Section 1: Curriculum Cycle Information

Course: INDIS 370: Introduction to Science Technology Engineering and Math (STEM)
Proposal Type: New to District
Faculty Initiator: Paul deGennaro
Outline Status: Board
Last Full Review: Sep 28, 2018
Last Curriculum Action: Sep 28, 2018
Official: No

Section 2: Submission Information

Proposal: To add a course to the SCC catalog that is not currently offered by any Los Rios college.
Explanation: The purpose of this course is to raise awareness about the different STEM academic and career opportunities that are available on this campus and beyond. This course (as part of the INDIS 370-373 sequence) was specifically developed to ameliorate the disproportionate representation in STEM education on our Sacramento City College campus.

Section 3: Basic Course Information

Identifier: INDIS 370
Title: Introduction to Science Technology Engineering and Math (STEM)
Units: 1.00
Prerequisite: None.

Constraints:
- Prerequisite list: None; Special prerequisite: None.
- Corequisite list: None; Special corequisite: None.
- Advisory list: LIBR 318; Special advisory: None.

Hours: 18 hours lecture, 36 hours out-of-class work, for a total of 54 student learning hours.
Description: This course introduces the STEM field from a local and global perspective through guest speakers, discussions, small research projects, and a culminating presentation. As a central theme to the course, students will investigate the challenges facing individuals from underrepresented groups in STEM as defined by the National Science Foundation. Students will then generate an individualized plan for pursuing their particular STEM emphasis of choice. This plan will consist of elements of a basic education plan, a reflection of their unique sociocultural experiences, specific study skills strategies, and STEM skills analysis and strategies for improvement. The student will be given an opportunity to apply the practices outlined in their plan through a sampling of a number of STEM-related courses (through guest lectures, etc.). This course is not open to students who completed the topic under INDIS 499.

[Courses embedded in catalog description: INDIS 499]

Section 4: Learning Outcomes and Objectives

Upon completion of this course, the student will be able to:

- describe the types of STEM occupations explored in the class.
- list and describe the various STEM related programs and courses offered at SCC that support the occupations explored in class.
- evaluate current social, political, and economic issues affecting ethnic minorities in the United States as it relates to STEM degree attainment or employment.
- investigate the unique experiences of a prominent individual in STEM that would be classified by the National Science Foundation as being "underrepresented" in STEM.
- explain their particular "STEM skills" profile and how they plan to improve in those specific areas.
- demonstrate a knowledge and understanding of essential practices for succeeding in difficult STEM coursework.
- explain and give examples of how pursuing a STEM academic pathway may differ from prior educational experiences.
- evaluate the suitability of a STEM pathway as a long-term option.
- evaluate their abilities as a learner and that the unique qualities of post-secondary and career STEM is vastly different than their previous K-12 STEM experiences.
- demonstrate competence in active listening skills and provide appropriate constructive feedback.
- demonstrate the skills necessary to create, assemble, and present informative presentations as it relates to the topics covered in this course.

Section 5: Course Topics

The topics for this course are typically allocated as follows:

Lec  Topic

5  Introduction to the vast fields comprising STEM including educational requirements, average salaries, job descriptions, and guest lectures from industry when possible

1  Assessment of learning- completion of STEM-Score Assessment and results review

2  Research and discussion of National Science Foundation data regarding underrepresented groups in
Section 1: Curriculum Cycle Information

Course: INDIS 371: Skills Practice in Science Technology Engineering and Math (STEM)
Proposal Type: New to District
Faculty Initiator: Paul deGennaro
Outline Status: Board
Last Full Review: Sep 28, 2018
Official: No

Section 2: Submission Information

Proposal: To add a course to the SCC catalog that is not currently offered by any Los Rios college.
Explanation: The purpose of this course is to raise awareness about the different STEM academic and career opportunities that are available on this campus and beyond. This course (as part of the INDIS 370-373 sequence) was specifically developed to ameliorate the disproportionate representation in STEM education on our Sacramento City College campus.

Section 3: Basic Course Information

Identifier: INDIS 371
Title: Skills Practice in Science Technology Engineering and Math (STEM)
Units: 1.50
Prerequisite: INDIS 370 (Introduction to Science Technology Engineering and Math (STEM)) with a grade of "C" or better

[ Prerequisite list: INDIS 370; Special prerequisite: None. ]

[ Corequisite list: None; Special corequisite: None. ]

[ Advisory list: None; Special advisory: None. ]
**Hours:** 18 hours lecture, 27 hours laboratory, 36 hours out-of-class work, for a total of 81 student learning hours.

**Description:** This course introduces the STEM field from a hands-on learning perspective. Based on a student's unique STEM-Skill profile, they will generate an individualized plan to address a particular STEM industry need. This plan will consist of an identification of that need and a specific engineered solution to it. In lecture, students will work on improving their STEM-Skills (spatial ability, proportional reasoning, pitch pattern perception, etc.). In lab, students will apply the steps outlined in their plan via hands-on experience in the campus Makerspace. These experiences will include an orientation and use of the equipment in the Makerspace lab in the generation of a final product. This course is not open to students who completed the topic under INDIS 499.

[Courses embedded in catalog description: INDIS 499]

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**Section 4: Learning Outcomes and Objectives**

*Upon completion of this course, the student will be able to:*

- evaluate and explain their own particular "STEM skills" profile.
- evaluate their abilities as a STEM learner.
- assemble a plan of STEM skill advancement based on their individual profile.
- develop a plan that incorporates these skills in their STEM product design and development.
- evaluate their ability to identify a STEM product or service need and how to engineer a solution.
- demonstrate a knowledge of essential practices for succeeding in a challenging STEM environment.
- demonstrate the safe use of design, fabrication, and manufacturing equipment in the Makerspace Lab.
- list and describe the various STEM-related programs and courses offered at SCC that support the occupations, services, and products explored in class.

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**Section 5: Course Topics**

*The topics for this course are typically allocated as follows:*

<table>
<thead>
<tr>
<th>Lec</th>
<th>Lab</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Introduction to STEM courses, careers, products, and services</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Identification of STEM industry needs</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>Introduction to the process of engineering solutions to a STEM industry need</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Incorporation of each individual student's STEM skills profile within their engineering plan</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>Skill advancement strategies- visual/spatial ability training and study specific practices reviewed</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>Skill advancement strategies- proportional reasoning training and study specific practices reviewed</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>Skill advancement strategies- auditory processing training and study specific practices reviewed</td>
</tr>
</tbody>
</table>
Section 1: Curriculum Cycle Information

Course: INDIS 372: Numerical Problem Solving in Science Technology Engineering and Math (STEM)
Proposal Type: New to District
Faculty Initiator: Paul deGennaro
Outline Status: Board
Last Full Review: Sep 28, 2018
Official: No

Section 2: Submission Information

Proposal: To add a course to the SCC catalog that is not currently offered by any Los Rios college.
Explanation: The purpose of this course is to raise awareness about the different STEM academic and career opportunities that are available on this campus and beyond. This course (as part of the INDIS 370-373 sequence) was specifically developed to ameliorate the disproportionate representation in STEM education on our Sacramento City College campus.

Section 3: Basic Course Information

Identifier: INDIS 372
Title: Numerical Problem Solving in Science Technology Engineering and Math (STEM)
Units: 1.50
Prerequisite: INDIS 371 (Skills Practice in Science Technology Engineering and Math (STEM)) with a grade of "C" or better

[ Prerequisite list: INDIS 371; Special prerequisite: None. ]

[ Corequisite list: None; Special corequisite: None. ]

[ Advisory list: None; Special advisory: None. ]
**Hours:** 18 hours lecture, 27 hours laboratory, 36 hours out-of-class work, for a total of 81 student learning hours.

**Description:** This course introduces the STEM field through various data analysis techniques in a hands-on learning environment. As the course progresses, students will explore various STEM fields of study through a problem-solving lens. Specifically, students will use various mathematical or statistical techniques to uncover a particular STEM industry need. They will then use data analysis techniques to develop a plan for addressing this particular need and forecasting its potential effectiveness. Through a hands-on experience in the campus Makerspace facilities students will be given an opportunity to produce some important element of their proposed solution, and then showcase it to others. This course is not open to students who completed the topic under INDIS 499.

[Courses embedded in catalog description: INDIS 499]

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**Section 4: Learning Outcomes and Objectives**

*Upon completion of this course, the student will be able to:*

- demonstrate the ability to convert various units of measurement between standard and metric systems.
- recognize and differentiate between key statistical terms covered in the course.
- apply various types of sampling methods to data collection
- display data graphically and interpret graphs.
- recognize, describe, and calculate the measures of the center of data: mean, median, and mode.
- recognize, describe, and calculate the measures of the spread of data: variance, standard deviation, and range.
- understand and use the terminology of probability.
- differentiate between Type I and Type II Errors.
- describe hypothesis testing in general and in practice.
- conduct and interpret hypothesis tests for a given data set.
- incorporate their own "STEM-skills" profile into the proposed analytical plans.
- demonstrate the safe use of design, fabrication, and manufacturing equipment for which they have not already received training.

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**Section 5: Course Topics**

*The topics for this course are typically allocated as follows:*

<table>
<thead>
<tr>
<th>Lec</th>
<th>Lab</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Introduction to STEM courses, careers, products, and services</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>Orientation to Makerspace equipment and logistics</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>Review of STEM data through statistical analysis techniques including: measures of center and spread, and probability through an introduction to null and alternative hypothesis testing</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Analytical review of a chosen STEM industry topic</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Incorporation of each individual student's STEM-skills profile within their proposed analytical</td>
</tr>
</tbody>
</table>


Course Outline
Sacramento City College
Los Rios Community College District

Section 1: Curriculum Cycle Information

Course: INDIS 373: Research Writing Techniques in Science Technology Engineering and Math (STEM)
Proposal Type: New to District
Faculty Initiator: Paul deGennaro
Outline Status: Board
Last Full Review: Sep 28, 2018
Official: No

Section 2: Submission Information

Proposal: To add a course to the SCC catalog that is not currently offered by any Los Rios college.
Explanation: The purpose of this course is to raise awareness about the different STEM academic and career opportunities that are available on this campus and beyond. This course (as part of the INDIS 370-373 sequence) was specifically developed to ameliorate the disproportionate representation in STEM education on our Sacramento City College campus.

Section 3: Basic Course Information

Identifier: INDIS 373
Title: Research Writing Techniques in Science Technology Engineering and Math (STEM)
Units: 1.50
Prerequisite: INDIS 372 (Numerical Problem Solving in Science Technology Engineering and Math (STEM)) with a grade of "C" or better

[ Prerequisite list: INDIS 372; Special prerequisite: None. ]

[ Corequisite list: None; Special corequisite: None. ]

[ Advisory list: None; Special advisory: None. ]
Hours: 18 hours lecture, 27 hours laboratory, 36 hours out-of-class work, for a total of 81 student learning hours.

Description: This course introduces the STEM field from a research writing and hands-on learning perspective. In this course, students will select a particular STEM industry topic and develop a plan for researching and reporting on this topic. Emphasis will be on producing a publication-themed manuscript based on their hands-on research for this topic. Therefore, the principal focus of the lecture portion of this course will be the research writing process. The lab portion of the course is where students will be given an opportunity to apply the research practices outlined in his or her plan through a hands-on experience in the campus Makerspace facilities. Students will use the research writing approach to guide them through the entire process and produce a manuscript potentially worthy of submittal for publication in a peer reviewed journal. This course is not open to students who completed the topic under INDIS 499.

[Courses embedded in catalog description: INDIS 499]

Section 4: Learning Outcomes and Objectives

Upon completion of this course, the student will be able to:

- develop a plan that incorporates their STEM-skills in their product design and development.
- differentiate and explain the various elements included in a typical research paper.
- research using library and online sources and effectively incorporate research into manuscripts.
- analyze data and incorporate the findings into a research quality paper.
- exhibit mastery of the conventions of American Psychological Association publication standards.
- produce and evaluate a research quality manuscript outlining their particular topic.
- evaluate the effectiveness of their research plan with regard to the hands-on work done in their Makerspace Lab environment.
- demonstrate the safe use of design, fabrication, and manufacturing equipment that they were not previously trained.
- list and describe the various STEM-related programs and courses offered at SCC that support the occupations, services, and products explored in class.

Section 5: Course Topics

The topics for this course are typically allocated as follows:

<table>
<thead>
<tr>
<th>Lec</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>Introduction to STEM courses, careers, products, and services</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Experimental design considerations</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Development of research questions</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Elements included in a research paper of publication quality</td>
</tr>
<tr>
<td>0</td>
<td>20</td>
<td>Hands-on implementation of experimental design, data collection, and analyses</td>
</tr>
</tbody>
</table>