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| A round blue and white logo  Description automatically generated | **SOUTH DAKOTA BOARD OF REGENTS**ACADEMIC AFFAIRS FORMS |
| New Course Request |
|  |  |

Use this form to request a new common or unique course. Consult the system course database through for information about existing courses before submitting this form.

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| --- | --- | --- |
| DSU |  | **Beacom College of Computer and Cyber Sciences** |
| **Institution** |  | **Division/Department** |
| A picture containing text  Description automatically generated |  | 3/5/2025 |
| **Institutional Approval Signature** |  | **Date** |

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**Section 1. Course Title and Description**

If the course contains a lecture and laboratory component, identify both the lecture and laboratory numbers (xxx and xxxL) and credit hours associated with each. Provide the complete description as you wish it to appear in the system course database, including pre-requisites, co-requisites, and registration restrictions.

|  |  |  |
| --- | --- | --- |
| **Prefix & No.** | **Course Title** | **Credits** |
| CSC 737 | Embedded Systems | 3 |

*NOTE: The Enrollment Services Center assigns the short, abbreviated course title that appears on transcripts. The short title is limited to 30 characters (including spaces); meaningful but concise titles are encouraged due to space limitations in the student information system.*

|  |  |
| --- | --- |
| **Course Description** |  |
| This course delves into embedded platforms, covering software development, embedded architectures, and hardware interactions. Students gain hands-on experience programming embedded devices, working with various architectures, and interfacing with hardware components. Topics include peripheral communication protocols, memory management, and real-time constraints. Firmware development, debugging, and troubleshooting hardware-software integration are emphasized. |

*NOTE: Course descriptions are short, concise summaries that typically do not exceed 75 words. DO: Address the content of the course and write descriptions using active verbs (e.g., explore, learn, develop, etc.). DO NOT: Repeat the title of the course, layout the syllabus, use pronouns such as “we” and “you,” or rely on specialized jargon, vague phrases, or clichés.*

**Pre-requisites or Co-requisites (add lines as needed)**

|  |  |  |
| --- | --- | --- |
| **Prefix & No.** | **Course Title** | **Pre-Req/Co-Req?** |
|  | None | Pre-Req |

**Registration Restrictions**

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| --- |
| None |

**Section 2. Review of Course**

1. **Will this be a unique or common course (*place an “X” in the appropriate box*)?**

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| --- |
|[x]  **Unique Course***If the request is for a unique course, institutions must review the common course catalog in the system course database to determine if a comparable common course already exists. List the two closest course matches in the common course catalog and provide a brief narrative explaining why the proposed course differs from those listed. If a search of the common course catalog determines an existing common course exists, complete the Authority to Offer an Existing Course Form. Courses requested without an attempt to find comparable courses will not be reviewed.* |

|  |  |  |
| --- | --- | --- |
| **Prefix & No.** | **Course Title** | **Credits** |
| CENG 447/ 547 | Embedded Systems (Mines) | 3 |
| SE 440 | Embedded Systems (SDSU) | 3 |
| *Provide explanation of differences between proposed course and existing system catalog courses below:* |
| Summary of Differences* CSC 737 (DSU) emphasizes embedded architectures, hardware-software integration, and firmware development, making it ideal for students focusing on low-level embedded system design and troubleshooting.
* CENG 447/547 (Mines) focuses on real-time and interrupt-driven embedded systems with an introduction to mixed-signal interfacing and robotic applications.
* SE 440 (SDSU) takes a software-engineering-centric approach to embedded systems, emphasizing modern development methodologies and tools.

CENG 447/547: Embedded Systems: This course provides an introduction to programming embedded and real-time computer systems. It includes design of embedded interrupt driven systems and real-time interfacing. An introduction to mixed-signal interfacing is introduced to include filter design, controller design, and embedded robotic systems.SE 440: Embedded Systems: This course focuses on modern methods, techniques, and tools for specification, design, and implementation of embedded systems.  An overview of the platforms, tools, and processes used in developing software for embedded systems.  A hands-on approach experimenting with real-time embedded systems programming. |

**Key Differences: CSC 737 vs. CENG 447/547 vs. SE 440**

|  | CSC 737 (DSU) – Embedded Systems | CENG 447/547 (Mines) – Embedded Systems | SE 440 (SDSU) – Embedded Systems |
| --- | --- | --- | --- |
| Primary Focus | Embedded platforms & hardware/software integration | Real-time and interrupt-driven systems | Embedded software development methodologies |
| Programming & Development | Hands-on programming with various embedded architectures | Real-time programming, interrupt-driven design | Embedded software development processes |
| Hardware Interaction | Peripheral communication protocols, memory management, and real-time constraints | Mixed-signal interfacing, robotic systems, and controllers | Emphasis on tools and platforms for software development |
| System Design | Firmware development and debugging | Filter and controller design, robotic applications | Specification, design, and implementation methodologies |
| Application Domains | General embedded system development | Real-time and robotic systems | Modern software engineering techniques for embedded systems |
| Hands-on Experience | Programming embedded devices, debugging hardware-software interactions | Real-time embedded systems, interrupt-driven processing, and control systems | Experimenting with real-time embedded systems programming |

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|[ ]  **Common Course** | *Indicate universities that are proposing this common course:* |
|  |  |  |
|  |[ ]  BHSU |[ ]  DSU |[ ]  NSU |[ ]  SDSMT | [ ]  | SDSU |[ ]  USD |

**Section 3. Other Course Information**

1. **Are there instructional staffing impacts?**

|  |  |
| --- | --- |
|[ ]  **No**. Replacement of  |  |
|  |  | (course prefix, course number, name of course, credits) |
|  |  | \*Attach course deletion form |
|  |  |  |
| Effective date of deletion: | Click here to enter a date. |  |

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|[x]  **No**. Schedule Management, explain below: DSU will add this course into the rotation with current and newly hired faculty with this expertise. |

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|[ ]  **Yes**. Specify below:  |

1. **Existing program(s) in which course will be offered (i.e., any current or pending majors, minors, certificates, etc.)**:

Required in the MS in Cyber Operations and can be used as an elective in the MS Computer Science.
2. **Proposed instructional method by university *(as defined by*** [*AAC Guideline 5.4*](https://www.sdbor.edu/administrative-offices/academics/academic-affairs-guidelines/Documents/5_Guidelines/5_4_Guideline.pdf)***)*:**

*If requesting an instructional method that is exempt from the* [Section Size Guidelines](https://www.sdbor.edu/administrative-offices/academics/academic-affairs-guidelines/Documents/5_Guidelines/5_7_Guideline.pdf)*, please provide a brief description of how the course is appropriate for the instructional method, as defined in AAC Guidelines.*

 Lecture

1. **Proposed delivery method by university *(as defined by*** [*AAC Guideline 5.5*](https://www.sdbor.edu/administrative-offices/academics/academic-affairs-guidelines/Documents/5_Guidelines/5_5_Guideline.pdf)***)*:** D01 Face to Face to face D01; D15 Asynchronous; D18 Synchronous
2. **Term change will be effective**: Spring 2026
3. **Can students repeat the course for additional credit?**

|  |  |  |  |
| --- | --- | --- | --- |
|[ ]  Yes, total credit limit: |  |  |[x]  No |

1. **Will grade for this course be limited to S/U (pass/fail)?**

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| --- | --- |
|[ ]  Yes |[x]  No |

1. **Will section enrollment be capped?**

|  |  |  |  |
| --- | --- | --- | --- |
|[x]  Yes, max per section: | 25 |  |[ ]  No |

1. **Will this course equate (i.e., be considered the same course for degree completion) with any other unique or common courses in the common course system database?**

|  |  |
| --- | --- |
|[ ]  Yes |[x]  No |
| *If yes, indicate the course(s) to which the course will equate (add lines as needed):* |
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| **Prefix & No.** | **Course Title** |
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1. **Is this prefix approved for your university?**

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|[x]  Yes |[ ]  No |
| *If no, provide a brief justification below:* |
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**Section 4. Department and Course Codes (Completed by University Academic Affairs)**

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| 1. **University Department:**
 | The Beacom College of Computer and Cyber Sciences |

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| 1. **Banner Department Code:**
 | DCSI |

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| 1. **Proposed** [**CIP Code**](http://nces.ed.gov/ipeds/cipcode/default.aspx?y=55)**:**
 | 11.0701 |
|  |  |
| *Is this a new CIP code for the university?* |[ ]  Yes |[x]  No |