DVP 600 Foundations of Development
This intensive pre-program course will be taught over a three-week period prior to the start of fall semester, when each cohort is convened. It is designed to create a shared basic understanding of development for students with different academic and practitioner backgrounds and presents the context of development as a historical process, weaving in the major theories, concepts, and practice trajectories that have defined its particular trajectory.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

601 Principles of Social Science for Development: Themes, Theories, and Strategies
This course will introduce students to key social science analytical tools relevant to development. It provides training in major development theories and practices through a social justice and rights-based lens and prepares students to understand how relations of power at local and global scales intersect with and shape development efforts.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

602 Role of Culture in Sustainable Development
This course emphasizes the cultural and spatial dimensions to development practice and promotes sensitivity to the unique development practice challenges related to the management of cultural resources in the context of regional and local cultures. The course explores the management of natural resources as evidenced in resource-tenure systems, environmental policy, indigenous knowledge systems, participatory management practices, and collaborative management for ecosystem services.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

603 Macro and Micro-economic Tools for Development Practice
The development practitioner must be able to understand the nature of household, farm, community and national economies and economic decision making and the impacts of international market forces and public policies. This course introduces fundamental principles and tools of analysis used in micro and macro-economics, especially as they relate to household decision making and to policy impacts in a developing world context. The course introduces the measures and meaning of poverty and the dynamics and interrelationships between larger level forces, such as national finance, trade and fiscal policy, and the allocative decisions that are made at a local level. Students will learn specific tools to analyze these micro-macro relationships in terms of poverty reduction outcomes and the sustainable natural resource management.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

611 Global Health Case Studies and Community Responses
This intensive cross-disciplinary global health and nutrition course will highlight lessons learned from community-based research on high priority health problems spanning child survival; malnutrition and its behavioral determinants; infectious, vector born and emerging zoonotic diseases; reproductive and sexual health; lifestyle related disease; chronic disease and aging; health care seeking behavior in pluralistic health care arenas; and primary health care interventions. The course places an emphasis on understanding health and health care challenges in the social, political and economic contexts of developing countries. Students will gain critical problem solving skills that will enable them to conduct formative research in their own countries toward the end of developing viable health care and nutrition programs.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

620 Introduction to Natural Systems
This course presents the basic concept and principles of ecosystem analysis, the services those ecosystems provide, and the impacts of human-environment interactions. Instructional units will provide a clear understanding of the hydrologic and management of arid and semi-arid lands, rangelands, and forests. The impacts of desertification and development of hydrologic resources (water availability and quality) in all of these environments will be explored with specific emphasis on the concepts of ecology and watershed management. These units will be followed by instruction on the current concepts and practices in wildlife and fisheries conservation and management and will emphasize the importance of the biotic resources of ecosystems.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

621 Natural Resources Management: Applications
This course focuses on the management of natural resources within ecosystems. It introduces students to the management of land and water resources in the context of developing countries. Technical units explore the problems of conflict, the management and engineering of irrigation systems, water and sanitation, alternative sources for energy, integrated watershed management, and urban and rural land planning. The course also examines the human element of natural resource management as evidenced in evidence-based analysis, environmental policy, integrated management of land and water resources in the context of developing countries. Technical units explore the management of natural resources within ecosystems.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

630 Essential Management Principles for Development
This course introduces participants to the structure of development delivery services and the management skills that these delivery systems utilize. It first focuses on the organizational and operational characteristics of the principal development actors (bilateral and multilateral donors, international NGOs, local NGOs, national government agencies, foundations, etc.); then analyzes the sequential steps of the delivery process, including strategic planning, assessment, problem analysis / theory of change, project design, monitoring and evaluation, project development and policy analysis. This course will be administered by a combination of TANGO International Executive Officers and qualified guest lecturers with expertise in relevant fields.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

631 Methods II: Research & Data Analysis Tools & Applications for Development Practice
Building on the introductory methods course, this course reinforces the basic qualitative and quantitative tool set, including rapid appraisal, participatory appraisal, formal surveys, team ethnography, and so forth. The course further introduces the use of GIS, remote sensing, and other techniques used to develop problem solving (e.g. in community vulnerability mapping). This course also focuses on the skills needed for the management and analysis of qualitative and quantitative data using standard software packages, as well as the professional interpretation and presentation of research findings. Students will apply these techniques to data collected during the previous development practicum, in this way integrating the applied field experience into the classroom. Student teams research projects, in collaboration with community partners.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

640 Methods in Development Practice
This course introduces students to the culture of inquiry, the basic principles of applied, problem-solving research, and the logic of a mixed methods approach. It then relates research methodology to the development context as defined by the project cycle and project design principles, information systems management, livelihood and vulnerability assessment (including health, nutrition, and environmental assessment), community and environmental planning, project monitoring and evaluation, and proposal development. In providing a comprehensive overview of the role of information in development, the course is designed to build decision skills in the choice of method and the management of information. Instruction will be provided by faculty and practitioner experts in these fields.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

641 Global Classroom: Integrated Approaches to Sustainable Development Practice
This course is designed to foster cross-border and cross-disciplinary collaboration through web-conferencing, online portals for interactive communication, and shared course management sites and to provide students with an introduction to the core competency areas and practical skills required of a development practitioner. The course provides students with a general introduction to the basic core competencies and practical skills required of a development practitioner and as it relates to the development context as defined by the project cycle and project design principles, information systems management, livelihood and vulnerability assessment (including health, nutrition, and environmental assessment), community and environmental planning, project monitoring and evaluation, and proposal development. In providing a comprehensive overview of the role of information in development, the course is designed to build decision skills in the choice of method and the management of information. Instruction will be provided by faculty and practitioner experts in these fields.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

642A Cross Cohort Workshop
The course will convene first and second year MDP students. It is designed to promote a collaborative learning environment for both cohorts. First year students will be expected to prepare for an intensive summer field practicum and produce a proposal for their field projects. Second year students will analyze and present the findings of their projects conducted the previous summer and help to orient the first-year cohort in proposal development and field work. This course will generate a concrete context surrounding which analytical concepts and methodological tools can be evaluated and refined.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

693 Internship
Specialized work on an individual basis, consisting of training and practice in actual service in a technical, business, or governmental establishment.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

694A Summer Field Practicum in International Development
A core element of the Arizona MDP program is field practicum. The purpose of the field practicum is to create a structured opportunity for field tested learning on a closely mentored individual basis. The practicum experience engages students in an on-going specific development practice activity that utilizes cross-disciplinary skills, provides a more concrete methodological experience, and involves collaboration and field interaction with local colleagues. The field practicum will be carried out with one of University of Arizona’s long-term institutional partners in one of several countries including Brazil, Ethiopia, and Guatemala, or with the international development group TANGO International.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate

697B Cross Cohort Workshop: Field Practicum Analysis and Professional Development
DVP 697B is part of a collaborative learning environment for both MDP cohorts. For the first third of the semester we will co-convene with DVP 642A. Those first-year graduate students will be expected to prepare for an intensive summer field practicum and produce a proposal for their field projects. DVP 697B, the second-year cohort, will utilize their own prior field experience to assist the first-year cohort in proposal development and field work. Additionally, DVP697B students will analyze the data and present the findings from their own field practicum. Lastly, DVP 697B emphasizes professional development. Each student will do guided preparation of a personal professional website, social media sites, a blog, and entry into a customized professional network. There will also be sessions on fundamentals of grant-writing and presentation skills.

Academic Org Desc: Geography & Dev, Sch of
Academic Career Desc: Graduate
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Catalog Number</th>
<th>Course Title</th>
<th>Description</th>
<th>Academic Org Desc</th>
<th>Academic Career Desc</th>
<th>Crosslisted courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVP</td>
<td>699</td>
<td>Independent Study</td>
<td>Qualified Development Practice students will work on an individual basis with professors who have agreed to supervise such work.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
<td>-</td>
</tr>
<tr>
<td>909</td>
<td>Master's Report: The MDP Culmination Project</td>
<td>The Field Practicum will culminate with a Master's Project. In collaboration with field partners and faculty advisors, students will develop a report on the field research objectives, methods, and outcomes. The Master's project will be refined, refined, and presented to faculty and first year students as part of the seminar requirements. Additionally, it is anticipated that the Master's Report will reflect each student's chosen second-year specialization within MDP. The project will be presented formally at the annual University of Arizona MDP Forum involving faculty and leading representatives of the international development community and the MDP network. Student papers will contribute to the MDP Discussion Paper Series, available online as a forum for collaboration among students and faculty engaged in the MDP network and the broader international development community.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
<td>-</td>
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<tr>
<td>GEOG</td>
<td>500</td>
<td>Research Design</td>
<td>Focus on conceptualizing research projects and on writing and presenting a research proposal.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
<td>-</td>
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<tr>
<td>501A</td>
<td>Planning Theory and Practice</td>
<td>This course is designed for advanced undergraduate students seeking careers in urban/regional planning, architecture, real estate development, and related fields. The primary objective of the course is to introduce students to the planning profession and the tracks of study within the University of Arizona's Planning Degree Program. Some of the topics covered include: land assessment and evaluation of wildlife habitat; problem-solving with GIS. Graduate-level requirements include completion of a project on the use of GIS in their discipline or an original GIS analysis (100 points) in coordination with the instructor.</td>
<td>Planning</td>
<td>Graduate</td>
<td>PLG 501A</td>
<td></td>
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<tr>
<td>502</td>
<td>Applications of Geographic Information Systems</td>
<td>General survey of principles of geographic information systems (GIS); applications of GIS to issues such as land assessment and evaluation of wildlife habitat; problem-solving with GIS. Graduate-level requirements include completion of a project on the use of GIS in their discipline or an original GIS analysis (100 points) in coordination with the instructor.</td>
<td>Renewable Natural Resources</td>
<td>Graduate</td>
<td>RNR 503</td>
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<tr>
<td>507</td>
<td>The American Landscape</td>
<td>An in-depth exploration of the human experience and how it is affected by a broad range of landscapes across the United States. Students will have the opportunity to learn about and apply a variety of methods for studying human and landscape interactions across a great diversity of contexts. These might include: city spaces, suburban settings, national parks, agricultural lands, cold war landscapes, borderlands, and others. Graduate-level requirements include the completion of an essay and annotated bibliography on the work of a specific scholar, place, or region.</td>
<td>Geophysical &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>RNR 516A</td>
<td></td>
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<tr>
<td>510</td>
<td>Comparative Planning: Past, Present, and Future</td>
<td>Designed to help students plan students who expect to practice in a variety of planning systems. The objective of this course is to provide a comparative survey of domestic planning systems in an international context. Additional topics covered include variations in the powers of local units of government and analysis of interjurisdictional competencies and conflicts. Graduate-level requirements include more required reading and are graded on analysis of readings in their logs.</td>
<td>Planning</td>
<td>Graduate</td>
<td>PLG 510</td>
<td></td>
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<tr>
<td>514</td>
<td>Analytic Methods in Planning and Strategic Management</td>
<td>Methods and models for program planning and policy analysis; forecasting, service demand, facility location in capital investment programming, task sequencing, program analysis and evaluation.</td>
<td>Planning</td>
<td>Graduate</td>
<td>EPID 514</td>
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<tr>
<td>515</td>
<td>Introduction to Water Resources Policy</td>
<td>Water resources policy including the identification of regional problems of water use, the elements of water planning, water rights, and a consideration of institutional structures and processes. Graduate-level requirements include an in-depth term paper.</td>
<td>Hydrology &amp; Atmospheric Sci</td>
<td>Graduate</td>
<td>HWSR 515</td>
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<tr>
<td>516A</td>
<td>Computer Cartography</td>
<td>Introduces the principles of map design, production and analysis. Graduate-level requirements include an instructor approved 5-8 page paper on a related topic and an analytical cartography demonstration scholarly analysis in contemporary analytical cartography.</td>
<td>Geophysical &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>PLG 516C</td>
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<tr>
<td>516C</td>
<td>Urban Geographic Information Systems</td>
<td>Introduces concepts and application skills for use of geographic information systems to investigate a range of urban spatial issues and decision-making processes. Emphasis on complete project of GIS based problem solving, including project planning, spatial data sources/acquisition, preparation/coding, analysis, representation, and communication. Graduate-level requirements include writing an original research papers based on original data collected in the field.</td>
<td>Geophysical &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>RNR 516G</td>
<td></td>
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<tr>
<td>516D</td>
<td>PGGIS: Participatory Approaches in Geographic Information Science</td>
<td>A project-based course focusing on applications and impacts of GIS and other spatial analysis technologies in grassroots community development, participatory decision making, and community-engaged social science. Class format includes discussion seminar, GIS workshop, collaboration, and out-of-classroom community involvement. Graduate-level requirements include writing an original research papers based on original data collected in the field.</td>
<td>Geophysical &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>PLG 516D</td>
<td></td>
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<tr>
<td>516E</td>
<td>GeoVisualization (GIS)</td>
<td>Introduces principles and practices of GeoVisualization (GeoViz) and software (Community and ERDAS Imagine). Graduate-level requirements include an instructor-approved, scholarly paper on a related topic. The paper will be 5-8 double-spaced, typewritten pages and provide a scholarly analysis and critique of a significant real-world GeoViz application.</td>
<td>Geophysical &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>PLG 516E</td>
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<tr>
<td>516F</td>
<td>GIS for the Social Sciences</td>
<td>An advanced course for students who want to integrate social science data and geographic information science into their research or work life. The course is presented in a lecture/laboratory format. The lecture portion will be completed in class sessions necessary for the integration of social science data and approaches with a GIS framework. The laboratory portion will provide practical experience with GIS software products used for the development and analysis of spatial-referenced social science data sets. Graduate-level requirements include a 15 page term paper dealing with the integration of social science and GIS. Specific topics must be agreed upon in advance with the instructor. The paper will be completed in stages and due dates for selecting a topic, and for the completion of a précis, an outline and the paper will be posted on the course DLG site.</td>
<td>Geophysical &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>RNR 516F</td>
<td></td>
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<tr>
<td>517</td>
<td>Geographic Information Systems for Natural and Social Sciences</td>
<td>Introduction to the application of GIS and related technologies for both the natural and social sciences. Conceptual issues in GIS database design and development, analysis, and display. Graduate-level requirements include a thorough bibliographic review and a scholarly paper on a current application of geographic information systems in the student's major field.</td>
<td>Renewable Natural Resources</td>
<td>Graduate</td>
<td>RNR 517</td>
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<tr>
<td>519</td>
<td>Cartographic Modeling for Natural Resources</td>
<td>Computer techniques for analyzing, modeling, and displaying geographic information. Development of spatially oriented problem design and the use of logic are applied to the use of GIS programs. Emphasis on applications in land resources management and planning. Graduate-level requirements include research project and a research paper.</td>
<td>Renewable Natural Resources</td>
<td>Graduate</td>
<td>RNR 519</td>
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<tr>
<td>520</td>
<td>Advanced Geographic Information Systems</td>
<td>Examines various areas of advanced GIS applications such as dynamic segmentation, surface modeling, spatial statistics, and network modeling. The use of high performance workstations will be emphasized. Graduate-level requirements include a more extensive project and report.</td>
<td>Renewable Natural Resources</td>
<td>Graduate</td>
<td>RNR 520</td>
<td></td>
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<tr>
<td>521C</td>
<td>Physical Climatology: Mechanisms of Change</td>
<td>The global and surface energy balance; the hydrologic cycle; the influence of climate on the atmospheric and oceanic circulation; climate history, sensitivity, modeling, and natural and anthropogenic change. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter.</td>
<td>Hydrology &amp; Atmospheric Sci</td>
<td>Graduate</td>
<td>ARL 521C</td>
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<tr>
<td>522</td>
<td>Resource Mapping</td>
<td>Use of computer technologies to map and inventory natural environments; integration of global positioning systems, remote sensing, and geographic information systems. Graduate-level requirements include a detailed report on the application of problem mapping in a specific application area.</td>
<td>Renewable Natural Resources</td>
<td>Graduate</td>
<td>RNR 522</td>
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<tr>
<td>524</td>
<td>Integrated Geographic Information Systems</td>
<td>Addresses the theoretical rationale, current knowledge and methods for achieving a common spatial basis between remote sensing (image) and GIS (non-image) data. Graduate-level requirements include a scholarly seminar project.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate</td>
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<tr>
<td>529</td>
<td>Objective Analysis in the Atmospheric and Related Sciences</td>
<td>This graduate course provides an overview of statistical methods used to interpret datasets in the atmospheric and related sciences. The objective is to provide a working knowledge of the statistical tools most commonly used. Topics include application of basic statistics (composite analysis; significance testing; curve fitting; regression</td>
<td>Hydrology &amp; Atmospheric Sci</td>
<td>Graduate</td>
<td>ATMO 529</td>
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<td>GEOG 529</td>
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<td>Subject Code</td>
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<tr>
<td>GEOG 529</td>
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<td>Objective Analysis in the Atmospheric and Related Sciences</td>
<td>This course provides an overview of statistical methods used to interpret datasets in the atmospheric and related sciences. The objective is to provide working knowledge of the statistical tools most needed. Topics include application of basic statistics (composite analysis; significance testing; curve fitting; regression and correlation, and non-parametric statistical significance testing (e.g. Monte-Carlo methods and field significance), matrix methods (principal component analysis; SVD analysis; CCA), and time series analysis (harmonic analysis; power spectra; data filtering; cross-spectrum analysis; singular spectrum analysis; and wavelet analysis).</td>
<td>Hydrology &amp; Atmospheric Sci</td>
<td>Graduate</td>
<td>HWR 529</td>
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<tr>
<td>530</td>
<td></td>
<td>The Climate System</td>
<td>Systematic examination of processes and circulations influencing Earth’s climate. Emphasis on circulations influencing geographic processes using examples of atmospheric environmental issues. Graduate-level requirements include the completion of a term paper.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>ARL 530</td>
</tr>
<tr>
<td>531A</td>
<td></td>
<td>Traditional Ecological Knowledge</td>
<td>An introduction to the growing literature on traditional ecological knowledge and its relationships to the ecological and social sciences. Graduate-level requirements include preparing for and leading a class discussion on a specific topic.</td>
<td>American Indian Studies Cmt</td>
<td>Graduate</td>
<td>AIS 531A</td>
</tr>
<tr>
<td>532</td>
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<td>Climate and Water</td>
<td>This course explores the connections between climate and water resources from the perspective of the past, the present, and the future to foster an appreciation of the finite nature of water in the western U.S. and other regions in the face of a changing climate.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate</td>
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<tr>
<td>536A</td>
<td></td>
<td>Fundamentals of the Atmospheric Sciences</td>
<td>Broadly covers fundamental topics in the atmospheric sciences. Topics include composition of the atmosphere, atmospheric thermodynamics, atmospheric chemistry, cloud physics, radiative transfer, atmospheric dynamics, and climate. Graduate-level requirements include additional questions on homework and exams plus a term paper on a specialized research topic.</td>
<td>Hydrology &amp; Atmospheric Sci</td>
<td>Graduate</td>
<td>ATMO 536A</td>
</tr>
<tr>
<td>538</td>
<td></td>
<td>Biogeography</td>
<td>The role of historical events and ecological processes in determining the past and present geographic distribution of plants and animals. Graduate-level requirements include a research paper.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>ECOL 538</td>
</tr>
<tr>
<td>539A</td>
<td></td>
<td>Introduction to Dendrochronology</td>
<td>Survey of dendrochronological theory and methods. Applications to archaeological, geological, and biological dating problems and paleoenvironmental reconstruction. Emphasis on dating methods, developing tree-ring chronologies, and evaluating tree-ring dates from various contexts. Graduate-level requirements include a research paper reviewing critically some aspect of dendrochronology.</td>
<td>Geosciences</td>
<td>Graduate</td>
<td>ANTH 539A</td>
</tr>
<tr>
<td>544</td>
<td></td>
<td>Entrepreneurial Innovation for Sustainable International Development</td>
<td>This course examines development-driven social entrepreneurship strategies through which individuals and small groups can have an innovative, scalable impact on sustainable development in the impoverished world (e.g., Sub-Saharan Africa). Students will address two non-traditional development questions: what is the impact of innovative, development-driven entrepreneurship and how can I collaborate with my peers in the developing world to utilize technology and markets for the betterment of impoverished societies? Graduate-level requirements include a requirement to transfer the basics of their personal development project into a preliminary Logframe, the standard organizational template for development proposals. That task includes providing some assessment of costs, local needs and the sources of finance for your development entrepreneurship.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>GEOS 539A</td>
</tr>
<tr>
<td>546</td>
<td></td>
<td>Health and the Global Economy</td>
<td>This course deals with the interconnection of the global economy, local social structures, and health, as well as examining disease and spatial aspects of health care, including access to care. Graduate-level requirements include a more substantive research paper.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>GWS 546</td>
</tr>
<tr>
<td>547</td>
<td></td>
<td>Global and Regional Climatology</td>
<td>Description and analysis of the atmospheric circulation process that produces differences in climates throughout the world. Emphasis on the earth’s problem climates and climatically sensitive zones most susceptible to floods, droughts, and other environmental stresses due to global change. Graduate-level requirements include an additional term paper.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>GEOS 547</td>
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<tr>
<td>550</td>
<td></td>
<td>Geomorphology</td>
<td>Processes, form, and dynamics of the fluvial system from source to mouth. Introduction to aeolian, glacial, and planetary geomorphology. Graduate-level requirements include additional discussion section once a week.</td>
<td>Geosciences</td>
<td>Graduate</td>
<td>ARL 550</td>
</tr>
<tr>
<td>553</td>
<td></td>
<td>Advanced Location Theory</td>
<td>Advanced location theory, including such topics as spatial variation in costs and demand; consumer travel behavior; spatial competition and strategic marketing; geography of economic impacts; and the location of public and private facilities. This is a GIS-intensive course.</td>
<td>Geosciences &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>GEOS 550</td>
</tr>
<tr>
<td>555</td>
<td></td>
<td>Regional Geographies</td>
<td>Course provides focused training dedicated to a single region and can include fieldwork, lectures, and/or original research. Graduate-level requirements include writing original research papers based on original data collected in the field.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>PLG 553</td>
</tr>
<tr>
<td>557</td>
<td></td>
<td>Statistical Techniques in Geography, Regional Development and Planning</td>
<td>Methods of gathering and analyzing data for the solution of geographical, urban, and regional planning problems, with emphasis on quantitative and statistical techniques used in spatial analysis and cartography, on the one hand, and program planning, on the other. Graduate-level requirements include the completion of several data-intensive research projects.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate</td>
<td>PLG 557</td>
</tr>
<tr>
<td>559</td>
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<td>Land Use and Growth Controls</td>
<td>Lecture/seminar class designed for graduate planning students. Looks at basic and advanced land use, the tools utilized for land use planning, and the methodology of land use planning. Current planning and legal issues dealing with regulation of growth, the sequence of growth, and the limiting of growth are analyzed. Issues of equity in controlling land use are also explored. Graduate-level requirements include the completion of a series of research projects.</td>
<td>Planning</td>
<td>Graduate</td>
<td>PLG 559</td>
</tr>
<tr>
<td>560</td>
<td></td>
<td>The Environmental History of East Asia</td>
<td>This course explores the mutual impact of culture and nature - how the natural environment has shaped culture, and how human culture has changed the natural environment (and to take this full circle, how human-induced changes in the natural environment subsequently impact societies). The relatively rapid and thoroughgoing transformations in East Asia over the past century allow us an ideal setting to explore the interaction between culture and nature. Focusing largely on China, Japan, Korea, and Vietnam, this course explores how the relatively new field of environmental history opens new dimensions of historical inquiry. Graduate-level requirements include extra reading of additional translations of primary sources, extra discussion time with the instructor, a research-oriented paper, and a different grading scheme.</td>
<td>East Asian Studies</td>
<td>Graduate</td>
<td>EAS 560</td>
</tr>
<tr>
<td>563</td>
<td></td>
<td>Economic and Environmental Input-Output Analysis</td>
<td>This course provides the theory, techniques and hands-on experience necessary to understand input-output and its applications to economic and environmental issues. Input-output has the capacity to measure linkages and the propagation of an economic or environmental shock across sectors and regions of an economy. It is commonly used for transportation planning, disaster relief, energy forecasting, environmental analysis (pollution attribution), social accounting models, and quantifying the impact of a terrorist attack. An important aspect of the course is to gain hands-on experience by applying the appropriate techniques and perform impact analysis with Microsoft Excel and PyIO (Python Input-Output).</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate</td>
<td></td>
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<tr>
<td>564</td>
<td></td>
<td>The Arid and Semi-arid Lands</td>
<td>Past, present and future of settlement and resource utilization in the world’s arid lands; spatial interrelationships of environmental, demographic, socioeconomic and political systems.</td>
<td>Arid Lands Resrc Sciences, Cmt</td>
<td>Graduate</td>
<td>ARL 564</td>
</tr>
<tr>
<td>565</td>
<td></td>
<td>Physical Aspects of Arid Lands</td>
<td>The climate, landforms, hydrology, soils and vegetation of deserts, with special emphasis on processes and distribution at micro-to-macro scales.</td>
<td>Arid Lands Resrc Sciences, Cmt</td>
<td>Graduate</td>
<td>ARL 565</td>
</tr>
<tr>
<td>566</td>
<td></td>
<td>The Middle Eastern City and</td>
<td>Examines the physical and socioeconomic characteristics of the city in the Middle East and North Africa; the Islamic Middle East &amp; N</td>
<td>Graduate</td>
<td>MENA 566</td>
<td></td>
</tr>
</tbody>
</table>
GEOG 567 Geographical Analysis of Population

Social and environmental conflicts over water are intensifying in much of the world. This course studies the physical basis, history and political economy of water development and water policy in the U.S. and internationally. Graduate-level requirements include additional reading every week and a term paper instead of the final exam.

GEOG 569 Water Resource Assessment

Focuses on watersheds, aquifers, and river basins as sources of water to meet human and environmental demands. Methods include watershed delineation, water budget and safe yield calculation, and water quality assessment. Models and decision support systems are reviewed. Graduate students taking the course will participate in an all-day field trip and synthesize understanding in a comprehensive assessment of water resources with explicit emphasis on water policy linked to critical social and environmental processes across multiple scales.

GEOG 576 The Chinese City: Comparative Perspectives

This course asks how the city was understood and urban space was experienced in China from the late imperial period to the twentieth century, from the walled cities of Ming and Qing to the neoliberal remaking of Beijing and Shanghai, passing through the modernist experiments of the Communist and Republican periods. Examining some of the key social, political, and cultural factors that shaped urban life, we will address such questions as: how did changes in media shape conceptions of urban space and one’s place within it, what did the Chinese urban landscape look like, what were some of its key features, and how did political changes at the national level work to shape urban life and governance in the city? Our investigations will also lead us into the realm of cultural and intellectual history. We will look at how such notions as cosmopolitanism, nation-mindedness, and scientific rationality developed in and around the city. In more general terms, we will use the case of China to investigate a hypothesis about the modern urban life and urban space can be written, and what its significance might be. This course maintains a focus on the distinctive character of various Chinese cities while attempting to elucidate deeper commonalities and similarities that shape urban experience in China and elsewhere. Comparisons with other national experiences as well as theoretical reflections on issues of urbanism and urban life will then be integral part of the course. Graduate level requirements: In addition to the undergraduate assignments, you will have to submit a book review every other week. 3-4 pages in length, double-spaced. (No web posting or short paper when a book review is due). Graduate-level work is expected from graduate students in all assignments.

GEOG 578 Global Change

Analysis of the Earth system through an examination of its component parts (particularly climate and biogeochemistry) and their interactions with human activities, emphasizing information needed to understand modern and future environmental changes. Graduate-level requirements include an in-depth written exercise and additional activities as described in the syllabus.

GEOG 579 Spatial Statistics and Spatial Econometrics

This course provides the statistical and econometric techniques required for the analysis of geocoded data. Identification of spatial heterogeneity and inclusion in a formal regression model. An important aspect of the course is to gain hands-on experience in applying the appropriate techniques and using state-of-the-art software.

GEOG 580 Power, Politics and Deforestation in the Brazilian Amazon

This course examines the wide variety of causal explanations for deforestation in the Brazilian Amazon and the policy proposals offered by Latin American and North American political scientists, economists, historians, anthropologists, geographers, ecologists, journalists and environmental activists.

GEOG 583 Geographical Applications of Remote Sensing

Use of aircraft and satellite imagery for monitoring landforms, soils, vegetation and land use, with the focus on problems of land-use planning, resource management and related topics. Graduate-level requirements include the completion of a project report.

GEOG 590 Remote Sensing for the Study of Planet Earth

Remote Sensing for the Study of Planet Earth introduces basic and applied remote sensing science as a means to explore the diversity of our planetary environments (biosphere, atmosphere, lithosphere and hydrosphere) within and toward the environment. Focus is on spectral, spatial, angular and temporal domains of remote sensing systems. The course strikes a balance between theory, applications and hands-on labs and assignments. We explore how you can download, process, analyze and interpret multi-sensor data and integrate online remotely sensed data sources/products into your research of interest.

GEOG 593 Internship

Specialized work on an individual basis, consisting of training and practice in actual service in a technical, business, or governmental establishment.

GEOG 594 Practicum

The practical application, on an individual basis, of previously studied theory and the collection of data for future theoretical interpretation.

GEOG 596B Water Policy in Arizona and Semi-arid Regions

This course focuses on current Arizona water policy from a multi-disciplinary perspective. Through readings, research, lectures, discussions and presentations, the student is exposed to major, current water resource issues facing Arizona and other parts of the West and policies to address them. The faculty draw upon their and guest-lecturers’ experiences to demonstrate the development, analysis and implementation of real-world water policy.

GEOG 596I Law, Geography, and Property

This seminar aims to bring together law, geography, and political economy, where they overlap in matters of nature and society. Students will study the history of “law-and-society” and environmental studies, and to prepare graduate students to do interdisciplinary legal and policy analysis as part of their academic research.
Lectures, laboratory, and field projects covering various aspects of professional practice.

Geography &

Current Topics in Geography

Urban Geography

Physical Geography

Graduate

PLG 597T

This course shows students how planners frame the notion of public interest in their work, how planning, which is

Graduate

History of Geographic

Academic Org

Critical Methodological

Supervised Geotechnology

Planning Theory

Based on the exchange of scholarly information, usually in a small group setting, this course examines

Graduate

Sustainable Development and

New Urbanism

Examines contemporary competition between environment, resources (water, energy), social equity, and economic viability in the community development and revitalization arena. Public policy, planning initiatives, design strategies and technical solutions that bridge the conflicting agendas are analyzed. Field investigation of contemporary cases. Appropriate for students specializing in planning, architecture and landscape architecture. Graduate-level requirements include a case study paper and formal class presentation. The study should include a literature review, and assessment methodology and critical comment.

Planning

Graduate

PLG 597S

RED 597S

597T

Housing and Households

First of two-course sequence focusing on U.S. housing and community development. Topics covered include housing market projections, housing submarket analysis, housing finance and mortgage lending, household analyses, residential choice and residential mobility. Appropriate for students specializing in urban planning, architecture, urban geography and urban sociology.

Planning

Graduate

PLG 597T

599

Independent Study

Qualified students working on an individual basis with professors who have agreed to supervise such work. Graduate students doing independent work which cannot be classified as actual research will register for credit under course number 599, 699, or 799.

Geography &

Dev, Sch of

Graduate

ENVS 597F

LAD 597F

NSC 597F

PLG 597F

PSY 597F

STCH 597F

TTE 597F

605

Planning Theory

This course shows students how planners frame the notion of public interest in their work, how planning, which is often intervention in the private market, can be justified in a capitalist society, the role that professional ethics play in the life of the planner, and the ways in which various kinds of planners define their jobs - and then do it. The course includes both the classic work in planning theory and the latest conversations in the theory community but with a strong emphasis on the value of such work for practicing planners.

Planning

Graduate

PLG 605

611

Projects in Regional Planning

Lectures, laboratory, and field projects covering various aspects of professional practice.

Planning

Graduate

PLG 611

619

Ecology of Savannas, Shrubslands, and Woodlands

Taught Spring semester in even-numbered years. The functional ecology and dynamics of biogeographically diverse savanna, shrubland and woodland ecosystems will be examined. Interactions among co-occurring life forms and growth forms will be emphasized in the context of climate, soils and disturbance.

Planning

Graduate

Range Management

ECOL 619

ENVS 619

RAM 619

641

Water Law

The course in Water Law traditionally emphasizes state law rules that govern rights to use surface water and groundwater throughout the country. Although we will give ample attention to the prior appropriation doctrine, riparian water rights, and various systems for regulating groundwater use, this course will also address the theoretical derivation of research questions; retheorization through research findings.

Law

Graduate

ENVS 641

HWR 641

LAW 641

MNE 641

658

Critical Methodological Practice

A critical theory approach to method (primarily qualitative) in human geography and related social sciences; theoretical derivation of research questions; retheorization through research findings.

Geography &

Dev, Sch of

Graduate

- 

689

History of Geographic Thought

History of geographic philosophy and methodology.

Geography &

Dev, Sch of

Graduate

- 

695A

Current Topics in Geography

The exchange of scholarly information and/or secondary research, usually in a small group setting. Instruction often includes lectures by several different persons. Research projects may or may not be required of course registrants.

Geography &

Dev, Sch of

Graduate

- 

695B

Preparing Future Faculty in Geographic Professional Development

A course designed to assist advanced graduate students in obtaining academic employment.

Geography &

Dev, Sch of

Graduate

- 

695C

Preparing Future Faculty: College Teaching

Introduces graduate students to pedagogical theory, skills, practice and technological tools for college classrooms. Covers learning philosophies, cognitive skills, assessment, classroom dynamics and ethics. Provides practice in developing and presenting course materials.

Geography &

Dev, Sch of

Graduate

- 

695D

Preparing Future Faculty: Writing Workshop/Proposal Development

Course is to assist advance graduate students in writing up a geographic research project or developing a proposal.

Geography &

Dev, Sch of

Graduate

- 

696A

Economic Geography

Based on the exchange of information, usually in a small group setting, this course examines contemporary developments in economic geography. The selected topics rotate according to the interests of the faculty convener and the graduate student enrollees. Generally grounded in economic theories of space and place, typical topics include regional inequalities and development; location theory, urban economics, and transportation; mainstream post-ma克思主义 political economy; retailing and consumption; alternative economies; resources and agriculture; gender and work; migration and economic change; institutional approaches; the intersection of culture and economy; and money, finance, and trade. The scope of work shall consist of research by course registrants, with the exchange of the results of such research through discussion, reports, and/or papers.

Geography &

Dev, Sch of

Graduate

- 

696B

Cultural Geography

Based on the exchange of scholarly information, usually in a small group setting, this course examines contemporary developments in cultural geography. The selected topics rotate according to the interests of the faculty convener and the graduate student enrollees. Generally grounded in cultural theories of space and place, typical topics include transnationalism, globalization, resistance, identity, postcolonialism, social justice, the身体, and media. The scope of work shall consist of research by course registrants, with the exchange of the results of such research through discussion, reports, and/or papers.

Geography &

Dev, Sch of

Graduate

- 

696C

Physical Geography

Based on the exchange of scholarly information, usually in a small group setting, this course examines contemporary developments in physical geography. The selected topics rotate according to the interests of the faculty convener and the graduate student enrollees. Generally grounded in theories of biophysical space, topics typically include urban geography and urban sociology.

Geography &

Dev, Sch of

Graduate

- 

696F

Advanced Methods and Techniques

Based on the exchange of scholarly information, usually in a small group setting, this course examines contemporary developments in geographic methodology. The selected topics rotate according to the interests of the faculty convener and the graduate student enrollees. Generally following one or more units of advanced knowledge in quantitative and/or qualitative methodologies, typical topics include spatial statistics, spatial economics, mathematical programming, simulation, ethnography, participant observation, participatory action research, content and concept analysis, and visual methods. The scope of work shall consist of research by course registrants, with the exchange of the results of such research through discussion, reports, and/or papers.

Geography &

Dev, Sch of

Graduate

- 

696G

Urban Geography

Based on the exchange of scholarly information, usually in a small group setting, this course examines contemporary developments in urban geography. The selected topics rotate according to the interests of the faculty convener and the graduate student enrollees. Generally grounded in theories of urban space, typical topics include
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Catalog Number</th>
<th>Course Title</th>
<th>Description</th>
<th>Academic Org Desc</th>
<th>Academic Career Desc</th>
<th>Crosslisted courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG</td>
<td></td>
<td>Political Geography</td>
<td>This course will consist of a seminar format allowing different topics in political geography to be presented. Topics offered will likely include the state, governance, critical geopolitics, social movements, or an exclusive focus on a number of key political/social theorists inside and outside of the discipline of geography from Frederich Ratzel, to Karl Marx, to David Harvey.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
<td></td>
</tr>
<tr>
<td>696H</td>
<td></td>
<td>Political Ecology</td>
<td>This course is a multi-disciplinary approach to understanding resource access by different people, the institutions and environmental conditions through which resource access is mediated, and the sorts of environmental change that these systems may create. It also involves an analysis of the political institutions that have bearing on environmental outcomes. It frames local resource use systems within the 'nests' of processes that help to shape them – e.g. political economy, globalization, gender relations, and historically produced 'narratives.'</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
<td></td>
</tr>
<tr>
<td>696I</td>
<td></td>
<td>Water Resources Geography</td>
<td>Based on the exchange of scholarly information inside a small group setting, this course examines contemporary developments in water resources geography. The selected topics rotate according to the interests of the faculty convener and the graduate student enrollees. Typical topics include water issues in the Western U.S., comparative and international water policy, and lands, border regions, a warming world, groundwater management, water and urban growth, energy-water linkages, water rights, markets, and transfers, and public and cultural perceptions of water. The scope of work shall consist of research by course registrants, with the exchange of the results of such research through discussion, reports, and/or papers.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
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<tr>
<td>696J</td>
<td></td>
<td>Development and the Latin American Experience</td>
<td>The aims of this course are to 1) introduce students to general theories of development from development studies, anthropology, geography and related fields, 2) introduce students to critiques of development practices that have emerged from the Latin American experience, and 3) provide an opportunity for students to compare experiences from their own work (within or outside of Latin America) with the general theories and case studies offered in class.</td>
<td>Latin-American Studies, Ctr</td>
<td>Graduate LAS 696K</td>
<td></td>
</tr>
<tr>
<td>696L</td>
<td></td>
<td>Conservation and Community</td>
<td>An intensive exploration of the impact of conservation efforts, including protected areas, on rural peoples across the world.</td>
<td>Anthropology, Sch of</td>
<td>Graduate ANTH 696L, HIST 696L</td>
<td></td>
</tr>
<tr>
<td>696M</td>
<td></td>
<td>Geography and Dendrochronology</td>
<td>This graduate-level seminar will focus on a review and discussion of the literature on various topics in dendrochronology. The goal of the seminar is to become familiar with the current body of research on the featured topic, and to critique a set of papers that have appeared in the peer-reviewed literature.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
<td></td>
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<tr>
<td>696N</td>
<td></td>
<td>Geography and Social Theory</td>
<td>Based on the exchange of scholarly information, usually in a small group setting, this course examines developments in socio-spatial theory. Selected topics and thinkers will rotate according to the interests of the faculty convener and the graduate students enrolled. Course organization may be historical, e.g., based on a survey of trends in socio-spatial theory, or thematic, e.g., examining the intersection between spatial theory and such topics as politics, resistance, feminism, globalization, etc. The scope of work shall consist of research by course registrants, with the exchange of the results of such research through discussion, reports, and/or papers.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
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<tr>
<td>696O</td>
<td></td>
<td>Adaptation &amp; Resilience in Water Resources Systems</td>
<td>Climate change, urban growth, energy demand, and global food trade alter water in coupled human-natural systems. This seminar addresses adaptation and resilience using material on river basins, aquifers, infrastructure, policy, and institutions from Southwest U.S., transboundary U.S.-Mexico, and international cases.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
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<tr>
<td>696P</td>
<td></td>
<td>Participatory Systems Design and Delivery</td>
<td>This seminar is a graduate experience intended to improve the participants' ability to design, deliver and measure the performance of Participatory and Collaborative Systems (PCS) in their own work and research. The seminar covers philosophical considerations of PCS, performs a survey across a range of participatory and collaborative methods, and examines state-of-the-art efforts in PCS across a range of disciplines and application domains using case studies from a range of journals. To the degree possible during the semester, there will be active participation in a mandated public meeting process.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
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<tr>
<td>696R</td>
<td></td>
<td>International Environmental Policy</td>
<td>This seminar examines the challenges of understanding and governing environmental change at the international scale. The goal of the seminar is to provide an overview of the major scholars, theories and debates in the growing area of international environmental issues such as climate change, land use, oceans, biodiversity, and trans-boundary resources; to critically assess scholarship and policy; and to understand the origins and impacts of international environmental policy in different countries and geographic regions.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
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<tr>
<td>699</td>
<td></td>
<td>Independent Study</td>
<td>Qualified students working on an independent basis with professors who have agreed to supervise such work. Graduate students doing independent work which cannot be classified as actual research will register for credit under course number 599, 699, or 799.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
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<tr>
<td>900</td>
<td></td>
<td>Research</td>
<td>Individual research, not related to thesis or dissertation preparation, by graduate students.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
<td></td>
</tr>
<tr>
<td>909</td>
<td></td>
<td>Master's Report</td>
<td>Individual study or special project or formal report thereof submitted in lieu of thesis for certain master's degrees.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
<td></td>
</tr>
<tr>
<td>910</td>
<td></td>
<td>Thesis</td>
<td>Research for the master's thesis (whether library research, laboratory or field observation or research, artistic creation, or thesis writing). Maximum total credit permitted varies with the major department.</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
<td></td>
</tr>
<tr>
<td>920</td>
<td></td>
<td>Dissertation</td>
<td>Research for the doctoral dissertation (whether library research, laboratory or field observation or research, artistic creation, or dissertation writing).</td>
<td>Geography &amp; Dev, Sch of</td>
<td>Graduate -</td>
<td></td>
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