Course Title: CS 3984-Starting a CS Business

Course Description:

This experiential, project-based course teaches computer science students how to identify, evaluate, and pursue entrepreneurial opportunities. Using Lean Startup principles, students will engage in customer discovery, hypothesis testing, and business model validation. Special emphasis is placed on AI tools and strategies for building, deploying, and scaling software products and Minimum Viable Products (MVPs).

Learning Outcomes:

By the end of the course, students will:

1. Apply Lean Startup methodology to assess and validate technical innovations.
2. Develop and iterate a **Business Model Canvas (BMC)** based on customer insights.
3. Learn how to conduct effective **customer discovery interviews**.
4. Plan and design a minimum viable products (**MVP)** using AI, cloud and web technologies.
5. Make data-informed decisions to pivot, persevere, or pause startup efforts.
6. Present a validated business plan and investor-style pitch.

Course Structure:

- Format: Lecture, and Student presentations first 8 weeks, and mentor feedback and guest speakers for the remaining weeks
- Team-based learning (3–4 students per team)
- Weekly assignments and milestone deliverables

Syllabus Overview:

Week 1 – Entrepreneurial Mindset and Opportunity Recognition

- Introduction to Lean Startup
- Identifying and framing real-world problems
- Selecting a tech innovation (capstone, research, side project)
- Forming teams and defining problem hypotheses
  Assignment: Team formation + project selection

Week 2 – Business Model Canvas: Mapping Your Startup

- Business Model Canvas (BMC) overview
- Identifying key assumptions and risks
- Prioritizing hypotheses to test
  Assignment: Initial BMC + top 3 hypotheses

Week 3 – Customer Discovery: Validating the Problem

- Finding early adopters and interview techniques
- Problem-solution fit vs. product-market fit
- Tools for scheduling and recording interviews
  Assignment: Conduct first interviews + insights report

Week 4 – Value Propositions and Pivoting

- Designing strong value propositions
- Analyzing feedback: When and how to pivot
- Updating BMC with customer insights
  Assignment: Updated BMC + pivot/persevere decision

Week 5 – Go-to-Market Strategies and Revenue Models

- Channels: distribution, sales, and user acquisition
- Revenue models for software startups (SaaS, licensing, freemium)
- Building strategic partnerships
  Assignment: Conduct 5 more interviews focused on channels/revenue

Week 6 – Building Tech Startups: Cloud and Web Tools

- MVP strategy: defining scope and essential features
- Cloud platforms (AWS, GCP, Azure): usage, free credits, scalability
- Web development tools: frontend (React, Vue), backend (Node.js, Django), databases (Firebase, PostgreSQL)
- No-code/low-code tools for rapid prototyping
  Workshop: MVP planning session
  Assignment: Submit MVP technical plan (features, stack, deployment)

Week 7 – Deploying and Testing Your MVP

- Hosting and deployment platforms
- Vibe Coding
- Using LLM based code tools
- Agentic AI architectures for software startups
- CI/CD basics and version control
- User testing and analytics tools

- Collecting user feedback and iterating MVP
  Workshop: Live demo or prototype walkthrough
  Assignment: MVP demo + feedback summary

Week 8 – Fundraising Fundamentals

- Funding stages: pre-seed, seed, Series A
- SAFE notes, convertible notes, VC term sheets
- Non-dilutive funding: **SBIR/STTR grants**
- Fundraising timelines and investor expectations
  Assignment: Draft a fundraising plan or funding strategy memo (choose SBIR or investor track)

Week 9 – Why Startups Fail

- Case studies of failed startups
- Common reasons for failure: team, timing, market, execution
- Postmortem analysis and personal resilience
- Avoiding common traps and building long-term mindset
  Assignment: Startup postmortem analysis (choose a real or fictional startup)

Week 10-14 – Guest Speakers and Industry Engagement

- Throughout the course, we plan to host **guest speakers**, either in person or virtually, who have **real-world entrepreneurship experience**—particularly in technology and software startups. These speakers will **share their startup journeys**, lessons learned, and insights into product development, funding, and scaling.
- During select sessions, student teams will deliver **5-minute startup pitches**, after which guest speakers will provide **constructive feedback** on the pitch, business model, and overall opportunity. This interaction offers students a unique chance to gain **practical advice** and **network with entrepreneurs** who have navigated similar paths.

Week 15 – Final Pitches and Next Steps

- Final presentations: problem, solution, validation, market plan, MVP
- Feedback from instructors, peers, and guest entrepreneurs
- Go/no-go decision: future roadmap
  Assignment: Final pitch + reflection paper on entrepreneurial journey

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Assessment Breakdown:

Component	**Weight**
Participation and Collaboration	30%
BMC Iterations and Interview Summaries	20%

Component	Weight
MVP Technical Plan and Demo	20%
Final Pitch Presentation	20%
Reflection Paper	10%

Required Resources:

- **Books**:
  - *The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company Paperback – by* Steve Blank, Bob Dorf
  - *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers (The Strategyzer series) Paperback – July 13, 2010 by* Alexander Osterwalder, Yves Pigneur
  - *Talking to Humans* by Giff Constable (available free online)
- **Tools**:
  - Business Model Canvas templates (provided)
  - Interview guide templates (provided)