Engineering Innovation (EGN 4643 and EGN 6642)  
Class Day & Time: Thursday 1:55PM – 4:45PM  
Location: New Engineering Building, Room 102  
Course Syllabus and Rules

Catalog Description:
Engineering Innovation introduces students to the concepts of innovative thinking and innovation practices. Undergraduate (EGN 4643) and graduate (EGN 6642) students meet as a combined course that uses lectures, case studies, team exercises, the Spotlight on Innovation, and guest speakers to teach valuable life skills in innovative thought and action. Students study the vital role engineers play in problem-solving and in the innovation process, and take action by applying lessons learned in engineering careers that range from starting entrepreneurial ventures to executing R&D engineering-related projects to leading multinational companies.

Course Overview:
Innovation has transformed the world for millennia. Engineers have played an instrumental role in innovation and the innovation process. Engineers face both an unprecedented opportunity as well as a daunting challenge in continuing this role well into the 21st century. In its report, *The Engineer of 2020: Visions of Engineering in the New Century*, the National Academy of Engineering described how engineering students require instruction to become global leaders in engineering professions, non-engineering related industries, scientific research, academia, and society. Competition to assume this global leadership involving all-things related to innovation is intense, with technology accelerating the pace of transformation by highly educated and deeply skilled engineers. Winners in today’s hyper-competitive global environment will achieve professional success by developing their technical aptitudes, deepening their leadership attitudes, and sharpening their communication skills and interpersonal abilities. These winners will be engineers who are innovators and become expert practitioners in the process of innovation.

Engineering students and engineering professionals seeking this success are faced with the realities of navigating these global realities. Engineering Innovation prepares students with the insights and instruction necessary to successfully lead worldwide enterprises or local ventures. Students are exposed to weekly lectures covering timely real-world issues faced by organizations ranging from global multinationals to garage startups. Lectures are based on experiential learning, are fact-based, and emphasize a best practices approach used by engineering leaders who successfully develop commercially viable products (services), create efficient operating processes, manage profitable organizations, and transform companies into industry leaders. These leaders are engineering innovators capable of operating on a global scale.

Credit Hours: 3

Important notice: Graduate students do not receive graduate credit for taking the undergraduate version (EGN 4643) of Engineering Innovation. Graduate students may enroll in EGN 4643 but the three credits earned do not count toward the students’ graduate degree.

Prerequisite:
For EGN4643: Sophomore, junior, or senior status, or Instructor's permission.
Course Objectives:
Students examine the innovator’s mindset and explore the culture of innovation. In a real-work, hands-on way, students learn how to be innovative and understand why innovation is integral to commercial success in the 21st Century’s digital revolution. Innovation strategies and tactics are evaluated from the perspective of ideation; that is, turning innovative problem-solving ideas into products (services) that are produced, sold, and consumed in a highly competitive global marketplace.

Students develop an appreciation for the importance of innovation. A best practices approach is used to demonstrate how to develop commercially viable products (services), create efficient operating processes, and operate profitably sustainable organizations. Students learn how technology can serve as both a pathway and a roadblock in organizations committed to operating with an innovator’s mandate. Students are taught practical, applicable, and time-tested skills they can use in enterprises ranging from startup ventures to Fortune 100 companies.

Contribution of course to meeting the professional component:
Not applicable as course is not specific to a major.

Relationship of course to program outcomes:
Explore the role engineers and the engineering industry has on organizations involved in innovation and the innovation process. Students learn how to succeed on multidisciplinary teams; gain an understanding of professional and ethical responsibility; learn how to communicate effectively; acquire a broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context; develop an understanding of contemporary business and societal issues related to innovation and the innovation process.

Instructor:
David Whitney, Entrepreneur in Residence
University of Florida College of Engineering
Engineering Innovation Institute
Office: Weil Hall 311
Tel: (352) 392-8049 ext. 1008
Fax: (352) 392-9673
E-Mail: dwhitney@ufl.edu
Teaching Assistant: None

Important notice: Please do not send e-mails via Sakai. Instead use dwhitney@ufl.edu to send messages to Professor Whitney.

Office Hours: By appointment.

On-campus Class Meeting Times: Thursday, Periods 7-9 (1:55pm – 4:55pm) in New Engineering Building room 102.
**Class/laboratory Schedule:** The course will typically be delivered weekly through a lecture overview by the instructor or a lecture/seminar/workshop administered by the instructor and supported by guest presenters.

**Material and Supply Fees:** See UF Registrar’s Schedule of Courses.

**Textbooks and Software Required:** Students are encouraged to read one of the three books found in the Reading section. Students choose which one they wish to read. For software and online connection, students are required to have access to Sakai to view and take action on assignments, announcements, and course-related items posted by the instructor.

**Website:** [https://lss.at.ufl.edu/](https://lss.at.ufl.edu/)

**Recommended Reading (Choose One):**

**Class Outline:**
Engineering Innovation is firmly presented in an experiential learning “real-world” format. Students pursue problem solving ideas and write an innovation action plan (“Innovation Playbook”) that aligns their proposed problem-solving innovative solution with innovation concepts learned during the course. Upon completion of the course, students have acquired the hands-on, marketable skills in which they are able to pursue engineering careers ranging from that of an entrepreneur in an entrepreneurial venture to an intrapreneur working in a corporate enterprise to a senior executive leading a multinational organization.

Engineering Innovation is delivered along the following outline:

I. **Introduction to Innovation** – Innovation Past, Present, Future; Engineers as Global Innovators; Writing an Innovation Playbook; Successfully Executing Strategies & Tactics; Innovation Types; Innovation Methods & Methodologies.
II. **Ideation:** Moving Ideas Up the Value Chain – Ideation & Creativity; Idea vs. Opportunity; Keys to Creativity; Pattern Recognition; Creativity Tools; Overcoming Mental Blocks; Developing an Innovator’s Mindset.
III. **Conceive and Create a Game-changing Innovation Playbook** - Innovation Outcomes: Environmental & Social Impacts; Process-oriented Approaches; Continuous Innovation as a Business Model; Intellectual Property’s Role in Innovation.
IV. **Play to Win:** Executing Innovation Strategies and Tactics - Ideas + Execution Plan = Innovation; Step-by-Step Methodology; Executing Ideas 101; Continuous Innovation’s Impact on the Company’s Operations; Co-operation w/Competitors; Individual vs. Team Innovation; Innovation Ethical Quandaries.
V. **21st Century Innovation:** Think and Act Globally - Local Challenges-Global Solutions; Engineering's Impacts on Every Century; The World is Flat; Nature-inspired Innovation; The Future of Global Engineering Innovation.
Attendance and Performance Expectations:

**For on-campus students:** attendance is mandatory at class sessions. More than one unexcused absence can result in a loss of a letter grade per each unexcused absence at the discretion of the instructor, subject to the UF attendance policies. Attendance will be taken by the instructor during any class period; attendance for the entire class session is required unless the instructor has approved otherwise. The instructor has the right, at his sole discretion, to excuse an absence provided the student sends an e-mail to the instructor prior to the start of a class session in which an excused absence is requested. Students receiving excused absences are required to watch the class session missed online as well as to fulfill any/all course requirements associated with missed class sessions. Failure to watch the missed class session online in its entirety before the start of the next week’s scheduled class will result in a student receiving an unexcused absence.

For both on-campus and EDGE students:

- All lecture materials are posted in the Sakai Lessons tab. Students are required to read these materials before the corresponding class session.
- Reading materials have been specifically chosen to provide certain insights and instruction for each class session. These materials are required to be read before class.
- Unless stated otherwise, all assignments are to be submitted via Sakai by the stated due date/time deadline. Late submissions of assignments are not accepted, subject to the policies of the undergraduate (https://catalog.ufl.edu/ugrad/current) or graduate (http://gradschool.ufl.edu/students/catalog.html) catalogues, as appropriate.
- **All students are required to read all posts/view all videos posted in the Sakai Discussion Forum.** Students are also required to post articles/videos of their choice related to innovation in the Sakai Discussion Forum. Students should click “mark all as read” tab in each post; doing so indicates an article has been read and/or a video has been viewed. Students’ immersing themselves in this peer-to-peer learning platform is an important activity in Engineering Innovation.

Much effort has gone into the design, implementation, and delivery of Engineering Innovation course materials. It is students’ responsibility to learn – which is why students are expected to collaborate with the instructor to:

- Identify a student’s personal learning goals and determine ways to measure the progress made in achieving those goals.
- Think critically and step out of comfort zones to explore new innovation concepts, best practices methods, and innovative practices.
- Actively engage in classroom discussions by explaining insights while accommodating others’ personal viewpoints and perspectives.
- Completing assignments on-time and being prepared for all classroom lectures and ready to engage in all guest lecturer-led discussions.
- Adhering to the University of Florida’s policy on academic conduct and personal integrity.

Grading:

Undergraduate and graduate students follow the same course schedule and participate in lectures based on experiential learning concepts. All students are required to complete the same reading and written homework assignments and all students must demonstrate a “hands-
on/real-world” approach to learning about innovation. One way of demonstrating active participation is through class participation and in course-related interactions with the instructor.

Final grades for Engineering Innovation will be determined as follows:
Innovation Playbook – 30%
Assignments – 70%

Undergraduate students are required to learn of the history of innovation. However, undergraduates are not expected to apply specific business concepts or current business practices as most undergraduates do not yet possess the experience and/or knowledge to apply innovation principles in most business situations. Undergraduate students are expected to immerse themselves in subjects involving innovation and to develop a deep appreciation of the innovation process and its outcomes. Graduate students are required to perform a “deep dive” into innovation which results in examining historical business cases and current business situations for applying proposed problem-solving innovative solutions. Graduate students are also expected to develop a deep appreciation of the innovation process and its outcomes.

Both undergraduate and graduate students are required to deliver – as a final course project – an Innovation Playbook. The Innovation Playbook is a 10-15 page capstone report that describes a specific problem-solving innovation aligned with one of the National Science Foundation’s Engineering Grand Challenges for the 21st Century. Working in self-selected teams of 2-3 students, undergraduates and graduates collaborate on the Innovation Playbook which includes a poster board illustrating the team’s proposed innovation aligned in solving one of the National Science Foundation’s Engineering Grand Challenges for the 21st Century.

EDGE students will work individually on the Innovation Playbook assignment as well as on all other Engineering Innovation course assignments.

Final grades for Engineering Innovation will be determined in accordance with the University of Florida’s grading scale, which is as follows:

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<th>Points</th>
<th>Letter Grade</th>
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<tr>
<td>90-100</td>
<td>A</td>
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<td>87-89</td>
<td>A-</td>
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<td>84-86</td>
<td>B+</td>
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<td>80-83</td>
<td>B</td>
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<td>74-76</td>
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In order to graduate, graduate students must have an overall GPA and an upper-division GPA of 3.0 or better (B or better). Note: a B- average is equivalent to a GPA of 2.67, and therefore, it
does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: http://gradschool.ufl.edu/students/catalog.html.

**Unless stated otherwise, assignments must be submitted by Sakai by the stated deadline.** Students are strongly encouraged to submit their assignments well before deadlines as late submissions will not be accepted under any circumstances. Students who do not submit assignments via Sakai by the stated deadlines will receive 0 points for that assignment, subject to the policies of the graduate catalogue (http://gradcatalog.ufl.edu/) as appropriate.

**Academic Integrity:**
As a student at the University of Florida, you committed yourself to uphold the Honor Code. The Honor Code includes the following pledge: “We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.”

All students are expected to exhibit behavior consistent in adhering to the Honor Code and any violation of the Honor Code will not be tolerated. All work submitted for credit at the University of Florida is accompanied by the following pledge that is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” It is assumed that students will complete all work independently in each assignment unless the instructor provides explicit permission for students to collaborate on course tasks.

As part of students’ obligation in upholding the Honor Code, students should report any condition that facilitates academic misconduct to appropriate personnel. It is each student’s individual responsibility to know and comply with the all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the UF Student Honor Code, please see: http://www.dso.ufl.edu/scer/honorcodes/honorcode/php.

**Accommodation for Students with Disabilities:**
Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

**UF Counseling Services:**
Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
- UF Counseling & Wellness Center, 3190 Radio Road, 352/392-1575, psychological and psychiatric services.
- Career Resource Center, Reitz Union, 352/392-1601, career and job search services.

**Software Use:**
All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Such violations are also against University policies and rules and disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.