**BIODESIGN INNOVATION**

Course BIOE 76105/ BUS 55946

**Description**

Biodesign innovation is a “real world” course in creating successful medical devices. The course is given over two semesters of one academic year and is composed of frontal lectures, practical trainings, and a guided project. The autumn semester (A) is focused on identifying clinical needs, brainstorming and concept creation, while the spring semester (B) is focused on concept development, and business implementation. Teams of students from medical, engineering, business, and law disciplines will conceive and design an innovative medical device taking it through all steps of development. The teams will create an engineering prototype of their invention, file a provisional patent application, and compose a details business plan. Biodesign innovation is taught by a combination of Hebrew University faculty and medical device entrepreneurs, corporate executives, intellectual property attorneys, and venture capitalists. As such, it provides a unique opportunity to gain real world experience while still in an academic environment.

**Registration**

Course registration requires a formal evaluation process and instructor approval

The course is open to the following:

* MD fellows affiliated with the Hebrew University
* MSc students in Bioengineering
* MBA students in Business Administration
* LL.B students in Law School, third year

**Course Requirements (Final Grade)**

40% - Homework assignments, poster and oral presentations

40% - Final written project report

20% - Class participation

**Time**

Core Lectures Monday 16:00 – 18:00

Practical Monday 18:00 – 19:00

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| **Course Directors**Prof. Chaim Lotan, Faculty of Medicine Director, Heart Institute Hadassah Medical CenterEmail: chaim@cc.huji.ac.ilPh: 02-6776563Dr. Yaakov Nahmias, School of EngineeringDirector, Center for BioengineeringHebrew University of JerusalemEmail: ynahmias@cs.huji.ac.ilCell: 054-6104088**Administration**Mrs. Dana Levy, School of EngineeringHebrew University of JerusalemEmail: danale@savion.huji.ac.il Edmond J. Safra Campus (Givat Ram) Ph: 02-6585933 | **Management**Dr. David Planer, Faculty of Medicine Executive Medical Officer Email: davidpl@ekmd.huji.ac.il Cell: 050-7874741Prof. Niron Hashai, School of Business Administration Executive Business Officer Email: nironh@huji.ac.ilCell: 052-3550067**Instructors** Amit ZilbershteinBusiness Instructor Email: amit.zilber@mail.huji.ac.il Cell: 050-6215812Gahl Levy Engineering Instructor Email: gahl.levy@mail.huji.ac.ilCell: 054-335-1656 |

**Group Mentors**

Prof. Niron Hashai, Business Administration

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Dr. Yaakov Nahmias, Biomedical Engineering

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Dr. Elchanan Fried, Medicine

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Cell: 050-8573453

**Additional Core Faculty**

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| Prof. Dan Galai, School of Business Administration Hebrew University of Jerusalem Email: dan.galai@mail.huji.ac.il Ph: 050-8210955Dr. Amnon Buxboim, School of EngineeringHebrew University of JerusalemEmail: amnon.buxboim@mail.huji.ac.ilCell: 050-5238741 | Dr. Guy Pessach, Faculty of LawEmail: guy.pessach@mail.huji.ac.ilPh: 02-5882538Mt. Scopus Campus (Mt. Scopus)Faculty of Law 218Prof. Meir Liebergall, Faculty of MedicineEmail: liebergall@hadassah.org.ilPh: 02-67763462Hadassah Medical Center (Ein Kerem)Orthopedic Surgery Complex |

**Technology Transfer**

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| Mr. Yaacov Michlin, Yissum Email: yaacov.michlin@yissum.co.ilPh: 02-6586671Edmond J. Safra Campus (Givat Ram) Hi-Tech ParkDr. Shoshi Keynan, YissumEmail: shoshi.keynan@yissum.co.ilPh: 02-658-6683Edmond J. Safra Campus (Givat Ram) Hi-Tech Park | Dr. Einat Zisman, HadasitEmail: einat.zisman@hadassah.org.ilPh**:** 02-**6778757**Hadassah Medical Center (Ein Kerem)Jerusalem BioPark, JPB 5Mr. Tomer Bahar, HadasitEmail: tomerb@hadassah.org.ilPh: 02-6777906Hadassah Medical Center (Ein Kerem)Jerusalem BioPark, JPB 5 |

**First Semester: Needs Finding and Concept Creation**

**11.11.2013**

Auditorium, Heart Institute, 8th Floor, Ein Kerem

Lecture: Course overview (***Chaim*** ***Lotan)*** [15 min]

Lecture: Introduction to BioDesign (***Yaakov Nahmias***) [1.5 hr]

Lecture: The Medinol® success story (***Yaakov Richter****)* [1.5 hr]

*HW: Sign IP agreements, personal information, MBTI test*

**18.11.2013**

Auditorium, Heart Institute, 8th Floor, Ein Kerem

Lecture: Hospital introduction(**Avi Israeli**) [1 hr]

Lecture: Needs finding assignment (***Gahl Levy***) [15 min]
*Tour of emergency room, operating room, Pediatrics* [3 hr]

 *(****Elchanan Fried, David Planer, Yotam Almagor****)*

*HW: Receive list of clinical needs*

**25.11.2013**

Auditorium, Heart Institute, 8th Floor, Ein Kerem

Lecture: Disease state and existing technologies (Cardiac, Skeletal, Brain)

(***David Planer, Elchnan Fried, Tamir Ben Hur***) [3 hr]

**1.12.2013**

David Intercontinental Tel Aviv

Academy of Innovation 8:00 to 18:00

**9.12.2013**

Beit Maiersdorf, Mt. Scopus, Room 405

Session: Team Building (***Yaakov Nahmias, Gahl Levy, Amit Zilbershtein****)* [45 min]

Lecture: listening for effective teamwork (***Avi Kluger***) [1.25 hr]

Practical: Needs finding and validation (***Yaakov Nahmias***) [1 hr]

*HW: Need finding assignment due*

**16.12.2013**

Beit Maiersdorf, Mt Scopus, Room 501

Lecture: New product development and market analysis (***Renana Peres***) [2 hr]

Lecture: Healthcare market analysis (***Gil Pogozelich)*** [1 hr]

**23.12.2013**

Institute of Life Sciences (Silberman building), Edmond J. Safra Campus (Giv’at Ram), Class 1-504

Lecture: Early stage prototyping (***Yaakov Nahmias***) [2 hr]

Practical: Prototype examples

***(Lev Lavi, Itay Hayut, Elishai Ezra, Ester Feldblum)*** [2 hr]

**30.12.2013**

Institute of Life Sciences (Silberman building), Edmond J. Safra Campus (Giv’at Ram), Class 1-504

Lecture: Early research and development (***Rony Kalman***) [2 hr]

Practical: Successful presentation (***Iris Moshkowitz***) [2 hr]

*HW: Need specification assignment due*

**6.1.2014**

Pascal Classroom, Harman Library, Edmond J. Safra Campus (Giv’at Ram)

Lecture: Intellectual property and patent law (***Daniel Green***) [2 hr]

Practical: Interactive patent search (***Eitan Winter)*** [1 hr]

*HW: Executive summary assignment is due*

**13.1.2014**

Auditorium, Heart Institute, 8th Floor, Ein Kerem

Practical: Brainstorming with clinical experts [3 hr]

* Detailed description of problems considered
* Review of broad marketplace
* Engineering concept drawing of 3-4 solutions
* IP challenges and development considerations for each

*HW: Concept creation assignment presented to experts*

**Mid-Semester Workshop**

**20.1.2014**

Pascal Classroom, Harman Library, Edmond J. Safra Campus (Giv’at Ram)

Practical: Prototyping Workshop (***Elishai Ezra, Lev Lavi***) [3 hr]

**Second Semester: Concept Development and Implementation**

**17.2.2014**

The Rachel and Selim Benin School of Computer Science and Engineering, Rothberg Building,

Edmond J. Safra Campus (Giv’at Ram), Main Auditorium A3

Mid Stage Project Presentations [3 hr]

* Detailed description of one problem
* Review of broad marketplace
* Engineering concept drawing of 3-4 solutions
* IP challenges and development considerations for each
* Description of Invention (provisional) paperwork for each

*HW: Mid-state report is due*

**24.2.2014**

Beit Maiersdorf, Mt Scopus

Lecture: Status update (***Yaakov Nahmias***) [1 hr]

Practical: The business plan (***Niron Hashai***) [2 hr]

**3.3.2014**

Auditorium, Heart Institute, 8th Floor, Ein Kerem

Lecture: Patent strategy and execution (***Gil Pogozelich****)* [3 hr]

**Thursday, 6.3.2014**

Start at 16:30

The Rachel and Selim Benin School of Computer Science and Engineering, Rothberg Building,

Edmond J. Safra Campus (Giv’at Ram), Room B221

Guest Lecturer: Douglas Daum, Boston Scientific VP R&D of CRM  [3 hr]

**24.3.2014**

Auditorium, Heart Institute, 8th Floor, Ein Kerem

Lecture: Clinical trial strategy (***Ora Paltiel***) [2 hr]

Practical: Design of regulatory strategy [1 hr]

**31.3.2014**

Faculty Club, Institute of Life Sciences, 4th floor, Edmond J. Safra Campus (Giv’at Ram)

Practical: Status report with faculty [3 hr]

**28.4.2014**

Beit Maiersdorf, Mt Scopus

Lecture: Bringing innovation into the market (***Shosi Keinan***) [3 hr]

**12.5.2014**

The Rachel and Selim Benin School of Computer Science and Engineering, Rothberg Building,

Edmond J. Safra Campus (Giv’at Ram), Room B221

Lecture: Operating plan & financial modeling (***Dan Galai***) [1 hr]
Practical: Financial modeling [2 hr]

**19.5.2014**

Auditorium, Heart Institute, 8th Floor, Ein Kerem

Practical: Status report with faculty [3 hr]

**26.5.2014**

Faculty Club, Institute of Life Sciences, 4th floor, Edmond J. Safra Campus (Giv’at Ram)

Reception: Concept poster presentations [3 hr]

*HW: Poster presentation*

**2.6.2014**

Auditorium, Heart Institute, 8th Floor, Ein Kerem

Lecture: Regulation of medical devices (**Orit Yarden**) [2 hr]

Practical: Discussion [1 hr]

**9.6.2014**

The Rachel and Selim Benin School of Computer Science and Engineering, Rothberg Building,

Edmond J. Safra Campus (Giv’at Ram), Room B221

Lecture: Venture & Angel Financing (***Dan*** ***Galai Amit Zilbershtein & guests***) [2 hr]

Practical: Discussion [1 hr]

**19.6.2014**

The Rachel and Selim Benin School of Computer Science and Engineering, Rothberg Building,

Edmond J. Safra Campus (Giv’at Ram), Main Auditorium A3

Final Project Presentations [4 hr]

* Detailed description of problem
* Review of marketplace and competition
* Engineering concept and prototype
* Details of IP, reimbursement, and regulatory considerations
* Financial projections with key milestones and assumptions highlighted