Lecture Contact Hours: 48-54; Homework Hours: 96-108; Total Student Learning Hours: 144-162

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

<u>SCIENCE 100 – SUCCESS IN SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM)</u>

3 hours lecture, 3 units

Catalog Description
You can be a scientist! Begin building your scientific identity as a Science, Technology, Engineering and Mathematics (STEM) professional, developing the specific knowledge, thinking and learning skills and strategies, and habits of mind necessary to have a successful career in STEM. Working individually and in teams, students will learn and use skills and strategies to investigate and solve scientific scenarios, practicing the ways that scientific thinking is used to solve problems, and develop the critical thinking ability necessary to be successful in future STEM courses. The skills and knowledge you will gain in this course will be demonstrated through the production of scientific presentations and an e-portfolio that will show your new knowledge, skills and abilities.

Prerequisite
None

Course Content
1) Sociocultural, environmental and internal factors relating to the development of a sense of belonging to and self-identification with scientific disciplines
2) Significance of goal setting, prioritization of tasks, generating, evaluating and implementing short and long term schedules and career plans
3) Misconceptions about learning in STEM
4) Mindset: seeing yourself in STEM and expanding your intelligence
5) Controlling anxiety; removing fear of failure; sleep, exercise, eating and stress
6) Short and long term memory and how it impacts STEM learning
7) Reading for understanding in STEM
8) Reading as problem solving and a basis for critical thinking in STEM
9) Problem solving techniques/methods in STEM
10) Beyond learning styles: active learning strategies for STEM courses
11) Methods of durable learning: effective study skills for STEM including retrieval practice and its role in learning, Interleaving processes in STEM learning, appropriate use of mnemonic devices
12) Embracing learning challenges, and its role in learning
13) Note taking methods
14) Developing workarounds and compensating skills
15) Information literacy; evaluation of STEM primary and secondary literature sources based on accuracy, completeness and reliability
16) Identification of components of a peer-reviewed article, reading and analysis of peer-reviewed articles
17) Technical writing skills for STEM; development of technical presentations
18) Metacognition: thinking about learning as a platform for learning in STEM
19) Critical thinking processes in STEM; the connection between reading, problem solving and critical thinking
20) Use of college resources including the college catalog, tutoring, library, career exploration, counseling
21) Working effectively in groups and teams
22) Oral and written communication of STEM information
23) Development of a STEM resume

Course Objectives
Students will be able to:
1) Identify and apply appropriate learning techniques and strategies to achieve learning objectives of STEM courses.
2) Identify and apply effective strategies for managing the challenges faced by STEM college students.
3) Demonstrate ability to solve problems in STEM.
4) Demonstrate an understanding of the science of learning and how it applies to learning in STEM.
5) Effectively present research information to a non-STEM or STEM audience.
6) Develop an e-portfolio that demonstrates examples of student work and career planning information.

Methods of Evaluation
A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in the subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.
1) In-class activities and homework assignments that measures the student's ability to use the principles of learning.
2) Campus resources presentation or paper
3) Poster project
4) Quizzes to demonstrate learning of background knowledge
5) e-Portfolio

Special Materials Required of Student
None

Minimum Instructional Facilities
1) Active learning classroom with Smart cart, White boards, projection system
2) Laptop Computers with Internet access
3) Basic scientific laboratory and equipment

Method of Instruction
1) Problem based learning scenarios
2) Small/large group discussion/active learning exercises
3) In-class activities and independent homework, research projects
4) Individual and group presentations
5) Development of e-portfolio

Out-of-Class Assignments
1) Required reading in the textbook or other recommended sources and completion of a reading journal
2) Completion of pre-class and post-class assignments.
3) Completion of research or other assignments and written laboratory work

Texts and References
1) Required (representative example): Brown, Peter C, H.L. Roediger and M. A. McDaniel. *Make It Stick: The Science of Successful Learning*. First edition. The Belnap Press of Harvard University Press, Cambridge, Mass. 2014.
2) Supplemental: Success in STEM Course Reader

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

1) Identify and apply appropriate learning techniques and strategies to achieve learning objectives of STEM courses.
2) Identify and apply effective strategies for managing the challenges faced by STEM college students.
3) Demonstrate ability to solve problems in STEM.
4) Demonstrate an understanding of the science of learning and how it applies to learning in STEM.
5) Effectively present research information to a non-STEM or STEM audience.
6) Develop an e-portfolio that demonstrates examples of student work and career planning information.