Course Description:

The rising prevalence of diabetes has taken an alarming human and societal toll. Diabetes is becoming a national and global concern. This course explores the science behind Type 1 and Type 2 diabetes mellitus (T1DM and T2DM) plus gestational diabetes, the contribution of modern western lifestyle to disease development, the increasing rates of obesity and diabetes, current diabetes treatments including insulin and non-insulin drugs, artificial pancreas and bariatric surgery, future treatment such as stem cell therapy, the rising diabetes treatment cost and impact on current healthcare policy. Emphasis will be placed on discussion of molecular genetic research that has illuminated our understanding of the underlying pathophysiological mechanisms. A food lab is included to provide hands-on experience and to further inform about the importance of food and nutrition (coupled with exercise) in the management and prevention of T2DM.

This course meets the requirement as an area A elective (or a free elective) for HSSP BA students. It does not fulfill a requirement for the major in Biology. This course has been approved as an Oral Communication (OC) course.

Syllabus for the 2014 HSSP JBS (June 1 to July 24)

For this JBS, the course syllabus of BISC 10aj has been planned in parallel with Professor Rosenfeld’s course syllabus of HSSP 120aj, Health Care Landscapes. Professor Rosenfeld and I have integrated our two courses such that together they teach the biology and disease aspects (BISC 10aj) and the social and health policy aspects (HSSP 120j) of diabetes. Instead of taking different final exams in each of these two courses, three student groups will develop their own menus and prepare diabetic-friendly meals, give public presentations and write “position” papers. The public presentations and final papers will be co-graded by both professors.

Classes meet on Tuesdays from 9:30-noon in _________________ classroom, followed by Food Lab from 1-6 PM in Ridgewood Kitchen/Common Room.

(2.5 hours class, 1 time/week, 8 weeks, sub-total 20 hours; plus 8 Food Labs, each from 1-6 PM, sub-total 40 hours. TOTAL 60 hours)
**Instructor:** Dr. Elaine Lai, PhD. Office hours: after class or by appointment. 781-736–3152. Office: Bassine 406, Penthouse floor (P on elevator)  
E-mail: elai@brandeis.edu

**Program Assistant:** Sara Hazelnis, BA in HSSP, Brandeis University. Office hours: __________ or by appointment for one-to-one help sessions. E-mail: hazelnis@brandeis.edu

Assigned reading will be posted on LATTE or handed out in class. No textbook is assigned. Class format includes lectures, student presentations in class, class discussions as well as group conference, group presentations, group cooking sessions and team working. Two guest lectures are planned.

**CLASS SCHEDULE.**  
(CLASS MEETINGS FROM 9:30-NOON ON TUESDAYS.)

Class 1. **June 2**  The diabetes and obesity epidemics, and the biology of diabetes  
   What is diabetes?  
   Why is diabetes becoming a national and global concern?  
   The worldwide epidemiology of T2DM  
   Brief overview of health disparities

Class 2. **June 9**  Diabetes treatment  
   Self-monitoring  
   Physician-monitoring  
   Insulin and non-insulin drugs (e.g. metformin, a biguanide, was previously reported to reduce glucose synthesis through activation of the enzyme AMP-activated protein kinase, AMPK. Current research suggests that metformin antagonizes the hormone glucagon).  
   Bariatric surgery to treat T2DM  
   Recent breakthroughs in diabetes treatment  
   - Artificial pancreas  
   - Gut enzyme  
   - Fat blocker  
   New drugs in research and development  
   - Can an old asthma drug (amlexanox) point the way to new treatments of diabetes and obesity?  
   - Can a newly discovered hormone (beta-trophin) free diabetics from injections?
Class 3. **June 16**  Diabetes prevention and health promotion by lifestyle intervention

- Omega-3 polyunsaturated fatty acids and its beneficial effects on diabetes
- Fructose consumption and insulin resistance
- MyPlate, released in 2011, an educational tool that helps consumers implement the principles of the 2010 Dietary Guidelines for Americans
- The merits of the Mediterranean diet
- Exercise and physical activity
- Advertising and health promotion

Class 4. **June 23**  Obesity

Obesity has become a global health problem and has emerged as the important contributor to ill health, displacing undernutrition and infectious diseases. Overweight people are twice as likely to develop type 2 diabetes as people who are not overweight. Type 2 diabetes is a major cause of early death, heart disease, kidney disease, stroke, and blindness. In the United States, the prevalence of overweight and obesity has increased dramatically jumping from one of every four Americans to nearly two of every three. The rising rates among children are especially disturbing.

Myths, presumptions, and facts about obesity (NEJM 368:5, 2013)

Factors in the Development of Obesity, a Multi-factorial Disease
- Biological factors. Emphasis will be placed on the discussions of obesity genes. These discussions will include the *fto* gene, *ob* gene, and genes encoding the neuropeptide orexin, POMC and BDNF, as well as encoding the POMC receptor MC4.
  - Fat cell development
  - Adipose tissues
  - Sex and age
  - Race and ethnicity

Social and Environmental Factors (Professor Rosenfeld will teach this topic)
- Socioeconomic status
- The built environment
- Social factors

Lifestyle and Behavior Factors
- Physical activity
- Psychological Factors

Health Risks of Overweight and Obesity with focus on diabetes
Obesity Treatments
- By prescription drugs
- By bariatric surgery

Obesity Prevention
- Weight management
- Adopting a healthy weight-management lifestyle
- Diet and eating habits
- Physical activity
- Thinking and emotions
- Weight management approaches

Class 5. **June 30**
What has science contributed to the understanding and treatment of diabetes?
Basic research: T1DM and genetic causes
- T2DM and genetic causes
- Susceptibility of T2DM detected by epigenetic tools
- Stem cell research: Hope for cutting-edge treatment methods
- Gut bacteria and diabetes

Class 6. **July 7**
Each of the three student groups gathers to brainstorm and work on group project. Instructor and Program TA will circulate between groups to answer questions.

(To be confirmed) Guest lecture: Dr. K. C. Hayes, Brandeis University. Title: “From Fat Research to Smart Balance: Science at Work for Public Health”
Dr. Hayes welcomes questions from the class at the end of his lecture.

Class 7. **July 14**
Each of the three student groups gathers to brainstorm and work on group project. Instructor and Program TA will circulate between groups to answer questions.

(To be confirmed) Guest lecture: ______________, Brandeis University. Tentative title: “The Nile Rat: a Novel Model for Nutritionally Induced Type 2 Diabetes”
Guest speaker welcomes questions from the class at the end of his/her lecture.

Class 8. **July 21** Class continues teamwork on preparing group presentation and paper.

Class 9. **July 24** Class presentation on student-driven projects. Three student groups will give public presentations on race, culture, and the social and policy determinants of nutrition, obesity and diabetes. These presentations will include evidence-based critique of current science and policy solutions as well as new policy and program proposals.
FOOD LABS

Eight Food Labs (Tuesdays 1-6 PM) in Ridgewood Kitchen/Common Room unless specified otherwise. Please bring your lab coat to every Food Lab. At 1 PM, there will be a class discussion facilitated by the instructor and program assistant on the menu of the day, its suitability to a diabetic-friendly diet and cooking tips before we begin the all-hands-on-deck Food Lab at 2 PM.

FOOD LAB SCHEDULE

June 2  Food Lab # 1: Vegetables provide good sources of fibers, vitamins, minerals and phytochemicals including antioxidants, which are all good for our health. We will begin our HSSP JBS Food Lab with our appreciation for fresh vegetables, and to learn to prepare vegetarian dishes that are both delicious to eat and attractive to look at. Students will be preparing vegetarian eggrolls (Vietnamese Spring Rolls) and vegetarian sushi (California Rolls), followed by food tasting.

June 9  Food Lab # 2: The Mediterranean Diet has been scientifically proved to be a heart-healthy diet. It is also recommended as a nutritious diet for people with diabetes. Students will be cooking a meal based on the principles of the Mediterranean Diet, which includes Slowly Cooked Salmon (recipe by Jacques Pepin), Corn and Black Bean Salad and Balsamic Fig Salad. Everyone in class will enjoy eating together after food preparation in each Food Lab.

June 16 Food Lab # 3: We will prepare a scrumptious breakfast for diabetics. These recipes come from the cookbook “Eat to Beat Diabetes” by Robyn Webb. We will be baking or preparing as a class joint effort the following breakfast dishes: Summer Berry Muffins, Stuffed Eggs and Berry Salad with Passion Fruit (if passion fruit is not available, we will substitute with fresh peach sauce).

June 23 Food Lab # 4: Dietary proteins are either complete or incomplete, that is, whether the protein contains all the essential amino acids that our bodies do not make. We will focus on the preparation of dishes made with complete dietary proteins in this Food Lab. Our menu for this lab includes Asian Tofu-Vegetable Stir-Fry and Chicken, Broccoli and Red Pepper Stir-Fry. These protein-rich dishes will be paired with Jasmine White Rice and Nutritious Brown Rice. Recipes for this Food Lab are selected from DIABETES FORECAST, The Healthy Living Magazine.

June 30 Food Lab # 5 on the topic of salads. We will prepare four delightful summer salads in our Food Lab today. They are Tomato and Peach Salad, Roasted Potato Salad, Mushroom Orzo, Tropical Ambrosia made with mangoes, pineapple, kiwifruits and oranges. Recipes for this Food Lab are also selected from DIABETES FORECAST, The
Healthy Living Magazine. This is also the day for the Joint JBS Event proudly and graciously hosted by the FLH JBS.

Group A discusses their cultural cuisine menu planning with instructors
The other groups work on their menu planning.

**July 8**  
Food Lab # 6: Cultural cuisine prepared by Group A  
Group B discusses their cultural cuisine menu planning with instructors  
Group C works on their menu planning

**July 15**  
Food Lab # 7: Cultural cuisine prepared by Group B  
Group C discusses their cultural cuisine planning with instructors  
Group A works on their ‘position’ paper

**July 22**  
Food Lab # 8: Cultural cuisine prepared by Group C  
The other groups work on their ‘position’ papers.

**A note on our Joint JBS Event:** Our Joint JBS Event is planned for June 30 Food Lab. 2013 and 2014 FLH JBS students loved this opportunity of ‘show and tell, taste and party’. Not only can we share our culinary expertise with guests, other JBS students, administrators and faculty, we will enjoy fielding questions from people who would come up to learn from us about what we have been researching, cooking and studying. In addition to what we will be cooking in the Food Lab on that day, we will bring in fresh vegetable trays, fruit trays, as well as other nutritious ‘finger’ foods. Let us welcome this event and enjoy sharing what we have learned about the diabetes epidemic and the importance of food in the management and prevention of Type 2 diabetes mellitus.

**ASSIGNMENTS, COURSE GRADING**
The final grade will be determined as follows:

30% **Classroom participation/preparation:**
The success of this class depends on responsible participation by all students for each class, demonstrated by participation and contribution to class discussion and Food Labs. There is no assigned text or written exams. Assigned articles and papers will be handed out in class and posted on LATTE. I embrace scholarly and intellectual engagement and investment in the class and evidence in the material under study.

Attendance is required and recorded per class. Absences will be excused on sound reasons in advance by email. If an unanticipated absence arises, please submit a written email explaining the reason of the absence before the next class.

35% **Student-driven project on the preparation of a diabetic-friendly meal of one of the following racial/ethnic groups in the United States:**  
Africa Americans, Hispanic Americans, Asian Americans and Native Americans develop type 2 diabetes at much higher rates than the White population in the United States. Each
student group will explore one of the above groups. There will be a total of three student groups. Team work is encouraged among each group as students research, brain-storm, plan their diabetic-friendly meal menu as they study a particular cultural diet, lifestyle, social-economic status, health care availability or disparity, language proficiency if applicable, and other factors that might help to explain the higher diabetes rate among this sub-population group. This meal should be representative of the chosen cultural cuisine. Each student group will plan a menu, gather ingredients by going grocery shopping with the Program TA in advance of the Food Lab, cook the meal in the Food Lab and present to the whole class for tasting. Before food sampling, each student in the group that prepares the meal will give a ten minute talk on one or two food dishes of this meal to explain the ingredients used, food preparation techniques and cultural characteristics of the food dishes. Emphasis of their talks should be given to their thoughts and culinary efforts to modify recipes (if necessary) to make the meal suitable for diabetics to enjoy. Students are encouraged to compare the cultural diet they have chosen to study with the gold standard of diets (the Mediterranean Diet) and develop their own ideas regarding applying some principles of the Mediterranean Diet to make their cultural meal more diabetic-friendly. The menus of these meals should be handed in on the day of the respective Food Lab.

35% Student-driven project on a final public PowerPoint presentation and “position paper”:
Again students are encouraged to develop good team-working skills, carry out research, analyze data, do critical thinking, design effective PowerPoint slides and arrive at a PowerPoint presentation (30 minute talk shared by every student in the group, followed by 15 minutes of questions and answers) and a 10-12 page “position paper”. Both the talk and the paper would introduce the biology behind the pathophysiology of diabetes and its rising prevalence, discuss the importance of diet and exercise in the management and prevention of Type 2 diabetes, genetic factors, diabetes detection and treatment (current and future) that is cost-effective and culturally appropriate. This introduction is followed by a scholarly report of each group’s chosen study of a racial/ethnic group that is more prone to developing diabetes in our country. Each student group will choose one of the following racial/ethnic groups to research on. These four groups are Native Americans, Hispanic Americans, African Americans and Asian Americans. The students would present their research on the particular cultural diet, lifestyle, social-economic status, health care availability or disparity, language proficiency if applicable, and other factors that might explain the higher diabetes rate seen among this sub-population group. This paper would end by stating the “position” of the student group as to how to set up social and health policies or programs to encourage — make it possible for — people in their relevant racial/ethnic group to live healthily, eat nutritiously, exercise regularly and help to reduce the rising prevalence of diabetes.

Oral communication training and experience
Class discussions will be held throughout the JBS semester regarding public speaking skills. Students are encouraged to practice their group talks among themselves, with the Program TA or in front of their friends in advance of presentation time in order to learn
and gain public speaking experience and to time their presentation to fit the allowable time of 30 minutes.

*Final course grades* for each course will be individually determined by the professor in charge of each course based on all the expectation and requirements as specified in each syllabus.

**RESEARCH AND CITATION PROTOCOL**

Students need to know how to research library and web resources and apply proper citation protocol. When in doubt, please consult a reference librarian or the instructor or TA.

**DISABILITY STATUS**

If you are a student with a documented disability on record at Brandeis University and wish to have a reasonable accommodation made for you in this class, please see the instructors immediately and bring your documented papers.

**ACADEMIC INTEGRITY AND CLASSROOM ETIQUETTE**

Please follow university policy. Be respectful to each other, and have fun learning together.

**CONCLUSION**

It is my intention that the Instructor, TA and the students will have fun learning the topics of nutrition and diabetes rigorously in a scientific way via the proposed combination of lectures, student-driven research, class discussions, teamwork and self exploration, as well as enjoying food preparation followed by feasting on the fruitful labors of our cooking in the Food Lab. It is my hope that some of the students will become inspired to extend this learning not only to how they live their lives but possibly even ultimately to help with health care provision, educating the public about this rapidly rising complex metabolic disease and influencing health policy.