Syllabus for the FINTECH PRACTICUM

Course: **ECON 181** *Semester:* **SP25**	*Practicum Director:* **Prof. Nishant Dass** (ndass@cmc.edu)
Class time: **MW 4:15-5:30pm** (may be used for team meetings) *Office hours:* By appointment	*Faculty Advisors:* Prof. George Batta Prof. Ananda Ganguly Prof. Michael Gelman Prof. Eric Hughson Prof. Angela Vossmeyer
Weekly meeting times: **Please consult with your Faculty Advisor & Client**	
(You must independently meet with your Advisor, Client, and Prof. Dass once / week)	

Objective:

The primary objective of this elective, titled "Fintech Practicum," is to learn to solve real-world financial problems in a professional setting. As such, you will work in teams of 3-5 students on a project sponsored by an outside company. You and your team will leverage your knowledge of economics and finance as well as your expertise in coding, econometrics, mathematics, and statistics (among other things) to work on these projects. You will also collaborate with the client / liaison at the company and will be guided throughout the semester by a faculty advisor. The course is designed to be similar to the Data Science Capstone (DS 180) or Harvey Mudd's CS Clinic but focused on Finance.

The projects are typically sourced from a variety of firms across a broad spectrum of industries, ranging from commercial banks, asset management firms, venture capital funds, fintech startups, and even non-financial businesses (as long as the specific problem is economic / financial in nature). The nature of projects will vary but each team can expect to use skills, such as data analytics, econometrics, machine learning, data collection, market studies, etc. **This course is a Level II elective and can be counted towards the *Financial Economics Sequence* as well as BA/MA requirements at CMC.**

Projects:

You will be assigned to a project sponsored by one of the following companies:

Number	Sponsor	Faculty Advisor
1.	*Fiscali*, a fintech startup applying AI for analyzing credit agreements	Prof. George Batta
2.	*Sentinel Dome*, a PE firm that uses DS to invest in infrastructure assets, among other things	Prof. Ananda Ganguly
3.	*Kiavi*, a data-driven fintech lender that provides capital to RE invesetors	Prof. Michael Gelman
4.	*Tauroi*, a computing-driven hedge fund that applies ML to unique data	Prof. Eric Hughson
5.	*SBA*, a federal gov. agency that lends to small businesses	Prof. Angela Vossmeyer

Project Manager:

Each team will have a Project Manager. Ideally, someone in the team will volunteer to play the role of the Project Manager; if not, then the team must either decide on one, or the faculty member may help with assigning the role to someone. The job of the Project Manager will be to:

- Lead the team,
- Possibly assign weekly tasks to team members,
- Make sure those tasks are done,
- Prepare the weekly memo (but you may ask your team members to collaborate by, say, preparing a slide or two each)
- Lead the weekly meetings with the faculty advisor as well as client liaison, etc.

The Project Manager must be well organized, punctual, and good in management overall.

Deliverables and Grade Composition:

You will be expected to work independently as well as collaboratively in the group for approximately 10-12 hours a week (this includes meetings with your faculty advisor and client liaison). All projects will involve work on econometric modeling, data manipulation/wrangling, data analysis, coding in statistical software packages like Python or R, etc. as needed for the project. At the same time, you will be guided to learn soft skills such as project management, ethics, presentation, communications, collaboration, and leadership through weekly meetings. You will be expected to do the necessary background readings (if any, as assigned by the client, faculty advisors / practicum director, or team members), log your own work and time, prepare and deliver weekly progress reports to the client liaison and faculty advisors.

Deliverables

The specific deliverables expected of each team include:

- A Statement of Work (SOW) at the start of the semester, detailing the intended goals, methodology, and deliverables for client approval. This document will have to be finalized in consultation with the client. **Deadline – Fri, Feb 7th.**

- Team weekly memos, updating the faculty advisor + client as well Prof. Dass on the progress made over the course of the week. Think of this like a log of the project. This document should be 1-2 pages long. **Deadline – 9am each Friday.**

- Memo #1 is due in the second week of classes – that's **Fri, Jan 31st** this semester. Given that we will have barely launched the Practicum project, you might wonder what to put in the first memo, but don't worry – it's supposed to be a log of the "week's events," so, in that spirit, just report whatever the current state of the project is. The main purpose of this exercise is to be disciplined about recording weekly updates for everyone involved. Additionally, this will also give your Advisor + Client a chance to address any misinterpretations or add clarifications about your weekly discussions with them. Team members should help the Project Manager by contributing their respective content for the weekly memos. Please number and date your Memos so we can keep track of the sequence.

- A mid-term presentation by the team summarizing their client profile, project summary, progress towards the goals/milestones set in the SOW, report on the methodology used, outline of the final outcome to be delivered by semester-end, etc. Team members should help the Project Manager by contributing their respective content for this midterm report. **Deadline – Fri, Mar 7th.**

- A final presentation by the team for the client and the class on the project outcomes. Please come prepared to present your respective parts; the presentation should not be dominated by one or few members and students also not try to hide in the background – this is your opportunity to practice presenting in front of a high-profile audience. **Deadline – Fri, Apr 25th.**

- A final report by the team, along with all deliverables (codes, algorithms, instruments, etc.), which will be delivered to each client at the end of the semester. Once again, team members should help the Project Manager by contributing their respective content for the final report. (I keep repeating that to emphasize that it'll not be the PM's job to do everything!) **Deadline – Tue, May 6th.**

Grade Composition

Deliverable	**Portion of the Grade**
Team's Statement of Work	10%
Weekly Team Memos presented to the Faculty Advisor, informing about weekly progress	10 reports x 2% each
Team's Midterm Presentation to the faculty & client	25%
Team's Final Presentation to the faculty & client	25%
Team's Final Report to be delivered to the client	10%
End-of-semester peer-evaluation on a 1-5 scale (only integers allowed) – scores will be averaged across peers	10%

The assessment of the students' work has three components: (i) Faculty advisor's evaluations, (ii) Consultation with the client liaison, and (iii) Peer evaluations.

The following evaluation rubric may be used by the faculty and may also be useful for the students to keep track of their performance:

	Excellent	**Good**	**Improving**	**Lagging**	**Poor**
Quality of the Practicum outcome	Useful/functional product that meets all criteria of client	Useful/functional product that meets most criteria of client.	Semi-functional product that meets most criteria of client	Semi-functional product that meets few criteria of client	Nonfunctional product that meets or no criteria of client
Contribution to the Practicum outcome	Made consistently significant contributions that strongly impacted the quality of the product	Made consistently productive contributions that advanced the project	Made adequate contributions to the product; some contributions helped advance the project	Contributions were inconsistent or had only weak impact on project	Few or no contributions to the project; all contributions lacked impact on the final outcome
Process	Demonstrated contribution to the definition and ongoing improvement of good process used by the team	Demonstrated ability to accurately follow the process prescribed by the project coordinator or team	Demonstrated consistent ability to follow the process prescribed by the project coordinator or team	Ability to follow the process prescribed by the project coordinator or team was inconsistent	Process prescribed by the project coordinator or team was not followed
Professionalism	Active leadership/ ownership of key responsibilities resulting in high quality outcomes for the work product. Provided leadership and support to members of the team for at least one key area or phase of the project.	Assumed significant responsibilities across multiple areas or phases of the project. Showed some leadership. Provided significant input into important decisions.	Showed an active level of engagement, both internal and external, including organization and some leadership for smaller parts of the project.	Acceptable level of attendance and engagement with respect to both internal (team) and external (client) related activities.	Inadequate level of attendance and internal or external engagement.

Student Learning Objectives:

- To apply essential domain-specific knowledge as well as econometrics skills to real-world problems.
- To write professional documents such as statement of work, executive summary, and report.
- To practice professional communication skills through client meetings and presentations.
- To develop essential soft skills such as project management, ethics, teamwork, and leadership through professional engagement with industry

Weekly Team Meetings:

Each team must have at least two weekly meetings – one with the faculty advisor (ideally, but not necessarily, earlier in the week) and another one with their client liaison (maybe later in the week, but not necessarily). The goal of the meeting with the faculty advisor will be to report on your progress and discuss the next steps, and the purpose of the meeting with the client liaison is also to report on your weekly progress as well as make sure that you are meeting their project needs.

The team should also **briefly** meet with Prof. Dass for a weekly update. If scheduling becomes difficult, then the Project Lead alone may update Prof. Dass. Please also send a copy of the weekly memos to Prof. Dass.

Data Security and Confidentiality Agreement:

Before students get access to the datasets, all team members involved in the program will need to sign on and adhere to the agreements on data confidentiality, security, privacy, intellectual property and the use of the data and results.

Teleconference/Videoconference with Client Liaison(s):

Each team should regularly meet with their client liaison(s)—a weekly meeting is the best way to stay on the same page with your client.

Academic Integrity:

All students at CMC must maintain high ethical standards in the pursuit of their education. For more details, please check: https://www.cmc.edu/dean-of-students/academic-integrity

Special Accommodations:

Your experience in this class is most important. If you need me to make any special accommodations, please let me know in advance. I will be happy to work with you on alternative arrangements. For College policy on such matters, you may refer to https://www.cmc.edu/dean-of-students/student-resources

Support Services and Resources:

In your time at CMC, you may find yourself in need of support. There are plenty of useful resources to support you both as a student and as a person. Please do not hesitate to reach out for help when you need it. For more details on the resources available, please check: https://www.cmc.edu/dean-of-students/student-support

The Financial Economics Institute (FEI):

The Fintech Practicum is offered by the FEI. Our goal at FEI is to offer a series of curricular (and co-curricular) activities around the Fintech theme. We expect to build more pieces around this core Practicum in the semesters to come, so that students may be able to take a deeper dive into the world of Fintech. The Practicum is the main foundation, however, and it is similar to other Practicum-type courses across 5Cs, such as Keck Science's TMP, QCL's Data Science Capstone at CMC, and HMC's Computer Science Clinic. The unique offering of the current course will be its focus on financial services / fintech applications. Hope you will enjoy it!

TENTATIVE SCHEDULE – *subject to change*

Week	Internal Meetings	External-facing Milestones
1	Kick-off Day – Practicum overview; Data security and other responsibilities; Schedule Faculty Advisor meetings	Practicum Kickoff; Client Meeting: introductions and Q&A – by **Wed, Jan 29th**
2	Team working on the project	First Weekly Memo due – by **Fri, Jan 31st**
3	Team working on the project	SOW final for client review and Approval – complete by **Fri, Feb 7th**
4	Team working on the project	One-month milestone – progress check-in
5	Midterm presentation prep	
6	Midterm presentation	Midterm report – due by **Fri, Mar 7th**
7	Gather client feedback on Midterm report	
8	Special topics discussion	
9	Start preparing final presentation	Deliverables freeze
10	Work on final presentation	
11	Work on final presentation	
12	Final presentation draft submitted to faculty	
13	Dry run with Faculty Advisor	Check-in with the client before the final presentation
14	Team debrief / Peer evaluation / Discussion	Final presentation to the client + Debriefing – before **Fri, Apr 25th**
15	Final report submitted to faculty + client	Due by **Tue, May 6th**

FISCALI PROJECT

Fiscali Inc. is a fintech startup co-founded by Ashish Shrestha ('00), Prof. George Batta (RDS), and Prof. Hovig Tchalian (USC's Marshall School of Business). The company was founded in 2022. We are developing methods to match financial calculations in corporate contracts to the financial reports where the data are located, to make calculations easy and more consistently calculated across analysts and over time.

When large corporate borrowers issue debt, the contract they sign with their lenders is generally called a "credit agreement." These outline the rights and responsibilities of all parties. A fundamental part of credit agreements are covenants, which define minimum levels of net worth or financial performance, as well as maximum levels of indebtedness. They also specified types of allowed transactions (such as types of investments) or maximum levels of distributions to owners.

Covenant compliance often depends on financial performance and other information contained in financial statements. Failing to monitor these over the life of the contract or at origination could lead to large, unexpected credit losses and make financial crises more likely.

The project involves using large language models LLM, along with Fiscali's proprietary code, to break down financial definitions contained in credit agreements in into formulae, involving addition, subtraction, and conditional statements, in order to automate the process of evaluating loan financial covenant compliance.

Deliverables: Python code along with LLM prompts on a sample of 1,000 EBITDA and debt definitions provided to the team by Fiscali Inc. The code and prompts will be set up for EBITDA definitions to output to two dataframes: One in which each definition component is laid out within rows, and a second in which these components are laid out in a mathematical formula. An example of this is below:

data_frame_1			
credit_agreement_id	**definition**	**equation_key**	**equation_components (original language from credit agreement)**
230948-90a	EBITDA	A	Net income
230948-90a	EBITDA	B	depreciation and amortization expense (up to $50,000,000)
230948-90a	EBITDA	C	interest expense

data_frame_2			
credit _agreement_id	**definition**	**equation**	
230948-90a	EBITDA	A+MIN(B,50000000) +C	

Fiscali Inc. will share EBITDA and other definitions culled from a large sample of credit agreements, from U.S. publicly-traded corporate borrowers. We will also provide proprietary code that can break down numbered or alphabetized lists, based on searching over regex patterns we've identified.

KIAVI PROJECT

Kiavi is a leading provider of bridge loans and financing solutions for real estate investors specializing in fix-and-flip projects. The company leverages data-driven insights and technology to streamline the loan approval process, empowering investors to unlock the potential of underutilized properties. By providing flexible and fast funding, Kiavi enables investors to purchase, renovate, and resell homes efficiently, contributing to housing market revitalization.

Bridge lending refers to short-term financing used by borrowers to bridge the gap between their current financial situation and a future expected cash inflow. These loans are often employed in real estate transactions, particularly for fix-and-flip projects, where investors purchase distressed properties, renovate them, and resell for a profit.

The project aims to forecast home prices and loan amounts for fix-and-flip deals across the top 20 metropolitan statistical areas (MSAs). By leveraging publicly available data such as county recording and assessor records, building permits, 10-year treasury rates, and other economic indicators, we will forecast future property values and financing needs. These forecasts will provide Kiavi with insights into potential revenue trends, aiding in strategic planning and market positioning.

SBA PROJECT

Overall objective is to take data set from first practicum group and expand upon results and further dissect the data to reflect more granular past trends and see if predictive of future contracting needs.
This iteration of the practicum project should build on previous objectives to leverage external data sources on market influences and use models and machine learning to predict trends as outlined below.

As a reminder, the socio-economic categories are:

- Small business
- Woman owned small business (including Economically disadvantage woman owned small business)
- Service disabled veteran owned small business (Note: Veteran owned small business is a certification only used by the Department of Veterans Affairs. There is no government-wide goal for Veteran owned small business)
- Small disadvantaged business (goal category)
- 8(a) certified small businesses (8(a) is a subset of SBD but would like break-outs of this data set)
- HUBZone certified businesses

For geographic designation: use "recipient location" instead of "place of performance"
Questions for class to address:

1. Based on past data, which industry sector(s) represent the greatest potential for future contracts for California-based small businesses?
2. Trends for women-owned small businesses – growing industry sectors; agency utilization
3. Trends for service disabled owned small businesses - growing industry sectors and by agency
4. Trends for 8(a) small businesses - growing industry sectors and by agency (would also be interesting to compare and contrast with the Small Disadvantaged Business designation)
5. Trends for HUBZone small businesses - growing industry sectors and by agency

Given the time limitations and accounting for the learning curve for the students working with contracting data, we though addressing these questions could be accomplished during the semester. Should we find the students are working at a more rapid pace, we can expand upon this list of questions.

SENTINEL DOME PROJECT

Sentinel Dome Partners is a TMT-focused (technology, media, and telecom) investment firm that invests across the capital structure in equities, credits, and converts. Our flexible investment mandate allows us to invest across the lifecycle of industries, from legacy incumbent players to the new disruptors in both the public and private markets.

The project will be focused on the evolution of the media landscape. We will research the decline and ascendancy of the broadcasting, cable, and video streaming industries. Broadcasting is an increasingly under-researched part of the media market and we are trying to build a better understanding around how the traditional broadcasters have evolved in an increasingly digital age. Within legacy broadcasting, there is a lot of publicly disclosed data from the FCC, company disclosures, and research from the equity analyst community. The goal for the group is to build out a data dashboard that analyzes recent trends for subscriber viewership trends and changes in market share. The group will then analyze the data and craft a summary on the history and current state of the broadcaster landscape before arriving at a conclusion about how they think the landscape will evolve next. This work will be done in an industry memo (either in a Word memo or PowerPoint investment presentation). We envision most of the time will be used to analyze data and investigate future trends. In the last 2-3 weeks, the team will also work together to put together an investment recommendation on one specific company that is a culmination of their work over the semester. We will provide examples of internal firm investment memos to help guide the students on what the final work product should look like.

The aim is the project will be win-win for the students and the Sentinel Dome team. We want the final data product to be something tangible that Sentinel Dome team members can continue to update over time and help validate current & future investments in the media sector. For the student group members, we hope that after this semester, students are able to get a first-hand sense of what the investment process looks like from idea formulation to conclusion and what the job of an investment analyst entails. We will also do Zoom calls with current Sentinel Dome investment team members to provide context into their carriers and answer questions for student group members.

The majority of data that we provide will be publicly available information. There may be privileged presentations that are property of Sentinel Dome or from companies in the media sector.

- FCC data – https://www.fcc.gov/media/filing-systems-and-databases
- Equity research reports
- Company reports and presentations (including SDP and financial models)

TAUROI PROJECT

Utilize alternative data to uncover market truths! Tauroi Technologies is looking to utilize some of its alternative data to help understand why a market may move in an idiosyncratic way.

Tauroi Technologies will provide alternative data and historical minute level data. Additionally, they will help set up and manage compute resources (likely through GCP or Colab), to onboard students.