Development Engineering

The Designated Emphasis in Development Engineering is an interdisciplinary training program for UC Berkeley doctoral students whose dissertation research includes topics related to the application of technology to address the needs of people living in poverty. Through coursework, research mentoring, and professional development, the program prepares students to develop, pilot, and evaluate technological interventions designed to improve human and economic development within complex, low-resource settings. The DE serves students across engineering disciplines, quantitative social science disciplines (including public health), business programs, information sciences, and natural sciences.

The program builds upon ongoing research in technological innovations, human-centered design, development economics, remote sensing and monitoring, data science, and impact analysis at UC Berkeley. The program is overseen by the Graduate Group in Development Engineering, administered by the Department of Civil and Environmental Engineering, and affiliated with:

- Blum Center for Developing Economies (http://blumcenter.berkeley.edu)
- Center for Effective Global Action (CEGA) (http://cega.berkeley.edu)
- Technology and Infrastructure for Emerging Regions (TIER) (http://tier.cs.berkeley.edu/drupal)
- Development Impact Lab (DIL) (http://dil.berkeley.edu)

This constellation of affiliates—through DIL—is a cornerstone partner in USAID's Global Development Lab (http://www.usaid.gov/GlobalDevLab). As such, development engineering students are connected to an ecosystem of researchers and practitioners at Berkeley and also have access to a dynamic global network. To review the development engineering research projects sponsored by DIL, we encourage you to explore the DIL Technology Portfolio (http://dil.berkeley.edu/technology-portfolio).

To be admitted to the Designated Emphasis in Development Engineering, an applicant must already be accepted into a PhD program at the University of California, Berkeley. Before applying for the DE, interested PhD students should arrange a consultation meeting with one of the development engineering faculty advisers. Students must apply at least one semester before their PhD qualifying examination. Admission to the Designated Emphasis in Development Engineering is determined by the development engineering faculty advisers on a rolling basis throughout the academic year.

After the initial consultation meeting, a student must submit the application by email to the Graduate Student Affairs Officer (okimoto@ce.berkeley.edu), development engineering faculty adviser, and to the development engineering chair. The application must contain*:

1. Application forms for Admission to the Designated Emphasis in Development Engineering.
2. Letter of intent summarizing research interests and educational or employment background in issues related to development economics or development engineering.
3. A list of courses, if any, taken from the required and designated course list and a timeline when the rest will be taken.
4. Letter of recommendation from a member of the development engineering faculty graduate group or the student's graduate adviser.

For further information regarding admission to graduate programs at UC Berkeley, please see the Graduate Division's Admissions website (http://grad.berkeley.edu/admissions).

* If you have applied to InFEWs, you will have submitted these documents except the timeline and courses. Please submit that within one year of the InFEWs application.

Coursework/Curriculum

The Designated Emphasis in Development Engineering requires a total of five courses, comprised of two core courses and three electives. Electives must be selected from the areas listed below: 1) Problem Identification and Project Design, 2) Evaluation Techniques and Methods for Measuring Social Impact, and 3) Development Technologies. The three electives must span at least two areas. Only one course can be from the student's home department. All course work should be taken for a letter grade. See program website (http://deveng.berkeley.edu) for more information.

Required Courses

DEV ENG C200	Design, Evaluate, and Scale Development Technologies	3
DEV ENG 210	Development Engineering Research and Practice Seminar	2

Development Engineering Electives: Three electives from at least two of the thematic modules.

Problem Identification and Project Design

CIV ENG 209	Design for Sustainable Communities	3
DEVP 225	Innovation, Product Development, and Marketing	3
DEVP C232	Foundations of Public Health	2
INFO 213	User Interface Design and Development	4
INFO 214	Needs and Usability Assessment	3
INFO 272	Qualitative Research Methods for Information Systems and Management	3
MBA 215	Business Strategies for Emerging Markets: Management, Investment, and Opportunities	3
MEC ENG 290H	Green Product Development: Design for Sustainability	3
MEC ENG 290P	New Product Development: Design Theory and Methods	3
PB HLTH 290	Health Issues Seminars (Designing Innovative Pubic Health Solutions)	3

Evaluation Techniques and Methods for Measuring Social Impact

DEV ENG 290	Advanced Special Topics in Development Engineering	1-3
DEVP 228	Strategic Planning and Project Management	3
ECON 219B	Applications of Psychology and Economics	3
ECON 240A	Econometrics	5
ECON 240B	Econometrics	4
ECON C270A	Microeconomics of Development	3

ECON 270B	Development Economics	3
ECON 271	Seminar in Development Economics	3
ECON 274	Global Poverty and Impact Evaluation	4
INFO 272	Qualitative Research Methods for Information Systems and Management	3
MBA 292S	Social Sector Solutions: Social Enterprise	3
MBA 296	Special Topics in Business Administration (Applied Impact Evaluation: How to Learn What Works to Lower Global Poverty)	1-3
PB HLTH 235	Impact Evaluation for Health Professionals	3
PB HLTH 252C	Intervention Trial Design	3
PUB POL C253	International Economic Development Policy	3

Development Technologies (Appropriate Technologies, Sensors, Data Collection, Data Mining and Analysis)

BIO ENG 168L	Practical Light Microscopy	3
CIV ENG 271	Sensors and Signal Interpretation	3
CIV ENG 290	Advanced Special Topics in Civil and Environmental Engineering (Control Market and Privacy Tools for Participatory Sensing)	1-3
COMPSCI 289A	Introduction to Machine Learning	4
COMPSCI 294	Special Topics (Behavioral Data Mining)	1-4
ECON 291/ ENGIN 298B	Departmental Seminar (Behavior Management and Change)	1
INFO 271B	Quantitative Research Methods for Information Systems and Management	3
INFO 283	Information and Communications Technology for Development	3
INFO 290	Special Topics in Information	1-4

Qualifying Examination

All students must apply and be accepted to the Designated Emphasis in Development Engineering *at least one semester before their qualifying examination.* At least one faculty member of development engineering must participate in the qualifying examination committee and will evaluate the exam from relevant perspectives. Satisfactory performance on the qualifying examination for the PhD will be judged according to the established rules in the student's home department. Forms must be submitted with approval from both the department and the designated emphasis, at least one month in advance of the exam. For more details, please see the website (http://deveng.berkeley.edu/#quals).

If none of the faculty advisers/committee members on your qualifying exam or dissertation are in the Graduate Group in Development Engineering, consider encouraging one of them to apply for membership in the Graduate Group in Development Engineering. The faculty should contact the faculty chair (see Contact Information tab on right sidebar).

Advancing to Candidacy

Students must have a designated emphasis member on the dissertation committee as well as obtaining the approval of the designated emphasis Head Graduate Advisor at the time of applying for candidacy.

Dissertation

The dissertation must contain themes relevant to the field of Development Engineering (e.g., technology for economic and social development). The student's dissertation committee must include at least one faculty in development engineering who can evaluate the dissertation from relevant perspectives.