DEPARTMENT OF TECHNOLGY EDUCATION,IER
UNIVERSITY OF THE PUNJAB, LAHORE-PAKISTAN
Course Outline

Programme	BS Technology Education	**Course Code**	**BSTE310**	**Credit Hours**	3
Course Title	**Introduction to STEM Education**				

Course Introduction

This course provides a basic introduction to the principles and practices of STEM (Science, Technology, Engineering, and Mathematics) education. Students will explore the importance of STEM in the modern educational landscape, various teaching methods, and curriculum design. The course includes theoretical understanding and practical exercises to develop a foundational knowledge of STEM education.

Learning Outcomes

On the completion of the course, the students will:

1. Understand the basic concepts and importance of STEM education.
2. Identify effective teaching strategies for STEM subjects.
3. Design and implement STEM-based lesson plans.
4. Integrate technology into STEM education.
5. Explore current trends and future directions in STEM education.

	Course Content	**Assignments/Readings**
Week 1	**Introduction to STEM Education** • **Unit 1.1**: Overview of STEM Education	Reflective essay on the importance of STEM education in today's world
	• **Unit 1.2**: History and Evolution of STEM	
Week 2	**Basic Concepts of STEM** • **Unit 2.1**: Definition and Scope of STEM	Research and present a timeline of key developments in STEM education
	• **Unit 2.2**: Interdisciplinary Nature of STEM	
Week 3	**Teaching Strategies in STEM** • **Unit 3.1**: Inquiry-Based Learning	Develop a simple inquiry-based learning activity
	Unit 3.2: Problem-Based Learning	

Week 4	**Curriculum Design in STEM** • **Unit 4.1**: Principles of STEM Curriculum Design	Write a report on effective STEM curriculum design
	• **Unit 4.2**: Designing STEM Lesson Plans	
Week 5	**Integrating Technology in STEM** • **Unit 5.1**: Role of Technology in STEM Education	Research and present on different types of educational technology tools
	• **Unit 5.2**: Tools and Resources for STEM Teaching	
Week 6	**Science in STEM** • **Unit 6.1**: Key Concepts in Science Education	Develop a simple science experiment for classroom use
	Unit 6.2: Effective Science Teaching Methods	
Week 7	**Technology in STEM** • **Unit 7.1**: Key Concepts in Technology Education	Write a report on the integration of technology in education
	• **Unit 7.2**: Effective Technology Teaching Methods	
Week 8	**Engineering in STEM** • **Unit 8.1**: Key Concepts in Engineering Education	Design a basic engineering project for classroom use
	• **Unit 8.2**: Effective Engineering Teaching Methods	
Week 9	**Mathematics in STEM** • **Unit 9.1**: Key Concepts in Mathematics Education	Develop a simple math activity to teach a fundamental concept
	• **Unit 9.2**: Effective Mathematics Teaching Methods	

Week 10	**Assessment in STEM** • **Unit 10.1**: Principles of Assessment in STEM Education • **Unit 10.2**: Formative and Summative Assessments	Write a report on different assessment techniques for STEM subjects
Week 11	**Collaborative Learning in STEM** • **Unit 11.1**: Importance of Collaboration in STEM Education • **Unit 11.2**: Strategies for Promoting Collaboration	Develop a collaborative project for a STEM classroom
Week 12	**STEM Education and Diversity** • **Unit 12.1**: Addressing Diversity in STEM Education • **Unit 12.2**: Inclusive Teaching Practices	Research and present on strategies for promoting diversity in STEM
Week 13	**Current Trends in STEM Education** • **Unit 13.1**: Emerging Trends in STEM Education • **Unit 13.2**: Future Directions in STEM Education	Research and present on a current trend in STEM education
Week 14	**STEM Education Policies** • **Unit 14.1**: Overview of STEM Education Policies • **Unit 14.2**: Impact of Policies on STEM Education	Write a report on the impact of a specific STEM education policy
Week 15	**Developing a STEM Project** • **Unit 15.2**: Implementing a STEM Project • **Unit 15.1**: Planning a STEM Project	Develop a proposal for a STEM project for classroom implementation
Week 16	**Course Review and Final Assessment** • **Unit 16.1**: Review of Key Concepts and	key learning from the course

	Themes	
	• **Unit 16.2**: Comprehensive Final Exam	

Textbooks and Reading Material

1. Textbooks.

- STEM Education: An Integrated Approach by Allan M. Collins and Richard Halverson

2. Suggested Readings

- STEM Lesson Essentials, Grades 3-8: Integrating Science, Technology, Engineering, and Mathematics by Jo Anne Vasquez, Michael Comer, and Joel Villegas

Teaching Learning Strategies

1. **Lectures:** To introduce and explain key concepts and theories..
2. **Assignments and Projects:** To reinforce learning and encourage application of concepts in real-world scenarios.
3. **Group Discussions:** To facilitate peer learning and collaborative problem-solving.
4. **Guest Lectures:** To provide insights from industry experts and professionals.

Assessment

Sr. No.	Elements	Weight age	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.