DEPARTMENT OF COMPUTER SCIENCE
New Jersey Institute of Technology
University Heights
Newark, NJ 07102-1982

Tel: (973) 596-3366
Fax (973) 596-5777

BASELINE COURSE SYLLABUS

Course: CS485: Technology Startup Project

Credits: 3 credits.

Prerequisites: None

Description:

Do you want to test, validate, and launch your Startup idea or learn how it's done? If yes, then this course is for you. Ever wondered what it is like to take a new idea or insight that has the potential to solve a big problem and turn it into a technology-based product or service around which you can build a startup and scale it to a large company? That's what Bill Gates did with Microsoft, Steve Jobs did with Apple, and Jeff Bezos is doing with Amazon. There are millions of founders just like them like them all over the world, including several student and faculty at NJIT, who have taken a simple idea to a startup and thru innovation and hard work scaled it to a profitable company creating wealth for themselves and value for their customers, employees, and shareholders.

Here you'll learn how to generate startup ideas, evaluate their potential and test them with customers in real life. We use real-life examples to illustrate everything we teach to make it practical and easy to understand. It's all about startups, business, entrepreneurship by leveraging the Lean Startup Methodology and newer technology such as Mobile Apps, Cloud Computing, and Artificial Intelligence. This course you will learn the theory behind various business practices and then execute on them with the help of AI platforms. You will learn how to find, evaluate, and test innovative business models.

This new course offers a broad framework for understanding the startup process and exposes students to some of the common challenges faced by founders who start new technology ventures. This course explores some of the latest frameworks such as Lean Startup, Design Thinking, Agile process and the use of AI in Startups. We will explore how to leverage AI to solve some of the common issues associated with technology ventures such as generating good ideas, dealing with risk and uncertainty, finding co-founders, testing and validating a product, and developing a viable business model.

Unlike traditional courses, this course will be experiential, and learners will benefit from engaging and interesting team projects, case studies and guest lectures. The learning methodology will include a mix of classroom lectures, video-based learning, and working in small team to build a working prototype. The course will use the flipped classroom format wherein learners will review content outside the classroom and discuss practical application inside the classroom.

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Instructor: The course will be led by Dr. Suresh U. Kumar, Director of Innovation and Entrepreneurship Programs at the College of Computing. Suresh is a 5 time INC 500 ranked serial entrepreneur with multiple successful startups and exits under his belt. He is an expert in Lean Startup methodology and a mentor/angel investor in several startups. He was previously involved with the Lean Startup programs at Columbia Business School and the SDBC at Rutgers Business School. Most recently, Suresh served as a member of the Small Business and Entrepreneurship subcommittee of the Biden 2020 Campaign and currently serves as the President of The Indus Entrepreneur – New Jersey.

Textbook(s)/Study Materials:

(a) Required for Course Completion: Online course "How to Build a Startup" on Udacity.com
(b) Recommended Reading: The Startup Owner's Manual: The Step-By-Step Guide of How to Build a Startup- Authors Steve Blank, Bob Dorf, ISBN-10 0984999302
(c) Recommended Reading: Lean Startup : Author Eric Reis.
(d) Agile Development 12-factor framework: https://12factor.net/
(e) Business Model Generation Tools: https://strategyzer.com
(f) Additional Reading and Videos: As recommended by instructor in class or posted online on Canvas.

Learning Outcomes:

Increasingly, businesses are placing a premium on hiring executives with entrepreneurial skills. This entrepreneurship course prepares students to leverage AI tools to start a business that is technology driven and/or bring entrepreneurial skills to existing businesses. In this course, students receive a combination of theoretical and practical exposure to the building blocks of entrepreneurial thinking. Teaching methods include workshops, case studies, supplemented by lectures, curated online videos and team projects. The student learning goals are as follows:

SLO1. Define and identify the key characteristics of the entrepreneurial mindset
SLO2. Leveraging AI tools to generate new ideas and evaluate opportuniies.
SLO3. Design, develop and test business ideas using the Business Model Canvas
SLO4. Design, build and demo of a Minimum Viable Product
SLO5. Analyze the business models of existing technology businesses.

Main Topics to be covered during the course (the order of delivery may change)

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1. **Introduction to Technology Entrepreneurship**: Review of entrepreneurship education. Discussion on the background of innovation and entrepreneurship in United States. Startup resources and grants available on campus. Definitions of common terms, impact of information technology and globalization. Team formation guidelines

2. **The Entrepreneurial Mindset:** Common habits of successful entrepreneurs, comparison between entrepreneurial thinking and managerial thinking; strategies to develop entrepreneurial mindset with deliberate practice and real-life applications. Opportunity Recognition, Sources of good business ideas, Startup Metrics.

3. **The Lean Startup & Customer Development Methodology** Principles of lean startup, what we now know about startups. Design Thinking. Understanding the concept of Search Vs Execution mode of businesses. Understanding the principles and processes the Customer Development Methodology, Customer Vs Product development, The Customer Discovery Process, *Team formation Exercise*

4. **Leveraging Gen AI to generate, test and validate new ideas.** Understanding fundamentals of prompt engineering. Definitions, Introduction to the Business Model Canvas (BMC). Team exercises on development of initial hypotheses for BMC. *First Team Presentations.*

5. **Deploying Gen AI to Design New Business Models:** Use of Advanced prompt engineering to identify ideal customer segments, determine value proposition for technology ventures. Understanding customer types and archetypes and multi-sided markets, achieving product-market fit. Teams work on applying concepts to the BMC

6. **Rapid Development of a MVP:** Understanding how to create a Minimum Viable Product (MVP) by use of AI. Working in teams, students will design the wireframe for a mobile app, researching the business/market need, determining the list of features. *Teams will discuss their Value Prop.*

7. **Mid-Term Exams – Individual and team Presentations**

8. **Identify Distribution Channels, Competitors, Finding** the most effective distribution channels for product or service; digital vs physical channels, strategies to Get, Keep, and Grow customers, Lifetime value, Acquisition cost, Customer retention rate, Sales cycle.

9. **Key Partners, Resources, Costs and Revenue Models for Technology Ventures: I**dentifying key partners, and other resources for scaling up, how

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much capital is needed? Building Startup Teams: Finding co-founders, key employees, advisors, partners and advisors/ board of directors. Review of coast and revenue models. Application of concepts by teams in class.

10. **Business Models Workshop/Case Study:** Students will be given a real-life case study to explore the key considerations in developing a minimum viable prototype (MVP) of the product/solution, strategies to test product and obtain customer feedback. Students will be work on refining their MVP based on customer feedback data. the key considerations in developing a minimum viable prototype (MVP) of the product/solution, strategies to test product and obtain customer feedback.

11. **Customer Validation & Early-Stage Growth Issues for Technology Ventures:** Testing the MVP with customers. Collecting customer feedback, use data to determine if there is a real need for the product or service, designing experiments to determine if the hypotheses for customer needs, market size and pricing. Getting early customer, leveraging networking and social media marketing.

12. **Course Review & Final Team Presentations:** Discussion on the common question and concerns of would-be founders. Common reasons why startups fail. Using metrics to determine if business model has been validated. Questions and Answers on course and suggestion for next steps. *Final Team Presentations: As part of the final team startup project, teams will do a final pitch of a product/service idea, including a demo of a functional MVP.*

13. **FINAL EXAM (Last day of course)**

ATTENDANCE AND PREPARATION POLICY

Class participation and attendance is vital for the successful completion of this course. The only way to get the full impact of this course is to be in class, participate, and **take notes**. To that end, all students are expected to attend class consistently and promptly and be prepared to discuss the assigned topics/materials.

If I am to be absent, I will send you notice via email as far in advance as possible and let you know the topics to be covered and if needed plans for a make-up class. If you are to be absent, email me and the TA/Grader for the class and report your absence in advance to the college system. If your absence is due to religious observance, a NJIT-approved

activity, illness, or family emergency/death and you seek makeup work, also send me an email with full details and supporting documentation within 2 days of your first absence. For weather emergencies, please consult the campus home page. If the campus is open, class will be held.

Office Hours: Scheduling in person meetings during office hours which is on **Thursdays between 2 and 3.30 pm by appointment only**. Please make sure to contact me or the Grader/TA for the course to schedule an appointment in advance.

CLASSROOM & ONLINE CONDUCT

Please adhere to professional behavior in class. I ask for you refrain from using electronic devices except when required by the instructor. Cellphones and other electronic devices should be shut off during class. Also please refrain from texting, chatting, checking social media sites or wearing headsets, etc. Such behavior is rude and will result in an automatic deduction for the Class Participation portion of the course. For virtual sessions, students are required to turn on their camera and stay muted unless they are responding to a question or discussion. *Note: ALL students are required to strictly follow most updated NJIT guidelines related to social distancing and wearing of masks inside the classroom.*

ACEDEMIC INTEGRITY

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:
http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. ***Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.*** *If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu"*

EXAM DATES AND POLICIES

GRADING POLICY

Course grades will be determined on the following criteria:

Class Participation (responses to discussions in class)	20%
Written Assignments (discussion questions posted on Moodle/Canvas)	20%
Startup Team Projects	20%

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Individual Project	10%
Mid Term Exam	10%
Final Exam	20%

NOTE: Based on the background, individual learning needs, and progress made by the learners during the course, the instructor may make modification to the grading policy.

Class Participation:

Class participation and attendance is vital for the successful completion of this course. Perfect attendance without interactive participation in discussions will **NOT** result in a good participation grade. This requirement is based on the fact that discussion/teamwork is essential in most business settings. **ATTENDANCE IN CLASS IS ESSENTIAL TO BE ELIGIBLE TO EARN PARTICIPATION POINTS, BUT ATTENDANCE ALONE IS NOT EQUAL TO PARTICIPATION**. Participation grades will be based on the instructor's observation during the lectures and presentation discussions. The quality of your comments and frequency of your comments are equally important. However, your responses DO NOT have to be correct to earn participation points.

Classes are held as two sessions of one hour twenty minutes each per week. In the classroom sessions, please raise your hand before speaking and be courteous when others are speaking. I recognize that is not practical for every student to comment on all subjects at every class. We will do my best to enable everyone to participate in class. In case you do not get the opportunity to participate in the class, you can make up by taking part in chat room of WebEx/Zoom. In the event that discussion wanders off topic or goes too long, I reserve the right to intercede and move the class forward.
I do understand that there are circumstances that may require you to miss a class so informing me in advance will help you here, but does **NOT** remove your responsibility for all assigned work.

Special Exception

A special exception can be made with the instructor for unusual circumstances, such as a family illness or attending a professional conference or event that is directly related to the course. It will be the obligation of the student to inform the instructor and the TA of the special circumstance and provide reasonable evidence. Once an exception is approved, the student must work with the instructor or grader/TA to complete the assignment(s).

Grading System:

As shown below (right column) final course grades do not include "minuses". However, grades in this class for each individual and team assignment, for exams, and for class

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participation WILL include “minuses” (left column) in order to give you a more precise numerical measure of your grade throughout the semester. A ‘D’ grade can be assigned only to undergraduate students. A graduate student who is in the D range will receive an F grade.

Numerical value of a letter grade received on a team or individual assignment			Final grades available and their numerical range		
A	=	95.0	A	=	90-100
A-	=	91.5			
B+	=	88.5	B+	=	87-89.99
B	=	85.0	B	=	80-86.99
B-	=	81.5			
C+	=	78.5	C+	=	77-79.99
C	=	75.0	C	=	70-76.99
C-	=	71.5			
D	=	65.0	D	=	60-69.99
F	=	55.0	F	=	59.99 or below

Thank you for your interest in this course. Please do not hesitate to contact me or the Grader/TA if you have any questions or suggestion at any time during the course.
I look forward to helping you with your learning goals.

Sincerely

Dr. Suresh U. Kumar
skumar@njit.edu