



UNIVERSITI TEKNOLOGI MARA

SPS621: CRITICAL THINKING AND SCIENCE PROCESS SKILLS

Course Name (English)	CRITICAL THINKING AND SCIENCE PROCESS SKILLS APPROVED
Course Code	SPS621
MQF Credit	3
Course Description	This course provides an in-depth exposure of skills that focus on scientific skills, which include science process skills and manipulative skills, and thinking skills, particularly high-level thinking skills in scientific reasoning skills. The emphasis of the course is on how those skills can be integrated in teaching explicitly to students lastly, to enable the construction of scientific skills and think more effectively
Transferable Skills	science creative teaching science process skills creative thinking
Teaching Methodologies	Lectures, Blended Learning, Seminar/Colloquium, Presentation
CLO	CLO1 1. Explain the concept of scientific skills and thinking skills CLO2 2. Describe the approach and techniques of teaching scientific skills and higher order thinking skills CLO3 Designing teaching selected topics which directly able to build scientific and thinking skills of students CLO4 Encourage Science teacher to think critically and creatively
Pre-Requisite Courses	No course recommendations
Topics	
1. Chapter 1 Theories and Perspectives in Science Education 1.1) Active Learning: Learning by Doing 1.2) Teaching to Multiple Learning Modalities 1.3) Teaching to Multiple Intelligences 1.4) Metacognition: Teaching Students to Think About 1.5) Their Thinking 1.6) Developing Higher-Order Reasoning 1.7) Constructivism: Helping Students Build Their 1.8) Understanding of Science 1.9) Pedagogical Content Knowledge in Science	
2. Chapter 2 Science Process Skills 2.1) Observation 2.2) Classifying 2.3) Measuring and Using Numbers 2.4) Making Inferences 2.5) Predicting 2.6) Communicating 2.7) Using Space-Time Relationship 2.8) Interpreting Data 2.9) Defining Operationally 2.10) Controlling Variables 2.11) Making Hypotheses 2.12) Experimenting 2.13) Manipulative Skills 2.14) Science Laboratory Rules 2.15) Use and Handle Science Apparatus and Laboratory 2.16) Substances Correctly 2.17) Maintenance of Science Apparatus and Laboratory 2.18) Substance	

<p>3. Chapter 3 Scientific Reasoning Skills</p> <p>3.1) Levels of Reasoning 3.2) Inductive Reasoning 3.3) Deductive Reasoning 3.4) Lateral Thinking</p>
<p>4. Chapter 4 Thinking Critically and Resolving Misconceptions</p> <p>4.1) Critical Thinking 98 Evaluating Claims 102 Using a Decision-Making Matrix 4.2) Misconceptions in Physics 4.3) Misconceptions in Chemistry 4.4) Misconceptions in Biology 4.5) Misconceptions in Earth and Space Science</p>
<p>5. Chapter 5 Learning Science Concepts with Analogies</p> <p>5.1) Teaching with Analogies 5.2) Extended Science Analogies 5.3) Analogies for Learning Physics 5.4) Analogies for Learning Chemistry 5.5) Analogies for Learning Biology 5.6) Analogies for Learning Earth and Space Science</p>
<p>6. Tools for Improving Memory in Science</p> <p>6.1) Memory Technique 6.2) Maintenance Rehearsal 6.3) Memory Technique 2: Chunking 6.4) Memory Technique 3: Multiple Modalities 6.5) Memory Technique 4: Semantic Depth 6.6) Memory Technique 5: Acronyms 6.7) Memory Technique 6: Acrostic 6.8) Scientific Skills ii 6.9) Memory Technique 7: Transfer Appropriateness 6.10) Memory Technique 8: Discrepant Scenes 6.11) Events 6.12) Memory Technique 9: Integration of Visual and 6.13) Verbal information 6.14) Memory Technique 10: Retrieval Practice 6.15) The Primacy and Recency Effect 6.16) Expanding Short-Term Memory by Chunking 6.17) Science Acronyms and Abbreviations Acrostic for memorizing Lists</p>
<p>7. Theory Activity in Science - Activity</p> <p>7.1) n/a</p>

Assessment Breakdown	%
Continuous Assessment	70.00%
Final Assessment	30.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Test1	10%	CLO1 , CLO2 , CLO3 , CLO4
	Assignment	COMPILATION OF DISCREPANT EVENTS IN MY SCIENCE CLASSROOM – WRITTEN ASSIGNMENTS	20%	CLO1 , CLO2 , CLO3 , CLO4
	Assignment	CREATIVE SCIENCECLASSROOM PROJECT-WRITTEN PROJECT	20%	CLO1 , CLO2 , CLO3 , CLO4
	Assignment	SCIENCE EXPERIMENT REPORT-WRITTEN AND PRESENTATION	20%	CLO1 , CLO2 , CLO3 , CLO4

Reading List	This Course does not have any book resources
Article/Paper List	This Course does not have any article/paper resources
Other References	This Course does not have any other resources