Development Engineering (DEV ENG)

DEV ENG C200 Design, Evaluate, and Scale Development Technologies 3 Units
Terms offered: Fall 2023, Fall 2022, Fall 2021, Fall 2020

This required course for the Designated Emphasis in Development Engineering will include projects and case studies, many related to projects at UC Berkeley, such as those associated with the Development Impact Labs (DIL). Student teams will work with preliminary data to define the problem. They will then collect and analyze interview and survey data from potential users and begin to design a solution. Students will explore how to use novel monitoring technologies and “big data” for product improvement and evaluation. The student teams will use the case studies (with improvements based on user feedback and data analysis) to develop a plan for scaling and evaluation with a rigorous controlled trial.

Objectives & Outcomes

Course Objectives: Students will use multiple qualitative and quantitative methods to learn about user needs, to come up with new concepts and solutions, and to understand how new products and services achieve or fail to achieve their goals in a development setting.

Student Learning Outcomes: Students will be able to apply the skills to current challenges in development engineering
Students will develop a set of skills that will allow them to flourish in a climate of complex problem solving and design challenges in development engineering
Students will learn how to learn from users using qualitative and quantitative tools including surveys, interviews, new monitoring technologies, statistical analyses and experimental designs
Students will learn to participate in and lead innovation and creativity in collaborative settings

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Critical Systems of Development

Objectives & Outcomes

Course Objectives: To encourage students to research and better understand both the socio-historical and sector-specific contexts of their future development engineering, and to articulate this context in various course assignments.

Student Learning Outcomes: By the end of this class, students can expect to develop the ability to analyze the complex systems dynamics associated with the development contexts that you wish to work within and the changes that you aim to create, and thus to avoid unnecessary unintended consequences of change.

Rules & Requirements

Prerequisites: Graduate student standing

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Development Engineering/Graduate

Grading: Letter grade.

Instructors: Agogino, Levine

Also listed as: MEC ENG C200

Critical Systems of Development: Read Less [-]
DEV ENG 203 Digital Transformation of Development 3 Units
Terms offered: Spring 2024, Spring 2023, Spring 2022
As technology use proliferates globally, there exists significant potential to leverage such technology and associated data streams to further understand and improve the lives and livelihoods of people in low-resource settings. This course introduces students to data-intensive approaches to development. Students will learn methods from development economics, machine learning, information science, and computational social science as a means of gaining insight into development challenges and organizational decision-making. Students will gain an introduction to sensors as well as tools and methods for spatial modeling and spatial data analysis.

**Objectives & Outcomes**

**Course Objectives:**
- To increase students' capacity to use data to make informed decisions around development challenges.
- To provide students hands-on experience in digital systems. Students will learn data sourcing, data cleaning, data analysis, and data visualization.
- To provide students with a “systems” perspective for understand data and how data is used within a development context.
- To strengthen students’ programming and analysis skills.

**Student Learning Outcomes:**
- Demonstrate skill in critiquing a data-driven research article or report.
- Develop proficiency in data analysis and data visualization techniques.
- Understand basic research design, construction of a large data set, and how to analyze towards research outcomes.

**Rules & Requirements**

**Prerequisites:** Graduate student standing

**Hours & Format**
- Fall and/or spring: 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Development Engineering/Graduate

**Grading:** Letter grade.

Digital Transformation of Development: Read More [+]
DEV ENG 205 Development Engineering Applications 3 Units
Terms offered: Fall 2023, Fall 2022
Students engage in professionally oriented independent or group projects. The projects integrate the development engineering goals of creating technology interventions designed to improve human and economic development within complex low-resource settings.

Objectives & Outcomes

Course Objectives: Apply a range of leadership skills including motivating others, resolving conflict, developing theories of change, and building greater awareness of self. Apply a wide variety of methods for creatively framing and solving problems, use a human-centered process to uncover the needs of diverse stakeholders, and engage in divergent and convergent thinking as well as iterative solution testing. Apply the tenets of entrepreneurship including collaboration, value creation, resilience, and risk-taking to advance the project. Apply the tenets of systems thinking to understand and influence complex systems, design an innovation that takes into account the larger context surrounding the challenge, its various constitutes, and the interrelationships between system components. Demonstrate a habit of asking relevant questions to solve complex problems and designing research and methodologies to answer questions. Demonstrate complex problem-solving skills through the application of knowledge, skills, and responsibilities in the context of progressively more challenging problems and projects. Demonstrate the ability to function effectively in multidisciplinary, cross-functional teams that include students and mentors from various colleges and representatives from partnering organizations. Employ empathic listening to understand problems, concisely and precisely express ideas to diverse stakeholders using verbal, written, and electronic methods, and show ability to incorporate feedback to improve project outputs. Identify all the stakeholders involved in a project, and effectively engage with them to understand and describe their needs and capabilities.

Student Learning Outcomes: By the end of this class, students can expect to develop solutions to complex, real-world problems that are either actively implemented or implementation ready.

Rules & Requirements

Prerequisites: Graduate student standing

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Development Engineering/Graduate

Grading: Letter grade.

Development Engineering Applications: Read More [+]

DEV ENG 206 Ethical Reflection and Portfolio Building 2 Units
Terms offered: Fall 2023, Fall 2022
This course is intended to provide students with a forum for reflection on the Summer Internship component of the Master of Development Engineering as well as projects worked on to date. Topics covered by the course will include issues of power and privilege, civic engagement, political/public policy contexts, tensions between tourism vs. travel, and community service vs. engagement. Students will discuss and produce an op-ed on an issue of interest. Students will also develop a portfolio to capture their individual point of view and skill sets developed in the MDevEng.

Objectives & Outcomes

Course Objectives: Articulate in a nuanced and thoughtful manner how development engineering experiences have impacted their motivations, values, skills, and future goals. Develop the skills to articulate ideas in a non-confrontational, non-controversial and polite manner. Given a specific real-world situation, identify the most salient facts, stakeholders, consequences, duties, virtues/underlying values, and relationships. Reflect on and further develop informed, objective perspectives and judgments regarding the praxis of research and entrepreneurship in the development context. Students will structure and create a significant original portfolio weaving together experiences and outcomes that showcase their identity as a Development Engineer. Understand the principles of reflection and how these can be integrated into their lives.

Student Learning Outcomes: Be prepared to communicate their identity and experiences to a broader audience. Develop an individual identity as a professional in the field of Development Engineering.

Rules & Requirements

Prerequisites: Graduate student standing

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture per week

Additional Details

Subject/Course Level: Development Engineering/Graduate

Grading: Letter grade.

Ethical Reflection and Portfolio Building: Read Less [-]
DEV ENG 210 Development Engineering Research and Practice Seminar 2 Units
Terms offered: Spring 2024, Spring 2023, Spring 2022
Development Engineering represents a new interdisciplinary field that integrates engineering, economics, business, natural resource development and social sciences to develop, implement, and evaluate new technological interventions that address the needs of people living in poverty in developing regions and low-income areas of the United States. This seminar, offered each spring term, will focus on work-in-progress presentations by the students, as well as faculty and guest lecturers. This seminar is a required course for the Designated Emphasis in Development Engineering.

Rules & Requirements
Prerequisites: Graduate standing
Repeat rules: Course may be repeated for credit without restriction.

Objectives & Outcomes
Course Objectives: The objective of the seminar is to prepare students for research and practice in development engineering. Students will give presentations on their research and receive feedback from faculty and peer students in multiple disciplines. The seminar will also provide a community of practice in the new field of development engineering.

Instructors: Agogino, Brown

Global Poverty: Challenges and Hopes in the New Millennium 4 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
This class seeks to provide a rigorous understanding of 20th century development and thus 21st century poverty alleviation. Students will take a look at popular ideas of poverty alleviation, the institutional framework of poverty ideas and practices, and the social and political mobilizations that seek to transform the structures of poverty.

Objectives & Outcomes
Course Objectives: The graduate students will learn the social-political context constrains and opens opportunities for successful Development Engineering by building on the lectures and readings of the undergraduate course GPP 115, and adding on to it additional readings and a graduate-level discussion seminar.

Instructor: DeLong
DEV ENG 290 Advanced Special Topics in Development Engineering 1 - 3 Units
Terms offered: Fall 2023, Spring 2023, Fall 2022
This series covers current topics of research interest in development engineering. The course content may vary semester to semester. Check with the department for current term topics. All topics will address the development engineering goals of developing technology interventions designed to improve human and economic development within complex, low resource settings.

Objectives & Outcomes

Course Objectives: To prepare students to understand critical topics associate with developing economics, development technologies and social impact.

Student Learning Outcomes: Varies with the topic. However, all special topics courses will teach students skills in integrating multiple disciplines of social sciences, economics, policy and technology into better understanding of development challenges and potential solutions.

Rules & Requirements

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring:
7 weeks - 2.5-6 hours of lecture per week
15 weeks - 1-3 hours of lecture per week

Advanced Special Topics in Development Engineering: Read More [+]

DEV ENG 299 Graduate Research 1 - 4 Units
Terms offered: Spring 2024, Fall 2023, Spring 2023
Individual Study or Research in Development Engineering

Rules & Requirements

Prerequisites: Graduate standing

Repeat rules: Course may be repeated for credit without restriction. Students may enroll in multiple sections of this course within the same semester.

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of independent study per week

Summer:
6 weeks - 1-4 hours of independent study per week
8 weeks - 1-4 hours of independent study per week

Advanced Details

Subject/Course Level: Development Engineering/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Advanced Special Topics in Development Engineering: Read Less [-]