

Technology Education: STEM Curriculum

COMPONENT #: 2-209-307

POINTS TO BE EARNED: 120 MPP

PART I – PLANNING

DESCRIPTION: Write a brief description of content and intent of component.

This component is designed to enable the participant to develop or update technical knowledge of the curriculum of engineering principles and robotics systems, including construction, software, competition requirements, curriculum and instructional strategies, to integrate STEM academic principles into CTE content.

Upon successful completion of this professional development activity, the participant will be able to demonstrate skills attained in the workshop and incorporate the workshop principles into classroom instruction.

STANDARDS/FOCUS AREAS ADDRESSED BY COMPONENT: Identify the standards, national/state/district imperatives, initiatives or key focus areas this component supports.

Standards for Professional Learning (choose one)

- | | |
|---|--|
| <input type="checkbox"/> Learning Communities | <input type="checkbox"/> Learning Designs |
| <input type="checkbox"/> Leadership | <input checked="" type="checkbox"/> Implementation |
| <input type="checkbox"/> Resources | <input type="checkbox"/> Outcomes |
| <input type="checkbox"/> Data | |

Florida Educator Accomplished Practices (check all that apply)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Instructional Design and Lesson Planning | <input type="checkbox"/> Assessment |
| <input type="checkbox"/> The Learning Environment | <input type="checkbox"/> Continuous Professional Improvement |
| <input checked="" type="checkbox"/> Instructional Delivery and Facilitation | <input type="checkbox"/> Professional Responsibility and Ethical Conduct |

Florida Leadership Standards (check all that apply)

- | | |
|---|---|
| <input type="checkbox"/> Student Learning Results | <input type="checkbox"/> Decision Making |
| <input type="checkbox"/> Student Learning as a Priority | <input type="checkbox"/> Leadership Development |
| <input checked="" type="checkbox"/> Instructional Plan Implementation | <input type="checkbox"/> School Management |
| <input checked="" type="checkbox"/> Faculty Development | <input type="checkbox"/> Communication |
| <input type="checkbox"/> Learning Environment | <input type="checkbox"/> Professional and Ethical Behaviors |

IPEGS Standards (check all that apply)

- | | |
|--|--|
| <input type="checkbox"/> PS 2 – Knowledge of Learners | <input type="checkbox"/> PS 6 – Communication |
| <input checked="" type="checkbox"/> PS 3 – Instructional Planning | <input checked="" type="checkbox"/> PS 7 – Professionalism |
| <input checked="" type="checkbox"/> PS 4 – Instructional Delivery and Engagement | <input type="checkbox"/> PS 8 – Learning Environment |
| <input type="checkbox"/> PS 5 – Assessment | |

IMPACT FOCUS AREA(S): select the intended impact focus area(s) from the choices below. Note that Impact Evaluation procedures should reflect this level of impact.

Technology Education: STEM Curriculum

COMPONENT #: 2-209-307

- X Educator knowledge/skill (content)
- X Educator (professional growth)

- X Student learning
- Organizational support and change

SPECIFIC LEARNER OUTCOMES: Identify the intended learner outcomes (number and content of learner outcomes should be reflective of the total points participants will earn as a result of completing this learning).

1. Demonstrate technical knowledge and skills in the processes and systems related to science, technology, engineering and mathematics (STEM).
2. Demonstrate technical knowledge and skills in the designing, engineering, and analysis of constructed robotic systems.
3. Identify and guide students in the attainment of the mathematical and scientific skills in the solution of engineering design problems.
4. Identify the Career Technical Education state approved curriculum standards that correlate with specific instructional objectives related to the engineering design model.
5. Develop learning strategies that address the issues surrounding diverse needs of learners.
6. Identify the Standards for Technological Literacy that correlate with the implementation of the engineering design model in a specific job assignment in related Technology Education careers.
7. Identify the NGSSS and Florida Career Readiness standards that correlate with the implementation of the engineering design model in related Technology Education careers.
8. Develop hands-on instructional activities integrating STEM principles into the curriculum and learning delivery system.
9. Develop interims and final assessments of students' skill level as preparatory for student engineering design competitions.
10. Identify current issues and developments in the Engineering and STEM career cluster program area within postsecondary educational opportunities and industry.
11. Follow protocols of Professional Learning Communities in regards to collaborative learning of STEM integrated curriculum, activities and competitions.

PART II – LEARNING

LEARNING PROCEDURES: Describe the experiences (the “what”) and formats/methods (the “how”) that will be used to provide participants with the knowledge and skills sufficient to master the intended learner outcome of this component.

1. Participants will have a variety of experiences that will include, but are not limited to, a blended format to include:
 - o Presentation of current research
 - o Demonstration of best practices
 - o Web based resources
 - o Live online course sessions
 - o Hands-on applied learning activities
 - o Case studies
 - o Collaborative learning activities
2. Participate actively in discussions and activities on innovative strategies/techniques, technology integration and/or materials for the attainment of software knowledge and skills (SLO 1-10).

Technology Education: STEM Curriculum

COMPONENT #: 2-209-307

3. Implement specific instructional strategies and activities that will address the needs of diverse learners (SLO 2, 4, 5, 7 & 8).
4. Practice using the software, electronics, tools and robotics systems parts in a “hands-on” workshop (SLO 1-10).
5. Select the Standards for Technological Literacy, using the Technology Education curriculum frameworks as a guide, and the Florida State Standards that apply to the skills attained and apply to lesson planning (SLO 3, 5, & 6).
6. Provide a product related to the training (e.g. written reflection, project, audio/video tape, case study or lesson plans) verifying that the professional development impacted their professional behavior.
7. Provide evidence (e.g. student work, pre and post assessments, surveys) verifying that the content impacted student achievement.
8. Monitor and adjust instruction of Technology Education programs, as needed, as a result of the implementation feedback and findings.

PART III – IMPLEMENTATION

IMPLEMENTATION PROCEDURES: Method(s) and resource(s) that will be provided to support implementation of new learning for participants (check all that apply).

- X Apply newly acquired professional knowledge, skills, dispositions, and behaviors to improve practice.
- X Provide sufficient classroom- and school-focused support and assistance by skillful coaches, mentors, or others to the educator to ensure high-fidelity implementation of professional learning.
- X Provide educators with web-based resources and assistance to support implementation of professional learning.

PART IV – EVALUATION

IMPACT EVALUATION PROCEDURES: Describe the processes that will be used to determine the impact (as identified in previous section titled “Impact Focus Areas”). Description should reflect methods for determining at least ONE of those areas, and will include a specific section for each impact focus area identified for this component.

1. Educator Knowledge/skill: Will consist of observation of participants using the identified skills, techniques, methods, specified in the component objectives during the learning events.
2. Educator: Evidence will include classroom walk-throughs, student portfolios, surveys, participant reflections, participant portfolios.
3. Student Learning: Evidence will include evidence of implementation through documented impact on student achievement.

COMPONENT EVALUATION PROCEDURES: Describe the process(es) that will be used to determine the effectiveness of this component to include design, implementation and impact (check all that apply).

- X Evaluate the impact of all professional learning on educator’s practice through reflection,

Technology Education: STEM Curriculum
COMPONENT #: 2-209-307

assessment, collaborative protocols for examining educator practice and work samples, peer visits, and/or professional portfolios.

- X Determine the degree to which educator's professional learning contributed to student performance gains as measured by classroom assessment data.

- X Use summative and formative data from state or national standardized student achievement measures, when available, or other measures of student learning and behavior such as district achievement tests, progress monitoring, educator-constructed tests, action research results, discipline referrals, and/or portfolios of student work to assess the impact of professional learning.

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Department: Career & Technical Education

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