##### GRADUATE CURRICULUM COMMITTEE (GCC)PROPOSAL FORMhttp://www.ric.edu/webcommunications/images/SealWithText_Small_Black.png

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| A.1. [Course or program](#bookmark=id.3znysh7) | **New course: SED 505: Inquiry into STEM** |  |
| A.2. [Proposal type](#bookmark=id.1fob9te) | **Course creation****: (for FSEHD MAT Secondary Education Programs with Concentration in Mathematics)** |
| A.3. [Originator](#bookmark=id.3dy6vkm) | **Lesley Bogad** | [Home department](#bookmark=id.4d34og8) **Educational Studies** |
| A.4. [Context and Rationale](#bookmark=id.tyjcwt)  | This is the fourth course in the pedagogical sequence of the secondary education program, following SED 503. SED 505 focuses on Science, Technology, Engineering and Mathematics (STEM); it supports the vision for STEM Education in America. This course, along with SED 503, replaces SED 507. This course builds on the skills and practices learned in SED 503 with four main tenets: fundamental concepts of STEM, behavioral competencies, computational literacy, and digital technologies necessary to be successful in the STEM areas of study. This two credit/seven week course will be taken by candidates in Secondary Education Mathematics and Science content areas. (Candidates in English, History/Social Studies, and World Languages will take SED 525, which is focused on the Humanities.) In SED 505, candidates will engage in key STEM activities that focus on complex real-world problems and challenges that require initiative and creativity. Candidates will be involved in and exposed to transdisciplinary activities such as project-based learning, robotics clubs or gaming workshops that require participants to identify and solve problems using knowledge and methods from across disciplines, which was not addressed in the previous program. Clinical Preparation hours will take place outside of class time and will be supervised by the instructor.Candidates will learn about how to increase diversity, equity, and inclusion in STEM by using innovative and tailored instructional methods using knowledge on educational policy from SED 503. In addition, candidates will explore literacies and standards related to STEM from various organizations. In the context of studying about STEM, candidates will be involved in project-based and model-eliciting learning. STEM can increase and make these subjects available to students with varying backgrounds and lived experiences, thus, to utilize mathematics as a magnet not a barrier.Students will develop and implement a project-based problem-solving mini-unit based on the tenants of engage, explore, explain, elaborate and evaluate. By engaging in implementing a mini-unit in the secondary schools as teams of interdisciplinary candidates, this will lead students to obtain a deeper understanding of how to inform, motivate and support the development of competencies, literacy and digital technologies to reach a wider range of students.The main goal of this course is for candidates to gain an understanding of the areas in STEM, their interconnectedness and richness for engaging more secondary students in these areas. |
| A.5. [Student impact](#bookmark=id.z337ya) | Students in the secondary education mathematics and science programs take this course as part of the methods sequence which is part of the overall redesign.  |
| A.6. [Impact on other programs](#bookmark=id.3j2qqm3)  | This course will be required of mathematics students in the MAT Secondary Education programs. |
| A.7. [Resource impact](#bookmark=id.1y810tw) | [*Faculty PT & FT*](#bookmark=id.4i7ojhp):  | **None**  |
| [*Library*:](#bookmark=id.2xcytpi) | **None** |
| [*Technology*](#bookmark=id.1ci93xb) | **None**  |
| [*Facilities*](#bookmark=id.3whwml4): | **None** |
| A.8. [Semester effective](#bookmark=id.30j0zll) | **Fall 2020** |  |  |

B. [NEW OR REVISED COURSES](#bookmark=id.2bn6wsx)

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|  | New |
| B.1. [Course prefix and number](#bookmark=id.qsh70q)  | SED 505 |
| B.3. [Course title](#bookmark=id.3as4poj)  | Inquiry into STEM |
| B.4. [Course description](#bookmark=id.1pxezwc)  | Candidates learn about and engage in Science, Technology, Engineering and Mathematics activities that can be implemented in secondary math and science classrooms or with youth organizations. 20 hours clinical preparation. |
| B.5. [Prerequisite(s)](#bookmark=id.49x2ik5) | Concurrent with SED 503 or consent of department chair |
| B.6. [Offered](#bookmark=id.2p2csry) |  **Spring | Summer |**  |
| B.7. [Contact hours](#bookmark=id.147n2zr)  | **2** |
| B.8. [Credit hours](#bookmark=id.3o7alnk)  | **2** |
| B.9.Justify differences, if any | The course is 2 credits and includes an additional 20 hours of level 3 clinical preparation outside of class time in order to observe a STEM class and implement a STEM lesson(s)/unit in a school or with a youth organization. |
| B.10. [Grading system](#bookmark=id.23ckvvd)  | **Letter grade |**  |
| B.11. [Instructional methods](#bookmark=id.ihv636) | **| Lecture | Small group | Individual |**  |
| B.12.[Categories](#bookmark=id.32hioqz) | **Required for Program | Required for Certification** |
| B.15. [How will student performance be evaluated?](#bookmark=id.1hmsyys) | **Attendance | Class participation | Presentations | Projects | Technology competency | Class Work | Mini-unit | Clinical Preparation** |

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| B.18**.** [**Course learning outcomes**](#bookmark=id.1ksv4uv)**: List each one in a separate row** | [**Professional Org.Standard(s)**](#bookmark=id.lnxbz9)**, if relevant** | [**How will each outcome be measured**](#bookmark=id.35nkun2)**?** |
| * Identify and analyze STEM appropriate projects and activities.
 | FSEHD 1RIPTS\* 10ISTE\*\*\* 1,2,3,4,5,6,7 | * Annotated Bibliography of resources
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| * Develop a plan for promoting appropriate habits of mind such as perseverance which is necessary for success in the STEM areas of study.
 | FSEHD 2,3RIPTS 1, 3, 4ISTE 4,5 | * Active class engagement: discussions, readings
* Write a group plan
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| * Identify and engage in project-based learning in STEM that cross disciplinary boundaries.
 | FSEHD 1,4RIPTS 2ISTE 2,4,7 | * Active class engagement: weekly group problem-solving’
* Project-based assessment
* Reflections
* Peer assessments
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| * Building computational literacy and thinking to promote equitable access for all that transcends social identities.
 | FSEHD 3, 4RIPTS 1, 3-6, 8ISTE 5 | * Active class engagement: discussions,
* Assignment listing the integral elements of computational thinking.
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| * Develop and implement a mini-unit in an area of STEM in either a math or science class in interdisciplinary teams.
 | FSEHD 1,2,3RIPTS 2,9ISTE 1,3,4,6 | * Active class engagement: creating a concept map of the mini-unit, SLOs, discussions
* Reflection on the implementation and its relationship to the four tenants of the course.
* Lesson Plan using the RI-ICEE\*\*format
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| * Effectively apply digital technology/

technologies available (3D printing & software, robotics, simulations, applets etc.) for planning, teaching & motivating students. | FSEHD 1, 2, 3, 4RIPTS 2-5, 8ISTE | * Lesson Plan using the RI-ICEE format
* Assignments and mini-workshops on the various STEM appropriate digital technologies.
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\* RIPTS: Rhode Island Professional Standards

\*\* the RI-ICEE is the required lesson plan format used throughout the FSEHD and based on RIDE standards

\*\*\* ISTE: International Society for Technology in Education

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| B.19. [**Topical outline**](#bookmark=id.44sinio)**: Do NOT insert whole syllabus, we just need a two-tier outline** |
| 1. **Fundamental Concepts of STEM (or STEM-literate talent)**
2. How current resources relate to defining STEM activities.
3. How to utilize STEM activities to integrate certain groups, particularly those with mathematical barriers.
4. Identify project-based, model-eliciting project that teach math and science through experiential, meaningful and applied context.
5. Explore questions that cross traditional disciplinary boundary lines.
6. **Behavioral Competencies**
7. Understand and apply how to develop habits of mind such as perseverance, adaptability, cooperation, organization and responsibility.
8. Relate behavioral competencies to various standards in science, technology, engineering and mathematics such as the Mathematical Practice Standards (MP), CCSSM, …..
9. How to select/revise activities from resources that can be used in a secondary math and science classrooms that develop these habits of mind.
10. **Computational Literacies**
11. Capitalize on the objectives of SED 501 by discussing the effective use of computers or computational tools for activities.
12. Determine meaningful and effective ways for students to be critical consumers and creators of digital media
13. Apply different technologies for teaching and communication with students, parents, colleagues and community members.

 **IV. Digital Technologies**1. Utilize a variety of appropriate digital technologies related to STEM that may include three-dimensional printing and software, robotic programming, SketchUp, GeoGebra, Desmos, simulations and applets to apply to the development of a mini-unit.
2. How to distinguish between the various digital technologies by analyzing their strengths and weaknesses.
3. How to use data for answering questions and to share ideas and promote collaboration.
4. Cyber safety is a component of digital literacy involving the responsible use of information and communication technologies, including new technologies like cryptocurrency.
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##### D.1. Approvals:

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| Name | Position/affiliation | [Signature](#_heading=h.41mghml) | Date |
| Jeannine Dingus-Eason | Dean, FSEHD |  |  |
| Lesley Bogad | Chair, Educational Studies |  |  |

##### D.2. [Acknowledgements](#bookmark=kix.3me7bqdl2vxw): REQUIRED from OTHER PROGRAMS/DEPARTMENTS IMPACTED BY THE PROPOSAL. SIGNATURE DOES NOT INDICATE APPROVAL, ONLY AWARENESS THAT THE PROPOSAL IS BEING SUBMITTED. CONCERNS SHOULD BE BROUGHT TO THE UCC COMMITTEE MEETING FOR DISCUSSION

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| Name | Position/affiliation | [Signature](#_heading=h.41mghml) | Date |
| Earl Simson | Dean, FAS |  |  |
| Stephanie Costa | Chair, Mathematics |  |  |