

To: Senate
Date: Sept. 17, 2020
From: M. A. McKibben, Chair, EPS
Re: Graduate program name change

Beginning with the award of a \$7M NASA Astrobiology Center grant to Distinguished Biogeochemistry Prof. Tim Lyons in 2015^[1], the then-named Dept. of Earth Sciences began to extend its established research expertise on the origin of life on Earth to the search for life on other planets. We hired established exoplanet detector^[2] Dr. Stephen Kane as Associate Professor of Planetary Physics to our faculty in 2017. In 2020 we hired Dr. Edward Schwieterman as Assistant Professor of Astrobiology to our faculty; his expertise is in computer modelling of planetary atmospheres with the goal of identifying signature chemical compounds for spacecraft and observatories to detect in the search for habitable planets^[3]. As a consequence of building this core faculty group in Planetary Science, the Department changed its name to Earth and Planetary Sciences in 2019.

Now that this core group has recruited a viable population of graduate students and post-docs, we propose to expand the name of our graduate program from “Geological Sciences” to “Earth and Planetary Sciences”. This reflects the fact that not only are new Ph.D. and M.Sc. students graduating with specialties in Planetary Sciences, those graduating with specialties in Geological Sciences now have more options for picking up ancillary expertise in Planetary Sciences as well via graduate coursework and research collaborations. We also believe that the name change on the degrees awarded will make our graduates more competitive in the job market by more accurately describing their broader expertise.

The EPS faculty voted for the graduate program name change in November of 2019.

[1] <https://ucrtoday.ucr.edu/25063>

[2] <https://www.nature.com/articles/s41550-019-0845-5>
<https://www.scientificamerican.com/article/how-visiting-venus-will-help-us-find-life-on-distant-planets/>

[3] <https://iopscience.iop.org/article/10.3847/1538-4357/ab1d52>

Current

Graduate Programs

The department of Earth and Planetary Sciences offers the M.S. and Ph.D. in Geological Sciences.

~~Graduate education in the Geological Sciences emphasizes general geology combined with specialization in fields such as evolutionary paleobiology, invertebrate and vertebrate paleontology, Quaternary geology, neotectonics, applied geophysics, geotectonics, crustal processes, geochemistry, groundwater, mineral deposits, stratigraphy, sedimentology, sedimentary geochemistry, basin analysis, landscape ecology, fire ecology, and natural resource conservation. Integrated field and laboratory studies are encouraged.~~

Admission An undergraduate degree in geology or geophysics is the normal preparation for graduate work; however, a degree from a related field of science or engineering is often appropriate. Applicants to graduate status must supply ~~GRE General Test (verbal, quantitative, analytical)~~ scores before admission.

Master's Degree

In addition to the general requirements listed under the Graduate Studies section of this

Proposed

Graduate Programs

The department of Earth and Planetary Sciences offers the M.S. and Ph.D. in Earth and Planetary Sciences.

Graduate education in the Earth and Planetary Sciences emphasizes all aspects of geology, geophysics and biogeochemistry as applied to understanding the Earth and other planetary bodies. Areas of research include the origin and evolution of life through geological time; astrobiology and the detection and modeling of exoplanets and their atmospheres; the theory, mechanisms and impacts of earthquakes and faulting; observing and modeling current and past climate change; modeling past and future global carbon and other biogeochemical cycles; and geophysical, geochemical and petrological studies of the structure and internal processes of planetary interiors. Integrated field, laboratory and numerical studies are encouraged.

Admission An undergraduate degree in geology, geochemistry, geophysics or earth/planetary science is the normal preparation for graduate work; however, a degree from a related field of science or engineering or even select non-science disciplines may be appropriate. Applicants to graduate status must supply any standardized test scores required by the Graduate Division before admission.

Master's Degree

In addition to the general requirements listed under the Graduate Studies section of this

catalog, the requirements for the M.S. degree in Geological Sciences, under the Plan 1 (Thesis), are as follows.

Admission Students must make up any deficiency in preparation. The background required ~~is course preparation equivalent to the bachelor's degree in Geology or Geophysics at UCR.~~ Courses taken to remedy background deficiencies are not applicable to the graduate degree. Such courses are designated in the letter of admission to the program sent by the dean of the Graduate Division to the student.

Biannual Reviews All students must undergo biannual reviews by the departmental Graduate Progress Committee. A student's progress is assessed in these reviews, and the committee may recommend changes in a student's plans after these reviews.

Course Work All students must enroll each quarter in the Graduate Seminar in Geosciences (GEO 250). Students must attend the weekly Hewett Club lecture series.

Students must complete a minimum of 36 units of course work in the major and related subjects and obtain advance approval of a coherent plan of study from the graduate advisor.

A maximum of 12 upper-division units beyond the requirements for the bachelor's degree may be applied to the 36-unit requirement.

Students must complete a minimum of 12 units of graduate courses, which must include at least four graduate-level instructional courses taught by four different faculty members as approved by the graduate advisor.

catalog, the requirements for the M.S. degree in Earth and Planetary Sciences, under the Plan 1 (Thesis), are as follows.

Admission Students must make up any deficiency in undergraduate preparation required for their area of study. The background required is determined by the graduate advisor in consultation with their faculty advisor. Courses taken to remedy background deficiencies are not applicable to the graduate degree. Such courses are typically designated in the letter of admission to the program sent by the dean of the Graduate Division to the student.

Biannual Reviews All students must undergo biannual reviews by the departmental Graduate Progress Committee. A student's progress is assessed in these reviews, and the committee may recommend changes in a student's plans after these reviews.

Course Work All students must enroll each quarter in the Graduate Seminar in Geosciences (GEO 250). Students must attend the weekly Hewett Club lecture series.

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A maximum of 12 upper-division units beyond the requirements for the bachelor's degree may be applied to the 36-unit requirement.

Students must complete a minimum of 12 units of graduate courses, which must include at least four graduate-level instructional courses taught by four different

faculty members as approved by the graduate advisor.

All graduate students must complete professional development training by the end of their 9th quarter. This is fulfilled by taking GEO 201 A and GEO 201B before taking their Ph.D. Oral Exam.

Subject to the approval of the graduate advisor, a limited number of upper-division courses in the major and related sciences, if not required for the bachelor's degree and not taken previously, may be accepted for graduate credit.

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Thesis and Final Oral Examination Before the end of the third quarter of study and before embarking on research, the student must submit a written thesis proposal to the graduate progress committee. After approval of the proposal, the student must submit a thesis based on original work for approval by a thesis committee. A maximum of 12 units of thesis research may be counted toward the 36-unit minimum.

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Students present an open research seminar as a final oral examination, which is advertised to all the students and faculty in the ~~Earth~~ **Sciences** Department.

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Normative Time to Degree 7 quarters

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Global Climate and Environmental Change (GCEC) The GCEC MS track is a field and laboratory based multidisciplinary program focused on the evidence for and controls of past and present climate change. Candidates must complete the following:

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upper-division undergraduate and graduate classes outside may be substituted with consent of the Graduate Advisor. 24 of 36 credits must be graduate level.

- 1) Required Core courses: GEO 224 upon entry into the program, GEO 260 and BIOL 212/ENTM 212/GEO 212.
- 2) At least two additional disciplinary courses: GEO 221, GEO 239, GEO 249, GEO 251, GEO 255, GEO 264, GEO 265, GEO 268, GEO 301, OR ENSC 200, ENSC 218, ENSC 224, ENSC 225, ENSC 232.

Thesis Work Before the end of the third quarter students must nominate a faculty advisor and identify a thesis topic. Before embarking on research the student must submit a thesis proposal based on original work for approval by a thesis committee. A maximum of 8 units of research credit can be counted toward the 36 unit minimum. Students present an open research seminar as a final oral examination.

Doctoral Degree

The Department of ~~Earth Sciences~~ offers the Ph.D. in ~~Geological Sciences~~. In addition to the general university requirements of the Graduate Division as found in the Graduate Studies section of this catalog, the Ph.D. in ~~Geological Sciences~~ normally requires the following.

Biannual Reviews All students meet with the Graduate Progress Committee during their first week at UCR to discuss general interests, goals, and plans. The committee recommends courses designed to prepare a student for research and to correct deficiencies in background. This committee also reviews a

upper-division undergraduate and graduate classes outside may be substituted with consent of the Graduate Advisor. 24 of 36 credits must be graduate level.

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Doctoral Degree

The Department of Earth and Planetary Sciences offers the Ph.D. in Earth and Planetary Sciences. In addition to the general University requirements of the Graduate Division as found in the Graduate Studies section of this catalog, the Ph.D. in Earth and Planetary Sciences normally requires the following.

Biannual Reviews All students meet with the Graduate Progress Committee during their first week at UCR to discuss general interests, goals, and plans. The committee recommends courses designed to prepare a student for research and to correct deficiencies in background. This committee also reviews a student's progress biannually

student's progress biannually and may recommend transfer to the master's program if normal progress is not maintained.

Course Work Students must complete at least four graduate-level instructional courses taught by four different faculty members as approved by the graduate advisor. Course work used in satisfaction of the M.S. degree may be accepted with the graduate advisor's approval. All students must enroll each quarter in the Graduate Seminar in Geosciences (GEO 250). Students are also required to attend the weekly Hewett Club lecture series.

Written and Oral Qualifying Examinations

Students must write two research proposals. The proposal topics must be approved by an examination committee to ensure breadth. The committee reviews the proposals and, if acceptable, recommends proceeding to the oral qualifying examination. An oral examination committee appointed by the dean of the Graduate Division examines the adequacy of the student's preparation to conduct the proposed research. Advancement to candidacy in the Ph.D. program follows successful completion of the oral examination. All Ph.D. candidates must satisfy the course requirements and have passed their written and oral qualifying exams within two years of entering the program, otherwise they will not be eligible to continue in the Ph.D. track. Exceptions can only be granted by the Graduate Advisor or by the Chair.

Dissertation and Final Oral Examination

A dissertation normally evolves from one of the research proposals. The dissertation must present original scholarly work and be approved by a dissertation committee before the student may take the final oral

and may recommend transfer to the master's program if normal progress is not maintained.

Course Work Students must complete at least four graduate-level instructional courses taught by four different faculty members as approved by the graduate advisor. Course work used in satisfaction of the M.S. degree may be accepted with the graduate advisor's approval. All students must enroll each quarter in the Graduate Seminar in Geosciences (GEO 250). Students are also required to attend the weekly Hewett Club lecture series.

Written and Oral Qualifying

Examinations Students must write two research proposals. The proposal topics must be approved by an examination committee to ensure breadth. The committee reviews the proposals and, if acceptable, recommends proceeding to the oral qualifying examination. An oral examination committee appointed by the dean of the Graduate Division examines the adequacy of the student's preparation to conduct the proposed research. Advancement to candidacy in the Ph.D. program follows successful completion of the oral examination. All Ph.D. candidates must satisfy the course requirements and have passed their written and oral qualifying exams within two years of entering the program, otherwise they will not be eligible to continue in the Ph.D. track. Exceptions can only be granted by the Graduate Advisor or by the Chair.

Dissertation and Final Oral Examination

A dissertation normally evolves from one of the research proposals. The dissertation must present original scholarly work and be approved by a dissertation committee before the student may take the final oral examination. Students must have satisfactory

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Normative Time to Degree from the B.S.
17 quarters

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Faculty approval Date: Nov. 20, 2019

Justification: The Department was recently renamed Earth and Planetary Sciences to more accurately reflect the diversity of research topics pursued by all of our faculty. Accordingly, the name of our M.Sc. and Ph.D. degrees is no longer accurate and should be changed from “Geological Sciences” to “Earth and Planetary Sciences” to more accurately span the range and diversity of research conducted by our graduate students. We have also updated the description of the research areas in the graduate program to more accurately represent the current faculty composition.

Department Chair Dr. Michael McKibben

Date: Dec. 4, 2019

Signature Michael A. McKibben _____