Course number and name

MTSE 5800.024 – Invention and Innovation

Credits and contact hours

3 Credits. Fall 2022; M/W 2:30-3:50 pm

Instructor’s or course coordinator’s name

Instructor: Dr. Rajiv Mishra

Textbook, title, author, and year

Lectures slides will be posted on Canvas as pdf files. There is no textbook.

a. Other supplemental materials – Additional reading materials will be provided during the semester. Several general study materials will be recommended

Specific Course Information

a. Brief description of the content of the course

Invention and Innovation are the key mantras for technological advantage and competitiveness of engineering companies in the U.S. Yet, in the formal training of graduate students, this aspect is often overlooked. This course is designed to better prepare our graduate students to make major contributions to this global economy. While invention is often a chance discovery by a prepared mind, the process of innovation is a progression of engineered design. This course will formally introduce the science of innovation. New materials and disruptive processes create an enabling environment for exceptional technological breakthroughs. A series of case studies will be presented to teach an anatomical approach to analyze materials and process innovations. Students will then concurrently apply this approach to create either a new alloy or process innovation during an eight-week stretch of guided learning module. In the last three weeks of the course, the students will launch a virtual company and write a business proposal to market their innovation.

b. Prerequisites or co-requisites

Graduate student standing in engineering.

c. Indicate whether a required, elective, or selected elective course in the program

Elective

Course structure:

• Instructor lectures on Mondays
  o Anatomical analysis of inventions and innovations
  o Systems approach for materials and process integration
  o Illustrative case studies on materials discovery and development
  o Illustrative case studies on process inventions and innovations
• Framework of attribute-based analysis
• Barriers to implementation or adoption of new materials and disruptive technologies.
• Guest lectures in weeks 4-10 on Wednesdays.
• Term paper topic discussion/selection in weeks 1-3 on Wednesdays.
• Hands-on workshop style interactive teaching on business development and marketing during the weeks of 12-14 including discussion with small business entrepreneurs.
• Grading will be based on (a) term papers on materials innovations and process innovations, and (b) report and presentation on virtual company and marketing plan.

**GRADING**

Term papers……………………………… 60%
Presentations…………………………. 20%
Reports………………………………….. 20%

Note
Homework must be turned in during the class. If you intend on missing a class, the homework should be submitted BEFORE the due date.
The total numbers of points possible is 100, and grades will be assigned as follows:

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<th>Points</th>
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<tr>
<td>&gt;86</td>
<td>A</td>
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<td>&gt;75</td>
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1. **Academic Integrity Standards & Sanctions for Violation**

Students caught cheating or plagiarizing will [instructors should insert consequences, insert sanction, such as course failure]. Additionally, the incident will be reported to the Dean of Students, who may impose further penalty. According to the UNT policy, the term "cheating" includes, but is not limited to: a. use of any unauthorized assistance in taking quizzes, tests, or examinations; b. dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; c. the acquisition, without permission, of tests or other academic material belonging to a faculty or staff member of the university; d. dual submission of a paper or project, or resubmission of a paper or project to a different class without express permission from the instructor(s); or e. any other act designed to give a student an unfair advantage. The term "plagiarism" includes, but is not limited to: a. the knowing or negligent use by paraphrase or direct quotation of the published or unpublished work of another person without full and clear acknowledgment; and b. the knowing or negligent unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

2. **ADA Statement**

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at disability.unt.edu

3. **Emergency Notification & Procedures**

UNT uses a system called Eagle Alert to quickly notify you with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). The system sends voice messages (and text messages upon permission) to the phones of all active faculty staff, and students. Please make certain to update your phone numbers at my.unt.edu. Some helpful emergency preparedness actions include: 1) know the evacuation routes and severe weather shelter areas in the buildings where your classes are held, 2) determine how you will contact family and friends if phones are temporarily unavailable, and 3) identify where you will go if you need to evacuate the Denton area suddenly. In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.