University of Central Florida
Ph.D. Planetary and Space Sciences
CIP 40.0203

Proposal document included:

Abbreviated Degree Proposal*

Documents available upon request:

Consultant's Report and Institution Response
Curricular Framework and Course Descriptions
Curriculum Vitae
Duplication of Existing Programs
Faculty Resources
Institutional Resources
Letters from Industry
Letters from Other Universities
Letters of Support
Required Appendices

*Complete degree proposal is available in the resources section in Onboard

STATE UNIVERSITY SYSTEM OF FLORIDA

Request to Offer a New Degree Program

In accordance with Board of Governors Regulation 8.011, Academic Degree Program Coordination and Approval

University of Central Florida **Institution Submitting Proposal**	**Fall 2025** **Proposed Implementation Term**
College of Sciences, Office of Research **Name of College(s) or School(s)**	**Department of Physics, Florida Space Institute** **Name of Department(s)/Division(s)**
Planetary and Space Sciences **Academic Specialty or Field**	**Master of Science/Doctor of Philosophy in Planetary and Space Sciences** **Complete Name of Degree**
40.0203 **Proposed CIP Code (2020 CIP)**	

The submission of this proposal constitutes a commitment by the university that, if the proposal is approved, the necessary financial resources and the criteria for establishing new programs have been met before the program's initiation.

12/05/2024 **Date Approved by the University Board of Trustees**	Alexander Cartwright Digitally signed by Alexander Cartwright Date: 2024.12.03 15:57:48 -05'00' **President's Signature** **Date**
12.5.24 **Board of Trustees Chair's Signature** **Date**	Michael D. Johnson Digitally signed by Michael D. Johnson Date: 2024.11.19 12:47:39 -05'00' **Provost's Signature** **Date**

STATE UNIVERSITY SYSTEM OF FLORIDA

I. Overview

A. Briefly describe the proposed program in the following table.

Purpose	We propose to convert a current and already-successful Planetary Sciences Track in the Physics MS/PhD program into a separate Planetary and Space Sciences MS/PhD program. This will allow UCF to eventually expand its graduate offerings in this highly interdisciplinary field, and thus take advantage of the need in Florida and the US for space, science, and technology workers. The proposed program is well aligned with the "Space Technologies and Systems" Area of Focus in UCF's strategic plan.
Degree Level(s): B, M, D, M+D, P	M+D
Majors, Concentrations, Tracks, or Specializations	None
Total Number of Credit Hours	72
Program Type	☒ **E&G Program** ☐ **Market Tuition Rate Program*** ☐ **Self-Supporting Program*** *Refer to Board Regulation 8.002, Self Supporting and Market Tuition Rate Program and Course Offerings, for additional details.
Possible Career Outcomes	Based on the careers of our existing Track MS/PhD program alumni, program graduates will be qualified for a range of technical occupations that require a knowledge of (e.g.) physics, chemistry, computer science, geology, astronomy, data science – or some combination of these – as they apply to planetary science and space exploration.

B. Does the proposed program qualify as a Program of Strategic Emphasis, as described in the Florida Board of Governors 2025 System Strategic Plan? Programs of Strategic Emphasis List

☐ Yes, it does qualify as a Program of Strategic Emphasis.
☒ No, it does not qualify as a Program of Strategic Emphasis.

Although the program currently lives in the Physics Department, and faculty members will retain their appointments in Physics and other departments, the new program will be under a CIP code that does not currently fall under the Programs of Strategic Emphasis list. However, it is related to CIP codes 40.0501 (Chemistry), 40.0601 (Geology/Earth Science), 40.0801 (Physics) that *are* in that list.

C. Programs of Strategic Emphasis Waiver *(for baccalaureate programs only)*
Does the program fall under one of the CIP codes listed below?

CIP CODE	CIP TITLE
11.0101	Computer and Information Sciences
11.0103	Information Technology
13.1001	Special Education
13.1202	Elementary Teacher Education
14.0801	Civil Engineering
14.0901	Computer Engineering
14.1001	Electrical and Electronics Engineering
27.0101	Mathematics
40.0801	Physics
52.0301	Accounting
52.0801	Finance
52.1201	Management Information Systems

☐ Yes. If yes, students in the program will be eligible for the Programs of Strategic Emphasis waiver. Refer to Board Regulation 7.008 and the Programs of Strategic Emphasis Waiver Guidance.

☒ No

D. Is the infrastructure in place to meet the new degree program requirements, such as hiring faculty and staff, curriculum development, facilities, and funding, prior to enrollment of students to the program?

☒ Yes

☐ No. If not, is there a plan to establish the infrastructure to support the program? Please describe.

II. Institutional and State-Level Accountability

A. Describe how the proposed program directly or indirectly supports the following.

1. The State University System's Strategic Plan goals.
2. The institution's strategic plan and goals the program will directly advance.
3. The university's mission.
4. The benefit to the university, the local community, and the state.

We are proposing the implementation of a Planetary and Space Sciences graduate program at the University of Central Florida, which directly advances State University System strategic goals, and the mission and strategic plan of the University of Central Florida, by educating students in an area of national strategic interest and providing them with practical experiences and opportunities throughout their education. This proposed program is supported by an existing core subset of space researchers at UCF, and would broaden and strengthen upon a productive degree track that has been in place for the past 15 years. The program and its graduates will facilitate expansion of faculty research and innovation in areas of strategic local and national interest.

The State University System (SUS) has long been focused on boosting Florida's economy by educating its people. UCF was thus founded in 1963 to support the burgeoning Space Coast, and has a renewed focus on becoming an Engineering and Technology University of the future. Today, Florida is entering a new economic era with the rapidly developing New Space industry, vastly enhanced and inexpensive access to space, and a new spirit of exploration of space resources. UCF is uniquely positioned to work with, support, and train this new industry. Already a large fraction (almost 30%) of employees at NASA's Kennedy Space Center graduated from UCF, and UCF is often ranked highly in number of aerospace engineering graduates.

UCF's Planetary Sciences Group, who constitute the core faculty of this program, is housed principally in the College of Science's (COS) Department of Physics and the Office of Research's Florida Space Institute (FSI), with additional members in the College of Optics and Photonics (CREOL/COP) and collaborators in the College of Engineering and Computer Science (CECS) and in other colleges. The Planetary Sciences Group was founded in 2003 and established Planetary Sciences Tracks in the Physics PhD and MS programs in 2009. The tracks have been highly successful, with >95% (20 out of 21) of PhD graduates finding employment in the field upon graduation. The planetary faculty are now sufficiently numerous to support the necessary number of graduates per year required for independent programs. The needs of the program and the field have broadened sufficiently to require a program that is not focused mainly on physics aspects of space research, but also includes astrochemistry, astrogeology, astrobiology, AI and computation, scientific instrument development, and more. Importantly, the program needs to be able to accept students with undergraduate degrees in these areas as well as physics, and to award an appropriately titled advanced degree.

This program replaces and expands upon the existing Planetary Sciences Track of the Physics MS/PhD program, leveraging the knowledge gained from successfully running that Track for 15 years to broaden its scope. For context, we have produced 21 PhDs and 7 MSs in the track, along with another 7 PhDs and 9 MSs in the regular Physics program whose primary research mentors were Planetary Sciences faculty and whose research specialty was planetary science. With this improvement from a track to an independent program, future potential new tracks and specializations in the program would allow expansion and flexibility to serve the full and rapidly evolving range of interdisciplinary space-science and space-exploration topics.

The **SUS Strategic Plan** lays out priorities for developing the knowledge economy in the state across the areas of Teaching and Learning, Scholarship, Research, and Innovation (SRI), and Community and Business Engagement (CBE). This program actively works to advance the Teaching and Learning goals for Excellence, Productivity, and especially Strategic priorities to "increase degree productivity and program efficiency, and increase the number of degrees awarded in STEM/Health and other programs of strategic emphasis" by increasing participation and broadening the depth of students accepted into our program. Across the SRI focus, our program has already demonstrated that we can strengthen the quality and productivity of research in the state, as well as increase external funding and relationships with commercial entities. The faculty group is highly research productive, working to continue increasing grant funding, partnering with commercial entities for research, and educating the next generation of students to be involved in that research. This also extends to CBE focus, as we will increase engagement with space economy in Florida and nationwide, and increase the percentage of graduates who are employed full-time in this highly competitive workforce. Strengthening this program will have downstream effects to undergraduate student education as well, as we teach both foundational and topical courses, have research opportunities for students, and mentoring relationships between graduate students and undergraduate students that often extend out to community and industry partners.

"Space Technologies and Systems" is the first focus area in the **UCF strategic plan**, *Unleashing Potential,* and is a strategic direction for the state. "UCF is a public research university invested in unleashing the potential within every individual; enriching the human experience through inclusion, discovery, and innovation; and propelling broad-based prosperity for the many communities we serve." [**UCF Mission Statement**] The proposed program will provide academic coursework, practical research experience, and access to cutting-edge projects that will place its graduates at the top of the field. We know this because the proposed program replaces and subsumes an existing track in the Physics MS/PhD, which has strong in-field employment record, with graduated students taking leadership roles in research institutions, in industry, and with NASA, and involved in major projects around the world. Our faculty's leadership of planetary missions, starting with NASA's GOLD (probing the Earth's extreme upper atmosphere) and Lunar-VISE (a lander and rover suite that will explore unique terrain on the Moon), will bring contracts with regional and national New Space companies while unleashing student potential through their work on the design and development of innovative instrumentation, as well as the discoveries made by analyzing and modeling mission data.

This includes research programs and research areas that **support the economy**,

specifically in science, technology, engineering, and mathematics (STEM). With the fast growth of the New Space economy in Florida, employers are both emerging in and moving to Florida. While NASA's Kennedy Space Center has historically been mainly a governmental load-and-launch facility, an increasing number of commercial payloads and components are now built here. Companies like SpaceX, Blue Origin, Redwire, and UCF spinoff Space Resources Technologies (the world's leading "space dirt" vendor) are just a few of those that could employ graduates of this program, as well as industry-government institutions such as the ISS National Lab. More importantly, UCF is a research and development nexus for the New Space industry, since they look to us for space science expertise to make their exploration and development dreams a reality. UCF faculty already collaborate with these companies in building or testing payloads, and consult on issues of scientific and technical importance, and will increasingly do so, attracting government and industry funding for larger R&D endeavors, including leading space missions.

UCF has approximately 50 researchers and professors engaged in space. These include ~25 in COS and FSI working in 'classic' scientific space-related research but also includes several more in CREOL and CECS who work on instrumentation, astronautics, propulsion, etc., as well as a few in the College of Business Administration (COBA), the College of Arts and Humanities (CAH), the College of Medicine (COM), and the Rosen College of Hospitality Management (RCHM) studying human activities and endeavors in space.

While our program will initially focus on science-based theses and dissertations, we note that space is an environment, not only a topic, and is inherently an interdisciplinarity endeavor, so by starting this PhD program we are laying the groundwork for faculty and their graduate students to engage in projects spanning colleges. For example, a student-built CubeSat (Physics/FSI) could carry an instrument (Physics/Engineering/COP) measuring the velocity field of small particles in the Earth-Moon system (Physics) that communicates measurements to the ground via a laser (COP). Students working on projects could collaborate with and use the expertise of faculty in multiple colleges, depending on the emphasis of their specific project, but, importantly, the scientific motivation and scientific planning that initiates the entire project in the first place, as well as the scientific analysis of data that would drive the field forward, would be in this program.

B. Provide the date the pre-proposal was presented to the Council of Academic Vice Presidents Academic Program Coordination (CAVP ACG). Specify any concerns raised and provide a narrative explaining how each has been addressed in this proposal or will be addressed before the proposed program is implemented.

Submitted 8/28/2018, presented to CAVP and approved shortly thereafter. No concerns raised.

III. Student and Workforce Demand

If the proposed program is a baccalaureate or master's degree on the Programs of Strategic Emphasis list, skip III-A.

A. Describe the Florida and national workforce demand for the proposed program. The response should, at a minimum, include the current state workforce data from Florida's Department of Commerce and national workforce data from the U.S. Department of Labor's Bureau of Labor Statistics. Additional documentation for workforce needs may include letters of program support by employers and job postings for program graduates, as well as a description of any specific needs for research and service that the program would fulfill.

Complete the table below using data from the Search by CIP or SOC Employment Projections Data Tool in the Academic Review Tracking System.

Labor Market Demand, CIP Code 40.0203 (and related codes 40.0201, 40.0202, 40.0299, 40.0499, 40.0599, 40.0601, 40.0699)

Occupations	Percent Change in Job Openings		Annual Average Job Openings		Total # of New Jobs		Education Level Needed for Entry
	FL 2023-31	U.S. 2023-31	FL 2023-31	U.S. 2023-31	FL 2023-31	U.S. 2023-31	
Physicists 19-2012	17.5%	9.8%	41	1593	82	2067	D
Astronomers 19-2011	17.4%	11.1%	6	228	12	327	D
Geoscientists 19-2042	14.2%	9.1%	97	2701	135	2606	M/D*
Atmospheric and Space Scientists 19-2021	7.9%	6.6%	74	1224	63	875	M/D*
Natural Sciences Managers 11-9121	11.5%	12.1%	389	9168	506	12348	M/D*

*We note that occupations within these SOC codes, especially advance and upper-level positions, clearly require MS or PhD degrees even if the BLS ostensibly lists them as 'typically' requiring BS degrees.

Sources:
Date Retrieved: 09/01/2024
U.S. Bureau of Labor Statistics - https://data.bls.gov/projections/occupationProj
Florida Department of Economic Opportunity - http://www.floridajobs.org/labor-market-information/data-center/statistical-programs/employment-projections

Florida has long been known as the space state, since we launch most of the nation's large rockets. But most of the payloads are designed, developed, built and tested elsewhere, and even the astronauts are trained in Texas. Similarly, the mission operations, the payload data analysis, and the scientific discoveries are made largely elsewhere. Most of the funding of space missions is spent on payload development, mission operations, and data analysis. This high-value, high-skill based work is the real growth area for Space in Florida and one that UCF is uniquely posed to exploit. The renewed push into space, driven by private companies and NASA's post-Shuttle human exploration program, is a second chance for Florida, an opportunity to capture a much larger fraction of the new space economy, and vastly more dollars, if we act quickly to capitalize on the opportunity to bring space-technology startups, payload development and assembly, and flight operations to the Sunshine State. Thus, this program does not just address current workforce needs, nor even merely the future demands of organic growth at levels seen in prior decades. Through the $35M NASA Lunar-VISE mission to the lunar surface, led by two UCF Physics faculty, and UCF-founded companies like Space Resources Technologies, the world's leading manufacturer of planetary soil simulants, our faculty are actively building the Florida space economy, driving future workforce needs not just for our own efforts, but also those of companies that start in or move to Florida to participate in the rich environment of customers, professionals, and suppliers.

See the appendix for letters of support from relevant industry partners.

B. If the occupations do not currently appear in the most recent version of the Search by CIP or SOC Employment Projections Data Tool provided by Board staff, provide occupational linkages or jobs graduates will be qualified to perform based on the training provided to students in the proposed program in the table below. Contact the institutional representative working with you on the degree proposal for more information about possible occupations.

Occupational Linkages for the Proposed Program

SOC Code (XX-XXXX)	Occupation Title	Source / Reason for Inclusion
19-2099	Physical scientists, all other	Program has relevant coursework and research mentoring.
19-2041	Environmental scientists and specialist	Program has relevant coursework and research mentoring for environmental analysts and environmental scientists.

17-2011	Aerospace engineers	Program has relevant coursework and research mentoring for astronautical engineers.
17-3021	Aerospace engineering and operations technologists and technicians	Program has relevant coursework and research mentoring for operations technologist.
17-3029	Engineering technologists and technicians	Program has relevant coursework and research mentoring for materials engineering technician, materials engineering technologist, optical engineering technician, optical engineering technologist.
17-3027	Mechanical engineering technologists and technicians	Program has relevant coursework and research mentoring for heat transfer technician and optomechanical technician.
17-2199	Optical engineer	Program has relevant coursework and research mentoring.
17-2151	Geophysical engineer	Program has relevant coursework and research mentoring.
11-3021	Computer and information systems managers	Program has relevant coursework and research mentoring for data operations director, data processing manager.
25-4013	Museum technicians and conservators	Program has relevant coursework and research mentoring for museum exhibit technician (e.g. in science museums).
25-4011	Archivist	Program has relevant coursework and research mentoring for digital archivist.
25-4012	Curators	Program has relevant coursework and research mentoring for collections curator (e.g. in science museums).
15-2041	Statisticians	Program has relevant coursework and research mentoring for analytical statistician, applied statistician, statistical analyst.
15-1299	Computer occupations, all other	Program has relevant coursework and research mentoring for computer laboratory technician.
15-1211	Computer systems analysts	Program has relevant coursework and research mentoring for data processing

		systems analyst, information systems analyst.
15-2051	Data scientists	Program has relevant coursework and research mentoring for data analytics specialist, data mining analyst, data visualization developer.
15-1251	Computer programmers	Program has relevant coursework and research mentoring for applications programmer, computer language coder, computer programmer.
15-1252	Software developers	Program has relevant coursework and research mentoring for applications developer, software applications designer.
43-9111	Statistical assistants	Program has relevant coursework and research mentoring for data analysis assistant.

C. Describe the student demand for the proposed program. The response should, at a minimum, include the following.

1. Projected headcount for Year 1 through Year 5.
2. Data that supports student interest or demand for the proposed program. Include questions asked, results, and other communications with prospective students.

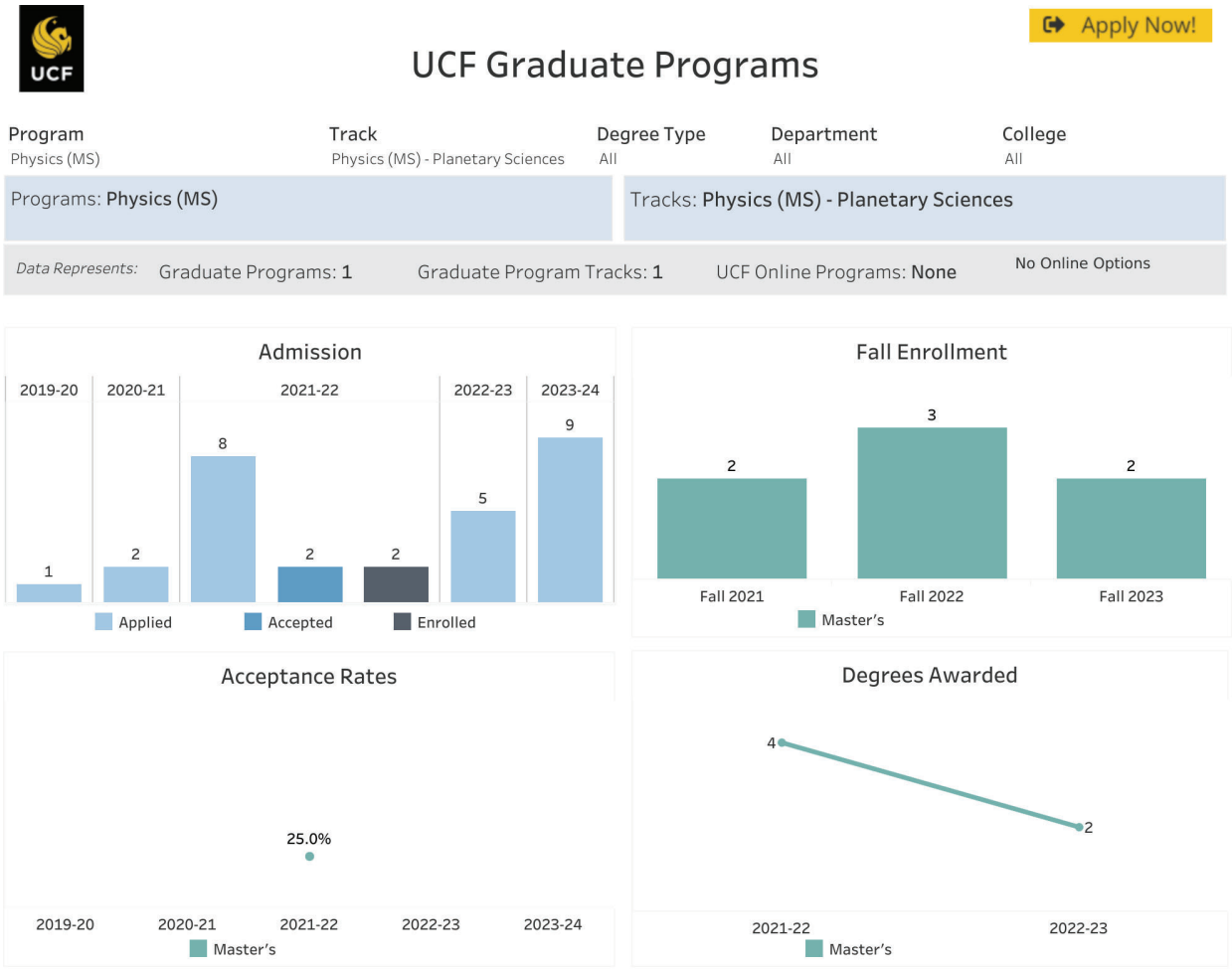
Planetary science students are currently admitted through the Physics program, indicating their interest in the planetary science track. Faculty also advise students in the regular Physics track, and from departments such as Chemistry and engineering. We receive a steady stream of emails from prospective applicants to the existing program, not just during application season, but throughout the year. Ten such contacts per faculty member is not uncommon. Generally, students inquire about research opportunities on faculty projects that would lead to a thesis or dissertation with that faculty member. These students are often well qualified, with undergraduate research experience. Inquiries come from throughout the United States and around the world.

For the 2024-25 academic year, 31 graduate students are enrolled in the planetary science track (29 PhD students, and 2 MS). We anticipate that the program will grow to a total of about 50 students as more faculty become associated with the program (e.g. with new lines and replaced retirements, as well as with faculty in our partner units). We assume each faculty member having approximately 2 to 5 students at any one time. We aim to have the population grow from the current 33 to 50 over the

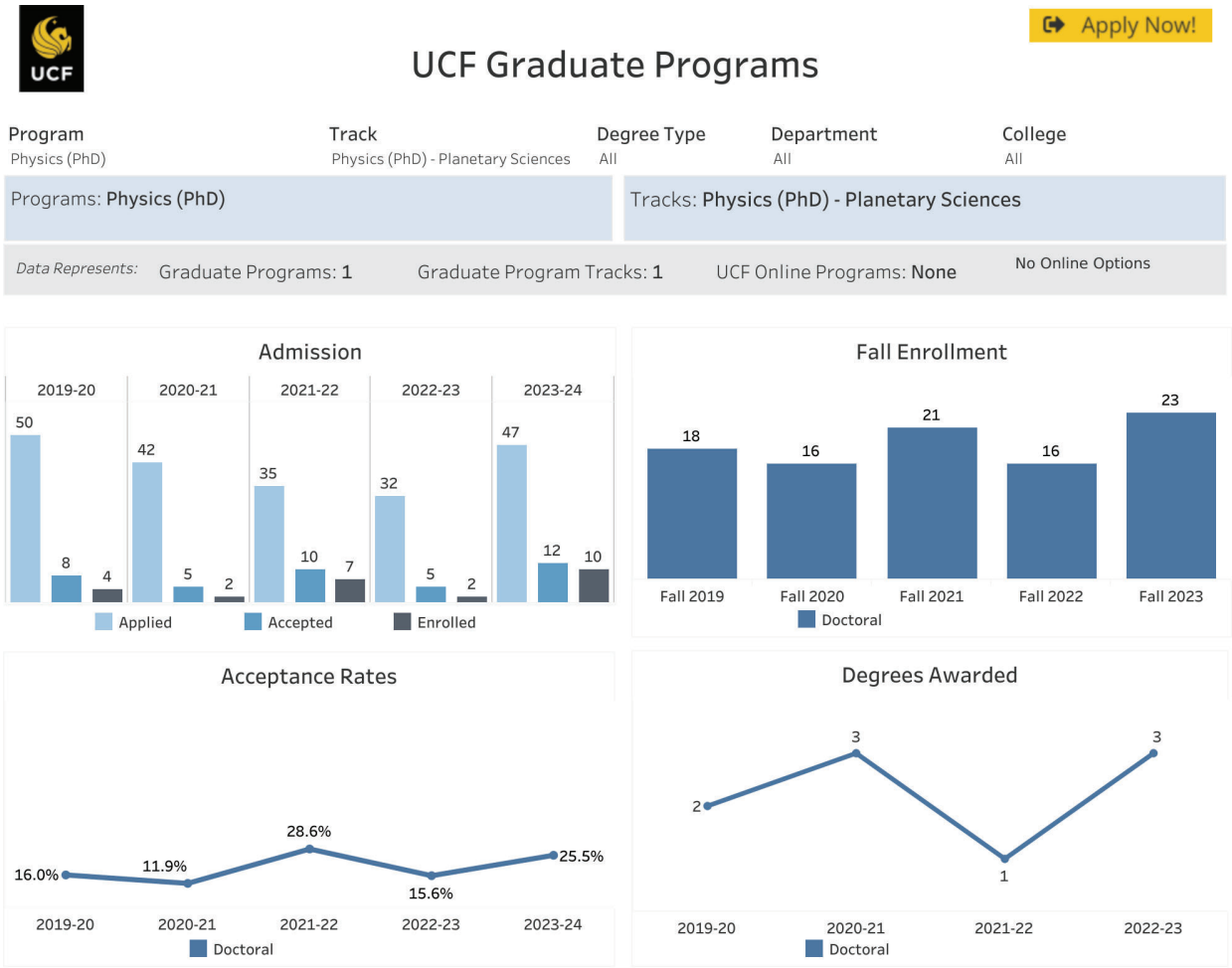
next 5 years, approximately as: Year 1, 33; Year 2, 36; Year 3, 40; Year 4, 45; Year 5, 50. This is enabled by the current physics faculty and the faculty who will be starting in Spring 2025 and Fall 2025, as well as increasing advising roles from faculty at FSI, as indicated in Section VI below. It is important to reiterate that the students applying to this program are not taking students away from the Physics program, as they are already considered separately for most admissions decisions.

We show below snapshots from UCF IKM giving basic statistics about the current Planetary Sciences Track in both our MS and PhD programs. We anticipate the number of applicants in both to increase as our faculty count grows over time and as we land larger research projects.

The graphic below shows data for the MS program within the current Planetary Sciences Track. Note that we are primarily a PhD-focused Track. MS degrees are usually “along the way” degrees for graduate students who desire that. Over time we also expect the number of MS students to increase, and we would be able to offer more of a stand-alone MS degree based on interest, including that from industry and government partners.



The graphic below shows data for the PhD program within the current Planetary Sciences Track of the Physics Program. Previous and current students in the track are aiming to earn their PhD. We receive 30-50 applicants per year.



V. Curriculum

A. If the program is a bachelor's degree, please identify if the university is seeking any of the following statuses for the program.

Status	Yes	No	If yes, complete the following
Common Prerequisites			Appendix C
Exception to 120 Credits			Appendix D
Specialized Admissions			Appendix E

B. Describe the admissions criteria and graduation requirements for the program.

Admissions criteria: In addition to UCF's minimum requirements, we are generally looking for applicants with relevant undergraduate degrees (in e.g. physics, astronomy, geology, geophysics, atmospheric sciences, chemistry, biology, mathematics, or planetary sciences) and with (1) useful research experiences, and (2) relevant skills in either lab work or programming. We also have a slight preference for students whose research experience is already in planetary science (as opposed to, say, astrophysics or terrestrial geology) although in our current program we have in fact admitted strong applicants with such backgrounds. We emphasize here that we anticipate more opportunities for admitting students with a diverse set of academic backgrounds as the faculty in our proposed program give us a broader and broader research repertoire. Admissions is done by committee; currently the entire planetary-sciences faculty in the Physics Department makes up this committee, and we welcome input from planetary-science-related faculty in other units (FSI, CREOL) if they are interested in taking responsibility for mentoring and funding graduate students. Note that we will not require the GRE, nor require a published paper, which is consistent with current best-practices in astronomy and planetary science graduate programs around the country.

The graduation requirements for the program are outlined below and follow the same requirements that we currently have with our MS/PhD track.

PhD requirements:

Our PhD requirements listed here match those described in the current (2024-25) Graduate Catalog for the Planetary Sciences Track PhD.

Course Credits: 72 past the bachelor's degree, divided up as follows:

- Required (a.k.a. "Core") Courses: 6 courses for 18 credits.

AST 5154 Advanced Planetary Geophysics
AST 5263 Advanced Observational Astronomy
AST 5765 Advanced Astronomical Data Analysis
AST 5151 Physics of Planetary Processes
AST 6165 Planetary Atmospheres
PHY 6246 Classical Mechanics

- Elective Courses: 15 credits.
  These are chosen from a broad list that includes courses within and outside the Physics Department. However, the choice of elective courses must be approved by the student's supervisory committee (see below). They must be formal courses, so the 15 credits are usually satisfied by 5 courses.

- Other Electives: 24 credits.
  These are likewise chosen from the same broad list, with the approval of the supervisory committee, but can also include such courses as directed research (AST or PHY 6918).

- Dissertation: 15 credits.
  These are AST or PHY 7980 credits and can only be taken once the student has advanced to candidacy.

Supervisory Committee

Within the first half-semester of admission to the Planetary Sciences PhD program, each student must select, by mutual agreement, a faculty adviser and at least two other faculty members to serve on the Supervisory Committee. UCF graduate faculty and UCF self-funded research scientists who are Graduate Faculty Scholars are eligible to serve on Supervisory Committees. Creation of and changes in the membership of a Supervisory Committee must be approved by the Planetary Sciences Graduate Committee. The adviser is expected to meet regularly with the student. The full committee shall meet with the student at least once per year to review and make recommendations regarding the student's academic progress.

Candidacy Examination

The Planetary Sciences PhD program requires a Candidacy Exam to be taken after the completion of the core courses. This examination is composed of written and oral components. The written component is a journal-level research paper. The oral component has two parts: (1) A public presentation of the research contained in the paper, including the traditional question-and-answer period of a scientific presentation; and (2) private questioning on the detail of the presented research as well as the topics covered in the student's preparation, coursework and dissertation direction. The Supervisory Committee administers the Candidacy Examination.

Dissertation Advisory Committee

After passing the Candidacy Examination, a non-UCF member shall be added to the Supervisory Committee by mutual agreement of the student and Supervisory Committee. This becomes the Dissertation Advisory Committee. The committee continues to meet with the student annually.

Admission to Candidacy

After passing the Candidacy Exam, completing all CITI and RCR Workshops, completing all required pre-candidacy coursework (including the minimum number of elective credits), and assembling an acceptable Dissertation Committee, the student is declared a PhD Candidate. The student must have an approved program of study in file with the College of Graduate Studies.

Dissertation Proposal

The dissertation proposal may be presented immediately after the Candidacy Examination or in a separate meeting not more than one semester thereafter. Before substantial work is done on the dissertation, the Dissertation Advisory Committee must approve the proposal and must also assess whether additional coursework is necessary to begin the dissertation. Such coursework should be completed at the earliest opportunity. Note that the Dissertation Proposal may technically be presented after the student has been admitted to candidacy; it is not formally a candidacy requirement.

Dissertation Defense

The dissertation defense is the final requirement for the PhD. It consists of a public presentation of the dissertation, typically lasting 60 minutes including the traditional question-and-answer period of a scientific presentation, followed by private questioning by the Dissertation Advisory Committee (lasting another 60-120 minutes).

Masters Along the Way

A student earns an MS degree along the way toward the PhD by passing the Candidacy Examination. Note that currently this is not formalized in the current Planetary Sciences Track but we intend to offer it for the new program.

MS requirements:

Our MS requirements listed here match those described in the current (2024-25) Graduate Catalog entry for the Planetary Sciences Track MS. As stated in other sections, this will be a Thesis-option MS. As it is intended to be received as a master's along the way, this will also provide early research support for students in advance of the dissertation.

Course Credits: 33 past the bachelor's degree, divided up as follows.

• Required (a.k.a. "Core") Courses: 5 courses for 15 credits chosen from the following 6 courses.

AST 5154 Advanced Planetary Geophysics
AST 5263 Advanced Observational Astronomy
AST 5765 Advanced Astronomical Data Analysis
AST 5151 Physics of Planetary Processes
AST 6165 Planetary Atmospheres
PHY 6246 Classical Mechanics

• Elective Courses: 12 credits.

These are chosen from a broad list that includes courses within and outside the Physics Department. However, the choice of elective courses must be approved by the student's supervisory committee (see below). They must be formal courses, so the 12 credits are usually satisfied by 4 courses.

• Thesis: 6 credits.

These are AST or PHY 6971 credits.

Supervisory Committee

Within the first half-semester of admission to the Planetary Sciences MS program, each student must select, by mutual agreement, a faculty adviser and at least two other faculty members to serve on the Supervisory Committee. UCF graduate faculty and UCF self-funded research scientists who are Graduate Faculty Scholars are eligible to serve on Supervisory Committees. Creation of and changes in the membership of a Supervisory Committee must be approved by the Planetary Sciences Graduate Committee. The adviser is expected to meet regularly with the student. The full committee shall meet with the student at least once per year to review and make recommendations regarding the student's academic progress.

Masters Defense

The written thesis and oral defense are the final requirements for the master's degree. The thesis is a journal-level research paper. The oral defense is in two parts: (1) A public presentation of the research contained in the paper; and (2) private questioning on the detail of the presented research as well as the topics covered in the student's preparation and coursework. The written and oral components will be administrated by the student's Supervisory Committee.

C. If the proposed program is an AS-to-BS capstone, provide evidence that it adheres to the guidelines for such programs, as outlined in State Board of Education Rule 6A-10.024. List any prerequisites and identify the specific AS degrees that may transfer into the proposed program.

VII. Estimate of Investment

A. Provide the tuition rate for the proposed program for resident and non-resident students.

Resident/Credit Hour	Non-Resident/Credit Hour
$369.65	$1194.05

If the proposed program will operate as self-supporting, market tuition rate, or establish differentiated graduate-level tuition, per Board of Governors Regulation 8.002, complete Appendix F, Self-Supporting & Market Rate Tuition.

B. Complete the summary table below.

1. Provide projected costs and associated funding sources for Years 1 and 5 of program operation. Include all new costs that will be incurred as a direct result of the new program, such as new faculty and staff hires and graduate assistantships.

   Because this is a transition from an existing program, no new faculty or staff hires are anticipated as part of this proposal. The two new faculty lines listed in the table in Section VI have already been approved and do not represent new costs. Further growth to the program is anticipated, in lines with hiring over the last five years, but not required for program success and growth. As shown in the table below, a majority of the students in the track are supported via C&G funds, via grants to either faculty PIs or NASA/NSF graduate student grants.

2. Provide headcount (HC) and full-time equivalent (FTE) estimates of student enrollment for Years 1 through 5.

   In the table below, we provide the starting headcount based on our current enrollment of 33 students in the Planetary Science Track in the Physics Department. Currently, about 5 of those students each year are primarily supported through a GTA. We estimate increasing our overall student counts by 17 to a total of 50 in the next 5 years, and increasing to approximately 10 GTAs by year 5. These are GTA lines that already exist in the Physics department, and students will continue to teach GTA courses that are relevant for physics majors, including our large service courses (Intro Physics and Astronomy courses).

3. Calculate an Educational and General (E&G) cost per FTE for Years 1 and 5 by dividing the total E&G by FTE. Undergraduate FTE must be calculated based on 30 credit hours per year. Graduate FTE must be calculated based on 24 credit hours per year.

Implementation Timeframe	HC	FTE	E&G Cost per FTE	E&G Funds	Contract & Grants Funds	Auxiliary / Philanthropy Funds	Total Cost
Year 1	33	16.5	$7,727	$127,500	$1,022,448		$1,149,948
Year 2	36	18					
Year 3	40	20					
Year 4	45	22.5					
Year 5	50	25	$6,200	$155,000	$1,560,640		$1,715,640