New Course CYCS 4540
New course selected: This new course is not seeking approval as a general education course.

1. Proposed course prefix and number:
   CYCS 4540

2. Proposed credit hours:
   3

3. Proposed course title:
   Operating Systems for Cybersecurity

4. Proposed course prerequisites:
   CYCS 3240

5. Proposed course corequisites:
   None

6. Proposed course prerequisites that may be taken concurrently (before or at the same time):
   None

7. Minimum grade for prerequisites (default grades are D for Undergrad and C for Grad):
   C

8. Major and/or minor restrictions:
   Include

9. List all the four-digit major and/or minor codes (from Banner) that are to be included or excluded:
   Major Code Restriction for New B.S. in Cybersecurity

10. Classification restrictions:
    Not Applicable

11. List all the classifications (freshman, sophomore, junior, senior) that are to be included or excluded:
    None

12. Level restriction:
    Not Applicable
13. List the level (undergraduate, graduate) that is to be included or excluded.
Not Applicable

14. Do prerequisites and corequisites for 5000-level courses apply to undergraduates, graduates, or both?
Not Applicable

15. Is this a multi-topic course?
No

16. Proposed course title to be entered in Banner:
Operating Sys for Cybersec

17. Is this course repeatable for credit?
No

18. Is this course mandatory credit/no credit?
No

19. Select class type:
Lecture/Lab/Discussion

20. How many contact hours per week for this course?
3

A. Please choose Yes or No to indicate if this class is a Teacher Education class:
No

B. Please choose the applicable class level:
Undergraduate

C. Please respond Yes if this is a current general education course and/or a course being submitted for the new WMU Essential Studies program. Please respond No if it is neither.
No

D. Explain briefly and clearly the proposed improvement.
Create the course CYCS 4540 as part of a new Bachelor of Science in Cybersecurity.

CYCS 4540 is a required course that will be offered by the Computer Science Department as part of the new cross-disciplinary online B.S in Cybersecurity degree proposed in the complete Program Improvement form packet submitted separately.
E. Rationale. Give your reason(s) for the proposed improvement. (If your proposal includes prerequisites, justify those, too.).

CYCS 4540 is one of the required classes that students must take to complete the Bachelor of Science in Cybersecurity degree collaboratively offered by the BIS and CS departments. This course will be regularly offered online as detailed in the complete Program Improvement form packet [Appendix C] submitted separately.

CYCS 3240 is a prerequisite because it provides the necessary systems programming background for this course.

F. List the student learning outcomes for the proposed course or the revised or proposed major, minor, or concentration. These are the outcomes that the department will use for future assessments of the course or program.

Students will be able to:
- Design, implement, and test programs.
- Explain operating system structures.
- Explain process management.
- Explain scheduling.
- Explain threads.
- Explain vulnerabilities involving race conditions.
- Explain vulnerabilities arising from synchronization methods.
- Explain the organization of OS kernels.
- Modify and compile an OS kernel.

G. Describe how this curriculum change is a response to student learning assessment outcomes that are part of a departmental or college assessment plan or informal assessment activities.

CYCS 4540, as part of the B.S. in Cybersecurity, aligns with the CEAS mission vision by preparing students for careers in an exciting and high-demand industry. Our students will learn to be ethical and professional leaders, and to answer challenges in our local and global communities to improve the well-being of society by protecting both individuals and organizations from malicious attackers.

CYCS 4540 is part of the B.S. in Cybersecurity that has been designed to meet all ABET accreditation criteria for Cybersecurity and similarly named computing programs. ABET accreditation will be pursued for this program once approved.

H. Effect on other colleges, departments or programs. If consultation with others is required, attach evidence of consultation and support. If objections have been raised, document the resolution. Demonstrate that the program you propose is not a duplication of an existing one. Both the CIS and CS program have collaboratively worked with EUP to develop the online B.S. in Cybersecurity.
Letters of support from each department, college, and EUP are attached to in the complete Program Improvement form packet [Appendix B] submitted separately.

This course, as part of the new degree, is not duplicated at Western Michigan University.

I. Effect on your department's programs. Show how the proposed change fits with other departmental offerings.
CYCS 4540 is not currently offered in the CS Department because it is a new course for the B.S. in Cybersecurity.

CYCS 4540 will become a regular offering in the CS Department.

J. Effects on enrolled students: are program conflicts avoided? Will your proposal make it easier or harder for students to meet graduation requirements? Can students complete the program in a reasonable time? Show that you have considered scheduling needs and demands on students' time. If a required course will be offered during summer only, provide a rationale.
CYCS 4540 does not conflict with any current degree or program offerings in either CIS or CS as this is a new course designed for the Bachelor of Science in Cybersecurity.

CYCS 4540 proposed scheduling has been included in the complete Program Improvement form packet [Appendix C] submitted separately.

Enrolled Bachelor of Science in Cybersecurity students will be able to complete all coursework in 4 years.

K. Student or external market demand. What is your anticipated student audience? What evidence of student or market demand or need exists? What is the estimated enrollment? What other factors make your proposal beneficial to students?
Market research discussed in the submitted Program Improvement form packet demonstrates a strong market for job candidates with a Bachelor of Science degree in Cybersecurity. The complete data and analyses can be found in the complete Program Improvement form packet [Appendix F].

L. Effects on resources. Explain how your proposal would affect department and University resources, including faculty, equipment, space, technology, and library holdings. Tell how you will staff additions to the program. If more advising will be needed, how will you provide for it? How often will course(s) be offered? What will be the initial one-time costs and the ongoing base-funding costs for the proposed program? (Attach additional pages, as necessary.)
This course is part of the Bachelor of Science in Cybersecurity that will be offered completely online. EUP will provide resources to support the program to include additional faculty for each department.

EUP will also offer the necessary online support in terms of course development assistance and technology.

In the complete Program Improvement form packet this course is placed in the overall course offerings and sequences of the department within a four-year plan, as well as resource allocations [Appendix C].

This course will be offered entirely online. Technology, equipment, and support--to include advising--for this online offering will be provided via EUP.

M. With the change from General Education to WMU Essential Studies, this question is no longer used.

For courses requesting approval as a WMU Essential Studies course, a syllabus identifying the student learning outcomes and an action plan for assessing the student learning outcomes must be attached in the Banner Workflow system.
Not Applicable

N. (Undergraduate proposals only) Describe, in detail, how this curriculum change affects transfer articulation for Michigan community colleges. For course changes, include detail on necessary changes to transfer articulation from Michigan community college courses. For new majors or minors, describe transfer guidelines to be developed with Michigan community colleges. For revisions to majors or minors, describe necessary revisions to Michigan community college guidelines. Department chairs should seek assistance from college advising directors or from the admissions office in completing this section.
This change will not affect any current articulation agreements because this is a new course. Articulation agreements with community colleges relating to specific course transfer equivalencies with required Bachelor of Science in Cybersecurity courses will be agreed upon individually between Western Michigan University and the Community College in question as is usual.

O. Current catalog copy:
Not applicable

P. Proposed catalog copy:
The internal and external views of computer operating systems are presented. A historical survey of the development and growth of operating systems is given. Fundamentals of systems
and system design are stressed. Basic concepts and terminology are emphasized. Processes, communications and synchronizations, deadlocks, scheduling, shared resources, resource allocation and deallocation, memory management, files management, and protection are discussed. Applications to real systems are investigated to motivate the ideas presented. Students build or run simulations and modify the internals of a working operating system.