Course Syllabus and Rules of Engagement

Catalog Description:
Engineering Innovation introduces undergraduate and graduate students to the concepts of innovative thinking and innovation practices. The course uses lectures, case studies, 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 completing research and development activities, to executing engineering-related projects, and to leading multinational companies to industry-leading excellence.

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 are the innovators-as-engineers who become expert practitioners in the process of creative ideation, disciplined execution, and successfully commercializing problem-solving innovations.

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 garage startups to global, industry-leading multinationals. Fact-based lectures emphasize experiential learning and best practices methods; the best practices learned from both are applied by engineering leaders to successfully develop commercially viable products and services, create efficient operating processes, manage profitable organizations, and transform companies into industry-leading innovation-fueled organizations. The course prepares engineers to operate as innovators capable of leading organizations to perform on a global scale.

Credit Hours: 3
Course Objectives:
Students examine the innovator’s mindset and explore the culture of innovation. In a real-work environment, 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 viable products (services) that are produced, sold, and consumed in a highly competitive global marketplace.

Students develop an appreciation for the importance of innovation – and how it is applied. 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 that can be applied 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:
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Teaching Assistant: None

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

Office Hours: By appointment for in-person meetings and/or meetings via phone or Skype.

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.

E-mail Communications: All course-related e-mail communications are sent to the student’s university-issued official University of Florida e-mail address.
Material and Supply Fees: See UF Registrar’s Schedule of Courses.

Textbooks and Software: Students are required to read Inside the Box: A Proven System of Creativity for Breakthrough Results. It is strongly recommended students read one of four books listed in the Optional Reading section. For software and online connection, students are required to have access to Canvas to view and take action on assignments, announcements, and course-related items posted by the instructor.

Website: https://lss.at.ufl.edu/

Required Reading
• Inside the Box: A Proven System of Creativity for Breakthrough Results. Boyd, Drew and Goldenberg, Jacob.: ISBN-978-1-4516-5925-2. Simon & Schuster Paperbacks (2013). (Instructor’s note: Inside the Box is available new, used, as an e-book, and/or an audio book. The authors are terrific storytellers and insightful commentators of all-things innovation – especially how innovation is successfully conceive and applied. References to, and discussions about, Inside the Box will start approximately the last week of June.)

Optional Reading (I strongly recommended one of these four titles be read; all books are easy-to-read, value-packed, insightful, and fun):

Course 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 bases a proposed problem-solving solution with innovation concepts learned during the course. Upon completion of Engineering Innovation, students will have acquired the hands-on, multi-faceted “tools”, and marketable skills they can use to pursue engineering careers ranging from entrepreneur in a startup venture, to intrapreneur working in a corporate enterprise, to 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.

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.

Instructor’s Guidelines and Expectations of Student Performance:

- All weekly lecture materials are posted in Canvas’ Lessons tab. Students are required to read/view these materials corresponding to each session before watching videos.
- Reading materials have been specifically chosen to provide specific 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 Canvas by the stated due date/time deadline. **There is no make-up option in Engineering Innovation; late submissions of assignments are not accepted** subject to the policies of the graduate (http://gradschool.ufl.edu/students/catalog.html) catalogue, as appropriate.

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

- Identifying a student’s personal learning goals and determining ways to measure the progress made in achieving these goals.
- Thinking critically and stepping out of one’s comfort zone(s) to explore new innovation concepts, becoming familiar with best practices methods for achieving successful innovation outcomes, and applying innovative practices in the workplace – and beyond.
- Actively engage with the instructor by explaining insights either via in-person meetings, online exchanges, and/or telephone conversations – including Skype.
- Completing assignments on-time and in-full. Students should be prepared in advance for all weekly lectures.
- Adhering to the University of Florida’s policy on academic conduct and personal integrity.

**Grading:**

Students watch lectures that are based on experiential learning concepts. All students are expected to complete reading and homework assignments in which a high degree of professionalism and academic excellence are found. Similarly, students are expected to demonstrate a “hands-on/real-world” approach to learning about innovation’s origins, applications, and outcomes. One way of demonstrating active participation is to interact and engage with the instructor throughout the semester. Final grades for Engineering Innovation will be determined as follows:

- Innovation Playbook – 40%
- Assignments – 60%

Students are expected to learn about the history of innovation and to apply best practices learned to specific business (engineering) concepts and marketplace realities. Students are expected to immerse themselves in subjects involving innovation and to develop a deep appreciation of the
innovation process and the processes’ intended outcomes. Students are required to perform a “deep dive” into innovation concepts and applications; doing so results in examining past and present business situations so as to apply proposed problem-solving innovative solutions. Students are also expected to develop a deep appreciation of the innovation process and to adopt innovation practices both professionally and personally.

Students are required to deliver – as a final course project – a group-written Innovation Playbook. The Innovation Playbook is a 12-15 page capstone deliverable 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, students collaborate on the Innovation Playbook which includes a “poster/story board” illustrating the team’s proposed innovation. The Innovation Playbook must be based on a problem-solving innovation aligned with one of the National Science Foundation’s Engineering Grand Challenges for the 21st Century. Proposed problem-solving innovations not aligned with 1 of the 14 Engineering Grand Challenges will not be evaluated and will receive a score of 0 points.

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>
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<td>87-89</td>
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<td>84-86</td>
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<td>80-83</td>
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<td>74-76</td>
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<td>70-73</td>
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<td>67-69</td>
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For undergraduate students: A grade of C- will not be a qualifying grade for critical tracking courses. In order to graduate, undergraduate students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, visit: https://catalog.ufl.edu/ugrad/current.

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, all assignments must be submitted via Canvas by the stated deadline. It is the sole discretion of the instructor to determine if an individual student is making meaningful and measurable contributions to his/her team. The instructor reserves
the right to lower an individual student’s grade on any, and all, group assignments to a grade that the instructor – at his discretion – believes accurately reflects the individual student’s lack of meaningful and measurable contribution, responsibility, and accountability involving group assignment(s).

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 Canvas by the stated deadlines will receive 0 points for that assignment, subject to the policies of the graduate catalogue (http://gradcataglog.ufl.edu/) as appropriate.

Academic Integrity:
As a student at the University of Florida, you committed yourself to uphold the University’s 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/sccr/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, Gainesville; 352/392-1575. Psychological and psychiatric services.
- Career Resource Center, Reitz Union, University of Florida campus in Gainesville; 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.