## Course Outline: EGRMGMT 572.01 and 572.02
## Innovation Management in Technology-based Organizations Fall 2024

*Instructor:*
Jeffrey T. Glass, Ph.D., M.B.A
Hogg Family Director of Engineering Management and Entrepreneurship
Professor, Department of Electrical and Computer Engineering
Professor, Department of Mechanical Engineering and Materials Science
Pratt School of Engineering, Duke University
Durham, North Carolina 27708
Office: Teer Building, Rm 118
Mobile: (919) 452-7158, jeff.glass@duke.edu
*Co-Instructor:*
Kyra McDonald
Adjunct Assistant Professor
Mobile: (813) 426-4577, kyra.mcdonald@duke.edu
*Teaching Assistants:*
Tanya Nijhawan, tanya.nijhawan@duke.edu
Jescetta Joy, jescetta.joy@duke.edu

## ABSTRACT

This course will take students through a variety of issues related to managing technology and innovation in the context of a technology-based organization. It is about managing know-how and innovation processes as well as creating an organizational culture that fosters and supports innovation. We will study best practices and benchmarks, but students must develop their own approach to managing innovation given each unique situation; including, the organization's culture, the employee's strengths/weaknesses, etc. Nonetheless, there are accepted practices and concepts that will help guide students in developing a deeper understanding of this area. Learning objectives include: i) understanding the different processes that affect innovation in a technology-based firm, ii) how to create a culture of innovation in an organization, iii) the critical role of champions and iv) key concepts of innovation strategy.

## INTRODUCTION

Welcome to both campus program and online program students to our Innovation Management Course! This course will take you through a variety of issues related to managing technology and innovation in the context of a technology-based organization. Because there is sometimes confusion about terms, let me emphasize that the phrase "management of technology" and "managing innovation" are NOT about managing "Information Technology". Rather they are about managing know-how in an organization. In many ways they are the cornerstone of managing competitive advantage in today's global environment.

Management is messy. It is a complex field and the management of innovation is relatively young. You will not find any 'absolute truths' and there is no simple way to think about managing all aspects of an organization. There will be best practices and benchmarks, but each situation is unique in its own way. You must develop your own approach to managing innovation

given the situation, your organization's culture, the industry environment, your own strengths/weaknesses, etc. Nonetheless, there are accepted practices and ideas that will help guide you in doing this and we will explore these together during the course. Studying these will help you develop your intuition about how to manage innovation, so you can handle each unique situation with a customized approach rather than trying to apply a one-size-fits-all formula.

**IMPORTANT NOTE**: These concepts are NOT specific to a particular industry. Although we will utilize certain companies as examples, most concepts translate across numerous industries, including both services and products. Although time will not allow us to explore the details of how all the concepts apply to each industry or each corporate culture, you can and should do this on your own. As you begin to understand the basics of the concepts we discuss, you should then think about the impact of corporate culture and industry specific attributes on the applicability and limitations of the concepts. Similarly, you should see commonalities of the concepts in this course and various aspects of your other courses. If you observe this, great! Each topic has multiple perspectives, and the focus will vary from course to course. But more importantly, if you have seen a topic before, you should be able to dig much deeper into the details and nuances of the topic when it comes up in this class. If you simply skim the topic because you have seen it before, you are missing an important opportunity to improve your understanding of the trade-offs associated with the topic and thus, ultimately, improving your performance in the workplace.

## LEARNING OUTCOMES
The learning outcomes from the course should be an understanding of:
1. The different types of innovation in a technology-based firm
2. The definitions commonly used in describing innovation processes
3. Concepts for how to organize staff for technical development
4. What enables and motivates technical staff to be innovative
5. The critical role of champions and avoiding common problems
6. Key concepts of innovation strategy
7. Creating a culture of innovation in an organization


Each class will generally consist of the following elements although the amount of time spent on each will depend on the topics any given week:
1. Student presentation and discussion on case from previous week's material
2. Mini Quiz on readings (multiple choice/true false; 3 to 5 questions)
3. Lecture (based on readings AND additional information not covered in readings)
4. Discussion of readings
5. Exercise/breakout session

Each class session will require preparation by reading the assigned material, watching a video and/or analyzing a case. I will ask people to comment on the readings, so everyone must come prepared. This requirement that you speak up in class and participate in discussions is an important skill for becoming an influential and skillful manager. For our Online Program taking the course, discussions will take place on a Canvas discussion forum the week after the given class. On-site students are also encouraged to participate in the discussion board, and it will count for class participation.

**EXCUSED ABSENCE AND LATE ARRIVAL POLICY**

On-campus students are granted two excused absences per semester and must email the Teaching Team before the scheduled class to confirm absence. If a student is absent, quizzes must be completed online by 11:59 p.m. the night before the subsequent class. Late arrivals of more than 30 minutes to class will account for one-third of the full participation grade. Special health circumstances will be considered on a case by case basis with verification from student health.

Online program students are expected to view the classes via Panopto and participate via the discussion board for each class. A link for each class will be posted in Canvas.

**GRADING**

This course is about learning concepts and developing skills/habits that will make you successful, not getting a specific grade. I understand that some companies use grades to screen the students they hire but your career success will be MUCH more determined by how much you learn rather than what grades you get. If you do not make the grades that a particular company requires, look at other companies. With the right preparation and performance, you can work for that company a few years from now when they don't care about your grades, just your performance (which again, is much more strongly influenced by what you learn than what grades you get).

Class participation and team/self-evaluations are part of the grading. Class participation can be on the discussion boards or in the classroom. Quality of participation is more important than quantity. Note that Peer Evaluations are based on the perception of how your team members feel you contributed to the team. It is NOT how well YOU feel you contributed to the team. Thus, if you contribute well to the team but the team does not perceive that you contributed well, your evaluations are likely to be low. This is the real world. As one of our alumni mentioned to me, her manager told her the first week she started in her job that part of her performance evaluation will be based on how well she manages the **perception** others have of her work. This is entirely logical, and you should begin to accept this and develop this skill now. Similarly, self-awareness is an important leadership skill that we want to help you develop through this course. Understanding how your actions impact others and how they perceive your contribution is an important part of self-awareness.

Each week after add/drop a case will be provided for teams to analyze primarily based on that week's material. One on-campus team will be chosen each week (in advance) to present the case in class and one online team will be chosen each week to present through either a recorded video (if an online team prefers to present synchronously to the professor that is also fine and can be scheduled at the teams request). However, all teams must hand in a slide deck of their analysis. More details on the cases and the final project presentation will be provided during the class.

Breakdown of how grades will be determined are as follows:
- Class participation (in class or on discussion board) – 10%
- Team/Peer-assessments – 15%
- Self-assessments – 5%
- Quizzes: multiple choice and true-false – 10%

- Weekly Cases – 30%
- Final Team Presentations – 30%


## MENTAL HEALTH

As a student, you may experience personal or academic stress at some points throughout the semester. Duke offers several resources for students to both seek assistance on coursework and improve overall wellness, including, but not limited to:

DuWell at (919) 681-8421 or duwell@studentaffairs.duke.edu
- Purpose is to provide students an understanding of what wellness is and how it applies to their lives. Moments of Mindfulness programs teach practical steps that students can use, in order to facilitate the growth of their personal wellness.

WellTrack- https://app.welltrack.com/
- Offers a suite of online tools and courses that help you identify, understand and address issues that you are having. Using the variety of tracking and assessment tools and practicing mindfulness can be essential in maintaining your mental health.

The purpose of the above programming is to assist students in having a daily practice of wellness management. If your mental health concerns and/or stressful events negatively affect your daily emotional state, academic performance, or ability to participate in your daily activities, additional resources are available, including:

DukeReach at http://studentaffairs.duke.edu/dukereach
- DukeReach provides comprehensive outreach services to identify and support students in managing all aspects of their wellbeing. If you have concerns about a student's behavior or health visit the website above for resources and assistance.

Counseling and Psychological Services (CAPS) at (919) 660-1000
- CAPS services include: individual, group, and couples counseling services, health coaching, psychiatric services, and workshops and discussions

Blue Devils Care at bluedevilscare.duke.edu
- Blue Devils Care is a convenient and cost-effective way for Duke students to receive 24/7 mental health support through TalkNow.


## HONOR CODE

Note that students are expected to follow the **Duke/MEMP Honor Code and Code of Conduct** for this class. We may use some cases and exam questions from previous years, so you are NOT to obtain copies of such documents from previous years and you are NOT to provide them to next years' students. Either of these actions is considered an honor code violation and could be grounds for expulsion. Please see your orientation materials and program site for more information about the Duke Honor Code. As most of you have heard during orientation, students have been suspended from their program due to what they thought were minor infractions of the honor code.

The use of an AI tool such as ChatGPT is not recommended for this class. We are evaluating your submissions on your comprehension and application of course material and lecture discussions. Also, you will need to verbally engage in Q&A during presentations (Online students will do this remotely for the final project) and answer questions specific to your experience so you will need to learn the material for these situations where AI cannot be used. As we encourage ideation and thoughtful contributions, it's important to note that while AI assistance is permitted for brainstorming, the optimal responses will naturally stem from a comprehensive understanding of the course materials. Please refrain from direct copying and pasting from AI generated content.

**WEEKLY TOPICS**
The general areas we will cover are: 1) types of organizational structures, 2) managing the innovation process, 3) managing human resources in a technology-based firm, and 4) managing innovation and technology strategy. Thus, the areas of consideration to achieve an innovative organization are:
- **Managing Structure**
- **Managing Process**
- **Managing People**
- **Managing Strategy**

Note that all these areas overlap and there is not an easy way to consider a single topic. They are integrated in any management situation.

_Note about class preparation readings/videos and final team project presentation_: The pre-readings/videos for each week are listed below, however, we may modify the readings as the semester progresses if we find new readings that are of particular interest. If we do, we will announce this in class and will post a modified syllabus. There are now excellent articles and blogs for innovation on the web, so we have been able to support the class with these readings rather than a textbook. Previous students have indicated a strong preference for this approach. This has the added benefit of providing you with ongoing resources for after graduation. If you have a reading you recommend that is a good fit with our class topics, please post it to the Canvas discussion boards. A few of the readings (for example, HBR readings) may require that you go through the library using a VPN if you do not have an account with the publisher. More detail on the Final Team Project Presentation will be provided midway through the semester.

**Class Schedule (Readings included, but subject to minor changes during the semester)**

**Section I: Introduction to Innovation**

**Week 1. 8/27: Introduction to Course and Defining Innovation**
1. Innovation Systems Need a Reboot, BCG
   https://media-publications.bcg.com/innovation-systems-need-a-reboot-layout.pdf
2. The Philosophy of Innovation
   https://www.digitaltonto.com/2012/the-philosophy-of-innovation/
3. Why Is Innovation Management So Important to Compete?

https://www.huffingtonpost.com/scott-macfarland/why-innovation-management-is-important_b_4174482.html
   4. Innovation Is The Only True Way To Create Value
      https://www.digitaltonto.com/2015/innovation-is-the-only-true-way-to-create-value/
**Optional:**
   1. The Myth Of Shareholder Value
      https://www.digitaltonto.com/2019/what-is-the-purpose-of-a-business/


**Week 2. 9/3 (last class before add-drop ends): Types of Innovation**
   1. What Companies That Are Good at Innovation Get Right
      https://hbr.org/2019/11/what-companies-that-are-good-at-innovation-get-right
   2. How Amazon innovates in ways that Google and Apple can't
      https://www.vox.com/new-money/2016/12/28/13889840/amazon-innovation-google-apple
   3. Peter Drucker and the Discipline of Innovation
      https://hbr.org/2002/08/the-discipline-of-innovation
   4. Ten Types of Innovation, Deloitte
      https://www.deloittedigital.com/us/en/accelerators/ten-types.html
**Optional:**
   1. Novelty Bias
      https://www.ideatovalue.com/curi/nickskillicorn/2022/05/novelty-bias/

**Section II: Organizational Structures to Enhance Innovation**
**Week 3. 9/10: Barriers to Innovation**
   1. Three Things That Can Stall Innovation (And How To Overcome Them)
      https://www.digitaltonto.com/2015/3-things-that-can-stall-innovation-and-how-to-overcome-them/
   2. The Most Important Thing That Great Innovators Do Differently
      https://www.digitaltonto.com/2016/the-most-important-thing-that-great-innovators-do-differently/
   3. How Mark Zuckerberg keeps Facebook's 18,000+ employees innovating: 'is this going to destroy the company? If not, let them test it'.
      https://www.cnbc.com/2017/06/05/how-mark-zuckerberg-keeps-facebook-employees-innovating.html
   4. Fear factor: Overcoming human barriers to innovation
      https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/fear-factor-overcoming-human-barriers-to-innovation
   5. Three challenges to digital innovation and how to overcome them
      https://mitsloan.mit.edu/ideas-made-to-matter/3-challenges-to-digital-innovation-and-how-to-overcome-them
**Optional:**
   1. How Amazon Innovates
      https://www.inc.com/greg-satell/the-secret-behind-amazons-uncanny-ability-to-out-innovate-just-about-every-other-company-on-planet.html
   2. These 3 Cognitive Biases Can Kill Innovation
      https://www.digitaltonto.com/2019/these-3-cognitive-biases-can-kill-innovation/

**Week 4. 9/17: Managing Communications and Knowledge Management Structures**
1. Why Bad Ideas Don't Just Die, Digital Tonto
   https://digitaltonto.com/2024/why-bad-ideas-dont-just-die/
2. What is the Best Organizational Structure for Creativity?
   http://timkastelle.org/blog/2013/10/best-organisational-structure-creativity/
3. The Organizational Structure of Innovation: How Toyota, Procter & Gamble, GE, 3M, IBM, Google, Microsoft, Sony, Hewlett-Packard, DuPont, Honeywell, Whirlpool
   *File linked to this week's module in Canva
4. Knowledge Management
   https://www.skyrme.com/kmbasics/concepts.htm

**Optional:**
1. Neither Hierarchy nor Network: An Argument for Heterarchy
   https://www.rossdawsonblog.com/HRPS_Heterarchy.pdf

**Week 5. 9/24: Transnational Innovation**
1. Organizational Designs for Transnational Innovations
   https://www.linkedin.com/pulse/fostering-transnational-innovations-teja-vepakomma-mba-ms-strategy/
2. Innovation Is Management
   https://www.forbes.com/sites/tendayiviki/2017/01/08/innovation-is-management/#7cdbce253e65
3. What Makes an Organization "Networked"?
   https://hbr.org/2015/06/what-makes-an-organization-networked

**Optional:**
1. From space exploration to 5G commercialization: How cooperation bolstered sci-tech advances in 2019
   https://www.chinadaily.com.cn/a/201912/15/WS5df61410a310cf3e3557e38d_1.html

**Section III: Innovation Management Processes**

**Week 6. 10/1: The Networked, Data-driven Organization**
1. The 3 Axioms of the Network Organization
   https://www.linkedin.com/pulse/20130228134505-52906-the-3-axioms-of-the-network-organization/
2. Networked organizations: Making the matrix work
   https://www.bain.com/insights/decision-insights-12-networked-organizations-making-the-matrix-work
3. How Corporate Innovators Should Think About AI, Innolead
   https://www.innovationleader.com/thought-leadership/how-corporate-innovators-should-think-about-ai/
4. Why Software Won't Eat the World

https://www.digitaltonto.com/2020/why-software-wont-eat-the-world/
5. web3 Building the Foundation for a Decentralized Internet *pages 1-7*
*File is linked to this week's module in Canva


**Optional:**
1. Secrets of Silicon Valley—A two-part documentary by Jamie Bartlett (Part 1: The Disruptors)
https://medium.com/@marksstorm/secrets-of-silicon-valley-part-1-1bdb553fdb46

**Week 7. 10/8: Stage Gate Processes and Product Management Innovation**
1. Reframing Failure
http://timkastelle.org/blog/2013/04/reframing-failure/
2. Value of Long Tail
https://ecorner.stanford.edu/videos/value-of-the-long-tail/
3. Should You Invest in the Long Tail?
https://hbr.org/2008/07/should-you-invest-in-the-long-tail
4. Product Management Is Really Innovation Management
https://viderity.com/2017/02/06/product-management-is-really-innovation-management/
5. How to Use a Stage-Gate Process to Manage Organizational Change
https://www.industryweek.com/change-management/how-use-stage-gate-process-manage-organizational-change

**10/15: FALL BREAK, NO CLASS**

**Week 8. 10/22: Early Stages of Screening: Creativity and Technology Transfer from R&D Lab to Business**
1. The Power of Curiosity in the Workplace, Forbes
https://www.forbes.com/councils/forbescoachescouncil/2023/05/17/the-power-of-curiosity-in-the-workplace/
2. Selling Investors: Beaming at Bucks
https://ecorner.stanford.edu/videos/selling-investors-beaming-at-bucks/
3. Improv to Improve Idea Generation
http://www.ideachampions.com/weblogs/archives/2013/11/a_brainstorm_fa.shtml
4. The Limited Value Of Ideas
https://www.digitaltonto.com/2019/the-limited-value-of-ideas/
**Optional**
1. Don't Worry About People Stealing Your Ideas
https://www.digitaltonto.com/2017/dont-worry-about-people-stealing-your-ideas/

**Section IV: Managing People in Innovative Organizations**
**Week 9. 10/29: Lead Users and Where New Ideas Come From; How Breakthroughs Happen**
1. Why the future of Technology is Always More Human, Digital Tonto
https://digitaltonto.com/2024/why-the-future-of-technology-is-always-more-human/

2. What is Crowdsourcing Innovation, IdeaScale
   https://ideascale.com/blog/what-is-crowdsourcing-innovation/
3. 2018: The shift To A New Era of Innovation
   https://www.digitaltonto.com/2018/2018-the-shift-to-a-new-era-of-innovation/
4. Where good ideas come from
   https://www.ted.com/talks/steven_johnson_where_good_ideas_come_from
5. How lego builds a new lego set
   https://www.theverge.com/c/23991049/lego-ideas-polaroid-onestep-behind-the-scenes-price

**Optional:**
1. The unexpected benefit of celebrating failure
   https://www.ted.com/talks/astro_teller_the_unexpected_benefit_of_celebrating_failure?language=en
2. Outside Innovation
   https://outsideinnovation.blogs.com/pseybold/2006/03/customerled_inn.html

**Week 10. 11/5: Motivating Technical Staff and the Role of Champions**
1. How great leaders inspire action
   https://www.ted.com/talks/simon_sinek_how_great_leaders_inspire_action?utm_source=hare&utm_medium=referral&utm_campaign=tedspread
2. How Diversity Makes Teams More Innovative
   https://www.ted.com/talks/rocio_lorenzo_how_diversity_makes_teams_more_innovative
3. McClelland's Theory of Needs (Power, Achievement and Affiliation)
   https://www.managementstudyhq.com/mcclellands-theory-of-needs-power-achievement-and-affiliation.html
4. The Role of Champion in Product Innovation
   https://web.njit.edu/~chakraba/champion-cmr.pdf

**Optional:**
1. Ten Ways to Motivate Employees to be More Innovative
   http://www.innovationmanagement.se/2014/04/04/ten-ways-to-motivate-employees-to-be-more-innovative/
2. 50 Ways to Foster a Culture of Innovation
   http://www.ideachampions.com/weblogs/archives/2008/07/50_ways_to_fost.shtml

**Section V: Innovation Strategy**
**Week 11. 11/12: Intrapreneurship and Risk Taking in Organizations, Disruptive Innovation, Open Innovation, Blue Ocean Models**
1. The Right Kind of Wrong Book Summary
   https://www.linkedin.com/pulse/right-kind-wrong-book-summary-joe-allen-o4nfc/
2. Why Companies Want You to Become an Intrapreneur
   https://www.forbes.com/sites/danschawbel/2013/09/09/why-companies-want-you-to-become-an-intrapreneur/#5061876e75b8
3. Blue Ocean Strategy: Creating Your Own Market
   https://www.businessnewsdaily.com/5647-blue-ocean-strategy.html
4. What is Disruptive Innovation?

https://hbr.org/2015/12/what-is-disruptive-innovation
**Optional:**
1. A New Model for Innovation in Big Companies
   https://hbr.org/2013/11/a-new-model-for-innovation-in-big-companies

**Week 12. 11/19: Open Innovation, Ethics in Technology and the Balanced Scorecard**
1. Everything You Need to Know About Open Innovation
   https://www.forbes.com/sites/henrychesbrough/2011/03/21/everything-you-need-to-know-about-open-innovation/#567199d475f4
2. Technology And Globalization Have Failed Us
   https://www.digitaltonto.com/2019/how-technology-and-globilization-have-failed-us/
3. The Ethics Principles for Technology
   https://blog.prototypr.io/ethical-principles-for-humane-technology-19f4fb3b0ba2?gi=7c3202db1eb0
4. ISO 56000 Explained - VIIMA
   https://www.viima.com/blog/iso-56000-innovation-management

**Optional:**
1. The Top 10 Tech Trends in 2022 Everyone Must Be Ready For
   https://www.forbes.com/sites/bernardmarr/2022/02/21/the-top-10-tech-trends-in-2022-everyone-must-be-ready-for-now/?sh=70f269c5827d


**Week 13. 11/26: Miscellaneous topics and wrap up.**
         **On-Campus Final Team Presentations, mandatory for all students**

**Week 14. 12/3:**
         **On-Campus Final Team Presentations, mandatory for all students**

**Final team projects are due by 11:59 p.m. on the night before the team's assigned day of presentations.** All on-campus students are expected to attend all the final presentations

**NOTE FOR ONLINE STUDENT FINAL PRESENTATIONS:**

**Separate times will be determined for each team to present their final projects to the instructors at a mutually convenient time.**