Proposal for New Course

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| **Home Department and Contact Information** | |
| Home Department: Physics Earth Sciences | Date: 9/23/2020 |
| Home Department Chair: Larry McKenna | Extension: 4741  Email: lmckenna1@framingham.edu |
| Home Department  Curriculum Committee Chair:  *If not home department chair* | Extension:  Email: |
| Log Originator:  *If not home department chair or home department curriculum committee chair* | Extension:  Email: |
| **Course Information and Description** | |
| Proposed Course Number and Title: STEM 101 Python Programming for the Sciences | |
| Course Description  *Please provide a full description, including prerequisite(s) and notes. Use present tense and, except for the opening sentence, use complete sentences; the opening sentence should complete “This course is….”*  an introductory course in scientific computing using Python for all STEM and allied majors. With no pre-requisites, this course uses Python to teach fundamentals of scientific computing. The class assume no prior experience in programming, and so begins with the basics of installing the necessary software on a computer, establishing and using on-line resources for retrieving and submitting assignments, and creation of on-line repositories for one’s work. Students then learn the basic structure of Python (variable types, control flow, functions), how to use the array of publically-available libraries and extensions (Numpy, Pandas, SciPy, MatPlotLib) and how to write efficient, modular code to solve real-world problems, including moving, storing, searching and discovering signals in vast, not necessarily numeric, data sets. | |
| Prior Approval   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Has this course been taught with prior one-time approval? | |  |  |  |  | | --- | --- | --- | --- | |  | Yes | **x** | No | | Semester: |  | | If so, did it have General Education status? | |  |  |  |  | | --- | --- | --- | --- | |  | Yes\* |  | No | |  | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | \*One-Time Subdomain: |  | \*One-Time Learning Objectives: |  | | |
| **Rationale** | |
| *Please provide language that clearly explains the purpose for the new course and, if applicable, how the course differs from any similar courses offered by other departments. Include the date of department curriculum committee approval, if available.*  *STEM 101 Python Programming for the Sciences* serves three purposes to the FSU community. First, the class provides introductory training to STEM majors in programming, in a language that now dominates scientific computing. Second, an introductory Python class would complement introductory programming course offered by the Department of Computer Science. Finally, the course is the cornerstone of the nascent Data Science minor.  Scientific computing is a distinct practice from what most of us think as “computer science.” Python is now the most popular scientific programming language, and for good reason: scientists aren’t computer scientists. Unlike in Java, for example, Python is dynamically typed, so the user doesn’t have to define the type of variables, function arguments or return types. Users can simply name variables, and let Python’s automatic memory management allocate and deallocate memory for variables and data arrays. Python is an interpreted language, which means one doesn’t have to compile the code, run it, and then check to see if it works. Python eases the overhead of programming, minimizing the time required to develop, debug and maintain the code. Its modular and object-oriented design make it a good system for packaging and re-use of code, leading to more transparent, maintainable and bug-free code. Because it is an open-source language, it is free to all users, includes a wide array of standard libraries, and a large collection of add-on packages.  Some of these features that distinguish Python from Java are exactly why our Computer Science Department uses Java in their introductory classes for their majors. As CS professionals, these students do have to learn how to define variable types, assign and de-assign memory locations, and how to compile code. That’s what they’ll be doing once they leave school, and it is in their best interest to continue to learn these skills. STEM 101 compliments the University’s existing programming classes, and does not replicate any existing classes. In fact, this class will increase the number of students learning programming on campus.  Finally, this class serves as the entrance way to our newly-proposed Data Science minor. Of the five classes in the minor, four involve programming in Python (ENVS 202 had, until the Spring 2021 semester, used MATLAB. That class has been migrated to Python and R.) STEM 101 will do more than just show students how to use Python. Science is now a team-based activity, and knowing how to share and maintain code, data and results is a key component of professional success. Built in to STEM 101 (and the minor) is the use of “revision control systems” or RCSs. These structures-GitHub is probably the best known-are free, cloud-based sites on which anyone can post code, data and documents. It is an on-line portfolio of one’s work. Learning to use and effectively manage one’s RCS is a basic task in data science. Giving students early practice in this will immerse them into a professional atmosphere, which studies have repeatedly shown make success of all students, but those from Under-represented populations in particular, more likely to remain in STEM fields. | |
| **Course Status** | |
| *Select all that apply.*   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | Core Requirement for Major/Concentration |  | Service Course for Non-Majors | | |  |  |  |  | | |  | Choose List Addition for Major/Concentration |  | Prerequisite for Another Course | | |  |  |  |  | | |  | Major/Concentration Elective | **x** | Apply Retroactively to Existing Majors/Minors | | |  | | **x** | General Education Status Requested\* | | |   *\*If General Education status is being requested, complete the General Education Status Supplementary Form and submit a sample course syllabus and other supporting material(s) as necessary.* | |
| **Catalog Changes** | |
| *Provide information about catalog changes related to the addition of this course. Include information regarding where the course information should be added to the catalog; provide page number(s) from current catalog, if available, as reference. Catalog changes regarding General Education should be noted on the “General Education Status Supplementary” form.*  Department   |  |  | | --- | --- | | Add to the list of course descriptions on page(s): |  |  |  |  | | --- | --- | | Add the number and title to the list(s) of courses (e.g., core major requirements\*; concentration requirements\*; choose lists) on page(s): *Please specify which lists.* |  |   \* *Note that new courses cannot be added to programs using just this form if the addition would change the number of courses or other descriptive information in the program. If that is the case, a program change log should also be submitted.*  Other:  University-Wide   |  |  | | --- | --- | | Add the number and title to the list(s) of courses on page(s): *Please specify which lists.* |  |   Other: | |
| **Notifications** | |
| Home Department and Dean Acknowledgements  *Anyone submitting a log to the University Curriculum Committee is required to notify the home department’s chair, the chair or designee of the home department’s curriculum committee, and one of the academic deans (home department preferred) for their acknowledgements before the log goes to the All University Committee for distribution to UCC.*  *Home departments and deans have two weeks to acknowledge a log after which time the log without acknowledgement may still go to AUC for distribution to UCC. Note that the home department will be invited to subcommittee and full committee discussions of the log, whether or not they submit the log themselves and whether or not they acknowledge the log.*   |  |  | | --- | --- | | Home Department(s): |  | |  |  | | Date of Notification\*: |  |  |  |  | | --- | --- | |  | Acknowledgement\*\* by Home Department Chair | |  |  | |  | Acknowledgement\*\* by Home Department Curriculum Committee Chair or Designee | |  |  | |  | Acknowledgement\*\* by Academic Dean *(Home Department Dean Preferred)* |   *\*Submitters should submit a copy (PDF preferred) of the email notification message(s) with the log submission to AUC. If home departments are submitting the log (and thus signing this form), no email notification for the home department’s chair or curriculum committee chair or designee is necessary, but email notification to the dean is. There is no need to submit a record of acknowledgement, but submitters are advised to keep records of correspondence regarding these logs.*  *\*\* Only check these boxes if acknowledgement has been received. Home departments submitting logs for their own courses/programs should check these boxes, presuming that the departmental curriculum committee chair and department chair have reviewed the log.* | |
| Affected Departments/Programs  *Persons submitting logs to the University Curriculum Committee are required to notify the chair of another department/program if the log*   * *is similar to an existing course or program;* * *includes subject matter traditionally offered by another department;* * *adds, changes, or removes a prerequisite, co-requisite, or recommended course for a course in another department;* * *adds, changes, or removes a recommended or required course for a major, minor, or concentration of another department* * *affects a program that must meet external certification, licensing, or accreditation.*   *Affected departments must have the opportunity to respond to the log, so UCC review will not occur until affected departments have been notified and either (1) they have acknowledged the log or (2) the two-week post-notification period has passed. The chair of any affected department/program will be notified when the log is scheduled for review by the designated UCC subcommittee and by the full University Curriculum Committee, unless the two-week period has passed without response or unless otherwise indicated in Log Acknowledgements forum on Blackboard.*   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Does this new course affect another department/program? | |  |  |  |  | | --- | --- | --- | --- | |  | Yes\* |  | No | |   \*If yes, the chair of each affected department must be notified via the Log Acknowledgements forum on Blackboard.  *Note: A department chair’s acknowledgement of receipt of notification of this log via a Log Acknowledgements forum on Blackboard does not indicate endorsement of the proposal.*  *Indicate the department(s)/program(s) below whose chair must be notified via Blackboard.*   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | Accounting, Economics, and Finance |  | Fashion Design and Retailing | x | Mathematics | |  |  |  |  |  |  | |  | Art and Music | x | Food and Nutrition |  | Nursing | |  |  |  |  |  |  | | x | Biology | x | Geography | x | Physics and Earth Science | |  |  |  |  |  |  | | x | Chemistry and Food Science |  | Global Studies |  | Political Science | |  |  |  |  |  |  | |  | Communication Arts |  | History |  | Psychology and Philosophy | |  |  |  |  |  |  | | x | Computer Science |  | Management and Business & IT |  | Sociology | |  |  |  |  |  |  | |  | Education |  | Marketing |  | World Languages | |  |  |  |  |  |  | |  | English |  |  |  |  |      |  |  | | --- | --- | | Date(s) of Notification\*: |  |   *\* Dates of notification will be listed in the Log Acknowledgements section of Blackboard. Subcommittee chairs will transfer those dates here.* | |

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| Typed Name of Person Submitting the Log |  | Signature of Person Submitting the Log |

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| **Primary Reviewing Subcommittee** |  | A |  | B |  | C |  | Notifications Verified | Date: |

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| Log Reviewed/Revised | Date: | Recommendation: |  | Support |  | Oppose |

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| **Subcommittee D General Education Review** | Date: |  | NA |

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| Recommendation (General Education Request ONLY): |  | Support |  | Oppose |

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| **Reviewed/Revised by UCC** | Date: |

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| Recommendation |  | Support |  | Oppose |

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|  | Licensure/Accreditation Issue |

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|  | Contact Registrar (add notes below) |

UCC Notes: