SPACE RESOURCES (SPRS)

SPRS501. SPACE RESOURCES FUNDAMENTALS. 3.0 Semester Hrs. (I, II) This course provides an overview of the space resources field, including the current knowledge of available resources in the Solar System, extraction and utilization systems under development, economic and technical feasibility studies, legal and policy issues, and space exploration architectures that may be enabled by utilizing extraterrestrial resources in the near future. The course will build broad knowledge and develop confidence in problem solving in the space resources field. 8-week online course. 3 hours lecture; 3 semester hours. Prerequisite: Working knowledge of physical sciences, engineering fields, or economics at an advanced undergraduate level, with basic numerical analysis skills using a programming language or spreadsheet calculations.

SPRS502. SPACE SYSTEMS ENGINEERING. 3.0 Semester Hrs. This course conveys the fundamentals of the systems engineering process as applied to large, complex space systems. It is intended for graduate students with various backgrounds. The students will become familiar with full scope of the systems engineering process from requirements definition, system design, system analysis through system verification. The process will be illustrated with real-world examples from current space systems with an emphasis on systems relevant to the development of space resources. 8-week online course.

SPRS503. SPACE RESOURCES SEMINAR. 1.0 Semester Hr. (I, II) The Space Resources Seminar will engage students in the program with current research and developments related to space resources. Students will assess the importance and relevance to the space resources field in the near-, medium-, or long-term of topics covered in lectures presented by technical experts from a variety of disciplines. They will report and analyze events, news, and research publications and develop scientific, technical, and economic arguments for their impact and relevance to the space resources field, while also responding thoughtfully and critically to other students’ contributions. Students will synthesize the information presented during the entire course by contributing in teams to a final report with an analysis of the most important developments in the science, technology, economics and policy of space resources during the course period. 8-week online course. 1 hour seminar; 1 semester hour.

SPRS504. ECONOMICS OF SPACE RESOURCES. 3.0 Semester Hrs. This course provides an overview of economics and business topics that are commonly found in the space industries. Students will build a basic knowledge of economics, finance, and business issues that are relevant to space resource markets and industries. The big picture is to help provide perspective on what investors or the financial officers at companies are investing in and planning for in or around the space industry.

SPRS591. SPACE RESOURCES PROJECT I. 2.0 Semester Hrs. This course will provide graduate students in the program with directed team-based project learning by exploring the design, planning, and analysis of missions, processes, systems, science, business, and economics for space resources assessment, extraction, and/or utilization. The course will meet formally online once a week for one hour and include a 10-15 minute discussion on relevant design aspects of space mission, processes, and/or systems. In this regard, it will build on content learned in the Space Resources Fundamentals, Space Systems Engineering, and other courses in the Space Resources Program. Students will collaborate in multi-disciplinary teams, typically of up to 5 students. Teams will be advised by a course instructor with significant industrial aerospace design experience and supported by faculty affiliated with the Space Resources program from relevant disciplines on campus. For teams with students in space resource economics, detailed economic analysis will be incorporated into those projects. Student teams will prepare a preliminary design, planning and analysis report early in the semester, one interim progress report, and a final report and project presentation. 16-week online course.

SPRS592. SPACE RESOURCES PROJECT II. 3.0 Semester Hrs. This course will provide graduate students in the MS-NT and PhD programs in Space Resources with an independent design and analysis project. This project will be guided by the course instructor and a technical advisor, will enable the student to delve deeply into a particular system related to space resources prospecting, extraction, processing, and/or utilization of the science of potential resources into business and economics cases for space resources. As much as possible, projects will be coordinated with industrial or government agency partners who are collaborating with the program. The course will involve weekly online meetings where ideas are exchanged and progress discussed within the context of design and analysis principles learned in the prerequisite course. Students will be partnered with a faculty member affiliated with the Space Resources Program. The student will prepare a final report and presentation to present to industry collaborators, space resources faculty, and other students in the course. The final report and/or presentation as appropriate will be converted to a journal or conference publication and/or presentation and resources from the program will support student costs for publishing and/or presenting the work. 16-week online course.

SPRS598. SPECIAL TOPICS IN SPACE RESOURCES. 6.0 Semester Hrs. (I, II, S) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once, but no more than twice for the same course content. Prerequisite: none. Variable credit: 0 to 6 credit hours. Repeatable for credit under different titles.

SPRS599. INDEPENDENT STUDY IN SPACE RESOURCES. 0.5-6 Semester Hr. Students can do Individual research or special projects supervised by a faculty member. The student and instructor will agree on the subject matter, content, and credit hours. Prerequisites: Independent Study form must be completed and submitted to the Registrar.

SPRS707. GRADUATE THESIS / DISSERTATION RESEARCH CREDIT. 1-15 Semester Hr. (I, II, S) Research credit hours required for completion of Doctoral dissertation. Research must be carried out under the direct supervision of the student’s faculty advisor. Variable class and semester hours. Repeatable for credit. Prerequisite: Instructor approval.