usually situated in the vicinity of Haifa (Caesarea to Yokneam).

Interns will be supervised at the company by a Technion designated person, and will be required to submit monthly reports about their internship work experience.

As part of the admission process, candidates will undergo an interview. Applications for an internship should be submitted at least 3 months in advance to allow for allocation.

Program Costs

Application Fee - $50 (non-refundable)

Internship up to 12 weeks - $3,000

Internship above 12 weeks - $5,000

Housing costs will depend on location (typically between $380-500)

Program Administration

Admission

The admission process is detailed on the Technion International website – int.technion.ac.il

The application deadline for the Spring semester is December 1st each year. Internships should be applied for at least 3 months in advance.

Orientation

Technion International also provides a comprehensive Orientation day designed to familiarize students with the campus and surrounding neighborhoods, and to provide a general guide to student life in Israel. Orientation presents you with such "survival tips" as acquiring a student card, email account and internet access code, opening an Israeli bank account, getting a cellphone, and getting around the sprawling Technion campus and dormitory.

Housing

All students enrolled in a Neubauer Semester Program will be provided with either on-campus housing or off campus accommodations through the Technion. Housing costs can range between $380-$500 per month, depending on the number of tenants per room and location.

Hebrew Classes

Technion International, together with the Department of Humanities & Arts offers a beginner's Hebrew language course for international visitors. The course is offered each semester and is open to all visiting students. The course will provide knowledge of the Hebrew letters, vocabulary and basic language and grammar structures. Students will acquire elementary reading, writing and communication skills to use during their visit. The course will be taught during the semester.

Safety and Security

Technion operates a 24-hour monitoring system that includes a network with security guards stationed at the university entrances and security units patrolling the campus grounds at all times. Although there are occasional security tensions in Israel, in the nearly 85 years of its existence, Technion has never suffered a security breach. International students are provided with updated security information and instructions about staying safe during their orientation program and throughout the year. It is mandatory that every student rents a cellphone so that they can be contacted at all times. Organized trips around Israel offered throughout the year are run in conjunction with the relevant security authorities. We want our students to get to know Israel, feel comfortable, and stay safe while traveling on their own, which is why we suggest that they let our administrative staff know of their plans to leave Haifa so that we can assist them in their travel plans. In the event of an emergency we contact our students as soon as possible to make sure that they are safe. Our students' safety and security is our top priority.

Technion Campus

With modern dorms and computer centers operating 24/7, restaurants, cafes, banks, shops, medical and dental clinics, supermarket, school supply shop, hairdresser, second-hand shop, laundromats, and access to public transportation and Student Center within easy reach, the university campus has come to be known as “Technion City.”

Technion offers students a wide variety of weekly athletic, social and cultural activities. Once a week all teaching stops for two hours while Technion City celebrates with live music and open air markets for a chance to take a break from busy academic schedules, and meet with friends or mingle with the diverse groups of people on campus. Film and music fans can catch a movie at the campus cinema located at the Student Center or attend live concerts at the amphitheater within walking distance.

Location
The Technion campus is one of the largest and most beautiful university campuses in Israel. It extends over a 1.2 square kilometer area of pine woodlands on Mount Carmel, set 212m above sea level, with views of the spectacular Haifa Bay and Galilee.

Sports Facilities
Extensive sports facilities include a modern fitness center and gym offering a wide selection of classes (from Pilates, yoga and kickboxing to ballroom and belly dancing), an Olympic sized swimming pool, and basketball, tennis and squash courts.

Green Campus
Environmental studies, energy conservation and recycling are a big part of life on campus. Students are involved in building devices for saving and recycling water, designing eco-smart buildings, and gardening techniques using minimal irrigation.

Food – Great Places to Meet and Eat
The Technion has a variety of food venues, with numerous restaurants, cafes, cafeterias and a campus pub. Campus dining options include Middle Eastern, Israeli, American, Chinese, Japanese, Thai, Italian and Indian cuisines.

Religious and Spiritual Life
Technion embraces all spiritual traditions and celebrates the diversity of religious identity both on and off campus. Several synagogues, churches, mosques and other houses of worship can be found in the surrounding area.

On campus, the Ohel Aharon Synagogue complex holds regular daily services as well as weekly study groups for English speakers and the "Beyachad" Religious Life Organization coordinates Shabbat dinners. Orthodox lifestyle is supported by Kosher meat and dairy cafeterias, cafes and restaurants*, Kosher dorms (available upon request), and separate swimming and work out hours for men and women at sport and recreation facilities.

* Except for the restaurant at the swimming pool, which is open on the Sabbath.

List of Academic Courses – Spring 2015/2016

Basic Science Courses

1. 104131 - Differential Equations
2. 104019 - Linear Algebra M
3. 104003 - Differential and Integral Calculus 1
4. 104004 - Differential and Integral Calculus 2
5. 114051 - Physics 1
6. 125801 - Organic Chemistry
7. 125101 - Analytical Chemistry 1 for Engineers

Engineering Courses

8. 014103 - Introduction to Engineering Mechanics
9. 014108 - Statics of Structures I
10. 014214 - Fundamentals of Fluid Mechanics
11. 014405 - Engineering Geology
12. 014006 - Introduction to Numerical Analysis
13. 014505 - Building Materials
14. 014003 - Statistics
15. 014005 - Engineering Laboratory
16. 014703 - Introduction to Transportation Planning
17. 014617 - Planning and Control of Construction Projects
18. 014610 - Construction Methods
19. 014320 - Water Chemistry
20. 014325 - Design of Water and Wastewater Systems
21. 014615 - Introduction to Financial Management
22. 014605 - Industrialized Buildings
23. 014613 - Human Resource Management in Construction
24. 016203 - Water Resources Systems Engineering
25. 016302 - Air pollution
26. 034014 - Heat Transfer
27. 034035 - Thermodynamics 1

Courses in Medicine

28. 275200 History of Medicine
29. 274320 Ethics and Medicine
30. 275202 Medicine and Halacha
31. 274119 Introduction to Emergency Medicine
32. 274136 Behavioral Science
33. 274140 Becoming a Doctor
34. 275203 Human Sexuality
35. 274344 Epidemiology
36. 274300 Human Genetics
37. 274214 Physiology I
38. 274228 Physiology II

Business & Entrepreneurship Courses

39. 097657 - Organizations and Entrepreneurship – Introduction to Entrepreneurship
40. 096581 – Selected topics in Economics – Entrepreneurial Finance & Economy
41. 096809 – Social Ventures
42. 099760 – Managerial Negotiation
43. Project in Entrepreneurship

Humanities Courses

44. 324863 – Archeology and History in the Holy Land
45. 324049 – Basic Hebrew
46. 324055 – Topics in the History of the Jewish People

Appendix A – Course Syllabi

Syllabi - Engineering Semester

016302 – Air Pollution

Lecture Topics

Primary air pollutants – sources and effects.

Physical and chemical properties of aerosols.

Secondary pollutants, photochemical reactions, formation and removal of gasses and particles.

Global air pollution, meteorology of air pollution.

Evaluation and monitoring of ambient air: air pollution control – administrative and technological aspects.

Contact hours

Lecture: 2 hours

Recitation: 1 hour

Credit: 2.5

014214 - Fundamentals of Fluid Mechanics

Course Objectives

Introduction to fluid mechanics, required for all students of Mechanical Engineering. This course is a prerequisite for specialized electives. The students are introduced to the basic concepts of fluid mechanics and to their applications in engineering. The students develop the ability to formulate problems, identify the basic mechanisms, make the necessary approximations, and solve the problem by mathematical analysis or by application of experimental data.

Weekly Lecture Topics

Week	Content	Chapter
1	Introduction: Continuum, Fluid, Stress, Fluid Properties	1,2
2	Hydrostatics	3
3	Integral Formulation of Fluid Flow. Control Volume. Continuity Equation.	4
4	Momentum Equation in Integral Form.	5
5	Differential Formulation of Fluid Flow. Flow Kinematics. Continuity Equation.	5
6	Acceleration. Stress – Rate of Strain Relation. Newtonian Fluid.	5
7	Differential Momentum Equation. Navier-Stokes Equations. Boundary Conditions.	8A
8	Exact Solutions: Couette, Poiseuille, and Rayleigh Flows	6, 8C
9	Bernoulli Equation. Energy Equation. Flow Measurement.	7
10	Dimensionless Representation. Dimensionless Parameters. Similarity. Coefficients of Friction and Drag.	8B
11	Flow in Pipes. Laminar and Turbulent Flow. Friction Losses. Pipe Systems.	6
12	Potential Flow. Basic Solutions.	6
13	External Flow at High Reynolds Number. Boundary Layer Concept.	9
14	Boundary Layer: Exact Solution for Flat Plate, Momentum Integral Method.	

Prerequisites

- 034035 – Thermodynamics 1
- 104131 – Ordinary Differential Equations

And one of the following:

- 104218 – Partial Differential Equations
- 104213 – Differential Equations for Mechanical Engineering

Reading Requirement:

- Fox, R. W. and McDonald, A. T., “Introduction to Fluid Mechanics”, 5th ed., Wiley, 1998.

Contact Hours

Lecture: 2 hours

Recitation: 2 hours

Credit: 3.0

014003 - Statistics

Course Subjects

Data processing, introduction to sets and probability. Sample space, events, counting sample points, combinatorical conditional and total probability, independence, Bayes' theorem, one and higher dimensional random variables, probability distributions, expectation and higher moments, Chebyshev's inequality, known discrete and continuous distributions, regression, sampling, estimation of parameters, testing hypotheses, decision under uncertainty, basic concepts in simulation.

Contact Hours

Lecture: 2 hours.

Recitation: 2 hours.

House Work: 4 hours.

Credits: 3.0.

014610 – Construction Methods

Methods of piling and foundations for infrastructure works. Earth and rock drilling application and equipment, percussive, rotary and CFA technology. Basics of Bentonite and Slurry technology.

Construction methods for retaining walls, application and principles of built. Gravity walls, cantilevered, sheet piling, anchoring soil, earth nailing. Reinforced Earth construction methods. Applying Geosynthetics for soil stabilization.

Principles of rock drilling and blasting for civil engineering and quarries. Percussive vs. rotary drifters and down the hole. Explosives type and applications. Controlled blasting.

Trenching methods, equipment and trench supporting systems

Earthmoving methods, equipment and management for infrastructure and civil engineering projects. Soil and rock properties which affects earthmoving (based on 014409) ; earthmoving machine design, machine-job applicability and performance; rock ripping and dozing; earth loading methods; earth hauling and conveying equipment; computerized truck dispatch and GPS earthmoving applications; optimizing system and job layout selection by manual and computerized techniques. Included in the course are also the studies and student's personal practicing of the most updated computer programs (Runge – Talpac, FPC etc.) for earthmoving optimization in construction projects.

Soil and rock stabilization methods. Clayey layers consolidation by compaction and Vertical Drainage Methods.

Equipment economics and earthmoving cost analysis (based on 014603);

Principles of construction sites safety management and work regulations.

Contact Hours

Lecture: 2 hours

Recitation: 1 hour

Credit: 2.5

014108 – Statics of Structures 1

Lecture Topics

1. Diagrams of internal forces and influence lines in statically determinate structures.
2. Betti's theorem and calculations of elastic deflections.
3. Flexibility (force) method.
4. Stiffness (displacement) method.
5. Influence lines in statically indeterminate structures.

Prerequisite

014104 – Strength of Materials 1

Reading Requirements

- Kirsh, A. "Structural Statistics – Summary of Lectures, Examples of Solutions, Assisting Tables".
- Deklo, M., Farjh, D. "Structural Statistics – Exercise book". · Kirsh, A., "Structural Statistics – Exercises".
- Darkov AV, Kuznetsov VI "Structural Mechanics", Mir, 1969. · Utku S, Norris CH, Wilbur JB "Elementary Structural Analysis", McGraw-Hill, 1991.
- McCormac J, Elling RE, "Structural Analysis: A Classical and Matrix Approach", Harper and Row, New York, 1988.
- Weaver W, Gere JM, "Matrix Analysis of Framed Structures", Van-Nostrand, 1980.
- Ghali A, Neville AM, Brown TG, "Structural Analysis: A Unified Classical and Matrix Approach: Spon Press, 2003.

Contact Hours

Lecture: 2 hours

Recitation: 2 hours

Credit: 3.0

014320 – Water Chemistry

Solutions. Weak acid/base equilibria. Effect of ionic strengh and temperature on equilibrium constants. The carbobnate system. Buffer intensity. Development of equations for the various forms of alkalinity and acidity. Solving of acid-base problems related to water treatment. Aqueous-gas phase equilibrium. Aqueous-solid phase equilibrium. Calculation of precipitation potential. Water softening. Water disinfection. Analytical methods related to water quality control, water treatment processes, characterization of water sources and wastewater treatment. Laboratory coverage of the main analytical techniques used for characterizing water and determining contaminants in water.

Contact Hours

Lecture: 2 hours

Recitation: 1 hour

Laboratory: 3 hours

Credit: 3.5

104131 – Differential Equations

Weekly Lecture Topics

1. Introduction, examples and models
2. First order differential equations. Linear equations, separable equations, solution by substitution and other tricks, exact equations and integrating factors
3. Direction field, orthogonal curves
4. The existence and uniqueness theorem
5. Second order and higher order linear equations. Fundamental solutions of homogeneous equations, linear independence, the Wronskian
6. Abel's formula, reduction of order
7. Homogeneous equations with constant coefficients
8. Euler equations. Nonhomogeneous linear equations
9. Variation of parameters
10. The method of undetermined coefficients
11. Systems of linear equations
12. Homogeneous systems with constant coefficients
13. Nonhomogeneous systems and variation of parameters. Linear systems in the phase plane
14. Solution of differential equations by power series

Weekly Recitation Topics

- The recitation follows the lectures closely, with a delay of one week.

Prerequisite

104004 – Differential and Integral Calculus 2

104006 – Linear Algebra

Reading Requirements

- William E. Boyce & Richard C. Diprima, Elementary Differential Equations and Boundary Value Problems, John Wiley & Sons Inc.

Contact Hours

Lecture: 2 hours

Recitation: 1 Hour

Credit: 2.5

014405 – Engineering Geology

Course Objectives

The course is divided roughly into two parts:

The first part contains topics relating to geological materials, which form rocks of different types, identifying rocks and important engineering properties of different rocks and minerals.

The second part contains different topics from general and engineering geology, with an emphasis on geological tools within engineering fields. The exercises will include practical labs on the subjects of identifying minerals, identification and classification of rocks, and understanding geological maps.

Prerequisite

014104 – Strength of Materials 1

Week by Week

1. Introduction, architecture of the earth.

2. Minerals, what is a mineral, mineral groups, identifying minerals, rock forming minerals

3. Rocks, introduction to the Rock Cycle. Igneous rocks, intrusive, extrusive, volcanoes.

4. Sedimentary Rocks. Sedimentary processes, erosion, transport, deposition, lithification. Clastic sedimentary rocks versus chemical sedimentary rocks. Identifying sedimentary rocks. Important properties of sedimentary rocks in Israel.

5. Metamorphic Rocks. Causes and effects. Texture changes, changes in component mineralogy.

6. Plate tectonics. Concept of continental drift, evidence. Effects, spreading rates. Ocean geomorphology.

7 & 8. Structural geology. Correlation, faulting, folding, stresses conditions, introduction to strike dip and geological maps.

9. Engineering seismology, seismic waves qualitative site effect, liquefaction.

10. Geological time. Relative time, fossils. Absolute time.

11. Sinkholes along the Dead Sea. Why are they forming, where are they forming.

12. Slope stability, mass wasting.

Contact Hours

Lecture: 2 hours

Recitation: 1 hour

Credit: 2.0

014615 – Introduction to Financial Management

General Course Description

The course will impart basic and advanced concepts in financial accounting and management, such that the student will be able to understand and analyze a financial report, especially in areas related to real estate.

Weekly Lecture Topics

1. General introduction and accounting principles
2. Principles of accounting records and different depreciation methods
3. Types of business and economic models
4. Structure of a financial report, balance and profit & loss reports
5. Accounting, taxation and funding in real estate
6. Cash flows
7. Analysis of financial reports, cost of capital, financial stability and leverage
8. Worthwhileness of investments given risks and lifecycle costs
9. Different topics

Prerequisites

014603 – Engineering Economics

014606 – Introduction to Construction Management

Contact Hours

Lecture: 2 hours

Recitation: 1 hour

Credit: 2.5

014505 -Building Materials

Lecture Topics

1. Classification of cementitious materials: material testing and its significance, products and applications

a. Lime

b. Gypsum

c. Portland cement

2. Portland cement – composition types, setting and hardening, structure of the hardened paste and its effect on mechanical properties

3. Mortars for plastering and renderings

4. Aggregates, mixing water, chemical and mineral admixtures

5. Properties of fresh and hardened concrete, durability, mix design, concrete technology, testing and quality control

6. Laboratory exercises

Laboratory exercises

1. Introduction

2. Cementitious materials

3. Aggregates

4. Properties of fresh and hardened concrete

5. Concrete mix design

6. Plasters and special concretes

Participation in the lab exercise is obligatory. The safety codes require the student to come dressed with their legs covered (long pants/dress, closed shoes).

Prerequisite

125011 – General Chemistry + Lab

314535 – Introduction to Materials Engineering

Contact Hours

Lecture: 3 hours

Recitation: 1 hour

Lab: 1 hour

Credit: 3.5

014703 - Introduction to transportation planning

Course Objectives

The purpose of the course is to provide the students with some basic concepts in transportation:

The relationship between the transportation system, land use dissemination and human activities, study methods to analyze transport systems, development of sustainable transport facilities and tools to assist decision making in transport planning.

The course will include discussion of the role of the transportation systems and the Importance of the way it is integrated in the urban system. The course will also include selected topics in transport planning and policy development, basic models for predicting transport demand such as buses and trains. We will discuss various types of data that are required to develop and evaluate alternatives transport systems. We will review examples from Israel's transportation such as the development plans of Israel railways and mass transit in the three metropolises.

Course content

A. Introduction

1. The relationship between the transport system and the urban system
2. Transport planning process
3. Evaluation of transportation projects: economic, environmental and social considerations

B. Data Collection

4. Review of the types of data
5. Data collection methods

C. Transportation systems analysis model

6. The serial approach to travel forecast
7. Trip Generation models
8. Trip Distribution models
9. Modal Split models
10. Trip Assignment
11. New approaches to transportation systems analysis

D. Transportation planning and evaluation of transportation projects

12. Cost-benefit approach

13. Multi-criteria approach

14. Sustainable transport planning

Contact Hours

Lecture: 2 hours

Recitation: 1 hour

House Work: 4 hours.

Credit: 4.0

014613 - Human Resource Management in Construction

Course Objectives

a- To enhance the students' understanding of their future managerial role, with emphasis on the management of the human resources and with a multi-cultural perspective.

b- To learn about theories and practical tools applied when working with and/or managing human resources inside and outside of the construction industry.

Course Content

The course focuses on two main knowledge areas: a- soft aspects of management: primary HRM activities, motivation, change management, communications, teamwork; and b- the construction industry: its characteristics and various players; the players' roles, functions and interactions in the delivery of construction projects.

Contact Hours

Lecture: 2 hours

Recitation: 1 hour

Credit: 2.5

014325 – Design of Water and Wastewater Systems

Prerequisites

(Hydraulics 014205 and Water and Wastewater Treatment 014322 and Engineering Economics 014603)

Incorporated Courses: Design Principles of Water Supply Syst. 014208

Water Supply and Wastewater Collection 014323

Course Subjects

Principles of design and operation of water supply systems and wastewater collection. Calculation of water supply networks and wastewater collection systems. Goal, structure and preparation of an engineering project. Objectives of general planning, data collection and processing for design. Techno-economic evaluation and comparison of design alternatives. Topics in water and wastewater systems design. Project of general planning of water treatment and supply system.

Contact hours

Lecture: 3 hours.

Recitation: 1 hour.

Project: 1 hour.

House Work: 4 hours.

Credits: 3.5

014605 – Industrialized Buildings

Lecture Topics

Types of industrialized building systems.

Prefabrication, manufacturing and erection methods.

Design of the production plant.

Specific aspects of structural design.

Stability analysis of prefabricated buildings.

Design of connections.

Water tightness and design of joints.

Design of components and joints for acoustics, fire, thermal and energy performance.

Contact Hours

Lecture: 2 hours

Recitation: 1 hour

Credit: 2.5

014103 – Introduction to Engineering Mechanics

Weekly Lecture Topics

1. Introduction to Mechanics
2. The rigid body
3. Vector formulation of force and moment
4. Equivalent systems and the simplest equivalent system
5. Equilibrium of a particle and equilibrium of a rigid body
6. Point loads and distributed loads
7. Centers of area, mass and gravity; second moment of the area (moment of inertia)
8. Introduction to structures
9. Equilibrium of multi-body structure; Frames
10. Planar and space trusses
11. Beams and frames – 2-D and 3-D formulation
12. Differential and integral relationships for beams with distributed loads
13. Generalization of formulation for a planar frame and arch
14. Cables

Prerequisites

114051 – Physics 1

Contact Hours

Lecture: 3 hours

Recitation: 2 hours

Credit: 4.0

104019 – Linear Algebra M

Course Subjects

1. Polynomials, Complex numbers and Fields
2. Matrices: Addition, multiplication by a scalar, matrix multiplication, special types of matrices, row reduction, echelon and canonical matrices, row operations and row equivalence
3. Systems of linear equations: Properties and solutions, rank of a matrix
4. Vector Spaces: Subspaces, linear combinations, linear span and linear dependence
5. Basis and Dimension: Including row and column spaces, coordinate vectors
6. Invertible matrices
7. Determinants: Properties and applications
8. Linear Transformations: Definition, Kernel and Image of a linear transformation, matrix representation of a linear operator according to a given basis B, transition matrix, operations between transformations, similarity between matrices
9. Eigenvalues and Eigenvectors: The conditions for a diagonalizable matrix

Contact Hours

Lecture: 3.5 hours

Recitation: 2 hours

Credit: 4.5

014617 – Planning and Control of Construction Projects

Course Objectives

Deepening central issues of Construction Management: Comparing alternative designs and construction plans, methods of contracting, design management and information flows, client's design cost estimation, preparation of master plan schedules, tendering procedures, contractor cost calculations and bid preparation, budgeting, planning and scheduling of construction, production management, project controls. The goal is to understand and gain experience in these tasks, including achievement of a basic level of proficiency in appropriate software.

Teaching Methods

In addition to the theoretical material, there will be class discussions and exercises – guided homework and self-learning. In addition, guest lectures will be given by leaders in the field of information management in construction. **All materials will be included in the exam**.

Course Schedule

Week	Lectures	Tutorial
1	Introduction – Detailed construction process and project management objectives. Contracting methods. The multiple roles of construction managers at different levels and with different types of employers. Course aims and rules.	#1 CPM inMsProject (1%)
2	**Design management:** Information management in construction projects. Sharing information through an Extranet. **Cost estimates** at different accuracy levels; an initial estimate; estimating using parameters; detailed estimates. Measuring of quantities, methods of measurement, preparation of a bill of quantities.	#2 Initial estimate Excel (1%)
3	Manage bills of quantities and tenders, using a standard price list for the building industry	#3 Detailed estimating (2%) Candy 2.0
4	**Scheduling projects using CPM** Principles of the method, its advantages and its limitations; technological and organizational relationships; examination of alternatives.	#4 Scheduling constraints and resourcesVICO

		Control (2%)
5	Advantages of computers in CPM solution and comparing alternative plans. Updating a network of projects: Adding and removing tasks; update start dates and the estimated duration of their execution Examine alternatives to execution using Building Information Modeling (4D).	#5 Scheduling using line of balances VICO Control (2%)
6	**Detailed cost calculation** Direct costs, indirect costs, overheads; methods of distributing overheads; editing computer calculations; examination of alternative methods of distributing overheads. **Comparison of bids**	#6 General contractor calculations (2%) Candy 2.0
7	**Budget planning, cash and cost flows** Principles of planning and control of project budgets; Computerized budget management; layout according to the schedule budget	Preparation for the midterm exam
8	Budget, cost flows, cash flows (Continued): Preparation of flows of costs, expenses, income and cash;	Preparation for the midterm exam
9	Basic terms in production management: cycle time, throughput, work in progress; setup time, learning curve, waste	#7 Planning of construction budget Candy 2.0 (2%)
10	Production management: Last Planner System (LPS)	#8 Schedule of modular projects Candy 2.0 VICO Office (3%)
11	Principles of planning and scheduling of location based projects specialization; continuity; independence; responsibility; equal TAKT time. Implementation of principles in modular and non-modular projects	
12	Technological and organizational considerations, scheduling the execution of projects consisting of several modular buildings; a detailed demonstration of various alternatives and discussion of problems, advantages and disadvantages; impact of industrialization of construction; techniques for scheduling	

	alternatives.	
13	**Schedule control, budget and cash flow** Control Schedule; control cash flows. Understanding the control results; cash flow. Submitting interim accounts and calculations of price increases.	
14	Design management, Information management in construction projects, the DSM method.	

Contact Hours

Lecture: 2 hours

Recitation: 2 hours

Credit: 3.0

016203 – Water Resources Systems Engineering

Lecture Topics

- Mathematical models of water resources systems
- Selection of models for optimization and simulation
- Model structures
- Objective functions
- Formulation of optimization and simulation models
- Methods of solution
- Examples, including: development of surface water, aquifer management, design and operation of distribution systems

Contact Hours

Lecture: 2 hours

Recitation: 1 Hour

Credit: 2.5

014005 – Engineering Laboratory

Course Goals

1. Visually and practically demonstrate principles learned in engineering mechanics and engineering of material courses.
2. Practice structures and specimen component experiment methods, use of measurement devices, registering and analyzing measurement results.
3. Developing an understanding of the factors that affect measurement inaccuracies and compatibility between measured and calculated parameters (according to theory), measurement results distribution meaning.
4. Practice data representation and analysis and preparing technical documents.

References

The following is a list of general references. Specific references can be found in the lab guidelines.

1. Popov, E.P., Nagarjan, S. and Lu, Z.A., Mechanics of Materials, 2nd. ed., Prentice Hall, London, 1978.
2. Shames, I.H., Mechanics of Deformable Solids, Prentice-Hall, 1964.
3. Grover, R.L., Mechanics of Solids, John Wiley, 1964.
4. Hetényi, M., editor, Handbook of Experimental Stress Analysis, John Wiley, N.Y., 1950.
5. Hendry, A.W., Elements of Experimental Stress Analysis, Pergamon Press, 1977.
6. Godden, W.G., Demonstration Models for Teaching Structural Mechanics, University of Illinois Bulletin, 1963.
7. Cowan, H.J., Building Science Laboratory Manual, Applied Science Publishers, 1978.
8. Linear Regression Tutorial, Clemson University, 2006
9. Experiment Resources (2009). Statistics Tutorial. Retrieved 27.02.2010 from Experiment Resources: http://www.experimentresources.com/statistics-tutorial.html

Contact Hours

Lecture: 1 hour

Lab: 2 hours

Credit: 1.5

014006 – Introduction to Numerical Analysis

Course Objectives

The course aims to provide tools and methods of linear algebra. Emphasis is given to topics that will be useful in other disciplines. The course includes theoretical discussions (i.e. theorems) and practical implementations of the methods. Many of the theorems will be stated without proofs.

Lecture Topics

1. Introduction. Taylor series, partial derivatives.
2. Description of various errors: rounding errors truncating errors
3. Systems of linear equations
4. Finding roots of algebraic equations
5. Nonlinear systems of equations
6. Optimization of functions without constraints
7. Interpolation
8. Curve fitting: least squares approximation, regression
9. Numerical integration
10. Numerical derivation
11. Solution of ordinary differential equations

Prerequisites

104002 – Calculus 2

234112 – Programming C

104131 – Ordinary Differential Equations (may be taken in parallel)

Reading Requirements

- S.C. Chapra and R.P. Canale, “Numerical Methods for Engineers”, McGraw-Hill, 2002.
- R.L. Burden and J.D. Faires, “Numerical Analysis”, Brooks Cole, 2004.
- Auxiliary pages for lectures by Carol Braester, “Introduction to Numerical Methods”, 1998.

Contact Hours

Lecture: 2 hours

Recitation: 2 hours

Credit: 3.0

104003 – Differential and Integral Calculus 1

The real numbers as a complete ordered field, infinite sequences of real numbers, real valued functions of a single real variable: limits and continuity, continuity on a closed interval, monotonic functions, inverse functions, differentiability and the fundamental theorem of differential calculus, Taylor's theorem, L'Hopital's rule, curve tracing, elementary, functions, methods of integration, definite integrals, integrable functions, fundamental theorems of integral calculus, improper integrals. Sequences and numerical infinite series, power series.

Contact Hours

Lecture: 4 hours

Recitation: 2 hours

Credit: 5.0

Syllabi – Mechanical Engineering

034035 - Thermodynamics 1

Course Objectives

The course provides an introduction to engineering thermodynamics. Concepts including heat, work and energy are presented. The first and second laws of thermodynamics are introduced for systems and control volumes. Engineering applications include power and refrigeration cycles and humid air. The course is augmented by a wide range of engineering problems and examples.

Lecture Topics

Week #	Topics
1	Introduction, basic definitions, equilibrium
2	Work, First Law, energy, heat, Zeroth Law, temperature
3	State Principle, simple systems, pure substance, steam tables
4	Ideal gas
5	Control volume
6	Heat Engines, efficiency, Second Law, reversibility
7	Clausius Inequality, Entropy **Mid-term Quiz**
8	Thermodynamic temperature
9	Entropy applications
10	Steam work cycles – power stations
11	Gas work cycles – gas turbine
12	Refrigeration cycles – refrigerators and air conditioners
13	Ideal gas mixtures
14	Humid air

Prerequisites

104003 – Calculus 1 or equivalent.

Contact Hours

Lecture: 3 Hours

Recitation: 2 Hours

Credits: 4.0

034014 – Heat Transfer

Course Objectives

The course is designed as an introductory exposition to engineering heat transfer. Concepts including control volume analysis, conservation laws of mass, momentum and energy, conduction, laminar and turbulent convection, phase change and radiation will be developed and applied. The problems and examples will include theory and applications drawn from a wide range of engineering design and manufacturing problems.

Lecture Topics

Week	Content
1	Introductory Material, Modes of Heat Transfer, Control Volume Analysis, Conduction – Fourier's law
2	1D Steady State Conduction, Conduction with Thermal Energy Generation
3	Heat Transfer from Extended Surface, Fin Equation, Fin Performance
4	Analytical and Numerical Solutions to 2D and 3D Steady State Conduction problems
5	Transient Conduction, Lumped Capacitance Method, Spatial Effects
6	Convection, Boundary layer, Laminar and Turbulent, Similarity, Reynolds Analogy
7	Convection, Flow over Flat Plate, Empirical Methods
8	Convection, External Flows, Flow over Cylinder, Sphere, Flow across banks of Tubes
9	Internal Flow Convection, Laminar Flow in Circular Tubes, Empirical Correlations
10	Natural (Free) Convection
11	Heat Exchangers
12	Radiation, Black Body, Absorption, Reflection, Transmission
13	Radiation Exchange Between Surfaces
14	Boiling and Condensation

Prerequisites

- 034035 – Thermodynamics 1
- 034013 – Fluid Mechanics

Contact Hours

Lecture: 2 Hours

Recitation: 1 Hour

Credits: 2.5

Syllabi – Chemical Engineering

054131 - Introduction to Chemical and Biochemical Engineering -

Course Objective

The aim of this course is to introduce the field of chemical and biochemical engineering, and to provide basic tools to those who study this field. The covered topics include: the chemical industry in Israel, an introduction to biotechnology and to the production of bio-chemicals. Accuracy and units. Liquid/gas phase equilibrium, the phase rule, thermo-physical properties and steam table. Material balances: state material balances, methods of solve material balances with and without reactions. Independent and dependent equations, recycles and bypasses. Energy balances: the general energy balance equation, heat and work, steady state energy balances. Energy balances with chemical reactions, simultaneous material and energy balances. Non-steady state material and energy balances.

Contact Hours

Lecture: 3 hours.

Recitation: 2 hours.

Credits: 4.0

104004 - Differential and Integral Calculus 2

Course Topics

The n-dimensional Euclidean space RN, real valued functions on RN: limits, continuity and differentiability, the chain rule and the directional derivative, the gradient and its properties, implicit functions and inverse mappings, external problems and Lagrange multipliers, multiple integration: definition, applications and techniques, the Jacobian and change of variables. Vector analysis: line integrals and surface integrals, GREEN's, stokes' and Gauss' formulas.

Contact hours

Lecture: 4 hours.

Recitation: 2 hours.

Credits: 5.0

114051 - Physics 1

Lecture topics

Newtonian mechanics: internal and external forces, conservation of energy, linear momentum, angular momentum, equations of motion, Galilean transformation, accelerated systems. Special theory of relativity: velocity of light and its measurement, relativity principle, Lorentz transformation, proper time, relativistic Doppler effect, relativistic energy and momentum, collisions, creation and decay of particles.

Contact hours

Lecture: 2 hours.

Recitation: 1 hour.

Credits: 2.5

125801 - Organic Chemistry

Lecture topics

Saturated and unsaturated hydrocarbons, alcohols and ethers, alkyl halides, acids, esters, fats and lipids. Stereochemistry, amines, amino acids, proteins, aldehydes and ketons: chemistry of carbohydrates, aromaticity and reactions of benzene, condensation reactions for the building of molecules.

Contact hours

Lecture: 4 hours.

Recitation: 2 hours.

Credits: 5.0

125101 - Analytical Chemistry 1 for Engineers

Lecture topics

Ionic equilibrium:

a. systems involving insoluble salts - solubility product, preparation, titrimetric and gravimetric determinations, electolytic solubility and conductivity, conductometric titrations.

b. acid-base systems - acid and base strength, pH, buffer systems, titrations and indicators, illustrative determinations.

c. oxidation-reduction systems - oxidation state, half reactions, electrochemical cells, the Nernst equation, potentiometry, redox titration, ph measurements.

Contact hours

Lecture: 1 hour.

Recitation: 1 hour.

Credits: 1.5

History of Medicine

Course Number 275200

Lecturer: Prof. Moshe Feinsod
Academic Credits: 2
Method of Teaching: Lectures
2 hours per week

Overview:
The course will provide an introduction to the thought processes, tools and experiences of modern medical practice.

Schedule of Topics:

Lesson 1	The birth of systematic medicine: ancient medicine and its heritage (Egypt, Mesopotamia, and Persia).
Lesson 2	From Greek medicine to Hellenistic medicine: the beginning of scientific thinking.
Lesson 3	Greco-Roman medicine: Augustus Caesar organizes medical services, sanitary systems, water supply.
Lesson 4	Greco-Roman medicine: the great encyclopedists Dioscorides, Celsus and Pliny; Galen practice and thought; the fatal embrace.
Lesson 5	Medicine goes east: medicine in Byzantium and Iran; medicine in the Bible and the Talmud.
Lesson 6	The rise of Islamic medicine: preservation, development and dissipation of knowledge; Jews in Islamic medicine; medicine returns to Western Europe; Medical School of Salerno.
Lesson 7	The rise of universities: the educated physicians and surgeons; the public image of the physician. From the Black Death to AIDS: the role of epidemics in history; the responses to the challenge.
Lesson 8	The Renaissance: science and medicine dissociate from the rule of the Church; Vesalius and anatomical research: Harvey and the new physiology; the discovery of the New World and its influence; Jews in medicine during the Renaissance.
Lesson 9	The Enlightenment and its influence: science comes into medicine; the learned societies in France and Britain; Morgagni and the new anatomical pathology; The French Revolution and the rise of military

medicine – Ambroise Paré, D.J. Larrey, Crimea, the Civil War, World War I; the changing concepts of 'emergency medicine.'

Lesson 10 The introduction of instruments to medicine: the percussion hammer, the stethoscope, the thermometer, the sphygmomanometer; the microscope and the rise of cellular pathology.

Lesson 11 Development of 19th century medical schools and medical research: Magendie, Claude Bernard Emil Ludwig; the issue of vivisection; Pasteur and bacteriology and immunization; Lister and antisepsis; anesthesia and the new surgery.

Lesson 12 History of psychiatry and neurology: the Industrial Revolution and the ensuing "social diseases;" the development of Pediatrics.

Lesson 13 The development of pharmacology: the changing image and social role of the physician; eugenics.

Lesson 14 History of medicine in the land of Israel: discussion of issues raised by the students.

Ethics of Medicine

Course Number 274130

Lecturer: Dr. Gershon Gronfeld
Academic Credits: 2
Method of Teaching: Lectures
2 hours per week

Course Abstract:

Making ethical decisions, at times agonizing, are an integral part of routine practice of medicine. Since the need for such decisions are an unavoidable necessity, we must learn how to 'sift' through the evidence critically in order to be able to determine if they meet ethical standards. To this end, this course will attempt to provide an overview of the core values expressed in the work of occupational physicians today, and examine some of the more prominent ethical dilemmas that arise in this area. Such moral decisions have been expressed into law in Israel as well as in countries abroad. Having knowledge of legal aspects and dilemmas that arise in the daily practice of medicine is as important as understanding the standards required of this occupation. Therefore, as part of the course we will study some of the law cases and legislation relevant to a physician's work.

Sessions:

Lesson 1	Course Introduction: What is Ethics?
Lesson 2	Basic Concepts in Medical Ethics
Lesson 3	Autonomy and Paternalism
Lesson 4	Informed Consent
Lesson 5	Medical Confidentiality and Truth
Lesson 6	The Patient's Rights Law
Lesson 7	The Dying Patient Law
Lesson 8	Mental Health Care - Ethics and Law
Lesson 9	Medical Malpractice I
Lesson 10	Medical Malpractice II
Lesson 11	Physicians Ordinance and more
Lesson 12	Analysis of Ethical Dilemmas
Lesson 13	To be Determined

Grading System:

Students are required to attend classes and read the required course materials. A student's grade will be determined based on their final test score at the end the course. The exam will be based on the materials learned in the class and the content of articles and court rulings that make up the reading materials listed on Moodle. Coming prepared to lectures by reading the course materials before each lesson is

highly recommended as it will ensure a fruitful and more enjoyable discussion during class. Reference materials will not be permitted during the exam.

Halacha and Medicine

Course Number 275202

Course Director: Rabbi Shefran
Lecturer: Dr. Eitan Giat
Academic Credits: 1
Method of Teaching: Lectures

Course Abstract:

Course goals:

The goal of the course is to understand the confluence of medicine with the Jewish law, and gain familiarity with essential Halachic and ethical issues in the modern medical discourse.

Specific goals:

1. Learning about the main issues related to both medical practice and Jewish law; for example: fertilization, embryonic stem cells, sexuality, and so forth.
2. Understanding the mindset of various rabbinical authorities concerning medical issues; for example: genetic testing in the Haredi community, tests during pregnancy in the Hasidic community, and so forth.
3. Providing doctors with tools to enable them to function in observant populations using knowledge of fundamental terms that affect patients; for example: gynecology in light of the Nida laws, etc..
4. Studying the characteristics and interrelationships between medicine and Jewish law in the modern world; for example: transplants, determining death, and so forth.
5. Understanding Jewish morality and ethics in medical issue from the practical halachic angle.

Sessions:

Lesson 1 Informing patient about his/her medical condition: determinism versus autonomy; educational aspects.

Lesson 2 Thomas Kuhn Theory on the Structure of Scientific Revolutions: differences between Kuhn and the Rambam.

Lesson 3 Kubler Ross Theory on the mental condition of the patient and its impact in light of the teachings of Rabbi Kook.

Lesson 4 Moral dilemmas concerning organ transplant: educational and halachic aspects.

Lesson 5 Prolonging life for the dying patient.

Lesson 6 The definition of death in order to determine death.

Lesson 7 Brain Death: 3 definitions and their implications.

Lesson 8 The 'Sheep Experiment' and its scientific and halachic significance.

Lesson 9 Medical, halachic and ethical doubts concerning the fertilizations process.

Lesson 10 Ethical, medical and halachic aspects of family planning.

Lesson 11 Surrogacy, egg donation and stem cell research: ethical, medical and halachic aspects.

Lesson 12 Genetic cloning.

Lesson 13 Identifying the priests' (Cohen) gene and its halachic significance.

Lesson 14 Medical and halachic aspects of family structure.

Grading System:

Students are required to actively participate in class discussions and to come prepared to lectures (read the required course materials). A student's grade will be determined as follows: attendance and participation: 50%; score on final exam: 50%.

Emergency Medicine

Course Number 274119

Lecturer: Dr. Eric Schier
Academic Credits: 2
Method of Teaching: Lectures
1.5 hours per week

Course Abstract:

This undergraduate course will consist of six sessions lasting ninety minutes each and will be tailored for future health care professionals. We will present the fundamentals of emergency medicine, focusing specifically on prehospital, triage, and first hour. There will be no textbook. We will use review papers from medical and nursing literature as source material. Students will also participate in a 4 hour BLS course given by Magen David Adom so that they will be BLS certified for 2 years.

Sessions:

Session 1	Adult and Pediatric BLS
Session2	Trauma
Session 3	Environmental Emergencies
Session 4	Cardiac and Respiratory Emergencies
Session 5	GI and GYN
Session 6	Endocrine, Heme, Optho, Derm
Session 7	Q&A and Final Exam

Behavioral Sciences

Course Number 274136

Course Director: Dr. Tzvi Dwolatsky
Academic Credits: 2
Method of Teaching: Lectures
3 hours per week

Course Abstract:
This course will provide an introduction to the study of behavioral sciences. It will cover issues such as human development, including the stages of growth (children to elderly) and change in many domains of human functioning; human behavior in health, in illness, and in situations of challenges and difficulty; and the challenges and pressures of work as a medical student and physician.

Sessions:

Lesson 1	Communication Skills
Lesson 2	Children and Adolescents
Lesson 3	Elderly
Lesson 4	Women's Health
Lesson 5	Healer's Art Module 1
Lesson 6	Death and Dying
Lesson 7	Substance Abuse and Suicide
Lesson 9	Sexuality
Lesson 10	US Health Care System
Lesson 11	Ethical Issues
Lesson 12	Mutual Support
Lesson 13	Student Evaluations

Becoming a Doctor

Course Number 274140

Lecturer: Dr. Robert Glueck
Academic Credits: 1
Method of Teaching: Lectures
2 hours per week

Course Abstract:
This seminar-based course is designed to provide undergraduates an introduction to the thought processes, tools and experiences of modern medical practice. Class will be held weekly and will include didactic presentations, problem-based learning derived from clinical cases and exposure to patient care at Rambam Medical Center. The course will be led by Robert M. Glueck, M.D., F.A.C.C., and a Harvard-trained clinical cardiologist with 29 years of USA practice experience.

Sessions:

Lesson 1 **Didactic Presentation: "It was the best of times, it was the worst of times – The trajectory of modern medicine:"** Highlights of some of the areas of spectacular progress in medicine over the last 50 years, illustrated by "then and now" case presentations. In addition, the presentation will review some the signal problems faced by medicine today: access, cost, and "deprofessionalization." Discussion of the students' role in devising solutions.
Clinical Activity: The environments of medicine - introduction to the Emergency Room, Coronary Care Unit, and Internal Medicine wards at Rambam Health Care Campus.

Lesson 2 **Didactic Presentation: "The Physician's Art: the Patient Narrative:"** Overview of elements of the patient interview with introduction to the history of the present illness, past medical, social and family history and differential diagnosis (Assessment and Plan).
Clinical Activity: Observation and participation in patient interviews, Internal Medicine Ward, Rambam Health Care Campus.

Lesson 3 **Didactic Presentation: "The Physician's Art: the Physical Examination:"** Outline and description of the elements of a general physical examination with emphasis on cardiac auscultation.
Clinical Activity: Students auscultate their colleagues' hearts under supervision of clinical mentor and then observe complete patient physical examination, Internal Medicine Ward, Rambam Health Care Campus.

Lesson 4 **Didactic Presentation: "The Vision of Medicine: State-of-the-Art Imaging:"** Overview of imaging technology, representative chest X-rays, CT scans and echocardiograms.
Clinical Activity: Review of patient examinations, Departments of Radiology and Cardiology, Rambam Health Care Campus.

Lesson 5 **Didactic/Clinical Presentation: "As I Lay Dying: Patient Perspectives on Death:"** Narratives presented by survivors of life-threatening illnesses: their experiences with mortality and the medical system, followed by student discussion.

Lesson 6 **Didactic: "The Heart of the Matter: Cardiovascular Disease:"** Overview of coronary heart disease: incidence, pathophysiology, consequences, treatments.
Clinical Activity: Cardiac patient interview, physical examination, and review of heart catheterization/intervention, Coronary Care Unit and Department of Cardiology, Rambam Health Care Campus.

Lesson 7 **Didactic/Clinical Presentation: "Oh, the Places You'll Go!: Career Perspectives in Medicine:"** Presentations by several senior physicians/researchers on their own career paths in medicine, opportunities for the future and roundtable discussion.

Lesson 8 **Didactic: "Die Another Day: Life-Threatening Medical Emergencies:"** Case presentations including septic shock, sudden cardiac death, and overwhelming trauma.
Clinical Activity: Case review followed by patient examination, Intensive Care Unit, Rambam Health Care Campus.

Lesson 9 **Didactic/Clinical: "The Doctor is…You!:"** Student-led case presentations on previously assigned clinical topics integrating techniques and subject matter learned in the course; course review, closure.

Human Sexuality

Course Number 275203

Lecturer: Dr. David Rabinowitz
Academic Credits: 2
Method of Teaching: Lectures
2 hours per week

Course Abstract:
The course is a comprehensive introduction to clinical sexology.The course will focus on the theoretical clinical, psychosocial and ethical aspects, instead of sexology in psychiatry and medicine. Both normal and abnormal sexual behaviors will receive equal emphasis in the course. Teaching formats will include lectures and live interviews.

Sessions:
Human Sexuality: Normal and Abnormal

Lecture 1: Overview and introduction
Lecture 2: History of sexology
Lecture 3: The early pioneers: Masters and Johnston, Kinsey
Lecture 4: Understanding normal sexual function: the triphasic model of sex, gender differences
Lecture 5: Sexual dysfunctions in men and women
Lecture 6: Other sexualities: sexual deviations
Lecture 7: Understanding the transgender state, understanding the homosexual-heterosexual spectrum
Lecture 8: Sexuality: psychological and couple aspects
Lecture 9: Sexuality: social, cultural and anthropological aspects
Lecture 10: Ethical and moral issues and dilemmas in sexology
Lecture 11: Sexological treatment: medical and non-medical
Lecture 12: Talking with patients about sexual concerns; sex education

Grading System:
A final exam will be given at the end of the course.

Epidemiology

Course Number 274344

Lecturer: Dr. Ronit Almog
Academic Credits: 2
Method of Teaching: Lectures
2 hours per week

Course Abstract:

This course presents an introduction to the basic principles and methods of epidemiology and its applicability to public health and research. In addition, students gain skills in how to begin to interpret and critically evaluate literature relevant to public health professionals. The lectures will include in-class problems, discussions and clarifications of difficult issues. Students will be required to prepare for each session by reading the corresponding textbook readings. Structured exercises for self active learning will be available on Moodle. No homework assignment will be required.

Textbook: Gordis L (2004). Epidemiology. Fourth Edition. Philadelphia: W.B. Saunders.

Sessions:

Session 1 EPI: Introduction: Introduction to epidemiology; important terminology (outcome, risk factor, and prevalence and incidence); uses of epidemiology; types of epidemiological studies.

Session 2 EPI: Randomized Control Trials: Process of RCT: clinical trials; relative and absolute risk; the number needed to treat (NNT).

Session 3 EPI: Cohort Studies: Types: prospective + retrospective; advantages and disadvantages; attributable risk and risk difference; twin studies.

Session 4 EPI: Case Control and Cross-Sectional Studies: Purpose, uses; advantages and disadvantages; odds ratio; sources of bias; late-look bias; recall bias.

Session 5 EPI: Internal Validity, Bias, Confounding: Internal validity; precision vs. accuracy; bias vs. imprecision; confounding and confounders; ways to prevent/control confounding; asses confounding; effect modification and external validity.

Session 6 EPI: Sources of Bias: Types of selection and information bias; how to avoid bias; Bradford-Hill criteria for causal association.

Session 7 **EPI: PBL – Analyzing a Clinical Study**

Session 8 EPI: Screening: Introduction to screening; measures of test performance; sensitivity; specificity; interpreting results; predictive value +/-; Bayes' Theorem; common biases in the evaluation of screening programs (lead-time bias, length bias, and overdiagnosis).

Session 9 **EPI: PBL – Evidence-Based Medicine**

Grading System:

The final grade for this course will be based on a student's score on the final exam[1] (80%), class participation (in at least 7 lectures) and 1 presentation at the PBL session[2] (20%).

[1]*The exam is closed-book. A hand-calculator is permitted in the exam.*
[2]*Applies only if exam grade is 55 and above*

Genetics

Course Number 274300

Lecturer: Dr. Sara Selig
Academic Credits: 3
Method of teaching: Lectures
2.5 hours per week

Course Abstract:
Students will become familiar with many topics related to the field of human genetics. These will include basic principles in human genetics, different modes of inheritance, methods in human molecular genetics and human cytogenetics, different mechanisms of pathology of human genetics diseases, human genetics projects such as the human genome project, 1000 genome project, and more, cancer genetics, approaches for gene therapy, prenatal diagnosis and genetic counseling. All topics will include the newest developments in the field. Ethical issues related to human genetics will also be discussed. The students will be expected to integrate knowledge from different topics in order to understand many aspects of a certain genetic disease.

Learning Outcomes:

- On successful completion of this module, students should be able to: Identify various types of gene mutations and explain the mechanisms by which they lead to human disease
- Analyze a pedigree and determine the mode of inheritance
- Assess the relevance of the structure of the human genome and its different components to the mechanisms of different human genetics disorders
- Analyze the results of basic genetic testing carried out with polymorphic markers
- Evaluate methods and techniques described in current literature in human genetics
- Determine which types of genetic testing can be carried out for different genetic disorders
- Analyze chromosomal disorders with relation to the expected phenotype and methods for evaluating chromosomal disorders
- Evaluate which of the newest technologies in the field of genetics such as next generation sequencing, and genome editing technologies can be implemented in specific cases of genetic research and diagnosis
- Determine approaches for prenatal diagnosis, depending on the genetic disorder

- Be mindful to ethical issues related to human genetics and genetic counseling

Sessions:

Lecture topics will include:

- Chromosomal basis of inheritance
- Patterns of inheritance
- Molecular tools used in human genetics
- Genetic variation in populations
- Human genome organization and gene structure
- Mutations and polymorphisms
- The effect of mutation on protein function
- Microsatellite-expansion diseases
- Identification of genes underlying genetics diseases
- Human genome, HapMap and "A 1000 genome" projects
- Cancer genetics
- Inborn errors in metabolism
- Mitochondrial diseases
- Mendelian diseases with structural protein defects
- Mendelian diseases with receptor defects
- Mendelian diseases with transport defects
- Cytogenetics: methods in classical cytogenetics, molecular cytogenetics, clinical cytogenetics
- Complex traits and diseases
- Gene therapy including genomic editing.
- Prenatal diagnosis – indications, techniques and limitations
- Genetics counseling
- Ethics in human genetics

Tutorials:

- Patterns of inheritance
- Population genetics and Hardy-Weinberg problems
- Linkage analysis

Grading System:

An exam at the end of the semester will determine the grade of the course (constituting 100% of the final grade).

Course Requirements & Course Policies

While attendance is not obligatory, students are highly encouraged to attend lectures. Students are expected to be familiar with material taught in previous lectures, since the course is build gradually on accumulating knowledge and lectures integrate material from previous topics. An exam given at the end of the semester will determine the grade of the course. The exam will be composed of 50 multiple choice questions that cover all the topics taught during the semester.
The exam will include in addition to the presentations that appear on the course site, material that was discussed during the lectures and additional information present in the chapters of the recommended textbook, as noted in the syllabus.
In case a student wants to meet with the course coordinator, an appointment can be arranged in advance.

Academic Integrity

During examinations, you must do your own work. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and university disciplinary action.

Physiology 1

Course Number 274214

Lecturer: Dr. Yitzchak Kehat
Academic Credits: 4
Method of Teaching: Lectures, Exercises and Labs
10 hours per week

Sessions:

Lecture Topics

Hemodynamics

Electrophysiology: Action potential in heart cells, Ionic currents, automaticity, excitability, conduction, slow and fast response

Hemodynamics

Mechanics

Mechanics

Electrophysiology: Anatomy and physiology of the conduction system

Mechanics

Cardiovascular 1

Basic principles of electrocardiography (E.C.G)

Cardiovascular Lab (half class A) / Computer Simulation Lab - Cardiac Performance (half class B)

Neurohormonal control - autonomic system, baroreceptor reflex

Neurohormonal control - Integrated regulation of the cardiovascular system

Cardiovascular 2

Cardiovascular Lab (half class B) / Computer Simulation Lab - Cardiac Performance (half class A)

Coronary circulation and myocardial energetics

Microcirculation and Lymphatic system

Introduction to the pulmonary respiratory system (chp. 1)

Lung volumes, dead space (chp. 2,3)

Alveolar ventilation (chp. 4)

Oxygen transport (chp. 5)

Resp – Ex1

CO2 transport and buffering (chp 6), Pulmonary blood flow and metabolic functions of the lung (Chp 7-8),

Physiology 2

Course Number 274228

Lecturer: Prof. Zaid Abassi
Academic Credits: 4
Method of Teaching: Lectures, Exercises and Labs
10 hours per week

Course Abstract:

Sessions:

Lecture Topics

- Ventilation – Perfusion, Gas exchange in tissues
- Muscle Mechanics, Elastic properties of the lung, Resistance to flow and breathing work
- Flow Limitation, Control of breathing
- Anatomy of the kidney and anatomical-physiological correlation, Juxtaglomerular apparatus
- Body fluid compartments and their Composition. Single nephron glomerular filtration rate.
- Single nephron glomerular filtration rate.
- Glomerular filtration rate (GFR) and renal clearance
- Respiratory Physiology (whole class)
- Respiratory - Case Studies 2
- Renal circulation and glomerular hemodynamics, Sodium balance and regulation of extracellular fluid volume
- Renal tubular function and transport mechanisms along the nephron
- Potassium homeostasis and renal potassium handling
- Renal mechanisms of dilution and concentration of the urine.
- Renal 1
- Control of body fluid osmolarity and antidiuretic hormone
- Acid-Base Balance
- Acid-Base Balance
- Renal 2
- PBL - Renal
- The smooth muscle of the G.I. Tract
- Swallowing, Saliva secretion, GERD

- Stomach-roles, motility
- stomach-secretions, control of function
- PBL 1- GTI
- The small intestine-motility secretion
- The large intestine-roles, motility secretion defecation reflex
- PBL 2- GTI
- Digestion and absorption: Carbohydrates, Proteins, Lipids, Electrolytes and water, Diarrhea

Syllabi – Entrepreneurship and Innovation

097657 - Organizations and Entrepreneurship – Introduction to Entrepreneurship

Course Objectives

Entrepreneurship is a crucial engine for economic development, however, it is known for its complexity. The course focuses on entrepreneurship theory from economic, sociological and psychological points of view. During the course we will seek to get some answers to the following questions:

What explains entrepreneurs' intentions and actions?

What distinguishes ideas from real opportunities? What are the differences between opportunity identification/recognition, examination and exploitation?

What is the role of entrepreneurial passion and identities in establishing and managing new ventures?

How entrepreneurs affect and psychological characteristics influence their intentions and actions?

How do entrepreneurs make decisions to start ventures? What are the determinants of entrepreneurial persistence?

What are the criteria for external investors? How do venture capital investments make a difference?

How can we explain entrepreneurial failures?

What are the key differences between business and social entrepreneurship?

Teaching Method

The course will be based on multiple teaching methods. Beside theoretical presentations the course will use discussions of readings from academic and management journals, simulations, movies and guests lecturers. As part of the session in creativity and innovation, each student will be able to examine his/her entrepreneurial orientation, regulatory focus and entrepreneurial intentions.

Text Books

Baron, R.A. (2012). Entrepreneurship: An evidence-based guide. UK: Edward Elgar Publishing.

Bygrave, W., & Zacharakis, A. (2011), Entrepreneurship, Second Edition, Hoboken, NJ: John Wiley and Sons.

Senor, D., & Singer S. (2009). Start-up nation: The story of Israel's economic miracle. NY: Twelve.

Contact Hours

Lecture: 2 hours.

Recitation: 1 hour.

House Work: 5 hours.

Credits: 2.5.

096581 – Selected topics in Economics – Entrepreneurial Finance & Economics

Course Goals

Provide students with a basic understanding of the fundraising aspects of entrepreneurship, the process of raising funds for a new business and the conventional fundraising mechanisms available today.

Introduce students to a new fundraising mechanism – crowdfunding – while giving them a grasp of the fundamentals of crowdfunding, as well as a practical understanding of what it means to create a crowdfunding campaign.

Provide food for thought and, perhaps, a glimpse of the future by exploring the non-monetary benefits of crowdfunding and the ways to leverage a successful campaign.

Course Overview

The constant change and innovation of today's fast-paced business world leave no room for stragglers, especially in the competitive field of start-up financing, where the harsh reality is "keep up or get left behind". Hundreds of millions of people try each year to launch new businesses with only a third of the businesses actually being launched. Thousands more try and fail every day. That's why it's important for any aspiring entrepreneur to learn as much as possible about all of the options for available and to take advantage of anything and everything at their disposal.

When it comes to fundraising and business financing, crowdfunding is definitely the new kid on the block. Compared to more conventional options, such as venture capitalists and angel investors, crowdfunding has been around for a relatively few years and has only begun to trickle into mainstream awareness in the last year or two. However, as conventional funding sources have cooled off in recent years due, in no small part, to global economic shifts, crowdfunding has emerged as a bona fide go-to option for entrepreneurs and even established businesses seeking to finance their projects.

In this course we will learn about the basic principles of crowdfunding and how it contrasts with other fundraising mechanisms. We will learn about the different forms of crowdfunding, the different platforms which exist today and how to best take advantage of the competitive crowdfunding landscape as an entrepreneur. We will gain a better understanding of the crowdfunding process by participating in a practical workshop to create our own crowdfunding campaign. Finally, we will look at crowdfunding within the context of a larger phenomenon and try to discern methods of harnessing it to empower our business ventures.

Course Schedule and Agenda

1	Course overview, mutual introduction & Case Study	2 Academic hours
2	Intro to Entrepreneurial finance	2 Academic hours
3	The venture capital world (Part 1)	2 Academic hours
4	The venture capital world (Part 2)	2 Academic hours
5	Case study	2 Academic hours
6	Crowdfunding 101	2 Academic hours
7	Frontiers of Crowdfunding	2 Academic hours
8	The Crowdfunding framework – hands-on workshop	4 Academic hours
9+10	Two weeks without lessons – planning the crowdfunding campaigns	-
11	Elevator pitches – presentations of the crowdfunding campaigns	4 Academic hours
12	The Crowd empowered Startup	2 Academic hours
14	Summary	2 Academic hours
	Total:	26 Academic hours

Contact Hours

Lecture: 2 hours.

Recitation: 1 hour.

Credits: 2.5.

096809 – Social Ventures

Course Description

The course reviews theories and tools that help develop strategies and business models aimed at improving the well-being of all stakeholders, including shareholders, society and the environment. Thus, the performance of the business models is evaluated using not only profitability, but also social responsibility, and environmental impact measures (**People, Planet, Profit**, or Triple Bottom Line).

Courses and entire programs on the topics of social ventures and social responsibility in business and management are offered by leading universities such as the Social Enterprise Program – Columbia Business School, Stanford's Center of Social Innovation, and The Center for the Advancement of Social Entrepreneurship .

Course Objectives

Review strategies used by organizations that follow the Triple Bottom Line criteria

Understand the advantages and opportunities in building social business models

Learn tools that will help you improve and manage your own business model

Work on a project to help people help themselves and others

Teaching Methods

Learning will take place in a collaborative environment. This will require reading preparations, in-class discussions and exercises, presentations, posting assignments on the course blog and posting lessons learned on the teams' project sites. Credit will be earned accordingly.

Teaching Material

Optional Text – Scaling Your Social Venture: Becoming an Impact Entrepreneur (Social Entrepreneurship), July 2012, by Professor Paul N. Bloom

Group Project

Every social and global issue is a business opportunity just waiting for the right kind of inventing entrepreneurship. – Peter Druker –

Teams of students develop projects starting with a Minimum Viable Product (MVP) with the objective of *Helping People Help Themselves and Others in managing their own business model*. Your team can select a new project or advance an on-going project that was developed by a previous student team. As a platform for the project, you can use google sites, Facebook, or any other platform that will best serve your project.

Contact Hours

Lecture: 3 hours.

Credit: 3.5.

099760 – Managerial Negotiation

Course Objectives

The workshop has two related goals. The first is to review the knowledge accumulated in negotiation research. The second goal is to allow the participants to experiment with using the accumulated knowledge is searching for the negotiation strategies that fit them best in simulations of typical negotiations.

Course Background

The current review of the knowledge accumulated in negotiation research focuses on three lines of research: game theory, behavioral economics and social psychology. The course starts with a survey of the insights provided by basic game theoretic analysis of negotiation. It continues with a review of some of the limitations of traditional game theory, and the presentation of the refinements proposed by behavioral economics and social psychological study of negotiation. The implications of the different regularities will be clarified via an assortment of negotiation simulations.

Contact Hours

Lecture: 4 hours.

Credits: 2.0.

094815 – Project in Entrepreneurship

3 Academic Credits

Course Goals and Content

Teams will apply the concepts taught in the program by identifying an idea (of their own or proposed by the course instructor) and developing a business plan, including technology assessment of the invention, patent search, discovering possible applications of the technology, developing a first cut business model and a resource plan. Teams are expected to gather information on the technology, industry and markets. Students will write an executive summary and present it in front of a panel of academics and practitioners simulating a fund raising presentation.

Syllabi – Humanities

324055 - Topics in the History of the Jewish People

Instructor – Yisrael Ne'eman

This course is a survey of the history of the Jewish People with an emphasis on the modern period and the development of the State of Israel. There are 11 classes, one field study to the Diaspora Museum and a final exam entailing short definition answers and/or multiple choice questions.

1. Introduction to the National Memory – The Tanakh (Hebrew Scriptures or "Old Testament") – A discussion of the Israelite Covenant with God, Exodus from Egypt and development of the tribal federation under Kings David and Solomon. Construction of the First Temple.

2. First Temple Period – Judea and Israel split, the Assyrian invasion and the Ten Lost Tribes. Babylonian Exile and Return. The establishment of the Diaspora and its ramifications for Jewish existence.

3. Second Temple Period – The challenge of the Greco-Roman World and the rise of militant Judean nationalism. The "Jewish War", the destruction of Jerusalem and the loss of the physical centrality of the Land of Israel. The later Bar Kokhva Rebellion also fails. The development of the Talmud ensures Jewish continuity in the Diaspora through legal statutes and custom. Return to the homeland is delayed but the hope is never diminished. The Messianic idea is contained in Diaspora beliefs.

4. Jewish Existence in the Byzantine and Islamic Worlds – Judaism survives the challenge of survival under that Christian Byzantines and then once again under Islam. The rise of Islam in the Arabian Peninsula can be attributed to Jewish influences yet the two religions find themselves in an adversarial relationship. Similar to the Byzantines, Jewish life is permitted, yet restricted under the Charter of Omar statutes. Jews (like Christians) under Sharia Law are considered "dhimmis" or a protected second class community over the ages.

5. The European Middle Ages – The Crusades (1096) brought catastrophe to the Jews of central Europe while Jewish communities in the Iberian Peninsula during the Middle Ages and early Modern Period both flourished and was repressed during the great clashes between Islam and Christendom. The Inquisition (1391) and Expulsion (1492) put an end to centuries of Jewish existence.

With the rise of Emancipation - The "Age of Reason" (anthropocentrism) challenges the world of religion (diocentrism). A brief review of the Jewish Enlightenment (Haskala) thinkers Spinoza and Mendelsohn. The socio-political ramifications of Napoleon's "12 Questions" and offers of full equality to the French Jewish community.

6. Russian Jewry – A review of the Jewish predicament under the Czars. Antisemitism, persecution and the eventual revolt against the Rabbis lead the Jewish community towards messianism, emigration, revolution and Zionism by the late nineteenth century.

The Marxist revolution appears as the answer and Trotsky as an example to be followed. A look at the Jewish condition in the Soviet Union and the failure of the "promise" to end antisemitism and guarantee equality.

7. Antisemitism – A survey of the never ending bane of Jewish existence. Why are the Jews so often seen as an "out group"? An examination of anti-Jewish stereotypes and prejudice from Pharoah, through Greece/Rome and the Middle Ages until the racial theories of the 19th-20th centuries Enlightenment Age. Does antisemitism still exist today?

8. The American Experience – The New World offers an open, liberal and democratic society for Diaspora Jewry to flourish anew. Antisemitism is not truly an issue and the socio-economic battles may be won, but what of assimilation and the American Jewish or Jewish American identity?

Religious and Zionist solutions are offered in the great American compromise to ensure a Jewish identity alongside one's Jewish being. Are Jews just a "religious community" or are they a people outside their homeland? What is American Zionism?

9. Herzl and Zionism (Jewish National Liberation) – Political Diplomatic Zionism makes the Jewish People a player on the world scene, not just scattered communities. Is this the answer to the "Jewish Question"? A review of Labor, Revisionist (Likud) and National Religious ideologies.

10. From WWII and Independence (1948) to Peace with Egypt (1979) –Israel overcomes its opponents in three major wars and begins a process of reconciliation with secular Arab nationalism. On the other hand the Palestine national movement poses the greatest challenge to Jewish national acceptance in the Middle East. Domestically, Labor leads and over a million immigrants are absorbed.

11. From the 1980s to the Present – Labor is replaced by the Likud and national religious ideology catalyzes the settler movement. The Oslo Process begins but is never completed. Domestically the class gap widens with Israel's capital incentive society. Where to Israel?

12. *Field Study (Sunday)* – Diaspora Museum (Tel Aviv) **This is a mandatory trip to the Diaspora Museum in Tel Aviv to be held in June (on a Sunday). Date to be announced in the first class.**

13. Multiple choice final exam: Names and terms are given out earlier in the semester. 25 will be chosen for the final.

Contact Hours

Lecture: 2 hours.

Credits: 1.5.

324863 - Archeology and History in the Holy Land: From Antiquity to the Early Middle Ages

Instructor – Yisrael Ne'eman

This course entails six weekly class sessions of two academic hours each, a two hour survey of the Hecht Archeological Museum at the University of Haifa, two full archeological Sunday field study days (equal to twelve academic class hours) and an in class final (short answer and/or multiple choice test). Field Study dates will be announced during the first class. During field study weeks there will be no in class lecture. This course finishes several weeks before the engineering classes.

First Week *Class*

What is archeology? What does it prove and what significance does it have? Do "Creation" and "Evolution" clash?

A survey of not quite human existence and its development into families, tribes and agricultural society. A review of the archeological time period from the pre-historic Palaeolithic (hunting and gathering) through the Neolithic (New Stone Age) and Chalcolithic (Copper and Stone) Periods.

Second Week *Tour in the Hecht Archeological Museum*

Understanding archeology and the ancient time line in the Holy Land. Tuesday afternoon outing (instead of class) to the ***Hecht Museum at the Univ. of Haifa*** – Here is a full spectrum of archeology through the discovery of artifacts throughout the region. The museum outlines all the cultures and periods under discussion. For our purposes we will concentrate on the Neolithic, Chacolithic, Bronze and Iron Ages. In particular displays of the material culture of Canaanites, Phoenicians, Israelites and Philistines (representing Greece) will be investigated. This period of time corresponds to the literature of the Biblical period.

Third Week *Class*

The Ancient Eastern Mediterranean - Using archeology and written texts we will piece together the cultures and histories of those peoples who lived in this region from the Bronze Age until the advent of the Greek conquest of Alexander the Great.

Fourth Week *Class*

The clash between the Hebrew Scriptures and Biblical Archeology. Archeology is presented as a tool to verify or negate the Biblical text leading to issues of belief vs. "rational" study. Were the Israelites really hill dwelling Canaanites or was there truly an Exodus from Egypt? Was there a Davidic and Solomonic Empire?

Fifth Week *Field Study (Sunday)*

First Field Study - Pre-historic human existence took place in the Carmel Mountain range hundreds of thousands of years ago as was discovered at the ***Nahal Me'arot Archeological Dig***. According to archeologists how did we become the human beings that we are today and what do we know of this deep human past?

Megiddo Archeological Dig (Case Study) – We enter here from early recorded history until Biblical times. A View of the scale model and tour of the site helps one to understand how

archeologists worked in the past and the conclusions drawn through analyzing the layering of some 20 different civilizations. Megiddo is mentioned briefly in the Hebrew Scriptures and at length in Christianity – "Book of Revelations".

Sixth Week *Class*

Rome Defeats Greece and Builds an Empire – The story of the rise and domination of Rome from the defeat of Carthage and its destruction to the conquest of Greece and the eastern Mediterranean. Focus will be on the era from Julius Caesar to Octavian (Augustus). Focus on Herod in the Holy Land.

Seventh Week *Class*

The Development of Christianity – The Greco-Roman World conquered Judea and destroyed the Temple in Jerusalem in 70 CE. The resulting universalist religion grew from a small persecuted sect originally made up of Jews who believed Jesus to be the Messiah. What brought about the development of the Byzantine Empire and eventual Christianization of the Western World?

Eighth Week *Class*

9. The Rise of Islam and the Muslim Arab invasion of the Holy Land resulting in the defeat of the Christian Byzantines in the 630s. Zoroastrian Persia captured and Christendom defeated in North Africa and the Iberian Peninsula.

Ninth Week *Field Study (Sunday)*

Second Field Study – An outing to ***Tzippori*** to survey the archeological remains and testament to the pluralistic relations between Rome, the Byzantines and the dwindling Jewish community of the Galilee. In particular we will investigate the mosaic motifs, both geometric designs and those depicting the Greco-Roman gods of yesteryear including the world famous "Nile Mosaic" and "Mona Lisa of Galilee".

Caesarea (Case Study) – This famous port city built by Herod the Great represents Rome in all its glory from the time of Herod through the Byzantine Christianization and into the early Arab Muslim period. We will tour the ruins of classical Rome including the theatre, palace, hippodrome, bath house and even public latrine. Entering what is left of the walled city we will overview the most impressive harbor built at the time. Here excavations by marine archeologists were at their height. Lastly we will take in the Byzantine Street in Christian Caesarea.

We will see two audio-visuals, one a brief history of Caesarea until the final conquest by the Mamluke ruler Baybars and the second on the ancient building techniques used to construct both the city and port.

Tenth Week *In Class Final Exam*

10. Final exam – This is a 25 question multiple choice test based on the list of names and terms handed out earlier in the semester. Included are the archeological sites visited.

Contact Hours

Lecture: 2 hours.

Credits: 1.5.