Institutions: University of South Dakota and South Dakota School of Mines & Technology  Date: 10/31/2018

Institutional representatives should provide direct links to PDF documents for each of the curriculum requests represented below. All requests should be posted on the campus Curriculum and Instruction website one week prior to the Academic Affairs Council meeting where the curriculum request is being considered.

### New Unique Course

<table>
<thead>
<tr>
<th>Prefix &amp; Number</th>
<th>Course Title</th>
<th>Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 300</td>
<td>Quantitative Systems Physiology I</td>
<td>PT</td>
</tr>
<tr>
<td>BME 302</td>
<td>Quantitative Systems Physiology II</td>
<td>PT</td>
</tr>
<tr>
<td>BME 303</td>
<td>Introduction to Biomechanics</td>
<td>PT</td>
</tr>
<tr>
<td>BME 304</td>
<td>Biomedical Engineering Fluid Mechanics</td>
<td>PT</td>
</tr>
<tr>
<td>BME 305</td>
<td>Biomedical Engineering Transport Phenomena</td>
<td>PT</td>
</tr>
<tr>
<td>BME 306</td>
<td>Biomedical Engineering Thermodynamics</td>
<td>PT</td>
</tr>
<tr>
<td>BME 307/307L</td>
<td>Experimental Design/Lab</td>
<td>PT</td>
</tr>
<tr>
<td>BME 308</td>
<td>Biomedical Engineering for Global Health</td>
<td>PT</td>
</tr>
<tr>
<td>BME 401/BME 501</td>
<td>Introduction to Biomaterials</td>
<td>PT</td>
</tr>
<tr>
<td>BME 402/402L</td>
<td>Computational Biomedical Engineering/Lab</td>
<td>PT</td>
</tr>
<tr>
<td>BME 403</td>
<td>Cell Biomechanics</td>
<td>PT</td>
</tr>
<tr>
<td>BME 404/404L</td>
<td>Biomedical Signal and Imaging/Lab</td>
<td>PT</td>
</tr>
<tr>
<td>BME 405/405L</td>
<td>Cell and Tissue Engineering/Lab</td>
<td>PT</td>
</tr>
<tr>
<td>BME 463</td>
<td>Biomedical Engineering Laboratory</td>
<td>PT</td>
</tr>
<tr>
<td>BME 464</td>
<td>Biomedical Engineering Senior Design I</td>
<td>PT</td>
</tr>
<tr>
<td>BME 465</td>
<td>Biomedical Engineering Senior Design II</td>
<td>PT</td>
</tr>
</tbody>
</table>

### Revised Course Requests

<table>
<thead>
<tr>
<th>Prefix &amp; Number</th>
<th>Course Title</th>
<th>Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISCI 335/335L</td>
<td>Biomedical Technologies/Lab [Prereqs; cross-list/equate; delivery method]</td>
<td>PT</td>
</tr>
<tr>
<td>MET 232</td>
<td>Properties of Materials [Prereqs; cross-list/equate; delivery method]</td>
<td>PT</td>
</tr>
</tbody>
</table>

### Authority to Offer Common Course Requests

<table>
<thead>
<tr>
<th>Prefix &amp; Number</th>
<th>Course Title</th>
<th>Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 101/101L</td>
<td>Intro Biomedical Engineering</td>
<td>PT</td>
</tr>
<tr>
<td>EM 214</td>
<td>Statics  [Built as BME 214]</td>
<td>PT</td>
</tr>
<tr>
<td>IENG 301</td>
<td>Basic Engineering Economics [Built as BME 301]</td>
<td>PT</td>
</tr>
<tr>
<td>ISCI 335/335L</td>
<td>Biomedical Technologies/Lab</td>
<td>PT</td>
</tr>
<tr>
<td>MET 232</td>
<td>Properties of Materials [Built as BME 232]</td>
<td>PT</td>
</tr>
</tbody>
</table>

Courses referenced above for approval have been reviewed by the Academic Affairs Council and the System Vice President for Academic Affairs and may be advanced forward for entry in Colleague. For those courses listed above that did not receive approval, additional clarification or justification will be necessary and should be re-routed through the curriculum review process on a separate “Institutional Curriculum Requests” form once all issues have been resolved.

Signature: System Vice President for Academic Affairs  
Date: 12/13/2018
Section 1. Course Title and Description

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 300</td>
<td>Quantitative Systems Physiology I</td>
<td>3</td>
</tr>
</tbody>
</table>

**Course Description**

This course provides a quantitative approach to fundamental physiological principles and systems. Quantitative Systems Physiology I provides a rigorous overview of physical and chemical foundations in physiology, membrane transport, metabolism, and skeletomuscular and nervous systems.

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

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Pre-Req/Co-Req?</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>Physics</td>
<td>Pre-Req</td>
</tr>
<tr>
<td>MATH 123 or</td>
<td>Calculus I or</td>
<td>Pre-Req</td>
</tr>
<tr>
<td>MATH 125</td>
<td>Calculus II</td>
<td></td>
</tr>
</tbody>
</table>

Registration Restrictions N/A

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?

☐ Yes (if yes, provide the course information below) ☒ No

2.2. Will this be a unique or common course?

☒ Common Course  
*Indicate universities that are proposing this common course:*

☐ BHSU  ☐ DSU  ☐ NSU  ☒ SDSMT  ☐ SDSU  ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

☒ No. Schedule Management, explain below: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: R: Lecture

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site

3.5. Term change will be effective: Fall 2019
3.6. Can students repeat the course for additional credit?
☐ Yes, total credit limit: __________ ☒ No

3.7. Will grade for this course be limited to S/U (pass/fail)?
☐ Yes ☒ No

3.8. Will section enrollment be capped?
☐ Yes, max per section: __________ ☒ No

3.9. 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 in Colleague and the Course Inventory Report?
☐ Yes ☒ No

3.10. Is this prefix approved for your university?
☒ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)
4.1. University Department Code: UBME/MNANO

4.2. Proposed CIP Code: 14.0501

Is this a new CIP code for the university? ☐ Yes ☒ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

Request Originator ___________________________  Signature ___________________________  Date ___________________________

Department Chair ___________________________  Signature ___________________________  Date ___________________________

School/College Dean ___________________________  Signature ___________________________  Date ___________________________

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum. This course is a core course for the Biomedical Engineering Degree. This course applies engineering and quantitative modeling to organ system physiology.

2. Note whether this course is: ☒ Required  ☐ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size  50

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   Ying Deng, Associate Professor, PhD
   Zhongkui Hong, Assistant Professor, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus? ☐ Yes  ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS

New Course Request

USD/SDSM&T       Biomedical Engineering/Nanoscience & Nanoengineering
Institution       Division/Department
USD 9/10/2018    Elizabeth M. Freeburg   SDSM&T Senate 10/11/18
Institutional Approval Signature

Section 1. Course Title and Description

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 302</td>
<td>Quantitative Systems Physiology II</td>
<td>3</td>
</tr>
</tbody>
</table>

Course Description
The course provides a quantitative approach to fundamental physiological principles and systems. Quantitative Systems Physiology II provides a rigorous overview of the cardiovascular, respiratory, renal, gastrointestinal, and endocrine physiology.

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

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Pre-Req/Co-Req?</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 301</td>
<td>Quantitative Systems Physiology I</td>
<td>Pre-Req</td>
</tr>
</tbody>
</table>

Registration Restrictions
Must have taken BME 301 with a C or better.

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?
☐ Yes (if yes, provide the course information below) ☒ No

2.2. Will this be a unique or common course?
☒ Common Course

Indicate universities that are proposing this common course:
☐ BHSU   ☐ DSU   ☐ NSU   ☒ SDSMT   ☐ SDSU   ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?
☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: R: Lecture

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site

3.5. Term change will be effective: Fall 2019

Curriculum Forms, New Course Request (Last Revised 01/2017)
Page 1 of 3
3.6. Can students repeat the course for additional credit?
☐ Yes, total credit limit: __________ ☒ No

3.7. Will grade for this course be limited to S/U (pass/fail)?
☐ Yes ☒ No

3.8. Will section enrollment be capped?
☐ Yes, max per section: __________ ☒ No

3.9. 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 in Colleague and the Course Inventory Report?
☐ Yes ☒ No

3.10. Is this prefix approved for your university?
☒ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)
4.1. University Department Code: UBME/MNANO

4.2. Proposed CIP Code: 14.0501

Is this a new CIP code for the university? ☐ Yes ☒ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum.
   This course is a core course for the Biomedical Engineering Degree. This course applies engineering and quantitative modeling to organ system physiology.

2. Note whether this course is: ☒ Required ☐ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size 50

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   Zhongkui Hong, Associate Professor, PhD
   Hongli Sun, Assistant Professor, PhD
   Berit Foss, Quality Assurance Manager, PhD
   Aaron Harmon, Project Manager, PhD
   Erin Harmon, Lab Manager, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus?
   ☐ Yes ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
SOUTH DAKOTA BOARD OF REGENTS  
ACADEMIC AFFAIRS FORMS

New Course Request

<table>
<thead>
<tr>
<th>Institution</th>
<th>Biomedical Engineering/Nanoscience &amp; Nanoengineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD/SDSM&amp;T</td>
<td>USD 9/10/2018 Elizabeth M. Freeburg SDSM&amp;T Senate 10/11/18</td>
</tr>
</tbody>
</table>

Institutional Approval Signature

Section 1. Course Title and Description

<table>
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<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 303</td>
<td>Introduction to Biomechanics</td>
<td>3</td>
</tr>
</tbody>
</table>

Course Description

Analysis of biomechanical systems at the macroscopic scale based on principles of statics, dynamics, and strength of materials. The biomedical applications of mechanics will be illustrated through analysis of the biomechanics of medical devices and implants, human body tissues, kinematics, musculoskeletal injuries, and the design application of prostheses and safety equipment. Emphasis will be placed on mechanical behavior (stress and strain), structural behavior, and injury tolerance of the human body.

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

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Pre-Req/Co-Req?</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 125</td>
<td>Calculus II (no lab)</td>
<td>Pre-Req</td>
</tr>
<tr>
<td>EM 214</td>
<td>Statics</td>
<td>Pre-Req</td>
</tr>
</tbody>
</table>

Registration Restrictions N/A

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?

☐ Yes (if yes, provide the course information below)  ☒ No

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

☒ Common Course  

Indicate universities that are proposing this common course:

☐ BHSU  ☐ DSU  ☐ NSU  ☒ SDSMT  ☐ SDSU  ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: R: Lecture

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site

3.5. Term change will be effective: Fall 2019
3.6. Can students repeat the course for additional credit?
☐ Yes, total credit limit: _________ ☒ No

3.7. Will grade for this course be limited to S/U (pass/fail)?
☐ Yes ☒ No

3.8. Will section enrollment be capped?
☐ Yes, max per section: _________ ☒ No

3.9. 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 in Colleague and the Course Inventory Report?
☐ Yes ☒ No

3.10. Is this prefix approved for your university?
☒ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)
4.1. University Department Code: UBME/MNANO

4.2. Proposed CIP Code: 14.0501

Is this a new CIP code for the university? ☐ Yes ☒ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum. This course is a core course for the Biomedical Engineering Degree. This course enhances the understanding of the biomechanics of living things, the forces generated by and acting on the human body. From the inner workings of a single cell to the mechanical behavior of bones, tissues and organs, this knowledge provides the foundation to advance health care.

2. Note whether this course is: ☒ Required ☐ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size 30

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   Zhongkui Hong, Assistant Professor, PhD
   Scott Wood, Assistant Professor, PhD
   Adam Piper, Associate Professor, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus? ☐ Yes ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
Section 1. Course Title and Description

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>BME 304</td>
<td>Biomedical Engineering Fluid Mechanics</td>
<td>3</td>
</tr>
</tbody>
</table>

Course Description

This course focuses on the static and dynamic properties of ideal and real fluids through the application of continuity, energy, and momentum principles to laminar, turbulent, compressible and incompressible flows.

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

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
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<th>Pre-Req/Co-Req?</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 125</td>
<td>Calculus II</td>
<td>Pre-Req</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>University Physics I</td>
<td>Pre-Req</td>
</tr>
</tbody>
</table>

Registration Restrictions

Math 125 and PHYS 211, or permission of instructor.

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?

☐ Yes (if yes, provide the course information below)  ☒ No

2.2. Will this be a unique or common course?

☒ Common Course  Indicate universities that are proposing this common course:

☐ BHSU  ☐ DSU  ☐ NSU  ☒ SDSMT  ☐ SDSU  ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.
3.3. Proposed instructional method by university: R: Lecture

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site

3.5. Term change will be effective: Fall 2019

3.6. Can students repeat the course for additional credit?
   ☐ Yes, total credit limit: __________ ☒ No

3.7. Will grade for this course be limited to S/U (pass/fail)?
   ☐ Yes ☒ No

3.8. Will section enrollment be capped?
   ☐ Yes, max per section: __________ ☒ No

3.9. 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 in Colleague and the Course Inventory Report?
   ☐ Yes ☒ No

3.10. Is this prefix approved for your university?
   ☒ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)

4.1. University Department Code: UBME/MNANO

4.2. Proposed CIP Code: 14.0501

Is this a new CIP code for the university? ☐ Yes ☒ No
1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum. This course is a core course for the Biomedical Engineering Degree. This course enhances the student’s understanding of fluid dynamics as it relates to biological systems.

2. Note whether this course is: ☒ Required ☐ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size 20

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   - Timothy Brenza, Assistant Professor, PhD
   - Ying Deng, Associate Professor, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus?
   - ☐ Yes ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
Section 1. Course Title and Description

<table>
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<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BME 305</td>
<td>Biomedical Engineering Transport Phenomena</td>
<td>3</td>
</tr>
</tbody>
</table>

Course Description

This course covers the theory and practice of mass transport phenomena in biomedical processes with an emphasis on molecular diffusion, membranes, and convective mass transfer. Application of transport to diverse problems and solutions on the molecular, cellular, organ and organism levels.

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

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
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<th>Pre-Req/Co-Req?</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 304</td>
<td>Biomedical Engineering Fluid Mechanics</td>
<td>Pre-req</td>
</tr>
</tbody>
</table>

Registration Restrictions

BME 304, or permission of instructor.

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?

☐ Yes (if yes, provide the course information below) ☒ No

2.2. Will this be a unique or common course?

☒ Common Course

Indicate universities that are proposing this common course:

☐ BHSU ☐ DSU ☐ NSU ☒ SDSMT ☐ SDSU ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: R: Lecture

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site
3.5. Term change will be effective: Fall 2019

3.6. Can students repeat the course for additional credit?
   ☐ Yes, total credit limit: __________ ☒ No

3.7. Will grade for this course be limited to S/U (pass/fail)?
   ☐ Yes ☒ No

3.8. Will section enrollment be capped?
   ☐ Yes, max per section: __________ ☒ No

3.9. 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 in Colleague and the Course Inventory Report?
   ☐ Yes ☒ No

3.10. Is this prefix approved for your university?
   ☒ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)
4.1. University Department Code: UBME/MNANO
4.2. Proposed CIP Code: 14.0501

Is this a new CIP code for the university? ☐ Yes ☒ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

Request Originator
Signature
Date

Department Chair
Signature
Date

School/College Dean
Signature
Date

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum. This course is a core course for the Biomedical Engineering Degree. This course enhances the student’s understanding of Biological Transport and its application in solving biomedical problems.

2. Note whether this course is: ☒ Required ☐ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size 30

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   Timothy Brenza, Assistant Professor, PhD
   Daniel Engebretson, Department Chair, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus?
   ☐ Yes ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
Section 1. Course Title and Description

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 306</td>
<td>Biomedical Engineering Thermodynamics</td>
<td>3</td>
</tr>
</tbody>
</table>

Course Description

Principles and applications of the three laws of thermodynamics with an emphasis on the fundamental equations of state for open and closed systems, reaction equilibrium constants, chemical potential, standard and reference state and solution thermodynamics. Apply fundamental thermodynamics principles to set up and solve problems in physiological systems.

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

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Pre-Req/Co-Req?</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 225</td>
<td>Calculus III</td>
<td>Pre-Req</td>
</tr>
<tr>
<td>BME 304</td>
<td>Biomedical Engineering Fluid Mechanics</td>
<td>Pre-Req</td>
</tr>
</tbody>
</table>

Registration Restrictions N/A

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?
☐ Yes (if yes, provide the course information below) ☒ No

2.2. Will this be a unique or common course?
☒ Common Course  Indicate universities that are proposing this common course:
☐ BHSU ☐ DSU ☐ NSU ☒ SDSMT ☐ SDSU ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?
☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: R: Lecture

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site

3.5. Term change will be effective: Fall 2019
3.6. Can students repeat the course for additional credit?
☐ Yes, total credit limit: __________ ☒ No

3.7. Will grade for this course be limited to S/U (pass/fail)?
☐ Yes ☒ No

3.8. Will section enrollment be capped?
☐ Yes, max per section: __________ ☒ No

3.9. 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 in Colleague and the Course Inventory Report?
☐ Yes ☒ No

3.10. Is this prefix approved for your university?
☒ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)

4.1. University Department Code: UBME/MNANO

4.2. Proposed CIP Code: 14.0501

Is this a new CIP code for the university? ☐ Yes ☒ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum.
   This course is a core requirement in the Biomedical Engineering Degree program. This course takes the three laws of thermodynamics and conservation of mass and applies to living systems and biomedical devices.

2. Note whether this course is: ☒ Required ☐ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size 30

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   Timothy Brenza, Assistant Professor, PhD
   Daniel Engebretson, Department Chair, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus? ☐ Yes ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
Section 1. Course Title and Description

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 307</td>
<td>Experimental Design</td>
<td>2</td>
</tr>
<tr>
<td>BME 307 L</td>
<td>Experimental Design Lab</td>
<td>1</td>
</tr>
</tbody>
</table>

Course Description

Students will learn engineering skills in a hands-on, project-based format. The technical learning objectives of the course include introducing students to collection, analysis and interpretation of data; and the formation of meaningful conclusions from experimental results. Additionally, students learn teamwork skills and oral and written communications by working in teams throughout the semester, preparing frequent technical progress reports, and delivering oral presentations based on the project.

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

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Pre-Req/Co-Req?</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 170/L</td>
<td>Programming</td>
<td>Pre-Req</td>
</tr>
</tbody>
</table>

Registration Restrictions

Junior Level Standing

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?

☐ Yes (if yes, provide the course information below) ☒ No

2.2. Will this be a unique or common course?

☒ Common Course  
Indicate universities that are proposing this common course:

☐ BHSU  ☐ DSU  ☐ NSU  ☒ SDSMT  ☐ SDSU  ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: R: Lecture, L: Laboratory

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site
3.5. Term change will be effective: Fall 2019

3.6. Can students repeat the course for additional credit?
   ☐ Yes, total credit limit: __________ ☒ No

3.7. Will grade for this course be limited to S/U (pass/fail)?
   ☐ Yes ☒ No

3.8. Will section enrollment be capped?
   ☐ Yes, max per section: __________ ☒ No

3.9. 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 in Colleague and the Course Inventory Report?
   ☐ Yes ☒ No

3.10. Is this prefix approved for your university?
   ☒ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)

4.1. University Department Code: UBME/MNANO

4.2. Proposed CIP Code: 14.0501

   Is this a new CIP code for the university? ☐ Yes ☒ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum.
   The purpose of this course is to introduce quantitative skills required to conduct experimental research and analyze resulting data. Students will learn the strengths and limitations of experimental design techniques and the applicability of common designs in biomedical engineering. Students will also learn to identify which experimental designs are appropriate or inappropriate for particular situations.

2. Note whether this course is:  ☐ Required  ☒ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size 25

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   Etienne Gnimpieba, Research Professor, PhD
   Ying Deng, Associate Professor, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus?  ☐ Yes  ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
Section 1. Course Title and Description

Prefix & No. | Course Title                                    | Credits |
-------------|-------------------------------------------------|---------|
BME 308      | Biomedical Engineering for Global Health        | 3       |

Course Description

This course will ask the question of how biomedical engineering can improve global health. This course will broaden understanding of global health concerns and how biomedical engineering can play a role in improving human health in developed and developing regions. This course will highlight innovative technologies and health-knowledge gaps to show how biomedical engineering can tackle some of the world’s most pressing challenges.

Pre-requisites or Co-requisites N/A
Registration Restrictions N/A

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?
☐ Yes (if yes, provide the course information below) ☒ No

2.2. Will this be a unique or common course?
☒ Common Course

Indicate universities that are proposing this common course:
☐ BHSU ☐ DSU ☐ NSU ☒ SDSMT ☐ SDSU ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?
☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: D: Discussion/Recitation

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site

3.5. Term change will be effective: Fall 2019
3.6. Can students repeat the course for additional credit?
☐ Yes, total credit limit: __________ ☒ No

3.7. Will grade for this course be limited to S/U (pass/fail)?
☐ Yes ☒ No

3.8. Will section enrollment be capped?
☐ Yes, max per section: __________ ☒ No

3.9. 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 in Colleague and the Course Inventory Report?
☐ Yes ☒ No

3.10. Is this prefix approved for your university?
☒ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)
4.1. University Department Code: UBME/MNANO

4.2. Proposed CIP Code: 14.0501

Is this a new CIP code for the university? ☐ Yes ☒ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

<table>
<thead>
<tr>
<th>Request Originator</th>
<th>Signature</th>
<th>Date</th>
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<table>
<thead>
<tr>
<th>Department Chair</th>
<th>Signature</th>
<th>Date</th>
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<tr>
<th>School/College Dean</th>
<th>Signature</th>
<th>Date</th>
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</table>

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum.
   This course enhances the curriculum through having a course that focuses students to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

2. Note whether this course is: ☐ Required ☒ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size 25

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   Berit Foss, Quality Assurance Manager, PhD
   Aaron Harmon, Project Manager, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus? ☐ Yes ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
   We plan to incorporate this into a Study Abroad Program to regional reservations as well as Tanzania. This will give our students both the ability to work within a diverse environment and the ability to think critically, yet compassionately in a globally-connected culture. We will create a partnership at local institutions to establish a long-term relationship and collaboration to solve problems, both from an educational and technology perspective.
Section 1. Course Title and Description

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 401/BME 501</td>
<td>Introduction to Biomaterials</td>
<td>3</td>
</tr>
</tbody>
</table>

Course Description:
This course will provide students an overview of the biomaterials field with the knowledge necessary for biomedical product development and biomaterials research and development. Students will develop an understanding of major classes of materials used in medical devices including metals, polymers, ceramics, composites, and natural materials. Topics include material properties, processing, testing, corrosion, biocompatibility, tissue response, and sterilization methods. Biomaterial applications such as dental, orthopedic, cardiovascular, drug delivery, and tissue engineering will be reviewed.

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

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Pre-Req/Co-Req?</th>
</tr>
</thead>
<tbody>
<tr>
<td>MET 232</td>
<td>Properties of Materials</td>
<td>Pre-Req</td>
</tr>
</tbody>
</table>

Registration Restrictions N/A

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?

☐ Yes (if yes, provide the course information below)  ☒ No

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

☒ Common Course  Indicate universities that are proposing this common course:

☐ BHSU  ☐ DSU  ☐ NSU  ☒ SDSMT  ☐ SDSU  ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: R: Lecture

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site
3.5. Term change will be effective: Fall 2019

3.6. Can students repeat the course for additional credit?
   ☐ Yes, total credit limit: __________   ☒ No

3.7. Will grade for this course be limited to S/U (pass/fail)?
   ☐ Yes   ☒ No

3.8. Will section enrollment be capped?
   ☒ Yes, max per section: 30   ☐ No

3.9. 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 in Colleague and the Course Inventory Report?
   ☐ Yes   ☒ No

3.10. Is this prefix approved for your university?
      ☒ Yes   ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)

4.1. University Department Code: UBME/MNANO

4.2. Proposed **CIP Code**: 14.0501

   *Is this a new CIP code for the university?*  ☐ Yes   ☒ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum. This course is the first course in the capstone design course sequence in the Biomedical Engineering Department. Students will work in teams to solve biomedical problems through research, design, and produce a prototype.

2. Note whether this course is: ☒ Required ☐ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

If this will be a dual listed course, indicate how the distinction between the two levels will be made.
The term paper assignment for graduate students would instruct them to prepare a research proposal following the National Institutes of Health’s guidelines for an R03 research grant application. NIH limits the R03 proposal to 6 pages, but we’ve typically reduced that to 5-6 pages (since actual proposals contain preliminary data collected by the investigator; students will not have the resources (reagents, cells, equipment, etc.) to gather preliminary data to include in the proposal). While this is the only assignment that will differ between the undergraduate and graduate students, it is a significant difference. Graduate students will be expected to not only know the course content (biomaterials), but how biomaterials will interact with critical biological systems, such as the immune system, and how the materials can be engineered to solve real biomedical problems. The term papers are graded using the same guidelines that the NIH provides to peer-reviewers.

I would defer the decision to the committee. I do concur with Beth in that there seems to be rigor in the expectations for the graduate students since a NIH style R03 paper is expected from them. Although the length may only be six pages, I have often found, more challenges in constricting a grant proposal.

Best Regards
Ranjit T. Koodali

4.

5. Desired section size 25

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
Grant Crawford, Associate Professor, PhD
Berit Foss, GMP QA Manager, PhD
7. Note whether adequate facilities are available and list any special equipment needed for the course.
   Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course.
   Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus?
   ☐ Yes ☒ No
   If yes, provide justification.

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
Section 1. Course Title and Description

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 402</td>
<td>Computational Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 402 L</td>
<td>Computational Biomedical Engineering Lab</td>
<td>1</td>
</tr>
</tbody>
</table>

Course Description

This course is intended for students interested in the crossroads of biology and computational science. The course provides the resources to use methods and software to solve computational problems.

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

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Pre-Req/Co-Req?</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 170/L</td>
<td>Programming for Engineering and Science</td>
<td>Pre-Req</td>
</tr>
<tr>
<td>MATH 125</td>
<td>Calculus II</td>
<td>Pre-Req</td>
</tr>
</tbody>
</table>

Registration Restrictions

Junior Level Standing

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?

☐ Yes (if yes, provide the course information below) ☒ No

2.2. Will this be a unique or common course?

☒ Common Course

Indicate universities that are proposing this common course:

☐ BHSU ☐ DSU ☐ NSU ☒ SDSMT ☐ SDSU ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: R: Lecture, L: Laboratory

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site

3.5. Term change will be effective: Fall 2019
3.6. Can students repeat the course for additional credit?
   ☑ Yes, total credit limit: __________ ☐ No

3.7. Will grade for this course be limited to S/U (pass/fail)?
   ☑ Yes ☐ No

3.8. Will section enrollment be capped?
   ☐ Yes, max per section: __________ ☑ No

3.9. 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 in Colleague and the Course Inventory Report?
   ☐ Yes ☑ No

3.10. Is this prefix approved for your university?
   ☑ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)

4.1. University Department Code: UBME/MNANO

4.2. Proposed CIP Code: 14.0501

Is this a new CIP code for the university? ☐ Yes ☑ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum. This course will cover methodological and practical aspects of the application of system analysis and computational tools to the solution of biological and biomedical problems.

2. Note whether this course is:  ☐ Required  ☒ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size  50

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s). Etienne Gnimpieba, Research Assistant Professor, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus?
   ☐ Yes  ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
Section 1. Course Title and Description

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 403</td>
<td>Cell Biomechanics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Course Description**

This course provides the fundamental principles and concepts of biomechanical forces that develop in the human body and how they influence cell functions in a range of biological processes. Discussions will include viscoelastic theories, applications, and methods for studying biomechanics at the cellular and molecular levels.

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

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Pre-Req/Co-Req?</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 321</td>
<td>Differential Equations</td>
<td>Pre-Req</td>
</tr>
<tr>
<td>BME 303</td>
<td>Introduction to Biomechanics</td>
<td>Pre-Req</td>
</tr>
</tbody>
</table>

Registration Restrictions N/A

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?

☐ Yes (if yes, provide the course information below) ☒ No

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

☒ Common Course

Indicate universities that are proposing this common course:

☐ BHSU ☐ DSU ☐ NSU ☒ SDSMT ☐ SDSU ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: R: Lecture

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site

3.5. Term change will be effective: Fall 2019
3.6. Can students repeat the course for additional credit?
☐ Yes, total credit limit: __________ ☒ No

3.7. Will grade for this course be limited to S/U (pass/fail)?
☐ Yes ☒ No

3.8. Will section enrollment be capped?
☐ Yes, max per section: __________ ☒ No

3.9. 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 in Colleague and the Course Inventory Report?
☐ Yes ☒ No

3.10. Is this prefix approved for your university?
☒ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)

4.1. University Department Code: UBME/MNANO

4.2. Proposed CIP Code: 14.0501

Is this a new CIP code for the university? ☐ Yes ☒ No
NEW COURSE REQUEST  
Supporting Justification for On-Campus Review

Request Originator  
Signature  
Date

Department Chair  
Signature  
Date

School/College Dean  
Signature  
Date

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum.
This course is an elective course for the Biomedical Engineering Degree. This course enhances the understanding of the biomechanics of living things, the forces generated by and acting on the human body. From the inner workings of a single cell to the mechanical behavior of bones, tissues and organs, this knowledge provides the foundation to advance health care.

2. Note whether this course is: ☐ Required  ☒ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size  20

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
Zhongkui Hong, Assistant Professor, PhD
Scott Wood, Assistant Professor, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course.
Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus?
☐ Yes  ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
Section 1. Course Title and Description

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 404</td>
<td>Biomedical Signal and Imaging</td>
<td>3</td>
</tr>
<tr>
<td>BME 404 L</td>
<td>Biomedical Signal and Imaging Lab</td>
<td>1</td>
</tr>
</tbody>
</table>

Course Description
Introduction to the application of signal and image processing methodologies and tools in the field of biomedical engineering. This course includes a hands-on laboratory component, and the students will have opportunity to operate state of the art biomedical imaging systems, such as inverted phase contrast microscopy and confocal laser scanning microscopy.

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

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Pre-Req/Co-Req?</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 170/L</td>
<td>Programming for Engineering and Science</td>
<td>Pre-Req</td>
</tr>
<tr>
<td>MATH 225</td>
<td>Differential Equations</td>
<td>Pre-Req</td>
</tr>
</tbody>
</table>

Registration Restrictions
Junior Level Standing

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?
☐ Yes (if yes, provide the course information below)
☒ No

2.2. Will this be a unique or common course?
☒ Common Course
   Indicate universities that are proposing this common course:
   ☐ BHSU  ☐ DSU  ☐ NSU  ☒ SDSMT  ☐ SDSU  ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?
☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: R: Lecture, L: Laboratory

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site

3.5. Term change will be effective: Fall 2019
3.6. **Can students repeat the course for additional credit?**
   - ☐ Yes, total credit limit: □ No
   - ☒ No

3.7. **Will grade for this course be limited to S/U (pass/fail)?**
   - ☐ Yes
   - ☒ No

3.8. **Will section enrollment be capped?**
   - ☒ Yes, max per section: 25
   - ☐ No

3.9. **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 in Colleague and the **Course Inventory Report**?**
   - ☐ Yes
   - ☒ No

3.10. **Is this prefix approved for your university?**
   - ☒ Yes
   - ☐ No

**Section 4. Department and Course Codes (Completed by University Academic Affairs)**

4.1. **University Department Code:** UBME/MNANO

4.2. **Proposed CIP Code:** 14.0501

   *Is this a new CIP code for the university?*
   - ☐ Yes
   - ☒ No
NEW COURSE REQUEST  
Supporting Justification for On-Campus Review

<table>
<thead>
<tr>
<th>Request Originator</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department Chair</td>
<td>Signature</td>
<td>Date</td>
</tr>
<tr>
<td>School/College Dean</td>
<td>Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum. 
   This course presents the fundamentals of signal and image processing with particular emphasis on problems in biomedical research and clinical medicine. Students will learn how to produce signals from samples, how to image them, and how to process the data they obtain.

2. Note whether this course is: ☒ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size   25

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   Zhongkui Hong, Assistant Professor, PhD
   Erin Harmon, GEAR Lab Manager, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus? ☒ No
   If yes, provide justification.

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
Section 1. Course Title and Description

Prefix & No. | Course Title | Credits |
---|---|---|
BME 405 | Cell and Tissue Engineering | 3 |
BME 405 L | Cell and Tissue Engineering Lab | 1 |

Course Description

This course will introduce students to the basic concept of Cell and Tissue Engineering. Cellular engineering focuses on cell based therapies, while tissue engineering and regenerative medicine seek to repair tissue damages by engineering strategies. Concepts will include applied cell and tissue engineering in stem cell and cell therapy, gene therapy, biomaterials, and drug delivery.

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

Prefix & No. | Course Title | Pre-Req/Co-Req? |
---|---|---|
BME 335 | Biomedical Technologies | Pre-Req |

Registration Restrictions

Junior Level Standing

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?
☐ Yes (if yes, provide the course information below) ☒ No

2.2. Will this be a unique or common course?
☒ Common Course

Indicate universities that are proposing this common course:

☐ BHSU ☐ DSU ☐ NSU ☒ SDSMT ☐ SDSU ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?
☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: R: Lecture, L: Laboratory

3.4. Proposed delivery method by university: 025/020 DDN Host/Send Site

3.5. Term change will be effective: Fall 2019
3.6. Can students repeat the course for additional credit?
☐ Yes, total credit limit: __________ ☒ No

3.7. Will grade for this course be limited to S/U (pass/fail)?
☐ Yes ☒ No

3.8. Will section enrollment be capped?
☒ Yes, max per section: 25 ☐ No

3.9. 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 in Colleague and the Course Inventory Report?
☐ Yes ☒ No

3.10. Is this prefix approved for your university?
☒ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)
4.1. University Department Code: UBME/MNANO
4.2. Proposed CIP Code: 14.0501

Is this a new CIP code for the university? ☐ Yes ☒ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum. The objective of this course is for students to understand cell and tissue engineering strategies and components, both in theory and in practice.

2. Note whether this course is: ☐ Required ☒ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size 25

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   Hongli Sun, Assistant Professor, PhD
   Berit Foss, Quality Assurance Manager, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus?
   ☐ Yes ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.

Curriculum Forms, New Course Request (Last Revised 01/2017)
Page 3 of 3
Section 1. Course Title and Description

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 463</td>
<td>Biomedical Engineering Laboratory</td>
<td>1</td>
</tr>
</tbody>
</table>

Course Description

This laboratory will introduce students to fundamental topics in bioinstrumentation and imaging, focused on the acquisition and monitoring of biomarkers and vital signs. Basic principles for the selection and appropriate use of instruments for solving bioengineering and medical problems such as cell culture, immunoassays, microscopy, electrocardiograms, and ultrasound, among others, are addressed.

Pre-requisites or Co-requisites N/A

Registration Restrictions

Senior Level Standing.

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?

☐ Yes (if yes, provide the course information below)  ☒ No

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

☒ Common Course  Indicate universities that are proposing this common course:

☐ BHSU  ☐ DSU  ☐ NSU  ☒ SDSMT  ☐ SDSU  ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: J-Design/Research

3.4. Proposed delivery method by university: 030 Blended/Hybrid

3.5. Term change will be effective: Fall 2019

3.6. Can students repeat the course for additional credit?

☐ Yes, total credit limit:  ___________  ☒ No
3.7. Will grade for this course be limited to S/U (pass/fail)?
   ☐ Yes  ☒ No

3.8. Will section enrollment be capped?
   ☒ Yes, max per section: 25  ☐ No

3.9. 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 in Colleague and the Course Inventory Report?
   ☐ Yes  ☒ No

3.10. Is this prefix approved for your university?
   ☒ Yes  ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)
4.1. University Department Code: UBME/MNANO
4.2. Proposed CIP Code: 14.0501
   Is this a new CIP code for the university? ☐ Yes  ☒ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

Request Originator

Signature

Date

Department Chair

Signature

Date

School/College Dean

Signature

Date

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum.
   This course introduces students to fundamental topics in bioinstrumentation and imaging, focused on the acquisition and monitoring of biomarkers and vital signs. This course shows the application of bioinstrumentation and imaging that BME 101 introduces.

2. Note whether this course is: ☒ Required ☐ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size 25

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   Timothy Brenza, Assistant Professor, PhD
   Scott Wood, Assistant Professor, PhD
   Grant Crawford, Associate Professor, PhD
   Adam Piper, Associate Professor, PhD
   Daniel Engebretson, Department Chair, PhD
   Erin Harmon, GEAR Lab Manager, PhD
   Ying Deng, Associate Professor, PhD
   Etienne Gnimpieba, Research Assistant Professor, PhD
   Zhongkui Hong, Assistant Professor, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available. Special equipment needed will include [whatever instruments we decide to list in the course description that we don’t have already].

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus?
   ☐ Yes ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS

New Course Request

<table>
<thead>
<tr>
<th>Institution</th>
<th>Biomedical Engineering/Nanoscience &amp; Nanoengineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD/SDSM&amp;T</td>
<td>USD 9/10/2018 Elizabeth M. Freeburg SDSM&amp;T Senate 10/11/18</td>
</tr>
</tbody>
</table>

Institutional Approval Signature

Section 1. Course Title and Description

<table>
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<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>BME 464</td>
<td>Biomedical Engineering Senior Design I</td>
<td>3</td>
</tr>
</tbody>
</table>

**Course Description**

This course is the capstone course in Biomedical Engineering. Students will learn the engineering design process by applying knowledge and skills acquired in the undergraduate curriculum to devise a system, component, or process of biomedical engineering relevance to meet desired needs and specifications within constraints. Students will learn project management and technical communication skills. Students will prepare a design proposal, provide oral project updates, and prepare a final project report. Students will work in teams.

Pre-requisites or Co-requisites N/A

Registration Restrictions

Senior Level Standing.

Section 2. Review of Course

2.1. **Was the course first offered as an experimental course?**

☐ Yes (if yes, provide the course information below) ☒ No

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

☒ Common Course

Indicate universities that are proposing this common course:

☐ BHSU ☐ DSU ☐ NSU ☒ SDSMT ☐ SDSU ☒ USD

Section 3. Other Course Information

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

☒ No. Schedule Management, explain: Use available FTE.

3.2. **Existing program(s) in which course will be offered:** Biomedical Engineering, B.S.

3.3. **Proposed instructional method by university:** J-Design/Research

3.4. **Proposed delivery method by university:** 030 Blended/Hybrid

3.5. **Term change will be effective:** Fall 2019

3.6. **Can students repeat the course for additional credit?**

☐ Yes, total credit limit: ☒ No

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

☐ Yes ☒ No
3.8. Will section enrollment be capped?
☒ Yes, max per section: 25 ☐ No

3.9. 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 in Colleague and the Course Inventory Report?
☐ Yes ☒ No

3.10. Is this prefix approved for your university?
☒ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)

4.1. University Department Code: UBME/MNANO

4.2. Proposed CIP Code: 14.0501

Is this a new CIP code for the university? ☐ Yes ☒ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

Request Originator

Signature

Date

Department Chair

Signature

Date

School/College Dean

Signature

Date

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum.
   This course is the first course in the capstone design course sequence in the Biomedical Engineering Department. Students will work in teams to solve biomedical problems through research, design, and produce a prototype.

2. Note whether this course is: ☒ Required ☐ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size 25

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   Timothy Brenza, Assistant Professor, PhD
   Etienne Gnimpieba, Research Assistant Professor, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus?
   ☐ Yes ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
   This course brings together many concepts introduced in the undergraduate curriculum. The course will prioritize industry design projects and will focus on building relationships with regional and national industry partners. This effort will enrich the student design experience, improve our relationship with industry partners, and facilitate student placement by providing new internship and full-time job opportunities.
SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS

New Course Request

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Institutional Approval Signature

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</thead>
<tbody>
<tr>
<td>BME 465</td>
<td>Biomedical Engineering Senior Design II</td>
<td>3</td>
</tr>
</tbody>
</table>

A continuation of the Biomedical Engineering design sequence. Students will provide oral project updates, prepare a final technical design report, and participate in a Design Fair, including preparation of appropriate display material for the Design Fair.

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

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Pre-Req/Co-Req?</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 464</td>
<td>Senior Design I</td>
<td>Pre-Req</td>
</tr>
</tbody>
</table>

Registration Restrictions N/A

Section 2. Review of Course

2.1. Was the course first offered as an experimental course?

☐ Yes (if yes, provide the course information below) ☒ No

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

☒ Common Course

Indicate universities that are proposing this common course:

☐ BHSU ☐ DSU ☐ NSU ☒ SDSMT ☐ SDSU ☒ USD

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

☒ No. Schedule Management, explain: Use available FTE.

3.2. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

3.3. Proposed instructional method by university: J-Design/Research

3.4. Proposed delivery method by university: 030 Blended/Hybrid

3.5. Term change will be effective: Fall 2019

3.6. Can students repeat the course for additional credit?

☐ Yes, total credit limit: ________ ☒ No
3.7. Will grade for this course be limited to S/U (pass/fail)?
   ☐ Yes ☒ No

3.8. Will section enrollment be capped?
   ☒ Yes, max per section: 25 ☐ No

3.9. 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 in Colleague and the Course Inventory Report?
   ☐ Yes ☒ No

3.10. Is this prefix approved for your university?
   ☒ Yes ☐ No

Section 4. Department and Course Codes (Completed by University Academic Affairs)
4.1. University Department Code: UBME/MNANO
4.2. Proposed CIP Code: 14.0501

Is this a new CIP code for the university? ☐ Yes ☒ No
NEW COURSE REQUEST
Supporting Justification for On-Campus Review

Request Originator ______________________ Signature ______________________ Date

Department Chair ______________________ Signature ______________________ Date

School/College Dean ______________________ Signature ______________________ Date

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum.
   This course is part II of the capstone design course in the Biomedical Engineering Department. Students will work in teams to solve biomedical problems through research, design, and produce a prototype.

2. Note whether this course is: ☒ Required ☐ Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course? None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made. Not Applicable.

5. Desired section size 25

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
   Timothy Brenza, Assistant Professor, PhD
   Etienne Gnimpieba, Research Assistant Professor, PhD

7. Note whether adequate facilities are available and list any special equipment needed for the course. Adequate Facilities are available.

8. Note whether adequate library and media support are available for the course. Adequate library and media support are available.

9. Will the new course duplicate courses currently being offered on this campus?
   ☐ Yes ☒ No

10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined. N/A

11. Add any additional comments that will aid in the evaluation of this request.
   This course brings together many concepts introduced in the undergraduate curriculum. The course will prioritize industry design projects and will focus on building relationships with regional and national industry partners. This effort will enrich the student design experience, improve our relationship with industry partners, and facilitate student placement by providing new internship and full-time job opportunities.
### Section 1. Existing Course Title and Description

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</thead>
<tbody>
<tr>
<td>ISCI 335/335L</td>
<td>Biomedical Technologies/Lab</td>
<td>3/1</td>
</tr>
</tbody>
</table>

#### Course Description

Disease models (animal and organoid) and host of cell and molecular biology techniques are routinely used in biomedical research. In this course students will learn how to develop protocols for working with animals as well as PCR, ELISA that comply with Good Laboratory Practices.

[LAB: Laboratory to accompany ISCI 335.]

### Section 2. Modification(s) Requested

2.1. This modification will include:

- **Pre-requisites**
  - Current: ISCI 215
  - New: ISCI 225 or (BIOL151 + CHEM 114)

- **Cross-listing and equating with**
  - BME 335/BME 335L

- **Change delivery method**
  - 001-Face to face
  - New: 001-Face to face, 020/025 DDN Host/Receive

**Effective term of the change:** 1/1/2019

2.2. **Add justification for all changes noted above:**

The reason ISCI 215 was initially listed as a pre-requisite was to prepare the students in the associate’s degree program for the course. In order to make the course accessible to students in the Biomedical Engineering Bachelor’s Degree Program, the pre-requisites will be changed to include ISCI 225: Integrated Science III OR BIOL151 and CHEM 114. The associate’s degree program in Integrated Science will not be affected by this change in pre-requisite as the ISCI 215 will still be included in their curriculum.

New Biomedical Engineering Program will utilize this course in the undergraduate program, and for accreditation purposes will need this course to be listed in with the BME prefix.

### Section 3. Other Course Information

Will this course equate with any other unique or common courses in the common course database (Course Inventory Report)? No, authority to offer processing

### Section 4. Department and Course Codes (Completed by University Academic Affairs)

<table>
<thead>
<tr>
<th>Current</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in University Department Code</td>
<td>Change in CIP Code</td>
</tr>
<tr>
<td>UBME</td>
<td>UBME/MNANO</td>
</tr>
<tr>
<td>41.0301</td>
<td>N/A</td>
</tr>
</tbody>
</table>
SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS
Revised Course Request: Common Course
(Subtitle: Substantive Modifications)

USD
Dan Engebretson
Institution
Form Initiator
Nanoscience & Nanoengineering

SDSM&T
Nanoscience & Nanoengineering
Dean’s Approval Signature
SDSM&T Senate 10/11/18
Date
10/11/18

USD
Nanoscience & Nanoengineering
Division/Department
Dan Engebretson

Institution
Division/Department
Institutional Approval Signature
Elizabeth M. Freeburg
Date
9/10/18

Indicate universities that currently offer the common course:
☐ BHSU ☐ DSU ☐ NSU ☒ SDSMT ☐ SDSU ☒ USD

Section 1. Existing Course Title and Description

Prefix & No. | Course Title | Credits
--- | --- | ---
MET 232 | Properties of Materials | 3

Course Description
A course in engineering materials and their applications. The different technological uses of metals, ceramics, plastics, and composite materials are discussed and explained in terms of their basic atomic structure, and mechanical, thermal, optical, electrical, and magnetic properties. Material selection in engineering design is emphasized.

Section 2. Modification(s) Requested

2.1. This modification will include:
- ☒ Pre-requisites
  - Current: MATH 123 and CHEM 112
  - New: MATH 123; CHEM 112/L or ISCI 153/L
- ☒ Cross-listing and equating with
  - BME 232
- ☒ Change delivery method
  - 001-Face to face
  - New: 001-Face to face, 020/025 DDN Host/Receive

Effective term of the change: 1/1/2019

2.2. Add justification for all changes noted above:
ISCI 153/153L prerequisite will allow USD students to complete this course without additional hours. This prerequisite is already an approved prerequisite for organic chemistry.

New Biomedical Engineering Program will utilize this course in the undergraduate program, and for accreditation purposes will need this course to be listed in with the BME prefix.

Section 3. Other Course Information
Will this course equate with any other unique or common courses in the common course database (Course Inventory Report)? No, authority to offer processing

Section 4. Department and Course Codes (Completed by University Academic Affairs)

- ☒ Change in University Department Code
  - Current: MMET
  - New: MMET/UBME
- ☐ Change in CIP Code
  - Current: 14.2001
  - New: N/A
The MET department has agreed to the course modification to the pre-requisite requirements of MET 232 listed below. This will be submitted to the next CCM (Curriculum Committee Meeting) at SDSM&T.

Regards,
Timothy M. Brenza, PhD
Assistant Professor
CHEMICAL & BIOLOGICAL ENGINEERING
at SDSM&T
501 E. Saint Joseph St.
CBEC 2202B
Rapid City, SD 57701
605.394.1766
Timothy.Brenza@sdsmt.edu

From: Kouris, Demitris A.
Sent: Friday, August 31, 2018 8:24 AM
To: Freeburg, Beth M <beth.freeburg@usd.edu>
Cc: Foss, Beri Linnehan <berit.foss@usd.edu>; Engebretson, Daniel S <daniel.engebretson@usd.edu>; Leitru, Tammy R <tammy.leitru@usd.edu>; Brenza, Timothy M. <Timothy.Brenza@sdsmt.edu>
Subject: Re: USD BME: Met 232

Beth,
I am copying Tim Brenza so he can answer.

Demitris Kouris
Provost and VPAA
SD Mines

On Aug 31, 2018, at 8:12 AM, Freeburg, Beth M <Beth.Freeburg@usd.edu> wrote:

Good morning Demitris,

I am working with the USD-BME department on campus. We will have the joint BME undergraduate program on our upcoming university level C&I committee on September 10th. One outstanding question is if we could add ISCI 153 plus laboratory to the MET 232 pre-requisite requirements. USD is already able to use this course as a pre-requisite to our common organic chemistry course. May the pre-requisites for MET 232 include: MATH 123; CHEM 112 and 112L or ISCI 153 and 153L?

Thanks for your help and collaboration!
Beth

Elizabeth McKay Freeburg, Ed.S., Ph.D.
Associate Provost
University of South Dakota
414 East Clark Street, Slagle Hall 102
Vermillion, SD 57069
(605) 677-5317
Fax: (605)677-6651
1. Is this a request to offer an existing common course or an existing unique course (approval will change course status from unique to common)?

   Unique Course ☒

2. Provide the complete description as it appears in the system database including pre-requisites and co-requisites.

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 101/101L</td>
<td>Intro/Biomedical Engineering/Lab</td>
<td>1/1</td>
</tr>
</tbody>
</table>

   Course Description
   An introduction to biomedical engineering that includes lectures and hands-on laboratory design projects. The principles of problem definition, engineering inventiveness, team design, prototyping, and testing, as well as information access, engineering standards, communication, ethics, and social responsibility will be emphasized.

   Pre-requisites or Co-requisites
<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Pre-req</th>
<th>Co-req</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 123</td>
<td>Calculus</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3. Universities currently offering this course:
   ☐ BHSU ☐ DSU ☐ NSU ☐ SDSMT ☒ SDSU ☒ USD

4. Does Offering the Course Create FTE Implications? No, receive DDN from USD host site.

5. Does Offering the Course Create Schedule Management Implications? Yes
   Explain: SDSMT will need to work with USD to ensure DDN time and location are availability.

6. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

7. CIP Code for the course: 14.0501

8. Proposed instructional method by this university: D-Discussion/Recitation

9. Proposed delivery method by this university: 020/025 DDN Receive Site/Host


11. Authority to offer effective beginning in what term? Fall 2019

12. Section Restriction: 25
1. Is this a request to offer an existing common course or an existing unique course (approval will change course status from unique to common)?
   - Common Course ☒

2. Provide the complete description as it appears in the system database including pre-requisites and co-requisites.

<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM 214</td>
<td>Statics</td>
<td>3</td>
</tr>
</tbody>
</table>

   **USD course number created as BME 214**

   Course Description
   - The study of the effects of external forces acting on stationary rigid bodies in equilibrium. Vector algebra is used to study two and three dimensional systems of forces. Trusses, frames and machines, shear and moment in beams, friction, centroids, moments of inertia, and mass moments of inertia are discussed.

   Pre-requisites or Co-requisites
<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Pre-req</th>
<th>Co-req</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 123</td>
<td>Calculus I</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

3. Universities currently offering this course:
   - ☐ BHSU
   - ☐ DSU
   - ☐ NSU
   - ☒ SDSMT
   - ☒ SDSU
   - ☐ USD

4. Does Offering the Course Create FTE Implications? No, receive DDN from SDSMT host site.

5. Does Offering the Course Create Schedule Management Implications? Yes

   **Explain:** USD will need to work with SDSMT to ensure DDN time is available for the course.

6. Existing program(s) in which course will be offered: Biomedical Engineering

7. CIP Code for the course: 14.1101

8. Proposed instructional method by this university: D-Discussion/Recitation; R-Lecture

9. Proposed delivery method by this university: 020/025 DDN Receive Site/Host

10. University Dept. Code: UBME/MCEE

11. Authority to offer effective beginning in what term? Fall 2019

12. Section Restriction: 25
**SOUTH DAKOTA BOARD OF REGENTS**  
**ACADEMIC AFFAIRS FORMS**  
**Authority to Offer an Existing Course**

<table>
<thead>
<tr>
<th>Institution</th>
<th>Biomedical Engineering/Nanoscience &amp; Nanoengineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD/SDSM&amp;T</td>
<td></td>
</tr>
</tbody>
</table>

**Institution**  
**Division/Department**  
USD 9/10/2018 *Elizabeth M. Freeburg* SDSM&T Senate 10/11/18  
**Institutional Approval Signature**  
**Date**  

1. Is this a request to offer an existing common course or an existing unique course (approval will change course status from unique to common)?  
   Unique Course ☒

2. Provide the complete description as it appears in the system database including pre-requisites and co-requisites.
   
<table>
<thead>
<tr>
<th>Prefix &amp; No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IENG 301</td>
<td>Basic Engineering Economics</td>
<td>2</td>
</tr>
</tbody>
</table>

   **USD course number created as BME 301**

   **Course Description**  
   Introduces the concepts of economic evaluation regarding capital investments, including the time value of money and income tax effects. Graduation credit cannot be given for both IENG 301 and IENG 302.

   **Pre-requisites or Co-requisites-N/A**

3. Universities currently offering this course:  
   ☐ BHSU ☐ DSU ☐ NSU ☒ SDSMT ☐ SDSU ☐ USD

4. Does Offering the Course Create FTE Implications?  
   No, receive DDN from SDSMT host site.

5. Does Offering the Course Create Schedule Management Implications? Yes  
   **Explain:** USD will need to work with SDSMT to ensure DDN time is available for the course.

6. Existing program(s) in which course will be offered:  
   Biomedical Engineering, B.S.

7. CIP Code for the course:  
   45.0699

8. Proposed instructional method by this university:  
   D-Discussion/Recitation

9. Proposed delivery method by this university:  
   020/025 DDN Receive Site/Host

10. University Dept. Code:  
    MIE/UBME

11. Authority to offer effective beginning in what term?  
    Fall 2019

12. Section Restriction:  
    25
1. Is this a request to offer an existing common course or an existing unique course (approval will change course status from unique to common)?
   Unique Course ☒

2. Provide the complete description as it appears in the system database including pre-requisites and co-requisites.

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<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISCI 335/335L</td>
<td>Biomedical Technologies/Lab</td>
<td>3/1</td>
</tr>
</tbody>
</table>

   **Course Description**
   Disease models (animal and organoid) and host of cell and molecular biology techniques are routinely used in biomedical research. In this course students will learn how to develop protocols for working with animals as well at PCR, ELISA that comply with Good Laboratory Practices. [LAB: Laboratory to accompany ISCI 335.]

   **Pre-requisites or Co-requisites**

<table>
<thead>
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<th>Pre-req</th>
<th>Co-req</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISCI 215</td>
<td>Good Laboratory Practices</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

3. Universities currently offering this course:
   ☐ BHSU ☐ DSU ☐ NSU ☐ SDSMT ☐ SDSU ☒ USD

4. Does Offering the Course Create FTE Implications? No, this course is offered in the Integrated Science curriculum.

5. Does Offering the Course Create Schedule Management Implications? Yes
   Explain: SDSMT will need to work with USD to ensure DDN time and location are available.

6. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.

7. CIP Code for the course: 41.0301

8. Proposed instructional method by this university: D-Discussion/Recitation

9. Proposed delivery method by this university: 020/025 DDN Receive Site/Host


11. Authority to offer effective beginning in what term? Fall 2019

12. Section Restriction: 25
1. Is this a request to offer an existing common course or an existing unique course (approval will change course status from unique to common)?
   - Unique Course ☒

2. Provide the complete description as it appears in the system database including pre-requisites and co-requisites.

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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MET 232</td>
<td>Properties of Materials</td>
<td>3</td>
</tr>
</tbody>
</table>

   **USD course number created as BME 232**

   **Course Description**
   A course in engineering materials and their applications. The different technological uses of metals, ceramics, plastics, and composite materials are discussed and explained in terms of their basic atomic structure, and mechanical, thermal, optical, electrical, and magnetic properties. Material selection in engineering design is emphasized.

   **Pre-requisites or Co-requisites**
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<tbody>
<tr>
<td>Math 123</td>
<td>Calculus I</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemistry I/L or ISCI 153/L for USD*</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

   *Pending Revised common course form to update this prerequisite submitted at the same time.

3. Universities currently offering this course:
   - ☐ BHSU
   - ☐ DSU
   - ☐ NSU
   - ☒ SDSMT
   - ☐ SDSU
   - ☐ USD

4. Does Offering the Course Create FTE Implications? No, receive DDN from SDSMT host site.

5. Does Offering the Course Create Schedule Management Implications? Yes
   **Explain:** USD will need to work with SDSMT to ensure DDN time is available for the course.

6. Existing program(s) in which course will be offered: Biomedical Engineering, B.S.


8. Proposed instructional method by this university: D-Discussion/Recitation

9. Proposed delivery method by this university: 020/025 DDN Receive Site/Host

10. University Dept. Code: UBME/MMET

11. Authority to offer effective beginning in what term? Fall 2019

12. Section Restriction: 25
The MET department has agreed to the course modification to the pre-requisite requirements of MET 232 listed below. This will be submitted to the next CCM (Curriculum Committee Meeting) at SDSM&T.

Regards,

Timothy M. Brenza, PhD
Assistant Professor
CHEMICAL & BIOLOGICAL ENGINEERING
at SDSM&T
501 E. Saint Joseph St.
CBEC 2202B
Rapid City, SD 57701
605.394.1766
Timothy.Brenza@sdsmt.edu

From: Kouris, Demitris A.
Sent: Friday, August 31, 2018 8:24 AM
To: Freeburg, Beth M <beth.freeburg@usd.edu>
Cc: Foss, Berit Linnehan <berit.foss@usd.edu>; Engebretson, Daniel S <daniel.engebretson@usd.edu>; Leitru, Tammy R <tammy.leitru@usd.edu>; Brenza, Timothy M. <Timothy.Brenza@sdsmt.edu>
Subject: Re: USD BME: Met 232

Beth,
I am copying Tim Brenza so he can answer.

Demitris Kouris
Provost and VPAA
SD Mines

On Aug 31, 2018, at 8:12 AM, Freeburg, Beth M <Beth.Freeburg@usd.edu> wrote:

Good morning Demitris,

I am working with the USD-BME department on campus. We will have the joint BME undergraduate program on our upcoming university level C&I committee on September 10th. One outstanding question is if we could add ISCI 153 plus laboratory to the MET 232 pre-requisite requirements. USD is already able to use this course as a pre-requisite to our common organic chemistry course. May the pre-requisites for MET 232 include: MATH 123; CHEM 112 and 112L or ISCI 153 and 153L?

Thanks for your help and collaboration!
Beth

Elizabeth McKay Freeburg, Ed.S., Ph.D.
Associate Provost
University of South Dakota
414 East Clark Street, Slagle Hall 102
Vermillion, SD 57069
(605) 677-5317
Fax: (605)677-6651

Curriculum Forms, Authority to Offer an Existing Course (last revised 08/2016) Page 2 of 2