RES 100: Beginning STEM Research

1-credit, this course is a prerequisite for RES 110

Instructor Contact Information Here

 

**Course Catalog Description:** This introductory one credit research course is focused onlearning scientific research methodologies to develop an initial research proposal. Students will have opportunities to consult with doctoral-level research scholars and work with a mentor to explore different STEM areas to identify a research question of interest to them. Students will learn how to access scientific databases, conduct effective online bibliographic searches, and determine the appropriateness of sources. Students will identify a research question in a chosen field and formulate a scientific hypothesis that they propose to pursue. Throughout the course, students will maintain a scientific notebook and a comprehensive portfolio of all research work. They will summarize their findings in a literature review. This course culminates with students creating a research poster of their literature review and presenting it at a scientific symposium.

**Permission of instructor**. This course is a prerequisite to RES 110 and RES 210

Available for year-long course of study through the Dual Enrollment Program only.

**Course Objectives/Learning Outcomes**: By the end of this course, students should be able to:

* Explain basic concepts in research methodology
* Apply C**ritical Thinking** skills when selecting appropriate research articles and research methodologies.
* Use library databases effectively to find pertinent research articles
* Summarize and synthesize scientific literature in chosen research topic
* Develop appropriate research questions and explain the relevance and importance of the research question.
* Appropriately cite research literature
* **Communicate r**esearch topic visually by creating a poster of their literature review and presenting the poster at a public symposium

\*Students will engage in undergraduate level research throughout the course, which is a high-impact practice.

**Alignment of assignments with learning outcomes**

|  |  |
| --- | --- |
| Learning Outcome | Assignments |
| Basic concepts in research methodology | ***Research Proposal******Scientific Notebook*** |
| Apply **Critical Thinking** skills when selecting appropriate research articles and research methodologies   | ***Journal Article Reviews******Scientific Notebook*** |
| Summarize and synthesize scientific literature in chosen research topic | ***Journal Article Reviews******Scientific Notebook******Literature Review*** |
| Use library databases to find pertinent research articles | ***Journal Article Reviews******Scientific Notebook******Literature Review*** |
| Develop appropriate research questions and explain the relevance and importance of the research question.  | ***Research Proposal******Scientific Notebook*** |
| Appropriately cite research literature | ***Journal Article Reviews******Literature Review*** |
| Communicate the research topic visually by creating a poster of their literature review and presenting the poster at a public symposium  | ***Journal Article Reviews******Scientific poster******Literature Review Presentation at a Symposium*** |

**Required Text and References**

* Dawson, C., 2019. Introduction to Research Methods. 5th edition
* Kumar, R. 2014. Research Methodology: a step-by-step guide for beginners. 4th edition. Sage.
* Publication Manual of the American Psychological Association, Seventh Edition (2020)

**Advice**: This course involves a hefty workload, but it is manageable if you stay on top of assignments and *do not procrastinate* in completing goals. If you are having any problems at all, *please* contact me for assistance; I’m glad to help. Following this advice will reduce your stress and anxiety.

**Methods for Assessment of Learning**

* ***Scientific Notebook:*** Time logs chronicling approximately 8 hours of research every week. Annotations of research must be in the scientific notebook.
* ***Journal Article Reviews:*** Students will read at least three journal articles related to their topic. They will create a power point of key ideas in the article with examination of bias and evaluation of impact for their research. Students present to the class. Class discusses and critiques presentation.
* ***Literature Review:*** Students will synthesize key sources related to their research question(s) and write an APA-style literature review for their research proposal. The literature review will contain an introduction, body, and conclusion. The body of the literature review will summarize and synthesize the main points from each study, analyze and interpret the significance of each research study's findings, and critically evaluate the strengths and weaknesses of each source. The submission must include: (1) an electronic copy of the Review of Literature, 2) all appendices (including drafts of informed consent form, debriefing form, etc.), and 3) copies of all articles cited in your proposal.
* ***Symposium Presentation:*** Students will create a poster outlining their literature review along with their research hypothesis and present at a symposium.
* ***Biweekly assessments***: Students will conference with instructor every two weeks to discuss goals and review research progress***.***

* ***Exams:***
	+ Mid-term evaluation paper that details contributions by specific scientists, rationale for topic selection and relevance of this topic (Introduction of your research paper)
	+ Final evaluation will be making a poster of a literature review for your research hypothesis and presenting it at a science symposium.

***Attendance***: Attendance will be taken and is part of the Class Participation grade. Students need to document at least 3 hours of work each week for class time. They will also submit reviews of presentations made during class.

***Class Participation*:** Students can earn up to 50 points for participation.

* *40****-5****0 points*: Attend almost every class. Ask and answer questions, submit all assignments on time, demonstrate knowledge of materials, participate actively in exercises, and attend office meetings with regularity.
* *25-39 points*: Attend about two thirds of in-class and online meetings, ask and answer some questions, demonstrate some knowledge of materials, participate in exercises, and miss only two or three office meetings.
* *0-24 points*: Attend class intermittently, did not participate in asking and answering questions and/or did not participate in demonstrating knowledge of materials, did not participate actively in exercises, and did not attend more than three office meetings.

Therefore, there are a possible 1000 *points* for the course:

|  |  |  |
| --- | --- | --- |
| **Assignment** |   | **Total Possible Points**  |
| Proposal  |   | 50  |
| Homework  |   | 400  |
| Biweekly assessments  |   | 200  |
| midterm  |   | 150  |
| Final paper and poster  |   | 150  |
| Class Participation  |   | 50  |

Grades for this course will be determined as follows:

* A = 93-100%
* A- = 90-92%
* B+ = 87-89%
* B = 83-86%
* B- = 80-82%
* C+ = 77-79%
* C = 73-76%
* C- = 70-72%
* D+ = 67-69%
* D = 60-66%
* F = Below 60

**Course Outline for SCI 100 (Formulating a Research Problem)**

This course is divided into 6 topic areas:

Part 1: Plagiarism and bias

Part 2: Introduction and basic research concepts

Part 3: Developing a research question (deciding what interests you)

Part 4: Finding and evaluating sources for your research

Part 5: Conducting a review of literature

Part 6: Ethics in science research

**Tentative course Calendar**

|  |  |
| --- | --- |
| Week #  | Topic  |
| 1  | What is Plagiarism? How to recognize it. How to avoid it. How to correctly cite.  |
| 2  | Can you spot bias? Time management skills  |
| 3-4  | Research: A way of thinking Applications of research Types of research Research objectives Qualitative vs quantitative  |
| 5  | The research process: Deciding- Planning - Conducting  |
| 6  | Evaluating your sources  |
| 7  | Maintaining a Lab Notebook  |
| 7-8  | Deciding on a research field  |
| 9  | Narrowing the field Present your 10 articles to the class (verbally) and select the one you find most interesting.  |
| 10  | Literature review What is already known about your proposed area of study? Primary vs secondary sources  |
| 11  | Library resources Databases and how to use them  |
| 12  | Documenting bibliography  |
| 13-15  | Reading first primary source journals How to read a scientific journal  |
| 16  | PowerPoint presentation to the class  |
| 17-19  | Reading of second scientific journal and PowerPoint presentation  |
| 20  | PowerPoint presentation to the class   |
| 21-22  | Work on Midterm Project  |
| 23-26  | Reading of third scientific journal and PowerPoint presentation  |
| 27-29  | Reading of fourth scientific journal and PowerPoint presentation  |
| 30-33  | Formulating a research question with emphasis on ethics. Interest, relevance, magnitude, level of expertise, ethical issues, objectives, time required, resources available to you  |
| 34-41  | Finding mentors  |
| 35-41  | Writing a review of Literature Organizing school science symposium  |
| 42  | Science Symposium   |

**ASSESSMENT RUBRICS RES 100**

**Science Research Biweekly Assessment**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Scoring Key:

A = outstanding work B = adequate work C = less than adequate D = dismal F = not there

NA = not applicable to this assessment

During this evaluation, did the student:

1. Document an appropriate amount of research for articles/information/people supported by documentation?

A B C D F NA

1. Achieve appropriate advancement in reading journals that are clearly annotated and summarized?

A B C D F NA

1. Effectively use their time both in class and out of class as evidenced by their time log?

A B C D F NA

1. Demonstrate respect for others in the classroom, displaying an exemplary and helpful attitude towards the research classroom?

A B C D F NA

1. Meet all deadlines and goals set at the end of the last assessment?

A B C D F NA

1. Statistically give a PowerPoint or poster presentation or complete a required paper?

A B C D F NA

1. Demonstrate independence, self-motivation, enthusiasm and timeliness to forward their progress in their research efforts?

A B C D F NA

1. Communicate with teacher, mentor, or other appropriate professional promptly with documentation?

A B C D F NA

**Missing an assessment is an automatic zero unless there is an unforeseen legal absence. It is the student’s responsibility for rescheduling the assessment ASAP. If a student needs to reschedule an assessment due to unforeseen circumstances, notification must be at least 24 hours in advance. It is up to the evaluator to decide how or when to reschedule based on the circumstances. Failure to reschedule the assessment ASAP could result in a missed assessment.**

Overall grade for this assessment: \_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_

Student’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Teacher’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Presentations of articles Rubric**

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| --- | --- |
| **Points** | **Evidence of completed work and presentation** |
| 10 | Excellent summation of articles, no evidence of plagiarism, student was well spoken with little to no signs of nervousness, clear and well-articulated, great PowerPoint presentation |
| 8 | Good summation of articles, no evidence of plagiarism, student was well spoken with some signs of nervousness, somewhat clear but needs to work on articulation, PowerPoint needs improvements |
| 6 | Summation of articles was done, no evidence of plagiarism, student was somewhat prepared and showed signs of nervousness, needs to speak up and speak clearly, PowerPoint was not well done |
| 5-2 | Summation of articles was completed but shows evidence of plagiarism, student was not well prepared, PowerPoint was poorly done or incomplete |
| 0 | Did not complete assignment |

**Rubric for Final Review of Literature at Symposium**

|  |  |  |
| --- | --- | --- |
|  | PASS | FAIL |
|  | Exceeds Expectations | Meets Expectations | Almost meets Expectations | Below Expectations |
| Topic selection | Accurately defined and addresses current issues of great concern | Defined but too broad, addresses a current issue  | Vaguely defined or not a current issue | Not defined |
| Research question or problem | A well stated research problem/question | Research problem/question is clearly presented | Research problem/question is not clearly stated | Questionable research problem |
| Search of scientific articles (secondary sources) | Student demonstrates excellent and through understanding of topic | Student demonstrates a good understanding of topic | Student somewhat understands topic | Student is not very well prepared to discuss topic in depth |

**Accommodations for Students with Disabilities**

Eastern Connecticut State University is committed to following the requirements of the Americans with Disabilities Act (ADA) of 1990, the ADA Amendment Act of 2008, and Section 504 of the Rehabilitation Act of 1973, as amended in 1998. If you are a student with a disability (or think you might have a disability) and require accommodations or assistance evacuating a building in the case of an emergency, please contact the Office of AccessAbility Services (OAS) at 860-465-0189 to discuss your request further. Please note that accommodations are not retroactive and must be communicated through a Letter of Accommodation, which is drafted by the OAS. Please visit the Office of Accessibility Website at <https://www.easternct.edu/accessability/index.html> for more information on how to register with our office.

**Student Sexual Misconduct Policy**

Title IX of the Education Amendment of 1972, as well as the Board of Regents Policy on Sexual Misconduct Reporting, Support Services and Processes, prohibit acts of sexual misconduct – sexual harassment, sexual assault, sex-based discrimination, dating violence, domestic violence, stalking, and inappropriate relationships between employees and students.  If you or someone you know has been or experiences harassment or assault, resources are available within the Title IX Office and with the Sexual Assault & Interpersonal Violence Response Team (SAIV-RT).  Alleged violations should be reported to the Title IX Coordinator in the Office of Equity and Diversity at 860-465-5012.  Reports to law enforcement can be made to Eastern Connecticut State University Police Department at 860-465-5310.  To receive support and advocacy, please contact the Co-Chair of the Sexual Assault & Interpersonal Violence Response Team (SAIV-RT) at 860-465-4314. You may also visit the SAIV-RT website at [https://www.easternct.edu/sexual-assault-and-interpersonal-violence/index.html](https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.easternct.edu%2Fsexual-assault-and-interpersonal-violence%2Findex.html&data=04%7C01%7Crodriguezlau%40easternct.edu%7C63e1e16837cb455b3df908d962847131%7C00bc4ae8576c45e3949d4f129d8b670a%7C1%7C0%7C637649143783810922%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=wrC0aDoD0PR59afvL5VL6UHOJZRq1pCpTgZT5xVstHA%3D&reserved=0) for more information including a list of confidential resources.

**Cheating, Plagiarism, and Personal Misconduct**

Students are responsible for familiarizing themselves with the University’s numerous policies and procedures contained in the University Catalog and Student Handbook.  The Code of Conduct policies and the Policy on Academic Misconduct are of special significance, since cheating, plagiarism, and personal misconduct are strictly prohibited and carry severe penalties.  Students should read and understand Eastern's Academic Misconduct Policy, which can be found in the student handbook. <https://easternct.makekb.com/entry/307/> All violations will be handled under the procedures established in this policy.

**Assistance at the Writing Center**

The Eastern Writing Center, located in the ASC and staffed by trained peer tutors, is available to help all students with their writing. The Writing Center supports the liberal-arts mission of Eastern by helping students with their writing from any class, at any stage, from brainstorming and drafting to revision to proofreading and editing. We help students do their own work, and do it more comfortably and confidently. Any student can and should use the Writing Center. The process of talking with readers about writing and getting feedback on student writing is something all writers do and can benefit from. Students can either drop into the Center or make an appointment by going to the “Useful Links” column on the Current Students webpage and selecting “GradesFirst” ([http://www.easternct.edu/index/current-students/](https://na01.safelinks.protection.outlook.com/?url=http%3A%2F%2Fwww.easternct.edu%2Findex%2Fcurrent-students%2F&data=02%7C01%7C%7C3160dad10a984ba6642708d60f463376%7C00bc4ae8576c45e3949d4f129d8b670a%7C0%7C0%7C636713191515391454&sdata=FnXdgewhsTrm6Jmyi0RI2br6DeTwTJJZm10LwM5n9gM%3D&reserved=0)). Students are asked to bring copies of any assignment sheets to the Writing Center, so tutors know what is expected of the assignment.

**Assistance with Academic Advising and Subject Tutoring at the Academic Service Center**

Students are encouraged to use the support offered by the Academic Services Center (ASC) located on the ground floor of the Library. Advising Services and tutoring in math, writing, and other subjects, including supplementary instruction, are available. The ASC also offers Peer Academic Coaching (PAC) assistance with study techniques, time management, “Eastern in 4” planning and understanding learning styles. For further information about our services, please call 465-4625 or check the ASC website at <http://www.easternct.edu/asc/>.

**Student Crisis Statement**

Any student who is facing challenges (i.e. mental health, securing food/housing) and believes this may affect their performance in the course is urged to contact the Dean of Students at 860-465-5244 for support. Students experiencing an immediate threat to their safety or wellbeing should contact 24-hour emergency services by dialing 911 or the Eastern’s University Police Department: 860-465-5310.

**Final Examination Statement**
University policy states that, “No examination shall be given during the final week of scheduled classes of a full semester course.” Faculty must receive prior approval from the Vice-President of Academic Affairs in order to schedule an examination during the final week of classes. Faculty may, with approval from the Vice-President of Academic Affairs in consultation with the Academic Dean and Registrar, hold a single exam session for all sections of the same course. Students will be notified of the exam date, time, and place on the course syllabus.

**Misuse of Intellectual Property**

Students are advised that lectures, notes, and faculty-developed materials are the intellectual property of the instructor. Students who record lectures without express permission\*, re-distribute notes/recordings, or in any other way violate intellectual property laws may be subject to disciplinary action (e.g. failure of the course, and/or academic misconduct charges up to and including Academic Dismissal). Faculty members reserve the right to pursue separate civil litigation pertaining to copyright violation in such situations.

\* Students with documented ADA accommodations are governed under the signed Audio Recording Agreements.

**Note on the Syllabus**

Faculty reserves the right to make changes to the course syllabus as needed. However, every attempt will be made to keep such changes to a minimum and are usually made in response to university, program, or Connecticut State Department of Education rules or regulations.

**Electronic Communication**

Students are expected to receive, read, and respond to their email in a timely fashion. Some communications may be time-sensitive or contain important classroom announcements, and students are responsible for checking their email so they can react to such information. Additionally, all electronic communications relevant to the course should take place within the ECSU email system. Do not assume that email sent by outside providers will be received by your professor.

**Weather Cancellations:**

Call (860) 465-4444 or (800) 578-1449, or go online and subscribe to the alert system: [www.easternct.edu/easternalert](http://www.easternct.edu/easternalert)

Students are responsible for familiarizing themselves with the University’s numerous policies and procedures contained in the University Catalog and Student Handbook. The Code of Conduct policies and the Policy on Academic Misconduct are of special significance, since cheating, plagiarism, and personal misconduct are strictly prohibited and carry severe penalties. Students should read and understand Eastern's Academic Misconduct Policy, which can be found in the student handbook. <http://ecsu-svkb2.easternct.edu/index.php?View=entry&EntryID=307>

All violations will be handled under the procedures established in this policy.

**Academic Success Center:** Students are encouraged to use the support offered by the Academic Success Center (ASC) located on the ground floor of the Library. Its *Writing Center* is excellent in supporting your class writing assignments. For the most updated hours of operation, check the ASC website at [http://www.easternct.edu/asc/***.***](http://www.easternct.edu/asc/)

**Academic Misconduct**: Students are responsible for familiarizing themselves with the University’s numerous policies and procedures contained in the University Catalog and Student Handbook. The Code of Conduct policies and the Policy on Academic Misconduct are of special significance, since cheating, plagiarism, and personal misconduct are strictly prohibited and carry severe penalties. Students should read and understand Eastern's Academic Misconduct Policy, which can be found in the student handbook. https://easternct.makekb.com/entry/307/