Chair: Tracy Christofero | **GC#7: Course Change**

# Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Medicine | Dept/Division: Biomedical Research | Current Alpha Designator/Number: BMS 628

Contact Person: Todd Green, PhD | Phone: 6-3531

**CURRENT COURSE DATA:**

Course Title: Neuroscience I - MS

Alpha Designator/Number: B M S 6 2 8

Title Abbreviation: N E U R O S C I E N C E I

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date 3/27/18 |
| Registrar 2601-02 | Date 3-30-18 |
| College Curriculum Chair Todd L. Green | Date 3/27/18 |
| Graduate Council Chair TChristofero | Date 5/15/18 |

# Request for Graduate Course Change - Page 2

College: Medicine | Department/Division: Biomedical Research | Alpha Designator/Number: BMS 628

Provide complete information regarding the course change for each topic listed below.

**Change in CATALOG TITLE:** ☐ YES ☒ NO

From (limited to 30 characters and spaces)

To

If Yes, Rationale

**Change in COURSE ALPHA DESIGNATOR:**

From: B M S To: B M R ☒ YES ☐ NO

If Yes, Rationale: The MS program name has been changed from BMS (Biomedical Sciences) to BMR (Biomedical Research).

**Change in COURSE NUMBER:** ☐ YES ☒ NO

From: To:

If Yes, Rationale

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale

**Change in CATALOG DESCRIPTION:** ☐ YES ☒ NO IF YES, fill in below:

From

To

If Yes Rationale

# Request for Graduate Course Change - Page 3

**Change in COURSE CREDIT HOURS:** ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

**Change in COURSE CONTENT:** ☐ YES ☒ NO

From

To

Rationale

# Request for Graduate Course Change-Page 4

College: Medicine

Department: Biomedical Research

Course Number/Title BMS 628/Neuroscience I - MS

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

# Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

| COURSE DESCRIPTION CHANGE | COURSE NUMBER CHANGE | COURSE TITLE CHANGE |
|---|---|---|
| Department: | Department: | Department: |
| Course Number and Title: | Current Course Number/Title: | Current Course Number/Title: |
| Rationale: | New Course Number: | New Course Title: |
| Course Description (old) | Rationale: | Rationale: |
| Course Description: (new) | Catalog Description: | Catalog Description: |
| Catalog Description: | Credit hours: | |

COURSE ALPHA DESIGNATOR CHANGE
Department: Biomedical Research
Current Course Number/Title: BMS 628/Neuroscience I - MS
New Course Number: BMR 628
Rationale: The name of the MS program has been changed from BMS (Biomedical Sciences) to Biomedical Research (BMR).
Catalog Description: To study and understand the structure and function of the nervous system and disorders of neuronal function.
Credit Hours: 3

Chair: Tracy Christofero | **GC#7: Course Change**

# Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Medicine Dept/Division: Biomedical Research Current Alpha Designator/Number: BMS 629

Contact Person: Todd Green, PhD Phone: 6-3531

**CURRENT COURSE DATA:**

Course Title: Neuroscience II - MS

Alpha Designator/Number: B M S 6 2 9

Title Abbreviation: N E U R O S C I E N C E I I

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date 3/27/18 |
| Registrar Sonja G Cox 260102 | Date 3.30.18 |
| College Curriculum Chair Todd L. Green | Date 3/27/18 |
| Graduate Council Chair T Christofero | Date 5/15/18 |

# Request for Graduate Course Change - Page 2

College: Medicine | Department/Division: Biomedical Research | Alpha Designator/Number: BMS 629

Provide complete information regarding the course change for each topic listed below.

**Change in CATALOG TITLE:** ☐ YES ☒ NO

From ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ (limited to 30 characters and spaces)

To ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

If Yes, Rationale

**Change in COURSE ALPHA DESIGNATOR:**

From: B M S ☐ To B M R ☐ ☒ YES ☐ NO

If Yes, Rationale The MS program name has been changed from BMS (Biomedical Sciences) to BMR (Biomedical Research).

**Change in COURSE NUMBER:** ☐ YES ☒ NO

From: ☐☐☐☐ To: ☐☐☐☐

If Yes, Rationale

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale

**Change in CATALOG DESCRIPTION:** ☐ YES ☒ NO IF YES, fill in below:

From

To

If Yes Rationale

# Request for Graduate Course Change - Page 3

**Change in COURSE CREDIT HOURS:** ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

**Change in COURSE CONTENT:** ☐ YES ☒ NO

From

To

Rationale

# Request for Graduate Course Change-Page 4

College: Medicine

Department: Biomedical Research

Course Number/Title BMS 629/Neuroscience II - MS

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

# Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

| COURSE DESCRIPTION CHANGE | COURSE NUMBER CHANGE | COURSE TITLE CHANGE |
|---|---|---|
| Department: | Department: | Department: |
| Course Number and Title: | Current Course Number/Title: | Current Course Number/Title: |
| Rationale: | New Course Number: | New Course Title: |
| Course Description (old) | Rationale: | Rationale: |
| Course Description: (new) | Catalog Description: | Catalog Description: |
| Catalog Description: | Credit hours: | |

COURSE ALPHA DESIGNATOR CHANGE
Department: Biomedical Research
Current Course Number/Title: BMS 629/Neuroscience II - MS
New Course Number: BMR 629
Rationale: The name of the MS program has been changed from BMS (Biomedical Sciences) to Biomedical Research (BMR).
Catalog Description: To study and understand the structure and function of the nervous system and disorders of neuronal function.
Credit Hours: 3

Chair: Tracy Christofero | **GC#7: Course Change**

# Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Medicine | Dept/Division: Biomedical Research | Current Alpha Designator/Number: BMS 631

Contact Person: Todd Green, PhD | Phone: 6-3531

**CURRENT COURSE DATA:**

Course Title: Neuroscience and Developmental Biology Literature Review - MS

Alpha Designator/Number: B M S 6 3 1

Title Abbreviation: N E U R O S C I / D E V B I O L I T R E V

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date 3/27/18 |
| Registrar 240162 | Date 3-30-18 |
| College Curriculum Chair | Date 3/27/18 |
| Graduate Council Chair Christofero | Date 5/15/18 |

# Request for Graduate Course Change - Page 2

College: Medicine | Department/Division: Biomedical Research | Alpha Designator/Number: BMS 631

Provide complete information regarding the course change for each topic listed below.

**Change in CATALOG TITLE:** ☐ YES ☒ NO

From ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ (limited to 30 characters and spaces)

To ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

If Yes, Rationale

**Change in COURSE ALPHA DESIGNATOR:**

From: B M S ☐ To B M R ☐ ☒ YES ☐ NO

If Yes, Rationale The MS program name has been changed from BMS (Biomedical Sciences) to BMR (Biomedical Research).

**Change in COURSE NUMBER:** ☐ YES ☒ NO

From: ☐☐☐☐ To: ☐☐☐☐

If Yes, Rationale

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale

**Change in CATALOG DESCRIPTION:** ☐ YES ☒ NO IF YES, fill in below:

From

To

If Yes Rationale

# Request for Graduate Course Change - Page 3

**Change in COURSE CREDIT HOURS:** ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

**Change in COURSE CONTENT:** ☐ YES ☒ NO

From

To

Rationale

# Request for Graduate Course Change-Page 4

College: Medicine

Department: Biomedical Research

Course Number/Title BMS 631/Neuroscience and Developmental Biology Literature Review - MS

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

# Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

| COURSE DESCRIPTION CHANGE | COURSE NUMBER CHANGE | COURSE TITLE CHANGE |
|---|---|---|
| Department: | Department: | Department: |
| Course Number and Title: | Current Course Number/Title: | Current Course Number/Title: |
| Rationale: | New Course Number: | New Course Title: |
| Course Description (old) | Rationale: | Rationale: |
| Course Description: (new) | Catalog Description: | Catalog Description: |
| Catalog Description: | Credit hours: | |

COURSE ALPHA DESIGNATOR CHANGE
Department: Biomedical Research
Current Course Number/Title: BMS 631/Neuroscience and Developmental Biology Literature Review - MS
New Course Number: BMR 631
Rationale: The name of the MS program has been changed from BMS (Biomedical Sciences) to Biomedical Research (BMR).
Catalog Description: A seminar course where published articles in the fields of neuroscience and developmental biology will be presented by students and faculty.
Credit Hours: 1

Chair: Tracy Christofero | **GC#7: Course Change**

# Request for Graduate Course Change

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College: Medicine | Dept/Division: Biomedical Research | Current Alpha Designator/Number: BMS 641

Contact Person: Todd Green, PhD | Phone: 6-3531

**CURRENT COURSE DATA:**

Course Title: Molecular Developmental Biology - MS

Alpha Designator/Number: B M S 6 4 1

Title Abbreviation: M O L E C U L A R D E V E L O P M E N T

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
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5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date 3/27/18 |
| Registrar 260102 | Date 3-30-18 |
| College Curriculum Chair | Date |
| Graduate Council Chair | Date 5/15/18 |

# Request for Graduate Course Change - Page 2

College: Medicine | Department/Division: Biomedical Research | Alpha Designator/Number: BMS 641

Provide complete information regarding the course change for each topic listed below.

**Change in CATALOG TITLE:** ☐ YES ☒ NO

From ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ (limited to 30 characters and spaces)

To ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

If Yes, Rationale

**Change in COURSE ALPHA DESIGNATOR:**

From: B M S ☐ To B M R ☐ ☒ YES ☐ NO

If Yes, Rationale The MS program name has been changed from BMS (Biomedical Sciences) to BMR (Biomedical Research).

**Change in COURSE NUMBER:** ☐ YES ☒ NO

From: ☐☐☐☐ To: ☐☐☐☐

If Yes, Rationale

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale

**Change in CATALOG DESCRIPTION:** ☐ YES ☒ NO IF YES, fill in below:

From

To

If Yes Rationale

# Request for Graduate Course Change - Page 3

**Change in COURSE CREDIT HOURS:** ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

**Change in COURSE CONTENT:** ☐ YES ☒ NO

From

To

Rationale

# Request for Graduate Course Change-Page 4

College: Medicine

Department: Biomedical Research

Course Number/Title BMS 641/Molecular Developmental Biology - MS

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

# Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

| COURSE DESCRIPTION CHANGE | COURSE NUMBER CHANGE | COURSE TITLE CHANGE |
|---|---|---|
| Department: | Department: | Department: |
| Course Number and Title: | Current Course Number/Title: | Current Course Number/Title: |
| Rationale: | New Course Number: | New Course Title: |
| Course Description (old) | Rationale: | Rationale: |
| Course Description: (new) | Catalog Description: | Catalog Description: |
| Catalog Description: | Credit hours: | |

COURSE ALPHA DESIGNATOR CHANGE
Department: Biomedical Research
Current Course Number/Title: BMS 641/Molecular Developmental Biology - MS
New Course Number: BMR 641
Rationale: The name of the MS program has been changed from BMS (Biomedical Sciences) to Biomedical Research (BMR).
Catalog Description: An in-depth discussion of current literature in developmental biology with emphasis on early embryo development, morphogenesis, lineage determination and regulation of developmental processes.
Credit Hours: 3

Chair: Tracy Christofero | **GC#7: Course Change**

# Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Medicine | Dept/Division: Biomedical Research | Current Alpha Designator/Number: BMS 651

Contact Person: Todd Green, PhD | Phone: 6-3531

**CURRENT COURSE DATA:**

Course Title: Cancer Biology - MS

Alpha Designator/Number: B M S 6 5 1

Title Abbreviation: C A N C E R B I O L O G Y

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date 3/27/18 |
| Registrar Sonja L. Ca 260102 | Date 3-30-18 |
| College Curriculum Chair Todd L. Green | Date 3/27/18 |
| Graduate Council Chair TChristofero | Date 5/15/18 |

# Request for Graduate Course Change - Page 2

College: Medicine | Department/Division: Biomedical Research | Alpha Designator/Number: BMS 651

Provide complete information regarding the course change for each topic listed below.

**Change in CATALOG TITLE:** ☐ YES ☒ NO

From ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ (limited to 30 characters and spaces)

To ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

If Yes, Rationale

**Change in COURSE ALPHA DESIGNATOR:**

From: B M S ☐ To B M R ☐ ☒ YES ☐ NO

If Yes, Rationale The MS program name has been changed from BMS (Biomedical Sciences) to BMR (Biomedical Research).

**Change in COURSE NUMBER:** ☐ YES ☒ NO

From: ☐☐☐☐ To: ☐☐☐☐

If Yes, Rationale

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale

**Change in CATALOG DESCRIPTION:** ☒ YES ☐ NO IF YES, fill in below:

From An advanced graduate course on the core principles of initiation, progression, treatment and prevention of cancer, based on current literature. (PR:BMS 600, and permission of instructor)

To An advanced graduate course on the core principles of initiation, progression, treatment and prevention of cancer, based on current literature. (PR:BMR 601, 602, 603, 604, and permission of instructor)

If Yes Rationale BMS 600 is no longer taught, and BMR 601, 602, 603, and 604 have replaced it.

# Request for Graduate Course Change - Page 3

**Change in COURSE CREDIT HOURS:** ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

**Change in COURSE CONTENT:** ☐ YES ☒ NO

From

To

Rationale

# Request for Graduate Course Change-Page 4

College: Medicine

Department: Biomedical Research

Course Number/Title BMS 651/Cancer Biology - MS

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

# Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

| COURSE DESCRIPTION CHANGE | COURSE NUMBER CHANGE | COURSE TITLE CHANGE |
|---|---|---|
| Department: | Department: | Department: |
| Course Number and Title: | Current Course Number/Title: | Current Course Number/Title: |
| Rationale: | New Course Number: | New Course Title: |
| Course Description (old) | Rationale: | Rationale: |
| Course Description: (new) | Catalog Description: | Catalog Description: |
| Catalog Description: | Credit hours: | |

COURSE ALPHA DESIGNATOR CHANGE
Department: Biomedical Research
Current Course Number/Title: BMS 651/Cancer Biology - MS
New Course Number: BMR 651
Rationale: The name of the MS program has been changed from BMS (Biomedical Sciences) to Biomedical Research (BMR). BMS 600 is no longer taught, and BMR 601, 602, 603, and 604 have replaced it.
Catalog Description: An advanced graduate course on the core principles of initiation, progression, treatment and prevention of cancer, based on current literature. (PR:BMR 601, 602, 603, 604, and consent of instructor)
Credit Hours: 4

Chair: Tracy Christofero | **GC#7: Course Change**

# Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Medicine | Dept/Division: Biomedical Research | Current Alpha Designator/Number: BMS 652

Contact Person: Todd Green, PhD | Phone: 6-3531

**CURRENT COURSE DATA:**

Course Title: Cancer Biology Colloquium - MS

Alpha Designator/Number: B M S 6 5 2

Title Abbreviation: C A N C E R B I O L C O L L O Q U I U M

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date 3/27/18 |
| Registrar Sonya L Cates 260102 | Date 3-30-18 |
| College Curriculum Chair Todd L. Green | Date 3/27/18 |
| Graduate Council Chair TChristofero | Date 5/15/18 |

# Request for Graduate Course Change - Page 2

College: Medicine | Department/Division: Biomedical Research | Alpha Designator/Number: BMS 652

Provide complete information regarding the course change for each topic listed below.

**Change in CATALOG TITLE:** ☐ YES ☒ NO

From ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ (limited to 30 characters and spaces)

To ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

If Yes, Rationale

**Change in COURSE ALPHA DESIGNATOR:**

From: B M S ☐ To B M R ☐ ☒ YES ☐ NO

If Yes, Rationale The MS program name has been changed from BMS (Biomedical Sciences) to BMR (Biomedical Research).

**Change in COURSE NUMBER:** ☐ YES ☒ NO

From: ☐☐☐☐ To: ☐☐☐☐

If Yes, Rationale

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale

**Change in CATALOG DESCRIPTION:** ☐ YES ☒ NO IF YES, fill in below:

From

To

If Yes Rationale

# Request for Graduate Course Change - Page 3

**Change in COURSE CREDIT HOURS:** ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

**Change in COURSE CONTENT:** ☐ YES ☒ NO

From

To

Rationale

# Request for Graduate Course Change-Page 4

College: Medicine

Department: Biomedical Research

Course Number/Title BMS 652/Cancer Biology Colloquium - MS

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

# Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

| COURSE DESCRIPTION CHANGE | COURSE NUMBER CHANGE | COURSE TITLE CHANGE |
|---|---|---|
| Department: | Department: | Department: |
| Course Number and Title: | Current Course Number/Title: | Current Course Number/Title: |
| Rationale: | New Course Number: | New Course Title: |
| Course Description (old) | Rationale: | Rationale: |
| Course Description: (new) | Catalog Description: | Catalog Description: |
| Catalog Description: | Credit hours: | |

COURSE ALPHA DESIGNATOR CHANGE
Department: Biomedical Research
Current Course Number/Title: BMS 652/Cancer Biology Colloquium- MS
New Course Number: BMR 652
Rationale: The name of the MS program has been changed from BMS (Biomedical Sciences) to Biomedical Research (BMR).
Catalog Description: This is a mentored journal club for graduate students covering selected areas of current interest in cancer biology research.
Credit Hours: 1

Chair: Tracy Christofero | **GC#7: Course Change**

# Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Medicine | Dept/Division: Biomedical Research | Current Alpha Designator/Number: BMS 665

Contact Person: Todd Green, PhD | Phone: 6-3531

**CURRENT COURSE DATA:**

Course Title: Cardiovascular Disease, Obesity, Diabetes Research Colloquium - MS

Alpha Designator/Number: B M S 6 6 5

Title Abbreviation: C O D R C C O L L O Q U I U M

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date 3/27/18 |
| Registrar 260102 | Date 3-30-18 |
| College Curriculum Chair Todd L. Green | Date 3/27/18 |
| Graduate Council Chair JChristofero | Date 5/15/18 |

# Request for Graduate Course Change - Page 2

College: Medicine | Department/Division: Biomedical Research | Alpha Designator/Number: BMS 665

Provide complete information regarding the course change for each topic listed below.

**Change in CATALOG TITLE:** ☒ YES ☐ NO

From: CODRC COLLOQUIUM (limited to 30 characters and spaces)

To: CDRC COLLOQUIUM

If Yes, Rationale: Cardiovascular Disease has replaced Cardiovascular Disease, Obesity and Diabetes as an area of emphasis in the BMR MS Program.

**Change in COURSE ALPHA DESIGNATOR:**

From: BMS To: BMR ☒ YES ☐ NO

If Yes, Rationale: The MS program name has been changed from BMS (Biomedical Sciences) to BMR (Biomedical Research).

**Change in COURSE NUMBER:** ☐ YES ☒ NO

From: To:

If Yes, Rationale:

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale:

**Change in CATALOG DESCRIPTION:** ☒ YES ☐ NO IF YES, fill in below:

From: A seminar-style series that will focus on recent advances in topics related to cardiovascular disease, diabetes and obesity.

To: A seminar-style series that will focus on recent advances in topics related to cardiovascular disease.

If Yes Rationale: Cardiovascular Disease has replaced Cardiovascular Disease, Obesity and Diabetes as an area of emphasis in the BMR Program.

# Request for Graduate Course Change - Page 3

**Change in COURSE CREDIT HOURS:** ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

**Change in COURSE CONTENT:** ☐ YES ☒ NO

From

To

Rationale

# Request for Graduate Course Change-Page 4

College: Medicine

Department: Biomedical Research

Course Number/Title BMS 665/Cardiovascular Disease, Obesity, Diabetes Research Colloquium - MS

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

# Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

| COURSE DESCRIPTION CHANGE | COURSE NUMBER CHANGE | COURSE TITLE CHANGE |
|---|---|---|
| Department: | Department: | Department: |
| Course Number and Title: | Current Course Number/Title: | Current Course Number/Title: |
| Rationale: | New Course Number: | New Course Title: |
| Course Description (old) | Rationale: | Rationale: |
| Course Description: (new) | Catalog Description: | Catalog Description: |
| Catalog Description: | Credit hours: | |

COURSE ALPHA DESIGNATOR CHANGE
COURSE TITLE CHANGE
Department: Biomedical Research
Current Course Number/Title: BMS 665/Cardiovascular Disease, Obesity, Diabetes Research Colloquium - MS
New Course Number: BMR 665
Rationale: The name of the MS program has been changed from BMS (Biomedical Sciences) to Biomedical Research (BMR).
New Course Title: Cardiovascular Disease Research Colloquium - MS
Rationale: Cardiovascular Disease has replaced Cardiovascular Disease, Obesity and Diabetes as an area of emphasis in the BMR MS Program.
Catalog Description: A seminar-style series that will focus on recent advances in topics related to cardiovascular disease.
Credit Hours: 1

Chair: Tracy Christofero | **GC#7: Course Change**

# Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Medicine | Dept/Division: Biomedical Research | Current Alpha Designator/Number: BMS 674

Contact Person: Todd Green, PhD | Phone: 6-3531

**CURRENT COURSE DATA:**

Course Title: Teaching Practicum - MS

Alpha Designator/Number: B M S 6 7 4

Title Abbreviation: T E A C H I N G P R A C T I C U M

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date 3/27/18 |
| Registrar Sonya G Gen 260102 | Date 3·30-18 |
| College Curriculum Chair Todd L. Green | Date 3/27/18 |
| Graduate Council Chair TChristofero | Date 5/15/18 |

# Request for Graduate Course Change - Page 2

College: Medicine | Department/Division: Biomedical Research | Alpha Designator/Number: BMS 674

Provide complete information regarding the course change for each topic listed below.

**Change in CATALOG TITLE:** ☐ YES ☒ NO

From (limited to 30 characters and spaces)

To

If Yes, Rationale

**Change in COURSE ALPHA DESIGNATOR:**

From: BMS To BMR ☒ YES ☐ NO

If Yes, Rationale: The MS program name has been changed from BMS (Biomedical Sciences) to BMR (Biomedical Research).

**Change in COURSE NUMBER:** ☐ YES ☒ NO

From: To:

If Yes, Rationale

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale

**Change in CATALOG DESCRIPTION:** ☐ YES ☒ NO IF YES, fill in below:

From

To

If Yes Rationale

# Request for Graduate Course Change - Page 3

**Change in COURSE CREDIT HOURS:** ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

**Change in COURSE CONTENT:** ☐ YES ☒ NO

From

To

Rationale

# Request for Graduate Course Change-Page 4

College: Medicine

Department: Biomedical Research

Course Number/Title BMS 674/Teaching Practicum - MS

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

# Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

| COURSE DESCRIPTION CHANGE | COURSE NUMBER CHANGE | COURSE TITLE CHANGE |
|---|---|---|
| Department: | Department: | Department: |
| Course Number and Title: | Current Course Number/Title: | Current Course Number/Title: |
| Rationale: | New Course Number: | New Course Title: |
| Course Description (old) | Rationale: | Rationale: |
| Course Description: (new) | Catalog Description: | Catalog Description: |
| Catalog Description: | Credit hours: | |

COURSE ALPHA DESIGNATOR CHANGE
Department: Biomedical Research
Current Course Number/Title: BMS 674/Teaching Practicum - MS
New Course Number: BMR 674
Rationale: The name of the MS program has been changed from BMS (Biomedical Sciences) to Biomedical Research (BMR).
Catalog Description: Students gain experience in teaching using a variety of methods in a supervised setting.
Credit Hours: 1

Chair: Tracy Christofero | **GC#7: Course Change**

# Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Medicine | Dept/Division: Biomedical Research | Current Alpha Designator/Number: BMS 679

Contact Person: Todd Green, PhD | Phone: 6-3531

**CURRENT COURSE DATA:**

Course Title: Special Problems - MS

Alpha Designator/Number: B M S 6 7 9

Title Abbreviation: S P E C I A L P R O B L E M S

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date 3/27/18 |
| Registrar 260102 | Date 3.30.18 |
| College Curriculum Chair Todd L. Green | Date 3/27/18 |
| Graduate Council Chair T Christofero | Date 5/15/18 |

# Request for Graduate Course Change - Page 2

College: Medicine | Department/Division: Biomedical Research | Alpha Designator/Number: BMS 679

Provide complete information regarding the course change for each topic listed below.

**Change in CATALOG TITLE:** ☐ YES ☒ NO

From ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ (limited to 30 characters and spaces)

To ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

If Yes, Rationale

**Change in COURSE ALPHA DESIGNATOR:**

From: B M S ☐ To B M R ☐ ☒ YES ☐ NO

If Yes, Rationale The MS program name has been changed from BMS (Biomedical Sciences) to BMR (Biomedical Research).

**Change in COURSE NUMBER:** ☐ YES ☒ NO

From: ☐☐☐☐ To: ☐☐☐☐

If Yes, Rationale

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale

**Change in CATALOG DESCRIPTION:** ☐ YES ☒ NO IF YES, fill in below:

From

To

If Yes Rationale

# Request for Graduate Course Change - Page 3

**Change in COURSE CREDIT HOURS:** ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

**Change in COURSE CONTENT:** ☐ YES ☒ NO

From

To

Rationale

# Request for Graduate Course Change-Page 4

College: Medicine

Department: Biomedical Research

Course Number/Title BMS 679/Special Problems - MS

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

# Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

| COURSE DESCRIPTION CHANGE | COURSE NUMBER CHANGE | COURSE TITLE CHANGE |
|---|---|---|
| Department: | Department: | Department: |
| Course Number and Title: | Current Course Number/Title: | Current Course Number/Title: |
| Rationale: | New Course Number: | New Course Title: |
| Course Description (old) | Rationale: | Rationale: |
| Course Description: (new) | Catalog Description: | Catalog Description: |
| Catalog Description: | Credit hours: | |

COURSE ALPHA DESIGNATOR CHANGE
Department: Biomedical Research
Current Course Number/Title: BMS 679/Special Problems - MS
New Course Number: BMR 679
Rationale: The name of the MS program has been changed from BMS (Biomedical Sciences) to Biomedical Research (BMR).
Catalog Description: Intensive study of a selected topic or problem. Emphasizes independent study (PR: Consent of advisor)
Credit Hours: 1-3

Chair: Tracy Christofero | **GC#7: Course Change**

# Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Medicine | Dept/Division: Biomedical Research | Current Alpha Designator/Number: BMS 681

Contact Person: Todd Green, PhD | Phone: 6-3531

**CURRENT COURSE DATA:**

Course Title: Thesis - MS

Alpha Designator/Number: B M S 6 8 1

Title Abbreviation: T H E S I S

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date 3/27/18 |
| Registrar Sonya G Cox 240102 | Date 3-30-18 |
| College Curriculum Chair Todd L. Green | Date 3/27/18 |
| Graduate Council Chair TChristofero | Date 5/15/18 |

# Request for Graduate Course Change - Page 2

College: Medicine | Department/Division: Biomedical Research | Alpha Designator/Number: BMS 681

Provide complete information regarding the course change for each topic listed below.

**Change in CATALOG TITLE:** ☐ YES ☒ NO

From ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ (limited to 30 characters and spaces)

To ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

If Yes, Rationale

**Change in COURSE ALPHA DESIGNATOR:**

From: B M S ☐ To B M R ☐ ☒ YES ☐ NO

If Yes, Rationale The MS program name has been changed from BMS (Biomedical Sciences) to BMR (Biomedical Research).

**Change in COURSE NUMBER:** ☐ YES ☒ NO

From: ☐☐☐☐ To: ☐☐☐☐

If Yes, Rationale

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale

**Change in CATALOG DESCRIPTION:** ☐ YES ☒ NO IF YES, fill in below:

From

To

If Yes Rationale

# Request for Graduate Course Change - Page 3

**Change in COURSE CREDIT HOURS:** ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

**Change in COURSE CONTENT:** ☐ YES ☒ NO

From

To

Rationale

# Request for Graduate Course Change-Page 4

College: Medicine

Department: Biomedical Research

Course Number/Title BMS 681/Thesis - MS

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

# Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

| COURSE DESCRIPTION CHANGE | COURSE NUMBER CHANGE | COURSE TITLE CHANGE |
|---|---|---|
| Department: | Department: | Department: |
| Course Number and Title: | Current Course Number/Title: | Current Course Number/Title: |
| Rationale: | New Course Number: | New Course Title: |
| Course Description (old) | Rationale: | Rationale: |
| Course Description: (new) | Catalog Description: | Catalog Description: |
| Catalog Description: | Credit hours: | |

COURSE ALPHA DESIGNATOR CHANGE
Department: Biomedical Research
Current Course Number/Title: BMS 681/Thesis - MS
New Course Number: BMR 681
Rationale: The name of the MS program has been changed from BMS (Biomedical Sciences) to Biomedical Research (BMR).
Catalog Description:
Credit Hours: 1-6

Chair: Tracy Christofero | **GC#3: Intent to Plan**

# Graduate Intent to Plan--Major or Degree

NOTE: This "Intent to Plan" form must be submitted and go through the approval process BEFORE you submit the form titled, "Request for Graduate Addition, Deletion or Change of a Major or Degree." For detailed information on new programs please see: http://wvhepcdoc.wvnet.edu/resources/133-11.pdf.

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one PDF copy without signatures to the Graduate Council Chair. If attachments are included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: CITE

Dept/Division: Computer Science

Contact Person: Wook-Sung Yoo

Phone: x5452

New Degree Program Cybersecurity

Effective Term/Year  Fall 20 [18]  Spring 20 [ ]  Summer 20 [ ]

***Information on the following pages must be completed before signatures are obtained.***

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date March 26, '18 |
| College Curriculum Chair | Date 3/29/18 |
| College Dean | Date 03/29/18 |
| Graduate Council Chair | Date 5/15/18 |
| Provost/VP Academic Affairs | Date |
| Presidential Approval | Date |
| Board of Governors Approval | Date |

# Graduate Intent to Plan--Major or Degree-Page 2

Please provide a rationale for new degree program: (May attach separate page if needed)

After the security breach associated with more than one billion Yahoo user accounts in 2013, another 500 million Yahoo user accounts were stolen in 2016. Then, Yahoo, the giant web services provider, was hacked again in 2017. We have seen a huge increase in cyber-related incidents, including big data breaches, physical infrastructure tampering, ransomware, among others. As cybersecurity continues to be a primary challenge, the market and need of cyberseurity professionals are growing at an astonishing rate. Forbes reported that the burgeoning cybersecurity market is expected to grow from $75 billion in 2015 to $170 billion by 2020. A report from Cisco puts the global figure at one million cybersecurity job openings. According to the Bureau of Labor Statistics, there are currently more than 200,000 unfilled cybersecurity positions in US alone and the rate of growth for jobs is projected at 37 percent from 2012–2022, much faster than the average (7 percent) for all other occupations. At this rate, the United States is on pace to hit a half-million or more unfilled cybersecurity positions by 2021. It is clear that there is a strong need and job market for cybersecurity professions, locally, nationally and internationally and the proposed M.S in Cybersecurity degree program is very timely. The M.S. in Cybersecurity degree program will adequately produce graduates who will fill the workforce needs in this rapidly-growing field. The proposed program is a viable low-cost program that will significantly result in increasing the enrollment and producing more tuition and program/lab fees. Along with the B.S. in Computer and Information Security program proposed recently by the Weisberg Division of Computer Science, the proposed program will educate students to better understand, prevent, mitigate and respond to cybersecurity threats. The M.S. in Cybersecurity program will also strengthen existing programs at Marshall University. Closely-related programs will greatly benefit from the addition of the M.S. in Cybersecurity degree program as this new program will create exciting and productive new paths for education and research for students in existing Marshall University undergraduate and graduate degree and certificate programs in Computer Science, Information System, Technology Management, Electrical and Computer Engineering, Management Information Systems, Criminal Justice, and Digital Forensics.

**1. ADDITIONAL RESOURCE REQUIREMENTS:** If your new program requires additional faculty, equipment or specialized materials, attach an estimate of the time and money required to secure these items.
NOTE: Approval of this form does not imply approval for additional resources. Enter NONE if not applicable.

**2. NON-DUPLICATION:** If a question of possible duplication occurs, attach a copy of the correspondence sent to the appropriate department(s) describing the request and any response received from them. Enter NONE if not applicable.

None

***For catalog changes as a result of the above actions, please fill in the following pages.***

**5. *New* Catalog Description**

Insert a 'clean' copy of your proposed description, i.e., no strikethroughs or highlighting included. This should be what you are proposing for the new description. (May attach separate page if needed)

See attachment

# Graduate Intent to Plan--Major or Degree-Page 4

Please insert in the text box below your summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings):

Department:
New Major or Degree:
Credit Hours:
Rationale:

Department: Weisberg Division of Computer Science
New Major or Degree: Masters of Science in Cybersecurity
Credit Hours: 30 Credit Hours
Type of Change: Addition
After the security breach associated with more than one billion Yahoo user accounts in 2013, another 500 million Yahoo user accounts were stolen in 2016. Then, Yahoo, the giant web services provider, was hacked again in 2017. We have seen a huge increase in cyber-related incidents, including big data breaches, physical infrastructure tampering, ransomware, among others. As cybersecurity continues to be a primary challenge, the market and need of cyberseurity professionals are growing at an astonishing rate. Forbes reported that the burgeoning cybersecurity market is expected to grow from $75 billion in 2015 to $170 billion by 2020. A report from Cisco puts the global figure at one million cybersecurity job openings. According to the Bureau of Labor Statistics, there are currently more than 200,000 unfilled cybersecurity positions in US alone and the rate of growth for jobs is projected at 37 percent from 2012–2022, much faster than the average (7 percent) for all other occupations. At this rate, the United States is on pace to hit a half-million or more unfilled cybersecurity positions by 2021. It is clear that there is a strong need and job market for cybersecurity professions, locally, nationally and internationally and the proposed M.S in Cybersecurity degree program is very timely. The M.S. in Cybersecurity degree program will adequately produce graduates who will fill the workforce needs in this rapidly-growing field. The proposed program is a viable low-cost program that will significantly result in increasing the enrollment and producing more tuition and program/lab fees. Along with the B.S. in Computer and Information Security program proposed recently by the Weisberg Division of Computer Science, the proposed program will educate students to better understand, prevent, mitigate and respond to cybersecurity threats. The M.S. in Cybersecurity program will also strengthen existing programs at Marshall University. Closely-related programs will greatly benefit from the addition of the M.S. in Cybersecurity degree program as this new program will create exciting and productive new paths for education and research for students in existing Marshall University undergraduate and graduate degree and certificate programs in Computer Science, Information System, Technology Management, Digital Forensics and Information Assurance, Electrical and Computer Engineering, Management Information Systems, and Criminal Justice .

## CYBERSECURITY, M.S.

The Master of Science in Cybersecurity program provides students with the knowledge, skills, and professional practices needed for careers in the cybersecurity fields. The program also prepares students who desire to pursue further graduate work that leads to a Ph.D. degree. The curriculum covers several advanced topics in cybersecurity, such as; advanced cryptography, cybersecurity policy, cyber risk and vulnerability, cyber operation, wireless network security, web/mobile security, software security, security in Internet of Things (IoT), etc. These courses will be taught using the very latest, state-of-the-art security tools and technologies.

**Admission and Transfer Criteria**
Applicants should follow the admissions process as stated in the graduate catalog or the graduate admissions web site. Minimum requirements for admission is a four-year Bachelor's degree with GPA of 2.75 or higher out of 4.0 in Cybersecurity or any computer science related areas.
Whether a student meets the above requirements will be determined by the division chair or designee, based on the information provided in the admission application and transcripts. Applicants with a four-year bachelor degree in a major other than Cybersecurity or any computer science related area may be admitted to the program with a condition of successful completion of the following three bridge courses with a grade B or above in first two semesters of the program:

- Data Structure and Algorithms (CS 210)
- Internetworking (CS 320)
- Statistics (STA 225, STA 346, or STA 345)

Foreign nationals must score in the IELTS Band 6.5 on the TOEFL, and must have met all other admission criteria prior to registering for the first semester of courses.

**M.S. Degree Requirements**
The MS degree requires 30 credit hours (CR) of graduate work. At least 15 credit hours should be taken from 600 level courses.

- Core Required (12 CR):
  CYBR 510 Introduction to Cybersecurity (**New**)
  CYBR 530 Cybersecurity Policies and Management (**New**)
  CYBR 615 Cyber Risk and Vulnerability (**New**)
  CYBR 620 Cyberwarfare (**New**)

- Concentration (6 CR)
  Student must choose two courses from ONE concentration area below:

  *Network Security*
  CYBR 535 Cyber Risk (cross-listed with CYBR 435)
  CYBR 542 Cyber Operations (cross-listed with CYBR 442)
  CYBR 625 Applied Cryptography (**New**)

  *Application Security*
  CYBR 500 Computer Security Design (cross-listed with CYBR 400)
  CYBR 535 Cyber Risk (cross-listed with CYBR 435)
  CYBR 625 Applied Cryptography (listed above)

*Security Management*

| | |
|---|---|
| CYBR 500 | Computer Security Design (cross-listed with CYBR 400) |
| CYBR 542 | Cyber Operations (cross-listed with CS 442) |
| IS 631 | Information Security |
| IS 646 | Computer Systems Security |
| IS 647 | IT Disaster Planning & Recovery |
| IS 656 | Communication and Network Technologies |

- Thesis option or Core Electives Option (6 CR)
  The Thesis option offers a student an opportunity for serious investigation into an area of interest by completing a 3 credit research course (CYBR 680) and a 3 credit thesis (CYBR 681) course. Students must summarize their thesis work in the form of a formal written document and deliver an oral presentation. Thesis work is typically conducted over two semesters. A thesis option can be taken after the completion of 12 credit hours. The 6 CR of the thesis option courses cannot be combined in a semester.
  For the Core Electives Option, student may choose any two 600 level CYBR courses.

- Free electives (6 CR)
  Students may choose any two from following CYBR/CS/IS/ courses.

| | |
|---|---|
| CYBR 500 | Computer Security Design (cross-listed with CYBR 400) |
| CYBR 535 | Cyber Risk (cross-listed with CYBR 435) |
| CYBR 542 | Cyber Operations (cross-listed with CYBR 442) |
| CYBR 625 | Applied Cryptography (listed above) |
| CYBR 682-84 | Special Topics in Cybersecurity |
| CYBR 685-89 | Independent Study |
| CYBR 698 | Internship |
| | |
| CS 504 | High Performance Computing |
| CS 542 | Communication Networks and Distributed Systems |
| CS 579 | Software Engineering |
| CS 620 | Applied Algorithms. |
| CS 625 | AI Principles and Methods. |
| CS 630 | Machine Learning. |
| CS 660 | Big Data Systems. |
| | |
| IS 624 | Data Warehousing. |
| IS 625 | Software Engineering |
| IS 692 | Image Processing for Forensics |
| IS 631 | Information Security |
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COMPUTER SCIENCE

# MARSHALL UNIVERSITY

**College of Information Technology and Engineering**

**Weisberg Division of Computer Science**

March 31, 2018

**Master of Science in Cybersecurity**

**Effective Date:** Spring 2019

By: Wael Zatar, Dean

College of Information Technology and Engineering

and

Wook-Sung Yoo, Ph.D.

Chair, Weisberg Division of Computer Science

## Summary Statement

The Weisberg Division of Computer Science in the College of Information Technology and Engineering (CITE) proposes the establishment of the Master of Science (M.S.) in Cybersecurity degree program at Marshall University.

Cybersecurity is a computing-based discipline in which technology, computer science, people, and multiple processes are aligned to assure the continued operations of computer systems in the presence of risks and adversaries in cyber space. Two existing programs offered by CITE, M.S. in Computer Science and M.S. in Information Systems, cover various cybersecurity-related courses on an annual basis. The M.S. in Cybersecurity program, however, will focus on educating and training students to better understand, prevent, mitigate, and respond to cybersecurity threats. The program will raise awareness and garner interest in closely-related programs at Marshall University. Graduates of the program will contribute to West Virginia's economic development and advance its competitiveness regionally, nationally and globally.

Faculty members in the Weisberg Division of Computer Science have demonstrated expertise in the area of cybersecurity. In their Ph.D. dissertations, the Weisberg Division of Computer Science faculty have addressed cybersecurity challenges including computers security, network security, mobile and wireless networking, Internet of Things (IoT), and cloud computing.

The proposed program does not anticipate the need for additional faculty lines, major funding, or other resources to establish the program. The College of Information Technology and Engineering plans on leveraging available resources in the Weisberg Division of Computer Science to offer this timely program. The cybersecurity degree program will not only create exciting and productive new pathways for research and development, but will increase educational opportunities and inter-departmental collaborations across the campus.

The program will become viable from its first year and will grow each year. The College of Information Technology and Engineering aims at enrolling 70 students and graduating 28 students with a M.S. in Cybersecurity degree in the fifth year of the program. The projected net revenue in the fifth year is estimated at $657,315. The program will generate close to $2 million in new revenues during its first five years.

## 1. Program Description

Cybersecurity is an evolving discipline that encompasses several elements: the study of strategy, policy, and standards regarding the security of and operations in cyber space, the full range of threat reduction, vulnerability reduction, deterrence, international engagement, incident response, resiliency, and recovery policies and activities as they relate to the security and stability of the global information and communications infrastructure.

The proposed M.S. in Cybersecurity degree program offers Cybersecurity education with existing related graduate programs offered by the College of Information Technology and Engineering (M.S. in Computer Science, M.S. in Information Systems, and M.S. in Technology Management). The M.S. in Cybersecurity degree program prepares graduates to succeed in professional careers in a very rapidly growing Cybersecurity fields. The graduates will lead much-needed technological changes in the industry and research fields. The following sections provide additional details about the proposed M.S. in Cybersecurity degree program.

### *1.1 Program Mission*

Marshall University provides innovative undergraduate and graduate education programs that contribute to the development of the individual and their role in society. An important goal of the M.S. in Cybersecurity degree program is to equip students with a strong foundation in the theory and practice of cybersecurity. This foundation builds on Marshall's mission, where it is stated "to actively facilitate learning through the preservation, discovery, synthesis, and dissemination of knowledge". The proposed program will cover the fundamental concepts of cybersecurity and provide opportunities to apply the technical knowledge and skills to produce viable solutions for protecting and defending cyber space. Graduates from the M.S. in Cybersecurity degree program will achieve competency in the following four Program Educational Objectives (PEO):

*After graduation, students will be able to:*

***PEO 1**: be employed in Cybersecurity or related technical areas*

***PEO 2**: be engaged in life-long learning and professional development through self-study, continuing education or graduate and professional studies*

***PEO 3**: become effective communicators, collaborators and innovators*

***PEO 4**: practice professional ethics with social responsibility addressing social, technical and business challenges*

The M.S. in Cybersecurity program will strive to ensure that its graduates are placed in cybersecurity jobs or closely related fields within the professional practice. The graduates are trained to contribute to the evolving technology at their work place, identify opportunities for breakthrough research, and assume reasonable responsibilities in the decision-making process. The M.S. in Cybersecurity degree program aligns well with the mission of the College of Information Technology and Engineering (CITE):

- CITE will be a recognized leader in practice-oriented teaching and applied research.
- CITE is committed to serve the lifelong educational needs of students, new graduates, working professionals, and employees.
- CITE builds on combined traditions of student-focused education, entrepreneurship, and funded research and service emphasis.
- CITE provides education when and where needed, incorporating technology-enhanced methods, by full-time, dedicated faculty complemented by expert adjunct faculty from industry and government.

### *1.2 Program Features*

The M.S. in Cybersecurity degree program will make Marshall University a recognized leader in education, research and practice in cybersecurity fields. The program will attract traditional and non-traditional students from West Virginia, the Tri-State Region and the surrounding states. The M.S. in Cybersecurity degree program will promote collaboration with industries, government agencies, and educational institutions by:

- developing partnerships and alliances with external corporate and industry organizations for pursuing joint educational and research opportunities in cybersecurity
- pursuing research and grant opportunities in cybersecurity related areas
- coordinating availability of cybersecurity coursework to assist not only West Virginia, but the rest of the nation to meet the demand for cybersecurity professionals
- providing outreach opportunities to interested parties and organizations

The catalog description of the proposed M.S. in Cybersecurity degree program is shown in the following two pages.

## CYBERSECURITY, M.S.

The Master of Science in Cybersecurity program provides students with the knowledge, skills, and professional practices needed for careers in the cybersecurity fields. The program prepares students who desire to pursue further graduate work that leads to a Ph.D. degree. The curriculum covers several advanced topics in cybersecurity, such as; advanced cryptography, cybersecurity policy, cyber risk and vulnerability, cyber operation, wireless network security, web/mobile security, software security, security in Internet of Things (IoT), etc. These courses will be taught using latest and state-of-the-art security tools and technologies.

### Admission and Transfer Criteria

Applicants should follow the admissions process stated in the graduate catalog or the graduate admissions web site. Minimum requirements for admission is a four-year Bachelor's degree with GPA of 2.75 or higher out of 4.0 in Cybersecurity or computer science related programs.
Whether a student meets the above requirements will be determined by the Chair or designee of the Weisberg Division of Computer Science, based on the information provided in the admission application and transcripts. Applicants with a four-year bachelor degree in a major other than cybersecurity or computer science related program may be admitted to the program with a condition of successful completion of the following three bridge courses with a grade B or above in the first two semesters of the program:

- Data Structure and Algorithms (CS 210)
- Internetworking (CS 320)
- Statistics (STA 225, STA 346, or STA 345)

Foreign nationals must score in the IELTS B and 6.5 on the TOEFL, and must have met all other admission criteria prior to registering for the first semester of courses.

### M.S. Degree Requirements

The MS degree requires 30 credit hours (CR) of graduate work. At least 15 credit hours should be taken from 600 level courses.

- Core Required (12 CR):
  CYBR 510 Introduction to Cybersecurity (**New Course**)
  CYBR 530 Cybersecurity Policies and Management (**New Course**)
  CYBR 615 Cyber Risk and Vulnerability (**New Course**)
  CYBR 620 Cyberwarfare (**New Course**)

- Concentration (6 CR)
  Student must choose two courses from ONE concentration area below:

  *Network Security*
  CYBR 535 Cyber Risk (cross-listed with CYBR 435)
  CYBR 542 Cyber Operations (cross-listed with CYBR 442)
  CYBR 625 Applied Cryptography (**New Course**)

  *Application Security*
  CYBR 500 Computer Security Design (cross-listed with CYBR 400)
  CYBR 535 Cyber Risk (cross-listed with CYBR 435)

| | |
|---|---|
| CYBR 625 | Applied Cryptography (Also listed in the Network Security Concentration) |

*Security Management*

| | |
|---|---|
| CYBR 500 | Computer Security Design (cross-listed with CYBR 400) |
| CYBR 542 | Cyber Operations (cross-listed with CS 442) |
| IS 631 | Information Security |
| IS 646 | Computer Systems Security |
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- Thesis option or Core Electives Option (6 CR)
  The Thesis option offers a student an opportunity for serious investigation into an area of interest by completing a 3 credit research course (CYBR 680) and a 3 credit thesis (CYBR 681) course. Students must summarize their thesis work in the form of a formal written document and deliver an oral presentation. Thesis work is typically conducted over two semesters. A thesis option can be taken after the completion of 12 credit hours. The 6 CR of the thesis option courses cannot be combined in a semester.
  For the Core Electives Option, student may choose any two 600 level CYBR courses.

- Free electives (6 CR)
  Students may choose any two from following CYBR/CS/IS courses.

| | |
|---|---|
| CYBR 500 | Computer Security Design (cross-listed with CYBR 400) |
| CYBR 535 | Cyber Risk (cross-listed with CYBR 435) |
| CYBR 542 | Cyber Operations (cross-listed with CYBR 442) |
| CYBR 625 | Applied Cryptography (Also listed in the Network Security Concentration) |
| CYBR 682-84 | Special Topics in Cybersecurity |
| CYBR 685-89 | Independent Study |
| CYBR 698 | Internship |
| | |
| CS 504 | High Performance Computing |
| CS 542 | Communication Networks and Distributed Systems |
| CS 579 | Software Engineering |
| CS 620 | Applied Algorithms. |
| CS 625 | AI Principles and Methods. |
| CS 630 | Machine Learning. |
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| IS 631 | Information Security |
| IS 646 | Computer Systems Security |
| IS 647 | IT Disaster Planning & Recovery |
| IS 656 | Communication and Network Technologies |

The Weisberg Division of Computer Science plans on offering the five new courses (four core and one concentration courses) in the curriculum of the M.S. in Cybersecurity once a year:

| | |
|---|---|
| CYBR 510 | Introduction to Cybersecurity |
| CYBR 530 | Cybersecurity Policies and Management |
| CYBR 615 | Cyber Risk and Vulnerability (pre-requisite: CYBR 510) |
| CYBR 620 | Cyberwarfare (pre-requisite: CYBR 615) |
| CYBR 625 | Applied Cryptography (pre-requisite: CYBR 510) |

Appendix A includes brief description of five new cyber security courses.

Other courses, shown in the following list, could be added should there be a demonstrated growth of the program and an ability to teach them following a cost-effective mechanism.

| | |
|---|---|
| CYBR 630 | Network Security |
| CYBR 635 | Secure Software Engineering |
| CYBR 640 | Security in Internet of Things |
| CYBR 650 | Cybersecurity Data Analytics |
| CYBR 655 | Cloud Security |

### 1.3 Program Delivery

The delivery of the M.S. in Cybersecurity program will be following classical instructional mechanisms. The Cybersecurity lab, housed in the Arthur Weisberg Family Applied Engineering Complex, provides a first class hands-on experience to students in the M.S. Cybersecurity degree program. Effective utilization of the Cybersecurity lab, will enable designing, implementing, and administering the security of computer systems by embracing the concepts learned.

## 2. Program Needs and Justification

### 2.1 Existing Programs

#### 2.1.1 M.S. in Cybersecurity Degree Programs in West Virginia

The M.S. in Cybersecurity program is not currently offered by any public university in West Virginia. In order to provide a broad overview of the information assurance and biometrics fields, West Virginia University currently offers Graduate Certificate programs in: (1) Computer Forensics, and (2) Information Assurance and Biometrics (Table 1).

**Table 1: Cybersecurity or Related Graduate Programs in West Virginia**

| Institution | Degree | Public College | Distance from MU | CAE/CD | ABET Accredited |
|---|---|---|---|---|---|
| West Virginia University | Graduate Certificate in<br>- Computer Forensics<br>- Information Assurance and Biometrics | Yes | 207 miles | Yes | No |

However, West Virginia University has recently approved new B.S. and M.S. degree programs in cybersecurity.

#### 2.1.2 B.S. in Cybersecurity Degree Programs in West Virginia

Three B.S. in Cybersecurity degree programs are offered by private institutions and colleges in West Virginia (Table 5). For example, Salem International University, a small, for-profit college, is about 157 miles away from Marshall University, and offers a *Bachelor of Science in Information Technology - Cyber Security*. The University of Charleston, a private university located in Charleston, offers a *Bachelor of Science in Cyber Security*. The American Public University System, a private, for-profit online learning institution located about 370 miles away from Marshall University, offers a *Bachelor of Science in Cybersecurity* and other related degree programs (Table 2).

**Table 2: Cybersecurity or Related BS programs in the State of West Virginia**

| Institution | Degree | Public College | Distance from MU | CAE-CD | ABET Accredited |
|---|---|---|---|---|---|
| Salem International University | B.S. in Information Technology - Cybersecurity | No | 157 miles | No | No |
| University of Charleston | B.S. in Cyber Security | No | 53 miles | No | No |
| American Public University System | B.S. in Cyber Security | No | 370 miles | No | No |

The University of Charleston has six students enrolled in the fall semester of 2017 in their B.S. degree program in cybersecurity; their tuition is substantially higher than Marshall University. As previously mentioned, West Virginia University has recently approved new B.S. and M.S. in Cybersecurity program.

### 2.1.3 Cybersecurity Degree Programs in the Surrounding States

Few educational institutions within the surrounding 200 miles of Marshall University offer cybersecurity-related degrees or certificates (Table 3).

**Table 3: Cybersecurity or related program in Tri-state Area within 200 miles**

| Institution | B.S. | MS | Distance from MU | Type |
|---|---|---|---|---|
| **Kentucky** | | | | |
| Eastern Kentucky University | M.S. in Network Security and Electronics | | 130 miles | Public |
| Kentucky State University | M.S. in Computer Science<br>(Computer Information Security Option)<br>Cyber Security Certificate | M.S. in Computer Science Technology (Cybersecurity Option) | 148 miles | Public |
| Northern Kentucky University | Certificate in Corporate Information Security<br>Cybersecurity Certificate<br>Secure Software Engineering Certificate | | 141 miles | Public |

| Ohio | | | | |
|---|---|---|---|---|
| Franklin University | M.S. in Cybersecurity | | 135 miles | Private |
| Ohio State University | M.S. in Computer Science and Engineering (focus on Information Security)<br>M.S. in Computer and Information Science (focus on Information Security) | | 136 miles | Public |
| University of Cincinnati | Cyber Operations Certificate | | 151 miles | Public |
| Wright State University | Cybersecurity Analytic Certificate | M.S. in Cyber Security | 164 miles | Public |

Similar to most institutions of higher education in the United States, these cybersecurity-related programs are incorporated in existing programs as either an area of emphasis or a concentration. Most of these cybersecurity-related programs have modest enrollments and are relatively new, although the national demand of cybersecurity workforce is extremely high. The enrollment of Secure Software Engineering certificates in the Department of Computer Science at Northern Kentucky University is reportedly non-existent as of fall 2017.

Cybersecurity threats constitute a universal challenge that affects all of modern society. Combined with technical knowledge/skills and business/management acumen, the M.S. in Cybersecurity degree program will be attractive to a diverse student population. The program will attract West Virginia residents, non-residents and international students.

## 2.2 Program Planning & Development

### 2.2.1 Clientele and Need

The need for cybersecurity expertise is clearly evident. For example, the security breach associated with more than one billion Yahoo user accounts in 2013, and another 500 million accounts were illegally obtained in 2016. The dominant web services provider, suffered yet another cyber attack in 2017.

Within the last few years, we have seen a substantial increase in cyber-related incidents including big data breaches, physical infrastructure tampering, ransomware. As cybersecurity continues to be a primary challenge, the need for trained experts continues to grow at an astonishing rate. More than 200,000 cybersecurity positions are currently unfilled. The Bureau of

Labor Statistics predicts employment growth of 37 percent within the information security industry over the next 10 years, with four out of every five cybersecurity jobs requiring a degree. At this rate, the United States is predicted to reach an astounding half-million or more unfilled cybersecurity positions by 2021.

IBM's Chairman, President and CEO Ginni Rometty stated, "Cyber-crime is the greatest threat to every company in the world". Over 60 percent of the United States companies and numerous governmental agencies have been victims of cyber-attacks. The World Economic Forum recently reported that: (1) Cyber-crime damage costs will hit $6 trillion annually by 2021, (2) Cybersecurity spending will exceed $1 trillion, (3) Attacks to personal data/accounts will reach four billions by 2020 (Microsoft estimated that four billions will be online—twice the number of online people now), (4) Global ransomware damage costs are predicted to exceed $5 billion in 2017, which is up from $325 million in 2015 (15 times increase in two years), and (5) Attacks to healthcare organizations will quadruple by 2020. The political disagreement presented during and after the 2016 elections clearly magnified the criticality of addressing all cybersecurity challenges as these threats may compromise our national security and the prosperity of the American citizens.

The Integrated Post-secondary Education Data System (IPEDS) reported that the number of students enrolled in post-secondary institutions has been in a continuous decline since 2010 (two million less students between 2010 and 2015). Many states, including West Virginia, have systemically reduced their financial support to higher education, thus forcing more yearly budget cuts; therefore, the establishment of new programs to significantly increase enrollment rates and produce tuition revenues is vital to the growth of Marshall university. The M.S. in Cybersecurity degree program will be a viable, low-cost program that will significantly result in increased enrollment and the production of more tuition and program/lab fees. The M.S. in Cybersecurity degree program will effectively produce graduates who will fill the workforce needs in this rapidly-growing field.

### 2.2.2 Employment Opportunities

The proposed M.S in Cybersecurity degree program is timely for West Virginia, the nation, and the world. For example, Forbes reported that the burgeoning cybersecurity market is expected to

grow from $75 billion in 2015 to $170 billion by 2020. A report from Cisco estimates the global figure at one million cybersecurity job openings. Morever, the demand for these positions will rise to six million globally by 2019, with a projected shortfall of 1.5 million. According to the Bureau of Labor Statistics, the rate of growth for jobs in information security is projected at 37 percent from 2012–2022, which is a much faster rate than the average (seven percent) for all other occupations. According to the U.S. Bureau of Labor Statistics, the mean annual salary for private sector cybersecurity analyst jobs is $96,400. The U.S. News and World Report ranked the career in information security analysis 8$^{th}$ on its list of the 100 best jobs for 2015. CNN Money ranked the career of an Information Assurance Analyst 9$^{th}$ in 2015 and 5$^{th}$ in 2017 in Top 100 best jobs. Cybersecurity workers can also command an average salary premium increase of nearly $6,500 per year, or nine percent more than other IT workers, according to the Job Market Intelligence. It is clear that there is a strong need and job market for cybersecurity professions, locally, nationally and internationally.

A search of indeed.com for cybersecurity jobs in West Virginia showed advertisements for 41 different positions (https://www.indeed.com/jobs?q=cybersecurity&l=WV). About half of these jobs are in the IT industry including Amazon Web Services, Inc., NetCentrics Corporation, Pragmatics, and Rockwell Collins. The other half of the jobs are for commercial banks, the healthcare and manufacturing sectors, engineering firms, and federal and state government law enforcement. As reported by many industrial leaders, a substantial percentage of IT and Cybersecurity jobs in West Virginia are filled by graduates from out-of-state and foreign institutions. For example, many cybersecurity and technical support technician positions offered by Toyota Motor Manufacturing, West Virginia, Inc. were partially filled by local students in 2017 due to the lack of training/education in the area. Local companies such as State Electric Supply Co. or Strictly Business Computer Systems, Inc. have had similar experiences. The proposed M.S. in Cybersecurity degree program has received the full support of many local companies and letters of support are included in Appendix B.

### 2.3 Program Impact

The Weisberg Division of Computer Science currently houses three programs (B.S. in Computer Science degree program, M.S. in Computer Science degree program, and M.S. in Information

Systems degree program). The Division has taken the steps to start a B.S. in Computer and Information Security degree program in the fall 2018 semester, along with the M.S. in Cybersecurity. Currently, various cybersecurity courses are offered that relate to technology, people, and process, including all required Information Systems (IS) courses for the *Graduate Certificate in Information Security* of the College of Information Technology and Engineering. The M.S. in Cybersecurity degree program will strengthen existing programs at Marshall University while creating new pathways for education and research. Closely related existing Marshall University undergraduate and graduate degree and certificate programs (such as Information Systems, Technology Management, Digital Forensics and Information Assurance, Electrical and Computer Engineering, Management Information Systems, and Criminal Justice), will have the option of enhancing their offerings by incorporating Cybersecurity courses. The students in these programs will have many opportunities to participate in undergraduate and graduate research projects. These projects will provide students with research experience in innovative cybersecurity fields. The program's faculty will create partnerships with other universities and research institutions.

### 2.4 Cooperative Arrangements

The proposed M.S. in Cybersecurity program will incorporate an internship option in the curriculum. Currently, the Weisberg Division of Computer Science has strong partnerships with several industry partners and state government agencies. The proposed Cybersecurity program already has the strongest support from many local, state and tristate industries and employers. The advisory board members of the Weisberg Division of Computer Science have been very excited about this much needed degree program and have committed themselves to providing suitable employment opportunities for enrolled students as well as graduates of this proposed degree program. In addition, the advisory board members have committed to forming less formal relationships earlier in the students' curriculum through field experiences, internships, and co-ops beginning in the sophomore year.

### 2.5 Alternatives to Program Development

The M.S. in Cybersecurity degree program will be one of the the first established M.S. in Cybersecurity degree programs in a public institution in West Virginia. The regional, national and international shortage of qualified graduates in this specialized field have shaped the process of identifying and developing the program learning outcomes and curriculum. Currently, There is not an alternative to the proposed M.S. in Cybersecurity degree program.

## 3. Program Implementation Projected Resource Requirements

The program does not require additional resources in its initial stage and can be sustainable for two years by leveraging already existing resources available at the Weisberg Division of Computer Science. Additional resources might be added either when the number of students reaches 50 students or during the third year of the program. Even with these additional resources, the program will remain cost-effective. The program will provide multiple benefits at a low cost to the institution. Scenarios that examine the Return on Investment (ROI) of this timely program have shown it to be a lucrative addition to Marshall University.

### 3.1 Program Administration

The Weisberg Division of Computer Science of the College of Information Technology and Engineering will house the M.S. in Cybersecurity degree program. The Chair of the Weisberg Division of Computer Science will supervise and manage the program with oversight by the Dean of the College of Information Technology and Engineering. The college does not project changes in the administration of the division with the addition of this new degree program.

### 3.2 Program Projections

Based upon the number of student inquiries and interest of the proposed degree, it is conservatively estimated that the M.S. in Cybersecurity program will have 20 full time equivalent (FTE) students in its first year, with 20 percent annual growth and 80% retention in the following five years (Table 4). Twenty-eight students will graduate from the program in the $5^{th}$ year.

**Table 4: Student Enrollment Projection**

| Student Enrollment | 1st year | 2nd year | 3rd year | 4th year | 5th year |
|---|---|---|---|---|---|
| Enrollment of 1st year students | 20 | 16 | | | |
| Enrollment of 2nd year students | | 24 | 19 | | |
| Enrollment of 3rd year students | | | 29 | 23 | |
| Enrollment of 4th year students | | | | 35 | 28 |
| Enrollment of 5th year students | | | | | 42 |
| **Estimated Total Student Enrollment** | **20** | **40** | **48** | **58** | **70** |

### 3.3 Faculty Instructional Requirements

The College of Information Technology and Engineering has the administrative system and necessary faculty to support the M.S. in Cybersecurity degree program. The Weisberg Division of Computer Science's faculty acquired terminal degrees in their fields, have demonstrated excellent research and publication records, and possess the technical expertise to support the program. Dissertations and past research projects of the faculty have focused on security in mobile and wireless networking, Internet of Things (IoT), intrusion detection, cybersecurity, and cloud computing.

Recent staffing changes in the College of Information Technology and Engineering (CITE) have provided the college's administration with an opportunity to reshape the future of the Weisberg Division of Computer Science. CITE Dean has implemented an aggressive plan to address systemic obstacles, enhance the efficiencies of program delivery, and modernize the offerings of the Division through hiring very promising faculty who possess the latest knowledge in the fields of computer science and cybersecurity. The Division has successfully hired five talented tenure-track assistant professors in the last couple of years. These hires were tasked with teaching courses in the existing programs and developing research programs in their areas of expertise. Student engagement in faculty research projects is not only a key component to the success of the program, but also essential for faculty retention, promotion and tenure.

Each of the five new faculty received a three-credit-hours release per semester in the first year to develop the research program. The five faculty will collectively teach an additional 30

credit hours beginning in the fall semester of 2019, which will eventually result in covering the new cybersecurity courses. Out of the ten full-time faculty of the Weisberg Division of Computer Science, five faculty will teach the new cybersecurity courses (Table 5).

**Table 5. New Cybersecurity Courses and Faculty Assignment**

| New Cybersecurity Courses | Term | Course starts | Faculty |
|---|---|---|---|
| CYBR 510 - Introduction to Cybersecurity | SP | 2019 | Dr. Cong Pu |
| CYBR 530 - Cybersecurity Policies and Management | SP | 2019 | Dr. Wook-Sung Yoo |
| CYBR 615 - Cyber Risk and Vulnerability | FA | 2019 | Dr. Paulus Wahjudi |
| CYBR 620 - Cyberwarfare | SP | 2020 | Dr. Husnu Narman |
| CYBR 625 - Applied Cryptography | SP | SP | Dr. Tianyi Song |

Based on the estimated number of students shown in Table 4 and the number of computer science and cybersecurity courses in the M.S. in Cybersecurity degree program, one full-time faculty time from current faculty body and one adjunct faculty will cover courses needed in the program's curriculum in second year. 1.25 full-time faculty and 2 adjunct faculty will teach few more computer science sections needed for the students enrolled in the program from the third year of the program. CITE Dean anticipates the addition of a tenure-track faculty line to support the program's growth starting from the third year of the program. More faculty and adjuncts could be added as the program continues to grow. Table 6 displays the projected revenue generation over the first five years of delivering the program.

### 3.4 Library Resources and Instructional Materials:

Marshall University Libraries have the majority of the resources needed to support the proposed M.S. in Cybersecurity degree program. Few additional library collections may be added over time to adequately complement the library resources currently available for the Computer Science programs.

### 3.5 Support Service Requirements

A dedicated cybersecurity lab system administrator and two part-time graduate students (lab assistants) will be needed after the program acquires a critical mass (probably after three years

from the starting of the program).

### 3.6. Facilities Requirements

Marshall University Computing Services currently supports all user computing needs of the users on Marshall campuses. The College of Information Technology and Engineering has recently added multiple state-of-the-art computer labs and classrooms within its magnificent Arthur Weisberg Family Applied Engineering Complex (WAEC) to support the various programs of the Weisberg Division of Computer Science. The Weisberg Division of Computer Science houses a cybersecurity lab, Computer Science Project lab, and Computer Graphics lab. These spaces are shared amongst the existing programs in the Weisberg Division of Computer Science and will support the addition of other programs in the division, including the proposed M.S. in Cybersecurity degree program. The cybersecurity lab has a built-in internal network for testing and developing various cybersecurity-related projects without compromising the Marshall University network. The Cybersecurity lab currently supports existing courses of Internetworking and Cybersecurity. The M.S. in Cybersecurity program will have access to the available computer workstations and Wi-Fi in WAEC. As the program continues to grow, another cybersecurity specialized lab/classroom will be needed. The cost of the additional equipment is estimated at $250,000 (to acquire additional powerful computers, servers, and network facilities).

### 3.7. Operating Resource Requirements

As an integral part of the Weisberg Division of Computer Science, the M.S. in Cybersecurity degree program will share the operating resources with the other programs offered by the Division. Table 6 shows the estimated revenue generated by the proposed program during its first five years (based on the estimated number of students in Table 4). Table 7 provides a summary of the operating resource requirements.

## Table 6. Revenue Generated by the Proposed Program in 5 years

| | Tuition & Fee | 1st Year | | 2nd Year | | 3rd Year | | 4th Year | | 5th Year | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yearly | FTE | Revenue | FTE | Revenue | FTE | Revenue | FTE | Revenue | FTE | Revenue |
| Resident of WV (50%) | $9,188 | 10 | $91,880 | 20 | $183,760 | 24 | $220,512 | 29 | $266,452 | 35 | $321,580 |
| Metro resident (20%) | $16,040 | 6 | $96,240 | 12 | $192,480 | 14 | $224,560 | 17 | $272,680 | 21 | $336,840 |
| Out of State (30%) | $21,222 | 4 | $84,888 | 8 | $169,776 | 10 | $212,220 | 12 | $254,664 | 14 | $297,108 |
| **Total** | | **20** | **$273,008** | **40** | **$546,016** | **48** | **$657,292** | **58** | **$793,796** | **70** | **$955,528** |

## Table 7: Five-Year Projection of Total Operating Resources Requirements

| | First Year 2018 | Second Year 2019 | Third Year 2020 | Fourth Year 2021 | Fifth Year 2022 |
|---|---|---|---|---|---|
| A. FTE POSITIONS | | | | | |
| 1. Administrators | 0.125 | 0.125 | 0.125 | 0.25 | 0.25 |
| 2. Full-time Faculty | 0.5 | 1 | 1.25 | 1.25 | 1.25 |
| 3. Adjunct Faculty | 0 | 1 | 2 | 2 | 2 |
| 4. Graduate Assistants | 0 | 0 | 2 | 2 | 2 |
| 5. Other Personnel: | | | | | |
| a. Clerical Workers | 0 | 0 | 0 | 0 | 0 |
| b. Professionals | 0 | 0 | 1 | 1 | 1 |
| B. OPERATING COSTS | | | | | |
| 1. Personal Services: | | | | | |
| a. Administrators | $18,750.00 | $18,750.00 | $18,750.00 | $37,500.00 | $37,500.00 |
| b. Full-time Faculty | $53,125.00 | $106,250.00 | $132,812.50 | $132,812.50 | $132,812.50 |
| c. Adjunct Faculty | $- | $4,500.00 | $9,000.00 | $9,000.00 | $9,000.00 |
| d. Graduate Assistants | $- | $- | $6,400.00 | $6,400.00 | $6,400.00 |
| e. Non-Academic Personnel: | | | | | |
| Clerical Workers | $- | $- | $- | $- | $- |
| Professionals | $- | $- | $62,500.00 | $62,500.00 | $62,500.00 |
| Total Salaries | $71,875.00 | $129,500.00 | $229,462.50 | $248,212.50 | $248,212.50 |
| 2. Current Expenses (Recurring) | $10,000.00 | $15,000.00 | $20,000.00 | $30,000.00 | $40,000.00 |

| | | | | | |
|---|---|---|---|---|---|
| 3. Repairs and Alterations (Lab) | $- | $- | $5,000.00 | $5,000.00 | $5,000.00 |
| 4. Equipment: | | | | | |
| Educational Equip. | $5,000.00 | $5,000.00 | $5,000.00 | $5,000.00 | $5,000.00 |
| Library Books | $- | $- | $- | $- | $- |
| 5. Nonrecurring Expenses: (Lab) | $- | $- | $250,000.00 | $- | $- |
| Total Costs | $86,875.00 | $149,500.00 | $509,462.50 | $288,212.50 | $298,212.50 |
| **C. Sources** | | | | | |
| 1. General Fund Appropriations | $273,008.00 | $546,016.00 | $657,292.00 | $793,796.00 | $955,528.00 |
| **D Net Revenue** | $186,133.00 | $396,516.00 | $147,829.50 | $505,583.50 | $657,315.50 |

The program and lab fees will be sufficient to cover additional operating budget needs, and will ensure the program's financial viability.

### 3.8. Source of Operating Resources

The source of the program's operational support will be a combination of: (1) sharing the operating budget of the Weisberg Division of Computer Science, and (2) program and lab fees that will specifically be collected from the students in this program.

## References


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- ABET, Computing Accredited Commission, Retrieved from http://www.abet.org/about-abet/governance/accreditation-commissions/computing-accreditation-commission/.

## Appendix A: Course Description in Cybersecurity Program

**CYBR 510 - Introduction to Cybersecurity. 3 hrs.**
This course covers concepts and issues in physical and cyber security; technological vulnerabilities found in operating systems, database, Web servers, Internet, and local area networks.

**CYBR 530 - Cybersecurity Policies and Management. 3 hrs.**
This course covers topics of risk management, integrating continuous monitoring and real-time security solutions with information system to improve situational awareness and deployment of countermeasures.

**CYBR 615 - Cyber Risk and Vulnerability. 3 hrs.**
This course focuses on the complete cycle of Enterprise security from identifying vulnerabilities, detecting application exploitation and post exploitation mitigations and analysis for an enterprise level cyber infrastructure.

**CYBR 620 – Cyberwarfare. 3 hrs.**
The course covers both offensive and defensive techniques pertaining to cyber security from techniques to find vulnerabilities and analysis on the likelihood of an attack to developing solutions to secure cyber infrastructure.

**CYBR 625 - Applied Cryptography. 3 hrs.**
This course covers critical topics in cryptography, including the classical ciphers and cryptanalysis, Shannon's perfect secrecy, Feistel ciphers and DES, SPN's and AES, linear and differential cryptanalysis, public-key crypto (RSA, Discrete Log), secure hash, elliptic curves.

## Appendix B: Letter of Support

STATE OF WEST VIRGINIA
**DEPARTMENT OF ADMINISTRATION**
OFFICE OF TECHNOLOGY
State Capitol
Charleston, West Virginia 25305

Jim Justice
Governor

John A. Myers
Cabinet Secretary

John D. Dunlap
Chief Technology Officer

October 6, 2017

To whom it may concern:

As a cyber security expert serving the Department of Defense and the State of West Virginia, I have been exposed to the stark reality of the cyber security threat. Our world has fully integrated technology and the resulting interdependence has created a serious situation. The rapid advancement and integration of new technology, technology inheritably vulnerable, coupled with the lack of a skilled cyber workforce presents a situation that is likely to get worse before it becomes better. A key component to answer this threat is a strong dedication to the cyber workforce development.

The importance of developing a cyber workforce cannot be understated, but it should also be noted the development programs must be designed and implemented with an understanding of the cyber threat issue. Educational programs must account for the desperate need of technical-minded experts, trained with the skills to solve complex problems. Core education should start and delve deep in to computer science fundamentals. In addition, programs must recognize the need to teach practical skillsets in hands-on environments. Finally, cyber workforce programs can serve to help fill the workforce gap sooner, rather than later through internship and apprenticeship programs offering mutually beneficial opportunities.

In conclusion, I recommend Marshall University strongly consider implementing a strong cyber security program for the undergraduate and graduate levels with a curriculum foundation in computer science.

Respectfully,

//SIGNED//
Joshua D. Spence, CISSP
Chief Information Security Officer
West Virginia Office of Technology

City Holding Company

Wook-Sung Yoo, Ph. D.
Professor and Chair, Weisberg Division of Computer Science,
College of Information Technology and Engineering,
WAEC 3101A,
Marshall University
Huntington, WV 25755

Dear Dr. Yoo,

I'm very excited about the prospect of a Cybersecurity program at Marshall University. As an alumnus of Marshall University's Computer Science program, it's encouraging to see progress and growth. It seems I read an article weekly describing what is believed to be a cyber security professional shortage by 2019. What better time than now to begin providing students with an education that will allow them to take full advantage of this dynamic job market.

Throughout the country, financial institutions have identified cyber-threats as their top priority for 2017. This issue has been moved to the forefront of bank-board meeting agendas, and senior managers must act fast to mitigate these growing threats to banks. Cyber-threats have the power to wipe out huge swathes of business value in a matter of moments, and banks need to address this growing risk through resource budgeting. Radical change needs to be made. One way of incorporating cost-effective solutions will be by enlisting the help of specialized external cybersecurity teams along with building strong internal staffing expertise. The traditional approach to IT solutions and tools is not going to be enough to tackle this problem, which changes shape every moment. Skilled expert knowledge will be required to effectively tackle the fast-paced dynamics of threats—and even then because of the speed of technological development, it will be hard to keep up.

I'm sure City National Bank will be challenged in our market(s) to find qualified candidates to fill the security analyst positions that will be needed. We already are! Educate them and we'll find a place for them.

Sincerely,

Jeffrey D. Legge
Chief Information and Administrative Officer
City Holding Company

strictly BUSINESS
COMPUTER SYSTEMS

848 4th Avenue, Suite 200
Huntington, WV 25701
(304) 529-0401
www.sbcs.com
info@sbcs.com

Wook-Sung Yoo, Ph.D.
Professor and Chair, Weisberg Division of Computer Science,
College of Information Technology and Engineering,
WAEC 3101A,
Marshall University
Huntington, WV 25755

Dear Dr. Yoo,

I am writing in support of your proposed plan to create a Bachelor of Science in Cybersecurity program at Marshall University.

Given the recent news of a massive security breach and the possible leak of millions of customer records at Wells Fargo, it should come as no surprise that the field of Cybersecurity is tremendously important to our personal privacy interests as well as a major contributor to the protection of our national security interests. As such, the formation of a degree program in Cybersecurity is not only timely, but vital.

I believe the Weisberg Division of Computer Science is well positioned to take advantage of this opportunity as they have the resources in place to begin this program very quickly.

As the principal of a technology company that works with both industry and the Federal Government, I see daily, the demand for, and growing shortage of, professionals to manage cybersecurity initiatives nationwide, and am completely confident that graduates of Marshall's program will have little trouble finding rewarding careers as well as making significant contributions to the field.

As an employer of technology professionals, I am also confident that we will be the first in line to consider hiring a graduate of this important program.

With best regards,

Michael G. Owens, Sr.
President
Strictly Business Computer Systems Inc.

1900 Kanawha Boulevard, East, Building 6 • Charleston, WV 25305
Steven L. Paine, Ed.D., State Superintendent of Schools
wvde.state.wv.us

October 13, 2017

Wook-Sung Yoo, Ph.D.
Professor and Chair, Weisberg Division of Computer Science
College of Information Technology and Engineering
Marshall University
WAEC 3101A
Huntington, WV 25755

Dear Dr. Yoo,

Thank you for providing me with an overview of the proposed Bachelor of Science in Cybersecurity (BSCY) degree program currently under consideration at Marshall University. The program appears to be a rigorous course of study designed to prepare graduates to effectively prevent and mitigate emerging and evolving threats while maintaining high standards of ethical professional practice. I am pleased to support your efforts.

The need for trained experts in Cybersecurity has never been more pressing. According to the Identity Theft Resource Center,[1] the United States has experienced more than 1,000 confirmed data breaches to date in 2017, with at least 163 million individual records being exposed to unauthorized parties. Over the past 12 years, nearly 8,000 confirmed data breaches have exposed more than one billion records. In perhaps the most shocking breach so far, the credit reporting company Equifax revealed earlier this month that approximately 143 million credit records for more than 200,000 people were accessed by hackers who exploited a vulnerability in the company's website. Breaches and other security incidents seem to be becoming commonplace.

West Virginia's K-12 education system has so far been fortunate in avoiding major data breaches that threaten our students' information. However, we know that the risk is ever present and constantly growing. Agencies like the West Virginia Department of Education and our districts need highly skilled professionals with expertise to identify and stop threats before they become incidents and to respond quickly when breaches do occur.

[1] Identity Theft Resource Center. (2017, September 14). 2017 Data Breaches. Retrieved from http://www.idtheftcenter.org/2017-data-breaches.html

Threat environments evolve and change quickly. Cybersecurity professionals need adaptive skills and excellent critical thinking processes to be able to respond effectively and decisively. Marshall University's proposed BSCY program is designed to cultivate those technical and professional skills and to ensure that graduates will collaborate successfully to improve their employers' security postures in support of organizational missions.

Technology is a powerful tool for change. Through my leadership roles in West Virginia's education sector and in initiatives like the Partnership for 21st Century Skills, I have seen directly how effective technology implementation can provide a strong foundation for student achievement. West Virginia's educators have long recognized the great promise technological tools and advancements hold for helping our students cultivate the knowledge and skills they need to build bright futures. Every day, I see our educators working to find ways to harness the promise of technology and connected learning environments while simultaneously trying to avoid potential harm to their students. The ability to collaborate with trained Cybersecurity professionals, such as those who will graduate from the BSCY program, will enhance our educators' confidence that they are acting in the best interests of their students while adopting new innovations for improvement.

We must use every available tool and technology to prepare our students for their futures, and we must do so while respecting and protecting the security of their personal information. I look forward to watching the BSCY program at Marshall University further evolve as plans are finalized and implemented. I hope that, in the near future, we may see Marshall's BSCY graduates working with educators to keep our students safe.

Sincerely,

Steven L. Paine, Ed.D.
State Superintendent of Schools

SLP:GHW:csm

MARSHALL APPALACHIAN TRANSPORTATION INSTITUTE

CBER CENTER FOR BUSINESS AND ECONOMIC RESEARCH

Wook-Sung Yoo, Ph.D.
Professor and Chair, Weisber Division of Computer Science,
College of Information Technology and Engineering
WAEC 3101A
Marshall University
Huntington, WV 25755

Dear Dr. Yoo,

I am writing in support of the proposed Bachelor of Science, Cybersecurity program at Marshall University. As a research arm of Marshall University, we work directly with the public and private sectors who are increasingly concerned about cyber-threats.

This year alone we have seen an alarming number of cybersecurity breaches within the Federal Government, an onslaught of ransomware attacks and the Equifax data breach that compromised as many as 143 million consumers. Given the surge in cyber-attacks it is vital to the nation's security interest that we start developing a workforce that can combat these types of attacks.

I believe the Weisburg Division of Computer Science would be doing a great service to our community and nation by the creation of a Bachelor of Science Degree in Cybersecurity.

Sincerely,

Robert H. "Bob" Plymale,
Marshall University Research Corporation
Associate Vice President for Economic Development
COO, Appalachian Transportation Institute
COO, Center for Business and Economic Research

Marshall University Research Corporation
One John Marshall Drive
Huntington, WV 25755
njrati.org | cbermu.org
304-696-5747

# Request for Graduate Addition, Deletion, or Change of a Major or Degree

NOTE: Before you submit a request for a new Major or Degree, you must submit an INTENT TO PLAN form. Only after the INTENT TO PLAN goes through the approval process are you ready to submit this request for a new Major or Degree. For detailed information on new programs please see: http://wvhepcdoc.wvnet.edu/resources/133-11.pdf.

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one PDF copy without signatures to the Graduate Council Chair.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: COEPD

Dept/Division: School Psychology

Contact Person: Lanai Jennings

Phone: 304-746-2067

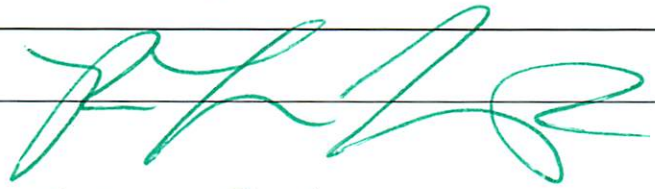
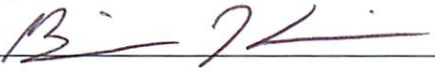
Degree Program: EdS

Check action requested: ☐ Addition ☐ Deletion ☒ Change

Effective Term/Year: Fall 20 18 ☐ Spring 20 ☐ Summer 20 ☐

***Information on the following pages must be completed before signatures are obtained.***

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head  | Date March 15, 2018 |
| College Curriculum Chair  | Date 3-26-18 |
| College Dean Sandra S Stroebel | Date 3-27-18 |
| Graduate Council Chair Christofero | Date 5-15-18 |
| Provost/VP Academic Affairs | Date |
| Presidential Approval | Date |
| Board of Governors Approval | Date |

# Request for Graduate Addition, Deletion, or Change of a Major or Degree-Page 2

Please provide a rationale for addition, deletion, change: (May attach separate page if needed)

Our students in School Psychology currently have three practicums in addition to a 1200 hour internship. With improvements to our Practicum I and Practicum II coursework, the Practicum III course is not needed. Also the closure of the Summer Enrichment Program has affected the program's ability to have Practicum III in its current form. In the summer the students will instead focus on the completion of their program evaluation or thesis.

Please describe any changes in curriculum:
List course number, title, credit hours. Note whether each course is required or optional. Enter NONE if no change. (May attach separate page if needed)

Students will no longer be required to take SPSY 740, School Psychology Practicum III, 3 credit hours. The total required hours for the EdS will be 39 instead of 42.

**1. ADDITIONAL RESOURCE REQUIREMENTS:** If your program requires additional faculty, equipment or specialized materials to ADD or CHANGE this major or degree, attach an estimate of the time and money required to secure these items.
NOTE: Approval of this form does not imply approval for additional resources. Enter NONE if not applicable.

None

**2. NON-DUPLICATION:** If a question of possible duplication occurs, attach a copy of the correspondence sent to the appropriate department(s) describing the request and any response received from them. Enter NONE if not applicable.

None

***For catalog changes as a result of the above actions, please fill in the following pages.***

# Request for Graduate Addition, Deletion, or Change of a Major or Degree-Page 3

**3. *Current* Catalog Description**

Insert the *Current* Catalog Description and page number from the latest catalog for entries you would like to change. (May attach separate page if needed)

SCHOOL PSYCHOLOGY, Ed.S. Pages 120-121
Program Description
The Ed.S. program in School Psychology is designed to prepare students to meet the Department of Education requirements for certification in West Virginia and other states. It is approved by the National Association of School Psychologists (NASP).
Prior to pursuing the 42 hours of required coursework and field experiences that lead to the Ed.S. in School Psychology, a student must first complete the M.A. degree in Psychology with an area of emphasis in School Psychology, described in the Psychology section of this catalog. After successfully completing the first semester of the master's degree program, students may apply to the Ed.S. program.
Students already possessing graduate degrees in psychology, counseling or education do not need to obtain the M.A. degree in Psychology with an area of emphasis in School Psychology. When these students apply to the Ed.S. in School Psychology program, they will be considered for advanced standing based upon a review of coursework, grades, and test scores by the School Psychology faculty.
Admission Requirements
Admission is competitive because of the limited number of available internships. Applicants should follow the admissions process described in this catalog or at the Graduate Admissions website at www.marshall.edu/graduate/admissions/how-toapply-for-admission.
In addition, applicants must:
• submit a sample of their professional writing (a scholarly paper on any subject) and a statement of their professional goals (1000 words or fewer). Submit all materials to Graduate Admissions.
Creating a diverse student body is a priority and minority applicants are encouraged to apply. A limited number of graduate assistantships are available. Students can be accepted into the school psychology program throughout the school year; however, school psychology competency classes begin in the fall semester of each academic year.
Program Requirements
During the second semester in the master's degree in psychology with an emphasis in School Psychology, students will apply for admission to the Ed.S. in School Psychology program. Students are admitted to the Ed.S. program with the expectation that they will complete the program within three to five years, depending on the number of classes in which they enroll each semester. Students are expected to enroll in all three semesters. Failure to make the expected amount of progress may result in reassignment to another internship year.
The internship requires a commitment to a school system for a full academic year and is 1200 hours (12 credit hours).
A maximum of 18 students will be admitted to this final-year experience. This paid internship must occur within a school setting and meet stringent criteria specified by the program and the National Association of School Psychologists. In addition, students must complete a thesis or program evaluation and earn a passing score on Praxis II Specialty Area Test in School Psychology before graduation.
Plan of Study: Ed.S. in School Psychology
Requirements:
SPSY 603 Professional Competence II: Professional School Psychology
SPSY 620 Indirect Service Delivery II: Primary Prevention
SPSY 622 Data Based Decision Making II
SPSY 624 Data Based Decision Making III
SPSY 720 Counseling with Youth: Advanced Topics
SPSY 738 School Psychology Practicum I
SPSY 739 School Psychology Practicum II
SPSY 740 School Psychology Practicum III
SPSY 745 Internship in School Psychology
SPSY 750 Research III: Thesis Research
SPSY 751 Program Evaluation
CIRG 636 Educational Foundations II: Developmental Reading
Defend Thesis
Take Praxis II Specialty Examination in School Psychology
Total of 42 hours required

**4. *Edits* to the Current Description**

Attach a PDF copy of the current catalog description prepared in MS WORD with strikethroughs to mark proposed deletions and use the highlight function to indicate proposed new text.

# Request for Graduate Addition, Deletion, or Change of a Major or Degree-Page 4

**5. *New* Catalog Description**

Insert a 'clean' copy of your proposed description, i.e., no strikethroughs or highlighting included. This should be what you are proposing for the new description. (May attach separate page if needed)

SCHOOL PSYCHOLOGY, Ed.S.
Program Description
The Ed.S. program in School Psychology is designed to prepare students to meet the Department of Education requirements for certification in West Virginia and other states. It is approved by the National Association of School Psychologists (NASP).
Prior to pursuing the 39 hours of required coursework and field experiences that lead to the Ed.S. in School Psychology, a student must first complete the M.A. degree in Psychology with an area of emphasis in School Psychology, described in the Psychology section of this catalog. After successfully completing the first semester of the master's degree program, students may apply to the Ed.S. program.
Students already possessing graduate degrees in psychology, counseling or education do not need to obtain the M.A. degree in Psychology with an area of emphasis in School Psychology. When these students apply to the Ed.S. in School Psychology program, they will be considered for advanced standing based upon a review of coursework, grades, and test scores by the School Psychology faculty.
Admission Requirements
Admission is competitive because of the limited number of available internships. Applicants should follow the admissions process described in this catalog or at the Graduate Admissions website at www.marshall.edu/graduate/admissions/how-toapply-for-admission.
In addition, applicants must:
• submit a sample of their professional writing (a scholarly paper on any subject) and a statement of their professional goals (1000 words or fewer). Submit all materials to Graduate Admissions.
Creating a diverse student body is a priority and minority applicants are encouraged to apply. A limited number of graduate assistantships are available. Students can be accepted into the school psychology program throughout the school year; however, school psychology competency classes begin in the fall semester of each academic year.
Program Requirements
During the second semester in the master's degree in psychology with an emphasis in School Psychology, students will apply for admission to the Ed.S. in School Psychology program. Students are admitted to the Ed.S. program with the expectation that they will complete the program within three to five years, depending on the number of classes in which they enroll each semester. Students are expected to enroll in all three semesters. Failure to make the expected amount of progress may result in reassignment to another internship year.
The internship requires a commitment to a school system for a full academic year and is 1200 hours (12 credit hours).
A maximum of 18 students will be admitted to this final-year experience. This paid internship must occur within a school setting and meet stringent criteria specified by the program and the National Association of School Psychologists. In addition, students must complete a thesis or program evaluation and earn a passing score on Praxis II Specialty Area Test in School Psychology before graduation.
Plan of Study: Ed.S. in School Psychology
Requirements:
SPSY 603 Professional Competence II: Professional School Psychology
SPSY 620 Indirect Service Delivery II: Primary Prevention
SPSY 622 Data Based Decision Making II
SPSY 624 Data Based Decision Making III
SPSY 720 Counseling with Youth: Advanced Topics
SPSY 738 School Psychology Practicum I
SPSY 739 School Psychology Practicum II
SPSY 745 Internship in School Psychology
SPSY 750 Research III: Thesis Research
SPSY 751 Program Evaluation
CIRG 636 Educational Foundations II: Developmental Reading
Defend Thesis
Take Praxis II Specialty Examination in School Psychology
Total of 39 hours required

# Request for Graduate Addition, Deletion, or Change of a Major or Degree-Page 5

Please insert in the text box below your change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings):

Department:
Major or Degree:
Type of Change: *(addition, deletion, change)*
Rationale:

School Psychology
Ed.S.
Changing the degree to not require Practicum III which results in a change in total hours from 42 to 39.
With changes to our Practicum I and Practicum II coursework, there is no longer the need for Practicum III. Also the closure of the Summer Enrichment Program has affected the program's ability to have Practicum III in its current form. Students also obtain clinical experiences in a 1200 hour internship.

**SCHOOL PSYCHOLOGY, Ed.S. Program Description**

The Ed.S. program in School Psychology is designed to prepare students to meet the Department of Education requirements for certification in West Virginia and other states. It is approved by the National Association of School Psychologists (NASP). Prior to pursuing the 39 hours of required coursework and field experiences that lead to the Ed.S. in School Psychology, a student must first complete the M.A. degree in Psychology with an area of emphasis in School Psychology, described in the Psychology section of this catalog. After successfully completing the first semester of the master's degree program, students may apply to the Ed.S. program. Students already possessing graduate degrees in psychology, counseling or education do not need to obtain the M.A. degree in Psychology with an area of emphasis in School Psychology. When these students apply to the Ed.S. in School Psychology program, they will be considered for advanced standing based upon a review of coursework, grades, and test scores by the School Psychology faculty. Admission Requirements Admission is competitive because of the limited number of available internships. Applicants should follow the admissions process described in this catalog or at the Graduate Admissions website at www.marshall.edu/graduate/admissions/how-toapply-for-admission. In addition, applicants must:

• submit a sample of their professional writing (a scholarly paper on any subject) and a statement of their professional goals (1000 words or fewer). Submit all materials to Graduate Admissions. Creating a diverse student body is a priority and minority applicants are encouraged to apply. A limited number of graduate assistantships are available. Students can be accepted into the school psychology program throughout the school year; however, school psychology competency classes begin in the fall semester of each academic year. Program Requirements During the second semester in the master's degree in psychology with an emphasis in School Psychology, students will apply for admission to the Ed.S. in School Psychology program. Students are admitted to the Ed.S. program with the expectation that they will complete the program within three to five years, depending on the number of classes in which they enroll each semester. Students are expected to enroll in all three semesters. Failure to make the expected amount of progress may result in reassignment to another internship year. The internship requires a commitment to a school system for a full academic year and is 1200 hours (12 credit hours). A maximum of 18 students will be admitted to this final-year experience. This paid internship must occur within a school setting and meet stringent criteria specified by the program and the National Association of School Psychologists. In addition, students must complete a thesis or program evaluation and earn a passing score on Praxis II Specialty Area Test in School Psychology before graduation.

Plan of Study: Ed.S. in School Psychology Requirements:

SPSY 603 Professional Competence II: Professional School Psychology

SPSY 620 Indirect Service Delivery II: Primary Prevention

SPSY 622 Data Based Decision Making II

SPSY 624 Data Based Decision Making III

SPSY 720 Counseling with Youth: Advanced Topics

SPSY 738 School Psychology Practicum I

SPSY 739 School Psychology Practicum II

SPSY 745 Internship in School Psychology

SPSY 750 Research III: Thesis Research

SPSY 751 Program Evaluation

CIRG 636 Educational Foundations II: Developmental Reading

Defend Thesis

Take Praxis II Specialty Examination in School Psychology

Total of 39 hours required

**SCHOOL PSYCHOLOGY, Ed.S. Program Description**

The Ed.S. program in School Psychology is designed to prepare students to meet the Department of Education requirements for certification in West Virginia and other states. It is approved by the National Association of School Psychologists (NASP). Prior to pursuing the 39 ~~42~~ hours of required coursework and field experiences that lead to the Ed.S. in School Psychology, a student must first complete the M.A. degree in Psychology with an area of emphasis in School Psychology, described in the Psychology section of this catalog. After successfully completing the first semester of the master's degree program, students may apply to the Ed.S. program. Students already possessing graduate degrees in psychology, counseling or education do not need to obtain the M.A. degree in Psychology with an area of emphasis in School Psychology. When these students apply to the Ed.S. in School Psychology program, they will be considered for advanced standing based upon a review of coursework, grades, and test scores by the School Psychology faculty. Admission Requirements Admission is competitive because of the limited number of available internships. Applicants should follow the admissions process described in this catalog or at the Graduate Admissions website at www.marshall.edu/graduate/admissions/how-toapply-for-admission. In addition, applicants must:

Formatted: Highlight

• submit a sample of their professional writing (a scholarly paper on any subject) and a statement of their professional goals (1000 words or fewer). Submit all materials to Graduate Admissions. Creating a diverse student body is a priority and minority applicants are encouraged to apply. A limited number of graduate assistantships are available. Students can be accepted into the school psychology program throughout the school year; however, school psychology competency classes begin in the fall semester of each academic year. Program Requirements During the second semester in the master's degree in psychology with an emphasis in School Psychology, students will apply for admission to the Ed.S. in School Psychology program. Students are admitted to the Ed.S. program with the expectation that they will complete the program within three to five years, depending on the number of classes in which they enroll each semester. Students are expected to enroll in all three semesters. Failure to make the expected amount of progress may result in reassignment to another internship year. The internship requires a commitment to a school system for a full academic year and is 1200 hours (12 credit hours). A maximum of 18 students will be admitted to this final-year experience. This paid internship must occur within a school setting and meet stringent criteria specified by the program and the National Association of School Psychologists. In addition, students must complete a thesis or program evaluation and earn a passing score on Praxis II Specialty Area Test in School Psychology before graduation.

Plan of Study: Ed.S. in School Psychology Requirements:

SPSY 603 Professional Competence II: Professional School Psychology

SPSY 620 Indirect Service Delivery II: Primary Prevention

SPSY 622 Data Based Decision Making II

SPSY 624 Data Based Decision Making III

SPSY 720 Counseling with Youth: Advanced Topics

SPSY 738 School Psychology Practicum I

SPSY 739 School Psychology Practicum II

~~SPSY 740 School Psychology Practicum III~~

SPSY 745 Internship in School Psychology

SPSY 750 Research III: Thesis Research

SPSY 751 Program Evaluation

CIRG 636 Educational Foundations II: Developmental Reading

Defend Thesis

Take Praxis II Specialty Examination in School Psychology

Total of 39 ~~42~~ hours required

Formatted: Highlight

## Request for Graduate Non-Curricular Changes

PLEASE USE THIS FORM FOR ALL NON-CURRICULAR CHANGE REQUESTS (changes in admission requirements or requirements for graduation, changes in existing or new policies/procedures, changes in program descriptions in catalog, general language changes in catalog).

SIGNATURES may not be required, depending on the nature of the request and from where it originates. Consult Graduate Council Chair.

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair.
3. **The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.**

College: COEPD Dept/Division: School Psychology

Contact Person: Lanai Jennings Phone: 6-2067

Rationale for Request:

Clarify 2-C rule for EdS in School Psychology

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.
NOTE: all requests may not require all signatures.

Department/Division Chair _____ Date Summer 2018

Registrar _____ Date 3-19-18

College Curriculum Committee Chair Christofero Date 5-15-18
(or Dean if no college curriculum committee)

Graduate Council Chair _____ Date 3-26-2018

NOTE: please complete information required on the following pages before obtaining signatures above.

1. **Current Catalog Description (if applicable)**: Please insert the catalog description from the current catalog for entries you would like to change.

SCHOOL PSYCHOLOGY, Ed.S.
Program Description The Ed.S. program in School Psychology is designed to prepare students to meet the Department of Education requirements for certification in West Virginia and other states. It is approved by the National Association of School Psychologists (NASP). Prior to pursuing the 42 hours of required coursework and field experiences that lead to the Ed.S. in School Psychology, a student must first complete the M.A. degree in Psychology with an area of emphasis in School Psychology, described in the Psychology section of this catalog. After successfully completing the first semester of the master's degree program, students may apply to the Ed.S. program. Students already possessing graduate degrees in psychology, counseling or education do not need to obtain the M.A. degree in Psychology with an area of emphasis in School Psychology. When these students apply to the Ed.S. in School Psychology program, they will be considered for advanced standing based upon a review of coursework, grades, and test scores by the School Psychology faculty.
Admission Requirements
Admission is competitive because of the limited number of available internships. Applicants should follow the admissions process described in this catalog or at the Graduate Admissions website at www.marshall.edu/graduate/admissions/how-toapply-for-admission. In addition, applicants must: • submit a sample of their professional writing (a scholarly paper on any subject) and a statement of their professional goals (1000 words or fewer). Submit all materials to Graduate Admissions. Creating a diverse student body is a priority and minority applicants are encouraged to apply. A limited number of graduate assistantships are available. Students can be accepted into the school psychology program throughout the school year; however, school psychology competency classes begin in the fall semester of each academic year.
Program Requirements
During the second semester in the master's degree in psychology with an emphasis in School Psychology, students will apply for admission to the Ed.S. in School Psychology program. Students are admitted to the Ed.S. program with the expectation that they will complete the program within three to five years, depending on the number of classes in which they enroll each semester. Students are expected to enroll in all three semesters. Failure to make the expected amount of progress may result in reassignment to another internship year. The internship requires a commitment to a school system for a full academic year and is 1200 hours (12 credit hours). A maximum of 18 students will be admitted to this final-year experience. This paid internship must occur within a school setting and meet stringent criteria specified by the program and the National Association of School Psychologists. In addition, students must complete a thesis or program evaluation and earn a passing score on Praxis II Specialty Area Test in School Psychology before graduation.
Plan of Study: Ed.S. in School Psychology Requirements:

SPSY 603 Professional Competence II: Professional School Psychology
SPSY 620 Indirect Service Delivery II: Primary Prevention
SPSY 622 Data Based Decision Making II
SPSY 624 Data Based Decision Making III
SPSY 720 Counseling with Youth: Advanced Topics
SPSY 738 School Psychology Practicum I
SPSY 739 School Psychology Practicum II

2. **Edits to current description**: Attach or insert a PDF copy of the current catalog description prepared in MS WORD with strikethroughs to mark proposed deletions and use the highlight function to indicate proposed new text.

Attached

3. **New Catalog Description**: Provide a "clean" copy of your proposed description without strikethroughs or highlighting. This should be what you are proposing for the new description.

Attached

## Request for Graduate Non-Curricular Changes – Page 5

Please insert below your proposed change information for the Graduate Council agenda.

Type of change request: Change in catalog

Department: COEPD

Degree program: School Psychology

Effective date (fall/spring/summer, year): Summer 2018

**SCHOOL PSYCHOLOGY, Ed.S. Program Description**

The Ed.S. program in School Psychology is designed to prepare students to meet the Department of Education requirements for certification in West Virginia and other states. It is approved by the National Association of School Psychologists (NASP). Prior to pursuing the 42 hours of required coursework and field experiences that lead to the Ed.S. in School Psychology, a student must first complete the M.A. degree in Psychology with an area of emphasis in School Psychology, described in the Psychology section of this catalog. After successfully completing the first semester of the master's degree program, students may apply to the Ed.S. program. Students already possessing graduate degrees in psychology, counseling or education do not need to obtain the M.A. degree in Psychology with an area of emphasis in School Psychology. When these students apply to the Ed.S. in School Psychology program, they will be considered for advanced standing based upon a review of coursework, grades, and test scores by the School Psychology faculty. Admission Requirements Admission is competitive because of the limited number of available internships. Applicants should follow the admissions process described in this catalog or at the Graduate Admissions website at www.marshall.edu/graduate/admissions/how-toapply-for-admission. In addition, applicants must:

• submit a sample of their professional writing (a scholarly paper on any subject) and a statement of their professional goals (1000 words or fewer). Submit all materials to Graduate Admissions. Creating a diverse student body is a priority and minority applicants are encouraged to apply. A limited number of graduate assistantships are available. Students can be accepted into the school psychology program throughout the school year; however, school psychology competency classes begin in the fall semester of each academic year. Program Requirements During the second semester in the master's degree in psychology with an emphasis in School Psychology, students will apply for admission to the Ed.S. in School Psychology program. Students are admitted to the Ed.S. program with the expectation that they will complete the program within three to five years, depending on the number of classes in which they enroll each semester. Students are expected to enroll in all three semesters. Failure to make the expected amount of progress may result in reassignment to another internship year. The internship requires a commitment to a school system for a full academic year and is 1200 hours (12 credit hours). A maximum of 18 students will be admitted to this final-year experience. This paid internship must occur within a school setting and meet stringent criteria specified by the program and the National Association of School Psychologists. In addition, students must complete a thesis or program evaluation and earn a passing score on Praxis II Specialty Area Test in School Psychology before graduation.

In the event a graduate candidate receives a second grade of C or below (including No Credit) in the specialist-level school psychology program, he or she will be placed on a remediation plan and be required to retake one course selected by his or her advisor. In the event a candidate receives a third grade of C or lower in the specialist program, the candidate will then be dismissed from the program. Dismissal will occur even if the second and third grades of C or below (including No Credit) are earned 1) simultaneously during the same semester or 2) in the same course (for example, a student received a C in SPSY 618 the first semester and again receives a C during the retake attempt). NOTE: Due to the significance of content in SPSY 618, SPSY 622, and SPSY 624 to the field of school psychology, all grades of C or below must be retaken regardless of the candidate's other course grades. Additionally, candidates with graduate GPAs that fall below a 3.0 will be additionally dismissed.

Plan of Study: Ed.S. in School Psychology Requirements:

SPSY 603 Professional Competence II: Professional School Psychology

SPSY 620 Indirect Service Delivery II: Primary Prevention

SPSY 622 Data Based Decision Making II

SPSY 624 Data Based Decision Making III

SPSY 720 Counseling with Youth: Advanced Topics

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SPSY 739 School Psychology Practicum II

SPSY 740 School Psychology Practicum III

SPSY 745 Internship in School Psychology

SPSY 750 Research III: Thesis Research

SPSY 751 Program Evaluation

CIRG 636 Educational Foundations II: Developmental Reading

Defend Thesis

Take Praxis II Specialty Examination in School Psychology

Total of 42 hours required

**SCHOOL PSYCHOLOGY, Ed.S. Program Description**

The Ed.S. program in School Psychology is designed to prepare students to meet the Department of Education requirements for certification in West Virginia and other states. It is approved by the National Association of School Psychologists (NASP). Prior to pursuing the 42 hours of required coursework and field experiences that lead to the Ed.S. in School Psychology, a student must first complete the M.A. degree in Psychology with an area of emphasis in School Psychology, described in the Psychology section of this catalog. After successfully completing the first semester of the master's degree program, students may apply to the Ed.S. program. Students already possessing graduate degrees in psychology, counseling or education do not need to obtain the M.A. degree in Psychology with an area of emphasis in School Psychology. When these students apply to the Ed.S. in School Psychology program, they will be considered for advanced standing based upon a review of coursework, grades, and test scores by the School Psychology faculty. Admission Requirements Admission is competitive because of the limited number of available internships. Applicants should follow the admissions process described in this catalog or at the Graduate Admissions website at www.marshall.edu/graduate/admissions/how-toapply-for-admission. In addition, applicants must:

• submit a sample of their professional writing (a scholarly paper on any subject) and a statement of their professional goals (1000 words or fewer). Submit all materials to Graduate Admissions. Creating a diverse student body is a priority and minority applicants are encouraged to apply. A limited number of graduate assistantships are available. Students can be accepted into the school psychology program throughout the school year; however, school psychology competency classes begin in the fall semester of each academic year. Program Requirements During the second semester in the master's degree in psychology with an emphasis in School Psychology, students will apply for admission to the Ed.S. in School Psychology program. Students are admitted to the Ed.S. program with the expectation that they will complete the program within three to five years, depending on the number of classes in which they enroll each semester. Students are expected to enroll in all three semesters. Failure to make the expected amount of progress may result in reassignment to another internship year. The internship requires a commitment to a school system for a full academic year and is 1200 hours (12 credit hours). A maximum of 18 students will be admitted to this final-year experience. This paid internship must occur within a school setting and meet stringent criteria specified by the program and the National Association of School Psychologists. In addition, students must complete a thesis or program evaluation and earn a passing score on Praxis II Specialty Area Test in School Psychology before graduation.

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Plan of Study: Ed.S. in School Psychology Requirements:

SPSY 603 Professional Competence II: Professional School Psychology

SPSY 620 Indirect Service Delivery II: Primary Prevention

SPSY 622 Data Based Decision Making II

SPSY 624 Data Based Decision Making III

SPSY 720 Counseling with Youth: Advanced Topics

SPSY 738 School Psychology Practicum I

SPSY 739 School Psychology Practicum II

SPSY 740 School Psychology Practicum III

SPSY 745 Internship in School Psychology

SPSY 750 Research III: Thesis Research

SPSY 751 Program Evaluation

CIRG 636 Educational Foundations II: Developmental Reading

Defend Thesis

Take Praxis II Specialty Examination in School Psychology

Total of 42 hours required

# Request for Graduate Addition, Deletion, or Change of a Major or Degree

NOTE: Before you submit a request for a new Major or Degree, you must submit an INTENT TO PLAN form. Only after the INTENT TO PLAN goes through the approval process are you ready to submit this request for a new Major or Degree. For detailed information on new programs please see: http://wvhepcdoc.wvnet.edu/resources/133-11.pdf.

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one PDF copy without signatures to the Graduate Council Chair.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: CoEPD

Dept/Division: Doctoral Programs in Education

Contact Person: Elizabeth Campbell

Phone: 304.746.1984

Degree Program: EdD Curriculum and Instruction

Check action requested: ☐ Addition ☐ Deletion ☒ Change

Effective Term/Year: Fall 20 [18] Spring 20 [ ] Summer 20 [ ]

***Information on the following pages must be completed before signatures are obtained.***

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head [signature] | Date 3/13/18 |
| College Curriculum Chair [signature] | Date 5/15/18 |
| College Dean Sandra S Stroebel | Date 3-27-18 |
| Graduate Council Chair [signature] | Date 3-26-2018 |
| Provost/VP Academic Affairs | Date |
| Presidential Approval | Date |
| Board of Governors Approval | Date |

# Request for Graduate Addition, Deletion, or Change of a Major or Degree-Page 2

Please provide a rationale for addition, deletion, change: (May attach separate page if needed)

In Fall 2015, the Leadership Studies and Curriculum and Instruction EdD programs revised curricula to reflect contemporary disciplinary trends and student needs; to address declining enrollment; and to situate Marshall University in a more competitive position in the market for terminal degree offerings. Faculty in the C&I EdD program now propose eliminating EDF 719: Introduction to Doctoral Studies, a one credit course students previously took during their first fall semester: first, because faculty have created a Blackboard Organization to house all content previously provided in EDF 719 (which will remain available to students throughout their doctoral careers); and second, in light of tuition trends, eliminating the one credit course will improve affordability.

Please describe any changes in curriculum:
List course number, title, credit hours. Note whether each course is required or optional. Enter NONE if no change. (May attach separate page if needed)

REMOVE: EDF 719: Introduction to Doctoral Studies, 01 credit hours, required

**1. ADDITIONAL RESOURCE REQUIREMENTS**: If your program requires additional faculty, equipment or specialized materials to ADD or CHANGE this major or degree, attach an estimate of the time and money required to secure these items.
NOTE: Approval of this form does not imply approval for additional resources. Enter NONE if not applicable.

NONE

**2. NON-DUPLICATION:** If a question of possible duplication occurs, attach a copy of the correspondence sent to the appropriate department(s) describing the request and any response received from them. Enter NONE if not applicable.

NONE

***For catalog changes as a result of the above actions, please fill in the following pages.***

# Request for Graduate Addition, Deletion, or Change of a Major or Degree-Page 3

**3. *Current* Catalog Description**

Insert the *Current* Catalog Description and page number from the latest catalog for entries you would like to change. (May attach separate page if needed)

p. 109
Curriculum and Instruction, Ed.D.
This program is designed to offer the opportunity to earn the Doctor of Education (Ed.D.) degree in Curriculum and Instruction. Coursework and other requirements will be met on the South Charleston campus. The mission of the doctoral program in education is to prepare practitioners to be reflective, ethical educators and researchers who contribute to the field of education. Program faculty are committed to creating a community of scholars through mentoring, engaging in collaborative research, and maintaining a focus on sound educational practices.

Acceptance into the Program
The decision to admit an applicant to doctoral work constitutes a significant commitment from the faculty of the department in the form of advising, teaching, chairing or serving on the student's committee, preparing and evaluating examinations, and guiding the successful completion of the dissertation. The applicant should note that the decision to admit students to the doctoral program is a collective judgment of the program faculty and represents their determination of the likelihood of the candidate to succeed in all major phases of the degree program. These judgments take into account the applicant's professional experiences, communication and thinking skills, and other relevant capabilities. Thus, an applicant is not automatically admitted on the basis of meeting only the minimum criteria.

An applicant must have earned at least a master's degree from an accredited institution in Educational Leadership, Curriculum and Instruction, or a related field. Details of all admission requirements and other pertinent information can be found at www.marshall.edu/edd.

**4. *Edits* to the Current Description**

Attach a PDF copy of the current catalog description prepared in MS WORD with strikethroughs to mark proposed deletions and use the highlight function to indicate proposed new text.

# Request for Graduate Addition, Deletion, or Change of a Major or Degree-Page 4

**5. *New* Catalog Description**

Insert a 'clean' copy of your proposed description, i.e., no strikethroughs or highlighting included. This should be what you are proposing for the new description. (May attach separate page if needed)

NO CHANGE TO CATALOG; SEE ATTACHED FOR CHANGES TO CURRICULUM AS REFLECTED ON EDD WEBSITE.

# Request for Graduate Addition, Deletion, or Change of a Major or Degree-Page 5

Please insert in the text box below your change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings):

Department:
Major or Degree:
Type of Change: *(addition, deletion, change)*
Rationale:

Department: Doctoral Programs in Education
Major or Degree: EdD, Curriculum and Instruction
Type of Change: Change
Rationale: In Fall 2015, the Leadership Studies and Curriculum and Instruction EdD programs revised curricula to reflect contemporary disciplinary trends and student needs; to address declining enrollment; and to situate Marshall University in a more competitive position in the market for terminal degree offerings. Faculty in the C&I EdD program now propose eliminating EDF 719: Introduction to Doctoral Studies, a one credit course students previously took during their first fall semester: first, because faculty have created a Blackboard Organization to house all content previously provided in EDF 719 (which will remain available to students throughout their doctoral careers); and second, in light of tuition trends, eliminating the one credit course will improve affordability.

ATTACHMENT 1 CURRENT PLAN W/CHANGES MARKED


# Doctoral Program of Study

**Doctor of Education**
**Curriculum and Instruction**

Name: _____ Date: _____

Student ID: _____

Area of Emphasis: _____

Committee Chair: _____

Mailing Address

Street: _____

City: _____ Zip: _____

Phone (H): _____ Phone (W): _____

Email: _____

Preparing the Experienced Professional as Specialist

**Required Core Courses[1] (21 hours)**

| | | HOURS | SEMESTER | GRADE |
|---|---|---|---|---|
| CI 701 | Curriculum Development | 3 | | |
| CI 702 | Curriculum Theories | 3 | | |
| CI 703 | Theories, Models, and Research of Teaching | 3 | | |
| CI 704 | Social, Cultural, and Political Determinants of Curriculum | 3 | | |
| CIEC 700 | Technology and Curriculum | 3 | | |
| EDF 635 | Policy Studies in Education | 3 | | |
| CI 627 | Program Planning and Evaluation | 3 | | |

**Course Hours Completed:** _____

**Area of Emphasis Courses[2] (min. 9 hours)**

| | | HOURS | SEMESTER | GRADE |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**Area of Emphasis Hours Completed:** _____

**Area of Emphasis Rationale:**

18

**Research and Support Courses (~~19~~ hours)**

| | | HOURS | SEMESTER | GRADE |
|---|---|---|---|---|
| ~~EDF 719~~ | ~~Introduction to Doctoral Studies~~ | ~~1~~ | | |
| EDF 703 | Research Design | 3 | | |
| EDF 676 | Statistical Methods | 3 | | |
| EDF 625 | Qualitative Research in Education | 3 | | |
| CI 677 | Writing for Publication | 3 | | |
| EDF 711 | Survey Research in Education ~~(PR: EDF 703)~~ | 3 | | |
| EDF 776 or EDF 725 | Computer Analysis in Research (PR: EDF 676) Advanced Qualitative Research (PR: EDF 625) | 3 | | |

**Research and Support Hours Completed:** _____

**Dissertation Courses (min. 9 hours)**

| | | HOURS | SEMESTER | GRADE |
|---|---|---|---|---|
| CI 797 | Dissertation Research | | | |

**Dissertation Hours Completed:** _____

**Total Hours Completed:** _____

[1] Use * to denote hours taken from a master's degree. No more than 12 master's hours may be applied to the Ed.D in C&I.
[2] Area of emphasis hours must be taken after admission to the Ed.D. in C&I.

| Printed Name | Signature | Date |
|---|---|---|
| *Student* | | |
| *Committee Chairperson – major area* | | |
| *Committee Member – major area* | | |
| *Committee Member – external* | | |
| *Committee Member – optional* | | |

| | | |
|---|---|---|
| Dr. Lisa Heaton<br>*Program Director* | | |
| Dr. Elizabeth Campbell<br>*C&I Program Coordinator* | | |
| Dr. Teresa Eagle<br>*CoEPD Dean* | | |

Attachment 2 CLEAN PLAN

MARSHALL UNIVERSITY™

# Doctoral Program of Study

**Doctor of Education**
**Curriculum and Instruction**

Name: _____ Date: _____

Student ID: _____

Area of Emphasis: _____

Committee Chair: _____

Mailing Address

Street: _____

City: _____ Zip: _____

Phone (H): _____ Phone (W): _____

Email: _____

Preparing the Experienced Professional as Specialist

**Required Core Courses[1] (21 hours)**

| | | HOURS | SEMESTER | GRADE |
|---|---|---|---|---|
| CI 701 | Curriculum Development | 3 | | |
| CI 702 | Curriculum Theories | 3 | | |
| CI 703 | Theories, Models, and Research of Teaching | 3 | | |
| CI 704 | Social, Cultural, and Political Determinants of Curriculum | 3 | | |
| CIEC 700 | Technology and Curriculum | 3 | | |
| EDF 635 | Policy Studies in Education | 3 | | |
| CI 627 | Program Planning and Evaluation | 3 | | |

**Course Hours Completed:** _____

**Area of Emphasis Courses[2] (min. 9 hours)**

| | | HOURS | SEMESTER | GRADE |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**Area of Emphasis Hours Completed:** _____

**Area of Emphasis Rationale:**

**Research and Support Courses (19 hours)**

| | | HOURS | SEMESTER | GRADE |
|---|---|---|---|---|
| EDF 719 | Introduction to Doctoral Studies | 1 | | |
| EDF 703 | Research Design | 3 | | |
| EDF 676 | Statistical Methods | 3 | | |
| EDF 625 | Qualitative Research in Education | 3 | | |
| CI 677 | Writing for Publication | 3 | | |
| EDF 711 | Survey Research in Education | 3 | | |
| EDF 776 or EDF 725 | Computer Analysis in Research (PR: EDF 676) Advanced Qualitative Research (PR: EDF 625) | 3 | | |

**Research and Support Hours Completed:** _____

**Dissertation Courses (min. 9 hours)**

| | | HOURS | SEMESTER | GRADE |
|---|---|---|---|---|
| CI 797 | Dissertation Research | | | |

**Dissertation Hours Completed:** _____

**Total Hours Completed:** _____

[1] Use * to denote hours taken from a master's degree. No more than 12 master's hours may be applied to the Ed.D in C&I.
[2] Area of emphasis hours must be taken after admission to the Ed.D. in C&I.

| Printed Name | Signature | Date |
|---|---|---|
| *Student* | | |
| *Committee Chairperson – major area* | | |
| *Committee Member – major area* | | |
| *Committee Member – external* | | |
| *Committee Member – optional* | | |

| | | |
|---|---|---|
| Dr. Lisa Heaton<br>*Program Director* | | |
| Dr. Elizabeth Campbell<br>*C&I Program Coordinator* | | |
| Dr. Teresa Eagle<br>*CoEPD Dean* | | |

## Request for Graduate Non-Curricular Changes

PLEASE USE THIS FORM FOR ALL NON-CURRICULAR CHANGE REQUESTS (changes in admission requirements or requirements for graduation, changes in existing or new policies/procedures, changes in program descriptions in catalog, general language changes in catalog).

SIGNATURES may not be required, depending on the nature of the request and from where it originates. Consult Graduate Council Chair.

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair.
3. **The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.**

College: College of Health Professions (COHP) Dept/Division: Department of Public Health

Contact Person: Dr. Anthony Woart Phone: 304-696-5772

Rationale for Request:

We have determined that applicant's GRE score or equivalent exam (MCAT,PCAT) does not determine the applicant's success in completing the MPH program.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.
NOTE: all requests may not require all signatures.

Department/Division Chair Anthony T. Woart Digitally signed by Anthony T. Woart Date: 2018.04.20 10:03:35 -04'00' Date Fall 2018

Registrar [signature] Date 4-20-18

College Curriculum Committee Chair [signature] Date 4-20-18
(or Dean if no college curriculum committee)

Graduate Council Chair [signature] Date 5/13/18

NOTE: please complete information required on the following pages before obtaining signatures above.

## Request for Graduate Non-Curricular Changes – Page 2

1. **Current Catalog Description (if applicable)**: Please insert the catalog description from the current catalog for entries you would like to change.

Admission
Students may be admitted to study for either fall or spring semester; however, spring matriculation for study in Research, Evaluation and Policy is made only in exceptional circumstances. Limited credit (6 hours maximum) may be granted to students transferring from CEPH-accredited programs.
Applicants must follow the admissions process at the Graduate Admissions website at www.marshall.edu/graduate/ admissions/how-to-apply-for-admission. Specific additional program requirements include:
• Admitted students must hold a bachelor's degree from an accredited college or university with a minimum undergraduate grade-point average of 3.0 on a 4.0 scale. Waivers to the requirement may be made in exceptional circumstances, such as when prior satisfactory graduate school performance has been demonstrated.
• Applicants must submit scores for either the Graduate Record Examination (GRE), or from an alternative doctoral level health professions examination {MCAT, PCAT) administered within five years. Applicants holding either doctoral level health practice degree, or J.D. are exempt from the standardized exam requirement.
• Submission of three {3) letters of recommendation. At least two must from previous faculty if the applicant has engaged in full-time post-secondary study in the previous five years.
• Resume of work history or curriculum vitae, to describe both post-secondary work and study.
• Personal statement not to exceed two pages in length. Applications are evaluated on a competitive basis, and individual interviews may be utilized in the admissions process.

2. **Edits to current description**: Attach or insert a PDF copy of the current catalog description prepared in MS WORD with strikethroughs to mark proposed deletions and use the highlight function to indicate proposed new text.

Admission

Students may be admitted to study for either fall or spring semester; however, spring matriculation for study in Research, Evaluation and Policy is made only in exceptional circumstances. Limited credit (6 hours maximum) may be granted to students transferring from CEPH-accredited programs.

Applicants must follow the admissions process at the Graduate Admissions website at www.marshall.edu/graduate/ admissions/how-to-apply-for-admission. Specific additional program requirements include:

• Admitted students must hold a bachelor's degree from an accredited college or university with a minimum undergraduate grade-point average of 3.0 on a 4.0 scale. Waivers to the requirement may be made in exceptional circumstances, such as when prior satisfactory graduate school performance has been demonstrated.

• ~~Applicants must submit scores for either the Graduate Record Examination (GRE), or from an alternative doctoral level health professions examination (MCAT, PCAT) administered within five years. Applicants holding either doctoral level health practice degree, or J.D. are exempt from the standardized exam requirement.~~

• Submission of three {3) letters of recommendation. At least two must from previous faculty if the applicant has engaged in full-time post-secondary study in the previous five years.

• Resume of work history or curriculum vitae, to describe both post-secondary work and study.

• Personal statement not to exceed two pages in length. Applications are evaluated on a competitive basis, and individual interviews may be utilized in the admissions process.

3. **New Catalog Description**: Provide a "clean" copy of your proposed description without strikethroughs or highlighting. This should be what you are proposing for the new description.

Admission
Students may be admitted to study for either fall or spring semester; however, spring matriculation for study in Research, Evaluation and Policy is made only in exceptional circumstances. Limited credit (6 hours maximum) may be granted to students transferring from CEPH-accredited programs.
Applicants must follow the admissions process at the Graduate Admissions website at www.marshall.edu/graduate/ admissions/how-to-apply-for-admission. Specific additional program requirements include:
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• Submission of three {3) letters of recommendation. At least two must come from previous faculty if the applicant has engaged in full-time post-secondary study in the previous five years.
• Resume of work history or curriculum vitae, to describe both post-secondary work and study.
• Personal statement not to exceed two pages in length. Applications are evaluated on a competitive basis, and individual interviews may be utilized in the admissions process.

## Request for Graduate Non-Curricular Changes – Page 5

Please insert below your proposed change information for the Graduate Council agenda.

Type of change request: Removal of GRE and equivalent exam as a requirement for student admission.

Department: Department of Public Health

Degree program: MPH Program

Effective date (fall/spring/summer, year): Fall 2018

Chair: Tracy Christofero | **GC#1: Area of Emphasis**

# Request for Graduate Addition, Deletion, or Change of Area of Emphasis-Page 1

1.Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2.E-mail one PDF copy without signatures to the Graduate Council Chair. If attachments included, please merge into a single file.
3.***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Science

Dept/Division: Biological Sciences

Contact Person: Anne Axel

Phone: 696-2426

Action Requested

Check action requested: ☐ Addition ☒ Deletion ☐ Change

Degree Program Biological Sciences

Area of Emphasis Organismal, Evolutionary, and Ecological Biology

Effective Term/Year Fall 20 [18] Spring 20 [ ] Summer 20 [ ]

Notifications

Attach a copy of written notification regarding this curriculum request to the following:

**1.** Statement of Non-Duplication: If this area of emphasis will be similar in title or content to an existing area of emphasis, please send a memo to the affected department/division and include a copy with this packet as well as the response received from the affected department.

2. If your department/division requires additional faculty, equipment, or specialized materials, attach an estimate of cost and time required to secure these items.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date 27 March 2018 |
| Registrar | Date 3-27-18 |
| College Curriculum Chair | Date 3-28-18 |
| College Dean | Date 30 MARCH 2018 |
| Graduate Council Chair T Christofero | Date 5/15/18 |
| Provost/VP Academic Affairs | Date |
| President | Date |

# Request for Graduate Addition, Deletion, or Change of Area of Emphasis-Page 2

1. Please provide a rationale for addition, deletion, change:

The area of emphasis is redundant. It is so broad that it is essentially the same as the Biological Sciences major. The Area of Emphasis is not distinct from the major itself.

2. Please describe any changes in curriculum:
Course number, title, credit hours. Note whether each course is required or optional. Enter NONE if no change.

NONE

3. **Additional Resource Requirements:** If your program requires additional faculty, equipment or specialized materials to ADD or CHANGE this Area of Emphasis attach an estimate of the time and money required to secure these items. May attach separate page if needed
NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

4. **NON-DUPLICATION:**
If a question of possible duplication occurs, attach a copy of the correspondence sent to the appropriate department(s) describing the request and any response received from them.
Enter NONE if not applicable.

NONE

***For catalog changes as a result of the above action, please fill in the following pages.***

# Request for Graduate Addition, Deletion, or Change of Area of Emphasis-Page 3

5. ***Current* Catalog Description**
Insert the *Current* Catalog Description and page number from the latest catalog for entries you would like to change.
(May attach separate page if needed)
Please see attached.

6. ***Edits* to the Current Description**
Attach a PDF copy of the current catalog description prepared in MS Word with strikethroughs to mark proposed deletions and use the highlight function to indicate proposed new text.

7. ***New* Catalog Description**
Insert a 'clean' copy of your proposed description, i.e., no strikethroughs or highlighting included. This should be what you are proposing for the new description. (May attach separate page if needed)

NONE

## M.S. Degree Requirements

- Students must complete at least 32 hours of graduate coursework, including the thesis. The maximum amount of credit that may be earned for the thesis (BSC 681) is 12 hours.
- Candidates for the M.S. degree must register for and participate in six hours of Graduate Seminar (BSC 660 and 661 during their first year and BSC 662 in at least two subsequent semesters) during each of the semesters in which they are actively enrolled in the graduate program and complete at least 18 hours in graded BSC electives at the graduate level (which may include BSC 660, 661, 662, and 681).
- Not more than 6 hours of seminar (BSC 660, 661, 662) may be used to complete the 32-hour requirement.
- Not more than 4 semester hours credit in Independent Study (BSC 585-588) or Special Problems (BSC 650-652) may be used to complete the 32 hour requirement, and these may only be applied beyond the 18 hours in BSC graduate credits.
- Students may elect to take 6 hours of graduate work in a minor field.
- Successful completion of the program in Biological Sciences requires a GPA of 3.0 or higher, and no more than 6 credit hours of "C" grades may be applied to the total hours for graduation. Upon completion of course requirements and the thesis, M.S. candidates must pass a comprehensive oral examination.

## M.A. Degree Requirements

- Students who select the M.A. option must complete a minimum of 36 hours of graduate coursework.
- M.A. candidates do not conduct thesis research. The Graduate Seminar, BSC electives, Independent Study/Special Problems, GPA, "C" grades, and comprehensive oral exam requirements are as stated for the M.S. degree.

## Area of Emphasis in Organismal, Evolutionary, and Ecological Biology

Organismal, Evolutionary, and Ecological Biology as an area of emphasis in Biological Sciences will provide participating students with a broad background in biology at the level of the individual organism and above. The anatomy, structure, and function of individual species are stressed, as is the comparative natural history and evolutionary relationships of groups of related organisms. Lastly, the roles of organisms in a broader context is studied via the analysis of ecological relationships. The intent of this area of emphasis is to serve students engaged in natural history studies, students engaged in the assessment of environmental impacts on species and communities, and those focusing on the detailed anatomy, structure, and function of individual organisms both recent and fossil. Students choosing this major will be well-prepared to pursue careers or further education in the environmental sciences, environmental mitigation, resource management, and ecological impact assessment. Others choosing this area of emphasis will be prepared for the study of evolutionary biology, biomechanics, and the natural history of groups of organisms ranging from today's plants to fossil reptiles and mammals.

**Degree Requirements for Area of Emphasis**

| | | |
|---|---|---|
| BSC | 660 | Introductory Graduate Seminar |
| BSC | 661 | Seminar I |
| BSC | 662 | Seminar II |
| BSC | 681 | Thesis, up to 12 hrs. |
| | | (If only 9 hours of thesis are taken, select an additional course(s) from the list below. |

**Additional Courses from which to select (at least 14 hours for M.S. and 18 hours for M.A.)**

| | | |
|---|---|---|
| BSC | 501 | Ichthyology |
| BSC | 505 | Economic Botany |
| BSC | 506 | Herpetology |
| BSC | 508 | Ornithology |
| BSC | 509 | Mammalogy |
| BSC | 513 | Principles of Organic Evolution |
| BSC | 516 | Plant Taxonomy |
| BSC | 517 | Biostatistics |
| BSC | 524 | Animal Parasitology |
| BSC | 525 | Biosystematics |
| BSC | 526 | Medical Entomology |
| BSC | 530 | Plant Ecology |
| BSC | 560 | Conservation Forest Soil Wildlife |
| BSC | 610 | Advanced Vertebrate Morphology |
| BSC | 620 | Taxonomy of Vascular Plants |

Additional electives not listed above may be included in a student's program of study if determined by the advisor to be appropriate to this area of emphasis.

## Area of Emphasis in Watershed Resource Science

Watershed Resource Science as an area of emphasis in Biological Sciences will provide participating students with a systematic and integrated approach to the study of water resources as well as the analysis and implementation of the most effective way to assess their quality and manage their use and conservation. In this program, the integration of course offerings in assessment, informatics, and management into traditional and integrated science curricula provides students with the knowledge base necessary to effectively and innovatively assess and manage water resources.

**Admissions Requirements for Watershed Resource Science Area of Emphasis**

- Must be admitted to the BSC master's degree program;
- Must have a bachelor's degree which includes a minimum of 6 courses from the following disciplines: two courses in mathematics (must include 1 semester of calculus and one semester of statistics); two courses in physical science (physics, chemistry, geology, etc.); and two courses in life science (biology, agronomy, microbiology, etc.).

**Degree Requirements for Watershed Resource Science Area of Emphasis**

- The curriculum of this program is made up of a research component, a core of required courses, and specialization in either environmental assessment, environmental management, or environmental informatics.
- Students choosing the M.S. option must complete 32 hours of coursework including up to six hours of thesis.
- Students choosing a non-thesis option will receive an M.A. degree and must complete 36 hours of credit.
- The M.A. degree also requires completion of a minimum of three hours of independent study credit.
- A minimum of sixteen hours for M.S. and eighteen hours for M.A. degrees must be completed in coursework at the 600 level.
- A successful graduate must complete the research core, which may be a thesis (M.S.) or independent study (M.A.) project, the core of required courses, and courses in a specialization chosen in collaboration with a faculty advisor.

## Graduate Certificate Program in Bioinformatics

The Marshall University bioinformatics certificate is designed to develop a working understanding of a variety of techniques and methods for analyzing vast amounts of biological data. The source of information may be associated with recent genomic research, but may also include data sets related to other complex biological problems involving such topics as structure modeling, database mining, and visualization.

The certificate is designed to complement existing degrees and to suit the needs of students and professionals who want to specialize in the fast-expanding field of bioinformatics. The certificate curriculum is interdisciplinary and includes courses from the College of Science, the College of Information Technology and Engineering, and the Joan C. Edwards School of Medicine. Through completion of the certificate, student will have acquired the necessary skills to analyze and interpret the large data sets using various bioinformatics tools.

Students who should apply for the certificate program would be biology, mathematics, chemistry, physics, and medical/biomedical students or medical doctors who desire to acquire skills required to understand bioinformatics methods and technology; computer science students who wish to understand biological concepts that can be analyzed using their programming skills; or health care processionals (medical, pharmaceutical, and agricultural industries) who desire to acquire bioinformatics knowledge relevant to their fields of expertise.

Students will earn the certificate by completing 15 credit hours, including 9 credit hours from 3 core courses, 3 credit hours from a first elective course, and another 3 credit hours from a second elective.

**Admissions Requirements**

1. Both senior-level undergraduate students with overall GPAs of at least 2.75 and graduate students may enroll in the certificate program.
2. Both undergraduate and graduate students must satisfy the following prerequisite requirement: Successful completion (grade of *C* or better) of MTH 140 or MTH 229, and one of MTH 225, MTH 326, or MTH 345.

**Curriculum**

*Required courses:*

| | | |
|---|---|---|
| CS | 505 | Computing for Bioinformatics |
| BSC | 550 | Molecular Biology |
| CS | 645 | Advanced Topics in Bioinformatics |

*(continued)*

## Area of Emphasis in Organismal, Evolutionary, and Ecological Biology

Organismal, Evolutionary, and Ecological Biology as an area of emphasis in Biological Sciences will provide participating students with a broad background in biology at the level of the individual organism and above. The anatomy, structure, and function of individual species are stressed, as is the comparative natural history and evolutionary relationships of groups of related organisms. Lastly, the roles of organisms in a broader context is studied via the analysis of ecological relationships.

The intent of this area of emphasis is to serve students engaged in natural history studies, students engaged in the assessment of environmental impacts on species and communities, and those focusing on the detailed anatomy, structure, and function of individual organisms both recent and fossil. Students choosing this major will be well prepared to pursue careers or further education in the environmental sciences, environmental mitigation, resource management, and ecological impact assessment. Others choosing this area of emphasis will be prepared for the study of evolutionary biology, biomechanics, and the natural history of groups of organisms ranging from today's plants to fossil reptiles and mammals.

Degree Requirements for Area of Emphasis
BSC 660 Introductory Graduate Seminar
BSC 661 Seminar I
BSC 662 Seminar II
BSC 681 Thesis, up to 12 hrs.
(If only 9 hours of thesis are taken, select an additional course(s) from the list below.
Additional Courses from which to select (at least 14 hours for M.S. and 18 hours for M.A.)
BSC 501 Ichthyology
BSC 505 Economic Botany
BSC 506 Herpetology
BSC 508 Ornithology
BSC 509 Mammalogy
BSC 513 Principles of Organic Evolution
BSC 516 Plant Taxonomy
BSC 517 Biostatistics
BSC 524 Animal Parasitology
BSC 525 Biosystematics
BSC 526 Medical Entomology
BSC 530 Plant Ecology
BSC 560 Conservation Forest Soil Wildlife
BSC 610 Advanced Vertebrate Morphology
BSC 620 Taxonomy of Vascular Plants

Additional electives not listed above may be included in a student's program of study if determined by the advisor to be appropriate to this area of emphasis.

# Request for Graduate Addition, Deletion, or Change of Area of Emphasis-Page 4

Please insert in the text box below your Area of Emphasis change information for the Graduate Council agenda. Please enter the information exactly in this way (including headings):

Department:
Area of Emphasis Title:
Credit Hours:
Type of Change Requested: *(addition, deletion, change)*
Term to Take Effect: *(Fall, Spring, Summer/Year)*
Rationale:

Department: Biological Sciences
Area of Emphasis Title: Organismal, Evolutionary, and Ecological Biology
Credit Hours: M.S.: 36 hours; M.A.: 32 hours (no credit hours to be changed)
Type of Change Requested: (addition, deletion, change): deletion
Term to Take Effect: (Fall, Spring, Summer/Year): Fall 2018
Rationale: The area of emphasis is redundant. It is so broad that it is essentially the same as the Biological Sciences major. The Area of Emphasis is not distinct from the major itself.

Chair: Tracy Christofero | **GC#1: Area of Emphasis**

# Request for Graduate Addition, Deletion, or Change of Area of Emphasis-Page 1

1.Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2.E-mail one PDF copy without signatures to the Graduate Council Chair. If attachments included, please merge into a single file.
3.***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Science

Dept/Division: Biological Sciences

Contact Person: Anne Axel

Phone: 696-2426

Action Requested

Check action requested: ☐ Addition ☒ Deletion ☐ Change

Degree Program Biological Sciences

Area of Emphasis Watershed Resource Science

Effective Term/Year Fall 20 [18] Spring 20 [ ] Summer 20 [ ]

Notifications

Attach a copy of written notification regarding this curriculum request to the following:

**1.** Statement of Non-Duplication: If this area of emphasis will be similar in title or content to an existing area of emphasis, please send a memo to the affected department/division and include a copy with this packet as well as the response received from the affected department.

2. If your department/division requires additional faculty, equipment, or specialized materials, attach an estimate of cost and time required to secure these items.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head | Date 27 March 2018 |
| Registrar 24101 | Date 3-27-18 |
| College Curriculum Chair | Date 3-28-18 |
| College Dean | Date 30 MARCH 2018 |
| Graduate Council Chair | Date 5/15/18 |
| Provost/VP Academic Affairs | Date |
| President | Date |

# Request for Graduate Addition, Deletion, or Change of Area of Emphasis-Page 2

1. Please provide a rationale for addition, deletion, change:

Instead of using Areas of Emphasis, the Department prefers to have the student, advisor, and committee work together to develop a personalized Plan of Study tailored to each student's thesis and career goals.

2. Please describe any changes in curriculum:
Course number, title, credit hours. Note whether each course is required or optional. Enter NONE if no change.

NONE

3. **Additional Resource Requirements:** If your program requires additional faculty, equipment or specialized materials to ADD or CHANGE this Area of Emphasis attach an estimate of the time and money required to secure these items. May attach separate page if needed
NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

4. **NON-DUPLICATION:**
If a question of possible duplication occurs, attach a copy of the correspondence sent to the appropriate department(s) describing the request and any response received from them.
Enter NONE if not applicable.

NONE

***For catalog changes as a result of the above action, please fill in the following pages.***

# Request for Graduate Addition, Deletion, or Change of Area of Emphasis-Page 3

5. ***Current* Catalog Description**

Insert the *Current* Catalog Description and page number from the latest catalog for entries you would like to change. (May attach separate page if needed)

Please see attached.

6. ***Edits* to the Current Description**

Attach a PDF copy of the current catalog description prepared in MS Word with strikethroughs to mark proposed deletions and use the highlight function to indicate proposed new text.

7. ***New* Catalog Description**

Insert a 'clean' copy of your proposed description, i.e., no strikethroughs or highlighting included. This should be what you are proposing for the new description. (May attach separate page if needed)

NONE

Additional electives not listed above may be included in a student's program of study if determined by the advisor to be appropriate to this area of emphasis.

## Area of Emphasis in Watershed Resource Science

Watershed Resource Science as an area of emphasis in Biological Sciences will provide participating students with a systematic and integrated approach to the study of water resources as well as the analysis and implementation of the most effective way to assess their quality and manage their use and conservation. In this program, the integration of course offerings in assessment, informatics, and management into traditional and integrated science curricula provides students with the knowledge base necessary to effectively and innovatively assess and manage water resources.

**Admissions Requirements for Watershed Resource Science Area of Emphasis**

- Must be admitted to the BSC master's degree program;
- Must have a bachelor's degree which includes a minimum of 6 courses from the following disciplines: two courses in mathematics (must include 1 semester of calculus and one semester of statistics); two courses in physical science (physics, chemistry, geology, etc.); and two courses in life science (biology, agronomy, microbiology, etc.).

**Degree Requirements for Watershed Resource Science Area of Emphasis**

- The curriculum of this program is made up of a research component, a core of required courses, and specialization in either environmental assessment, environmental management, or environmental informatics.
- Students choosing the M.S. option must complete 32 hours of coursework including up to six hours of thesis.
- Students choosing a non-thesis option will receive an M.A. degree and must complete 36 hours of credit.
- The M.A. degree also requires completion of a minimum of three hours of independent study credit.
- A minimum of sixteen hours for M.S. and eighteen hours for M.A. degrees must be completed in coursework at the 600 level.
- A successful graduate must complete the research core, which may be a thesis (M.S.) or independent study (M.A.) project, the core of required courses, and courses in a specialization chosen in collaboration with a faculty advisor.

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The certificate is designed to complement existing degrees and to suit the needs of students and professionals who want to specialize in the fast-expanding field of bioinformatics. The certificate curriculum is interdisciplinary and includes courses from the College of Science, the College of Information Technology and Engineering, and the Joan C. Edwards School of Medicine. Through completion of the certificate, student will have acquired the necessary skills to analyze and interpret the large data sets using various bioinformatics tools.

Students who should apply for the certificate program would be biology, mathematics, chemistry, physics, and medical/biomedical students or medical doctors who desire to acquire skills required to understand bioinformatics methods and technology; computer science students who wish to understand biological concepts that can be analyzed using their programming skills; or health care processionals (medical, pharmaceutical, and agricultural industries) who desire to acquire bioinformatics knowledge relevant to their fields of expertise.

Students will earn the certificate by completing 15 credit hours, including 9 credit hours from 3 core courses, 3 credit hours from a first elective course, and another 3 credit hours from a second elective.

**Admissions Requirements**

1. Both senior-level undergraduate students with overall GPAs of at least 2.75 and graduate students may enroll in the certificate program.
2. Both undergraduate and graduate students must satisfy the following prerequisite requirement: Successful completion (grade of *C* or better) of MTH 140 or MTH 229, and one of MTH 225, MTH 326, or MTH 345.

**Curriculum**

*Required courses:*

| | | |
|---|---|---|
| CS | 505 | Computing for Bioinformatics |
| BSC | 550 | Molecular Biology |
| CS | 645 | Advanced Topics in Bioinformatics |

*(continued)*

## Area of Emphasis in Watershed Resource Science

Watershed Resource Science as an area of emphasis in Biological Sciences will provide participating students with a systematic and integrated approach to the study of water resources as well as the analysis and implementation of the most effective way to assess their quality and manage their use and conservation. In this program, the integration of course offerings in assessment, informatics, and management into traditional and integrated science curricula provides students with the knowledge base necessary to effectively and innovatively assess and manage water resources.

### Admissions Requirements for Watershed Resource Science Area of Emphasis

- Must be admitted to the BSC master's degree program;
- Must have a bachelor's degree which includes a minimum of 6 courses from the following disciplines: two courses in mathematics (must include 1 semester of calculus and one semester of statistics); two courses in physical science (physics, chemistry, geology, etc.); and two courses in life science (biology, agronomy, microbiology, etc.).

### Degree Requirements for Watershed Resource Science Area of Emphasis

- The curriculum of this program is made up of a research component, a core of required courses, and specialization in either environmental assessment, environmental management, or environmental informatics.
- Students choosing the M.S. option must complete 32 hours of coursework including up to six hours of thesis.
- Students choosing a non-thesis option will receive an M.A. degree and must complete 36 hours of credit.
- The M.A. degree also requires completion of a minimum of three hours of independent study credit.
- A minimum of sixteen hours for M.S. and eighteen hours for M.A. degrees must be completed in coursework at the 600 level.
- A successful graduate must complete the research core, which may be a thesis (M.S.) or independent study (M.A.) project, the core of required courses, and courses in a specialization chosen in collaboration with a faculty advisor.

# Request for Graduate Addition, Deletion, or Change of Area of Emphasis-Page 4

Please insert in the text box below your Area of Emphasis change information for the Graduate Council agenda. Please enter the information exactly in this way (including headings):

Department:
Area of Emphasis Title:
Credit Hours:
Type of Change Requested: *(addition, deletion, change)*
Term to Take Effect: *(Fall, Spring, Summer/Year)*
Rationale:

Department: Biological Sciences
Area of Emphasis Title: Watershed Resource Science
Credit Hours: M.S.: 36 hours; M.A.: 32 hours (no change in credit hours)
Type of Change Requested: (addition, deletion, change): deletion
Term to Take Effect: (Fall, Spring, Summer/Year): Fall 2018
Rationale: Instead of using Areas of Emphasis, the Department prefers to have the student, advisor, and committee work together to develop a personalized Plan of Study tailored to each student's thesis and career goals.

Chair: Tracy Christofero | **GC#4: Major or Degree**

# Request for Graduate Addition, Deletion, or Change of a Major or Degree

NOTE: Before you submit a request for a new Major or Degree, you must submit an INTENT TO PLAN form. Only after the INTENT TO PLAN goes through the approval process are you ready to submit this request for a new Major or Degree. For detailed information on new programs please see: http://wvhepcdoc.wvnet.edu/resources/133-11.pdf.

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one PDF copy without signatures to the Graduate Council Chair.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Science

Dept/Division: Biological Sciences

Contact Person: Anne Axel

Phone: 696-2426

Degree Program: Biological Sciences, M.S. and M. A.

Check action requested: ☐ Addition ☐ Deletion ☒ Change

Effective Term/Year: Fall 20 [18] Spring 20 [ ] Summer 20 [ ]

***Information on the following pages must be completed before signatures are obtained.***

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head [signature] | Date 27 March 2018 |
| College Curriculum Chair [signature] | Date 3-28-18 |
| College Dean [signature] | Date 30 March 2018 |
| Graduate Council Chair [signature] | Date 5/15/18 |
| Provost/VP Academic Affairs | Date |
| Presidential Approval | Date |
| Board of Governors Approval | Date |

# Request for Graduate Addition, Deletion, or Change of a Major or Degree-Page 2

Please provide a rationale for addition, deletion, change: (May attach separate page if needed)

1. We are reducing our graduate seminar requirements (but maintaining same number of total hours required for graduation) from 6 to 3 credits so that students may fulfill their 600-level graduate course requirement with a greater diversity of coursework. Specifically we are making the following seminar requirement changes:
1a. Removing requirement to take BSC 661.
1b. Removing requirement to take BSC 662 twice (but maintaining the requirement to take BSC 662 one time).
2. To avoid confusion, we would like to rename the current Seminar I (661) to Topics in Biological Sciences so that our required seminars (660 and 662 may be named Seminar I and Seminar II). The course catalog description will remain as is.

Please describe any changes in curriculum:
List course number, title, credit hours. Note whether each course is required or optional. Enter NONE if no change. (May attach separate page if needed)
BSC 661, Seminar I, 2 credits: No longer required for graduation.
BSC 662, Seminar 2, 1 credit: Remains a required course but students are only required to take it one time. Optionally, they may still take the course 2 times.
New Course Title for BSC 661: Topics in Biological Sciences

**1. ADDITIONAL RESOURCE REQUIREMENTS:** If your program requires additional faculty, equipment or specialized materials to ADD or CHANGE this major or degree, attach an estimate of the time and money required to secure these items.
NOTE: Approval of this form does not imply approval for additional resources. Enter NONE if not applicable.

NONE

**2. NON-DUPLICATION:** If a question of possible duplication occurs, attach a copy of the correspondence sent to the appropriate department(s) describing the request and any response received from them. Enter NONE if not applicable.

NONE

***For catalog changes as a result of the above actions, please fill in the following pages.***

# Request for Graduate Addition, Deletion, or Change of a Major or Degree-Page 3

**3. *Current* Catalog Description**

Insert the *Current* Catalog Description and page number from the latest catalog for entries you would like to change. (May attach separate page if needed)

p. 204

M.S. Degree Requirements

- Students must complete at least 32 hours of graduate coursework, including the thesis. The maximum amount of credit that may be earned for the thesis (BSC 681) is 12 hours.
- Candidates for the M.S. degree must register for and participate in six hours of Graduate Seminar (BSC 660 and 661 during their first year and BSC 662 in at least two subsequent semesters) during each of the semesters in which they are actively enrolled in the graduate program and complete at least 18 hours in graded BSC electives at the graduate level (which may include BSC 660, 661, 662, and 681).
- Not more than 6 hours of seminar (BSC 660, 661, 662) may be used to complete the 32-hour requirement.
- Not more than 4 semester hours credit in Independent Study (BSC 585-588) or Special Problems (BSC 650-652) may be used to complete the 32 hour requirement, and these may only be applied beyond the 18 hours in BSC graduate credits.
- Students may elect to take 6 hours of graduate work in a minor field.
- Successful completion of the program in Biological Sciences requires a GPA of 3.0 or higher, and no more than 6 credit hours of "C" grades may be applied to the total hours for graduation. Upon completion of course requirements and the thesis, M.S. candidates must pass a comprehensive oral examination.

M.A. Degree Requirements

- Students who select the M.A. option must complete a minimum of 36 hours of graduate coursework.
- M.A. candidates do not conduct thesis research. The Graduate Seminar, BSC electives, Independent Study/Special Problems, GPA, "C" grades, and comprehensive oral exam requirements are as stated for the M.S. degree.

**4. *Edits* to the Current Description**

Attach a PDF copy of the current catalog description prepared in MS WORD with strikethroughs to mark proposed deletions and use the highlight function to indicate proposed new text.

**M.S. Degree Requirements**

• Students must complete at least 32 hours of graduate coursework, including the thesis. The maximum amount of credit that may be earned for the thesis (BSC 681) is 12 hours.

• Candidates for the M.S. degree must register for and participate in ~~six~~ 3 hours of ~~G~~graduate ~~S~~seminars (BSC 660 ~~and 661~~ during their first ~~year~~ semester and BSC 662 in ~~at least two subsequent semesters~~ what is expected to be their final semester) ~~during each of the semesters in which they are actively enrolled in the graduate program~~ and complete at least 18 hours in graded BSC electives at the graduate level (which may include BSC 660, ~~661,~~ 662, and 681).

• Not more than ~~6~~ 4 hours of seminar (~~BSC 660, 661, 662~~ BSC 660, maximum 2 credits; BSC 662, maximum 2 credits) may be used to complete the 32-hour requirement.

• Not more than 4 semester hours credit in Independent Study (BSC 585-588) or Special Problems (BSC 650-652) may be used to complete the 32 hour requirement, and these may only be applied beyond the 18 hours in BSC graduate credits.

• Students may elect to take 6 hours of graduate work in a minor field.

• Successful completion of the program in Biological Sciences requires a GPA of 3.0 or higher, and no more than 6 credit hours of "C" grades may be applied to the total hours for graduation. Upon completion of course requirements and the thesis, M.S. candidates must pass a comprehensive oral examination.

**M.A. Degree Requirements**

· Students who select the M.A. option must complete a minimum of 36 hours of graduate coursework.

· M.A. candidates do not conduct thesis research. The ~~G~~graduate ~~S~~seminars, BSC electives, Independent Study/Special Problems, GPA, "C" grades, and comprehensive oral exam requirements are as stated for the M.S. degree.

# Request for Graduate Addition, Deletion, or Change of a Major or Degree-Page 4

**5. *New* Catalog Description**

Insert a 'clean' copy of your proposed description, i.e., no strikethroughs or highlighting included. This should be what you are proposing for the new description. (May attach separate page if needed)

M.S. Degree Requirements

- Students must complete at least 32 hours of graduate coursework, including the thesis. The maximum amount of credit that may be earned for the thesis (BSC 681) is 12 hours. At least 16 credits must be at the 600-level.
- Candidates for the M.S. degree must register for and participate in 3 hours of graduate seminars (BSC 660 during their first semester and BSC 662 in what is expected to be their final semester) and complete at least 18 hours in graded BSC electives at the graduate level (which may include BSC 660, 662, and 681).
- Not more than 4 hours of seminar (BSC 660, maximum 2 credits; BSC 662, maximum 2 credits) may be used to complete the 32-hour requirement.
- Not more than 4 semester hours credit in Independent Study (BSC 585-588) or Special Problems (BSC 650-652) may be used to complete the 32 hour requirement, and these may only be applied beyond the 18 hours in BSC graduate credits.
- Students may elect to take 6 hours of graduate work in a minor field.
- Successful completion of the program in Biological Sciences requires a GPA of 3.0 or higher, and no more than 6 credit hours of "C" grades may be applied to the total hours for graduation. Upon completion of course requirements and the thesis, M.S. candidates must pass a comprehensive oral examination.

M.A. Degree Requirements

- Students who select the M.A. option must complete a minimum of 36 hours of graduate coursework. At least 18 credits must be at the 600-level.
- M.A. candidates do not conduct thesis research. The graduate seminars, BSC electives, Independent Study/Special Problems, GPA, "C" grades, and comprehensive oral exam requirements are as stated for the M.S. degree.

# Request for Graduate Addition, Deletion, or Change of a Major or Degree-Page 5

Please insert in the text box below your change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings):

Department:
Major or Degree:
Type of Change: *(addition, deletion, change)*
Rationale:

Department: Biological Sciences
Major or Degree: Biological Sciences, M.S. and M.A.
Type of Change: change
Rationale:
1. We are reducing our graduate seminar requirements (but maintaining same number of total hours required for graduation) from 6 to 3 credits so that students may fulfill their 600-level graduate course requirement with a greater diversity of coursework. Specifically we are making the following seminar requirement changes:
1a. Removing requirement to take BSC 661.
1b. Removing requirement to take BSC 662 twice (but maintaining the requirement to take BSC 662 one time).
2. To avoid confusion, we would like to rename the current Seminar I (661) to Topics in Biological Sciences so that our required seminars (660 and 662 may be named Seminar I and Seminar II). The course catalog description will remain as is.

# Request for Graduate Non-Curricular Changes

PLEASE USE THIS FORM FOR ALL NON-CURRICULAR CHANGE REQUESTS (changes in admission requirements or requirements for graduation, changes in existing or new policies/procedures, changes in program descriptions in catalog, general language changes in catalog).

SIGNATURES may not be required, depending on the nature of the request and from where it originates. Consult Graduate Council Chair.

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair.
3. **The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.**

College: Science Dept/Division: Biological Sciences

Contact Person: Dr. Anne Axel Phone: 304-696-2426

Rationale for Request:

We're revising our catalog description as follows:

1) updating Program Description to reflect re-organization of Biological Sciences under School of Biological and Environmental Sciences and to provide a more comprehensive list of our study areas
2) report GRE scores for admissions on the new scale
3) update location of resources for graduate assistantships

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.
NOTE: all requests may not require all signatures.

Department/Division Chair _____ Date 27 March 2018 ~~Fall 2018~~

Registrar _____ 26016 Date 3-27-18

College Curriculum Committee Chair _____ Date 3-28-18
(or Dean if no college curriculum committee) 30 MARCH 2018

Graduate Council Chair _____ Date 5/15/18

NOTE: please complete information required on the following pages before obtaining signatures above.

1. **Current Catalog Description (if applicable)**: Please insert the catalog description from the current catalog for entries you would like to change.

## Program Description

The Department of Biological Sciences at Marshall University offers Master of Science (M.S.) and Master of Arts (M.A.) degrees with a major in Biological Sciences. Students may complete the requirements for a M.S. under a faculty mentor in areas ranging from cellular and molecular to evolutionary and population biology. In addition, two areas of emphasis and a certificate program are available.

The Master of Science (M.S.) degree in Biological Sciences is preparation for further study or employment requiring biology research experience and requires a thesis. An M.S. student must be mentored by a faculty member, so applicants are encouraged (but not required) to contact potential faculty advisors about research projects and graduate assistantships prior to application for admission. Information about faculty may be accessed through the Biological Sciences website (*www.marshall.edu/biology*).

The Master of Arts (M.A.) degree does not require a thesis and allows students to strengthen their education in Biological Sciences through the completion of advanced coursework.

## Admission Requirements

Applicants should follow the admissions process described in this catalog or at the Graduate Admissions website at *www.marshall.edu/graduate/admissions/how-to-apply-for-admission.* Application deadlines are April 15 and November 15 for Fall and Spring admissions, respectively.

Applicants should send these materials directly to the Graduate Admissions Office:

- three letters of recommendation from academic or professional references;
- a written statement of educational and professional goals (250-500 words);
- Graduate Record Exam (GRE) scores. Applicants must specify that official test scores are to be sent directly to Marshall University.

Applicant must also have:

- A combination undergraduate GPA of 2.75 on a 4.0 scale for all previously completed undergraduate university work and 1100 GRE score (composite verbal and quantitative test scores, equivalent to an approximate combined score of 302 on the revised GRE test) and an undergraduate GPA in biology courses of 3.0 or higher on a 4.0 scale for all previously completed undergraduate university work.

## Graduate Assistantships

Students interested in applying for teaching assistantships must submit a completed Application for Graduate Assistantship by April 15 or November 15 for the Fall or Spring semester, respectively. The Application for Graduate Assistantship Form is available from the Department of Biological Sciences, One John Marshall Drive, Huntington, WV 25755.

2. **Edits to current description**: Attach or insert a PDF copy of the current catalog description prepared in MS WORD with strikethroughs to mark proposed deletions and use the highlight function to indicate proposed new text.

See document attached.

Program Description

The Department of Biological Sciences ~~at Marshall University~~ offers Master of Science (M.S.) and Master of Arts (M.A.) degrees with a major in Biological Sciences. Students in the School of Biological and Environmental Sciences, comprised of the Department of Biological Sciences (BSC) and the Department of Natural Resources and the Environment (NRE), may complete the requirements for a M.S. under a faculty mentor in a range of areas such as: aquatic biology, aquatic toxicology, biological anthropology, cellular and molecular biology, ecology, environmental sciences, evolution, genetics, microbiology, plant biology, neurobiology, and wildlife biology.

~~ranging from cellular and molecular to evolutionary and population biology~~. ~~In addition, two areas of emphasis and a certificate program are available.~~

The Master of Science (M.S.) degree in Biological Sciences is preparation for further study or employment requiring ~~biology~~ research experience and requires a thesis. A~~n~~ M.S. student must be mentored by a faculty member, so applicants are encouraged (but not required) to contact potential faculty advisors about research projects and graduate assistantships prior to application for admission. Information about faculty may be accessed ~~through~~ at the websites for ~~the~~ Biological Sciences (*www.marshall.edu/biology)* ~~graduate program~~ and Natural Resources and the Environment (*www.marshall.edu/nre/*).

The Master of Arts (M.A.) degree does not require a thesis and allows students to strengthen their education in biological sciences through the completion of advanced coursework.

# Admission Requirements

Applicants should follow the admissions process described in this catalog or at the Graduate Admissions website at *www.marshall.edu/graduate/admissions/how-to-apply-for-admission.* Application deadlines are April 15 and November 15 for Fall and Spring admissions, respectively.

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- a written statement of educational and professional goals (250-500 words);
- Graduate Record Exam (GRE) scores. Applicants must specify that official test scores are to be sent directly to Marshall University.

Applicant must also have:

- A combination undergraduate GPA of 2.75 on a 4.0 scale for all previously completed undergraduate university work and ~~1100~~ 302 GRE score (composite verbal and quantitative test scores, equivalent to ~~an approximate~~ a combined score of ~~302~~ 1100 on the ~~revised~~ old GRE test). An undergraduate GPA in biology courses of 3.0 or higher on a 4.0 scale for all previously completed undergraduate university work is also required.

**Graduate Teaching and Research Assistantships**

~~Students interested in applying for teaching assistantships must submit a completed Application for Graduate Assistantship by April 15 or November 15 for the Fall or Spring semester, respectively. The Application for Graduate Assistantship Form is available from the Department of Biological Sciences, One John Marshall Drive, Huntington, WV 25755.~~

Once application has been made to the Graduate College for admission to the Biological Sciences graduate program, students who are interested may also apply to become a teaching or research assistant. To do so, visit the Human Resources website's Employment section, select "Graduate Assistant Employment," and search for listings under

Biological Sciences or Natural Resources and the Environment. Open positions are generally posted in late Spring and late Fall; offers are made on a rolling basis.

3. **New Catalog Description**: Provide a "clean" copy of your proposed description without strikethroughs or highlighting. This should be what you are proposing for the new description.

Program Description
The Department of Biological Sciences offers Master of Science (M.S.) and Master of Arts (M.A.) degrees with a major in Biological Sciences. Students in the School of Biological and Environmental Sciences, comprised of the Department of Biological Sciences (BSC) and the Department of Natural Resources and the Environment (NRE), may complete the requirements for a M.S. under a faculty mentor in a range of areas such as: aquatic biology, aquatic toxicology, biological anthropology, cellular and molecular biology, ecology, environmental sciences, evolution, genetics, microbiology, plant biology, neurobiology, and wildlife biology.

The Master of Science (M.S.) degree in Biological Sciences is preparation for further study or employment requiring research experience and requires a thesis. A M.S. student must be mentored by a faculty member, so applicants are encouraged (but not required) to contact potential faculty advisors about research projects and graduate assistantships prior to application for admission. Information about faculty may be accessed at the websites for ~~the~~ Biological Sciences (*www.marshall.edu/biology)* and Natural Resources and the Environment (*www.marshall.edu/nre/*).

The Master of Arts (M.A.) degree does not require a thesis and allows students to strengthen their education in biological sciences through the completion of advanced coursework.

## Admission Requirements

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• Graduate Record Exam (GRE) scores. Applicants must specify that official test scores are to be sent directly to Marshall University.

Applicant must also have:
• A combination undergraduate GPA of 2.75 on a 4.0 scale for all previously completed undergraduate university work and 302 GRE score (composite verbal and quantitative test scores, equivalent to a combined score of 1100 on the old GRE test). and aAn undergraduate GPA in biology courses of 3.0 or higher on a 4.0 scale for all previously completed undergraduate university work is also required.

**Graduate Teaching and Research Assistantships**

Once application has been made to the Graduate College for admission to the Biological Sciences graduate program, students who are interested may also apply to become a teaching or research assistant. To do so, visit the Human Resources website's Employment section, select "Graduate Assistant Employment," and search for listings under Biological Sciences or Natural Resources and the Environment. listings. Open positions are generally posted in late Spring and late Fall; offers are made on a rolling basis.

## Request for Graduate Non-Curricular Changes – Page 5

Please insert below your proposed change information for the Graduate Council agenda.

Type of change request: Catalog change

Department: Biological Sciences

Degree program: M.S. and M.A.

Effective date (fall/spring/summer, year): Fall 2018

Chair: Tracy Christofero | **GC#7: Course Change**

# Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: COEPD Dept/Division: Counseling Current Alpha Designator/Number: COUN 654

Contact Person: Lori Ellison Phone: 304-746-2086

**CURRENT COURSE DATA:**

Course Title: Ecology of Domestic Violence.

Alpha Designator/Number: C O U N 6 5 4

Title Abbreviation: E c o A p p r t o D V

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head Lori Ellison | Date 3/19/18 |
| Registrar Sonya A C | Date 3-21-18 |
| College Curriculum Chair J Christofero | Date 5/15/18 |
| Graduate Council Chair B-Z | Date 3-26-2018 |

# Request for Graduate Course Change - Page 2

College: COEPD | Department/Division: Counseling | Alpha Designator/Number: COUN 654

Provide complete information regarding the course change for each topic listed below.

**Change in CATALOG TITLE:** ☒ YES ☐ NO

From: Ecology of Domestic Violence (limited to 30 characters and spaces)

To: Family Violence

If Yes, Rationale: The course has been revamped and revised to reflect more of a focus on family violence from a lifespan development perspective. The current title is a hold-over from when it was originally taught from the ecological perspective. While aspects of this model may be discussed in the course, this is no longer the primary focus.

**Change in COURSE ALPHA DESIGNATOR:**

From: ____ To: ____ ☐ YES ☒ NO

If Yes, Rationale:

**Change in COURSE NUMBER:** ☐ YES ☒ NO

From: ____ To: ____

If Yes, Rationale:

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale:

**Change in CATALOG DESCRIPTION:** ☒ YES ☐ NO IF YES, fill in below:

From: Ecology of Domestic Violence. 3 hrs.
The course will examine domestic violence from an ecological and sociocultural perspective in the context of the community infrastructure, and its response to victims, child safety, and batterer accountability.

To: Family Violence. 3 hrs.
The course will examine violence in families, covering ages from infancy to elder adulthood with a focus on variations in types of assault, violence, and abuse found within, among, or pertaining to family members across all ages.

If Yes Rationale: The description has been revised to reflect the more accurate focus of the content being taught in this course.

**Change in COURSE CREDIT HOURS:** ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

**Change in COURSE CONTENT:** ☒ YES ☐ NO

From This course will examine the ecological and contextual aspects of domestic violence, history of the domestic violence movement in the US, the cycle and dynamics of domestic abuse, and best practices associated with a community-coordinated approach to victim and child cruelty, and batterer accountability.

To This course explores the prevalence, victims, and perpetrators of various types of interpersonal and family violence across the lifespan. This course is intended to lay the foundation for understanding and developing a working knowledge of how to work with families who have experienced violent incidents. Among the topics of exploration will be partner violence, child abuse, adolescent dating violence, parent abuse, sexual assault, stalking, and abuse of the elderly and disabled. Attention to the multi-systemic impact of these and other types of interpersonal violence will be among the primary areas of focus.

Rationale This course was originally developed to focus primarily on victims and perpetrators of domestic violence. When the Counseling Program revamped the Domestic Violence Certificate into the Violence, Loss, and Trauma Certificate, the focus of this course changed slightly to include all forms of family and interpersonal violence, not only domestic battery between partners. The course name and description need to reflect the current content of the course.

# Request for Graduate Course Change-Page 4

College: COEPD

Department: Counseling

Course Number/Title COUN 654

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

Not applicable

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

Not applicable

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

Not applicable

# Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

| COURSE DESCRIPTION CHANGE | COURSE NUMBER CHANGE | COURSE TITLE CHANGE |
|---|---|---|
| Department: | Department: | Department: |
| Course Number and Title: | Current Course Number/Title: | Current Course Number/Title: |
| Rationale: | New Course Number: | New Course Title: |
| Course Description (old) | Rationale: | Rationale: |
| Course Description: (new) | Catalog Description: | Catalog Description: |
| Catalog Description: | Credit hours: | |

COURSE DESCRIPTION CHANGE
Department: Counseling
Course Number and Title: COUN 654 Family Violence
Rationale:
This course was originally developed to focus primarily on victims and perpetrators of domestic violence. When the Counseling Program revamped the Domestic Violence Certificate into the Violence, Loss, and Trauma Certificate, the focus of this course changed slightly to include all forms of family and interpersonal violence, not only domestic battery between partners. The course name and description need to reflect the current content of the course.

Course Description (old)
Ecology of Domestic Violence.
This course will examine the ecological and contextual aspects of domestic violence, history of the domestic violence movement in the US, the cycle and dynamics of domestic abuse, and best practices associated with a community-coordinated approach to victim and child cruelty, and batterer accountability.

Course Description: (new)
Family Violence
This course explores the prevalence, victims, and perpetrators of various types of interpersonal and family violence across the lifespan. This course is intended to lay the foundation for understanding and developing a working knowledge of how to work with families who have experienced violent incidents. Among the topics of exploration will be partner violence, child abuse, adolescent dating violence, parent abuse, sexual assault, stalking, and abuse of the elderly and disabled. Attention to the multi-systemic impact of these and other types of interpersonal violence will be among the primary areas of focus.

Catalog Description:
Family Violence. 3 hrs.
The course will examine violence in families, covering ages from infancy to elder adulthood with a focus on variations in types of assault, violence, and abuse found within, among, or pertaining to family members across all ages.

**Edited version**

~~Ecology of Domestic Violence~~. Family Violence across the Lifespan. 3 hrs.
The course will examine ~~domestic violence from an ecological and sociocultural perspective in the context of the community infrastructure, and its response to victims, child safety, and batterer accountability.~~ violence in families, covering ages from infancy to elder adulthood with a focus on variations in types of assault, violence, and abuse found within, among, or pertaining to family members across all ages and stages of development.

**Clean copy**

Family Violence across the Lifespan. 3 hrs.
The course will examine violence in families, covering ages from infancy to elder adulthood with a focus on variations in types of assault, violence, and abuse found within, among, or pertaining to family members across all ages and stages of development.

## BIBLIOGRAPHY
## COUN 654 (Currently: Ecology of Domestic Violence)
## (Proposed: COUN 654: Family Violence)


American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders, (*5th ed.). Washington D.C.: APA.

Bancroft, R.L., Silverman, J.G., & Ritchie, D. (2011). *The batterer as parent: Addressing the impact of domestic violence on family dynamics.* Thousand Oaks, CA: Sage Publications.

Barnett, O. W., Miller-Perrin, C. L., & Perrin, R. D. (2011). *Family violence across the lifespan,* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Echterling, L. G., Presbury, J. H., & McKee, J. E. (2005). *Crisis intervention: Promoting resilience and resolution in troubled times*. Upper Saddle River, NJ: Merrill/Prentice.

Gosselin, D.K. (2009). *Heavy hands: An introduction to the crime of intimate and family violence,* (4th ed.). Upper Saddle River, NJ: Prentice Hall.

Hamel, J. (2014). *Gender-inclusive treatment of intimate partner abuse: Evidence-based approaches,* (2nd ed.). New York: Springer Publishing.

Malley, Morrison, K. & Hines, D. A. (2003). *Family violence in a cultural perspective: Defining, understanding, and combating abuse.* Thousand Oaks, CA: Sage Publications.

Rivers, V. (2005). *A private family matter: A memoir*. New York: Atria books.

Wanberg, K. W., & Milkman, H. B. (2006). *Criminal conduct & substance Abuse treatment: Strategies for self-improvement and change.* Thousand Oaks, CA: Sage Publications.

Wilson, K. J. (2006). *When violence begins at home: A comprehensive guide to understanding and ending domestic violence.* Alameda, CA: Hunter House.

# Request for Graduate Non-Curricular Changes

PLEASE USE THIS FORM FOR ALL NON-CURRICULAR CHANGE REQUESTS (changes in admission requirements or requirements for graduation, changes in existing or new policies/procedures, changes in program descriptions in catalog, general language changes in catalog).

SIGNATURES may not be required, depending on the nature of the request and from where it originates. Consult Graduate Council Chair.

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair.
3. **The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.**

College: Graduate College Dept/Division: _____

Contact Person: David J. Pittenger Phone: 6-2818

Rationale for Request:

I believe revisions to the appeals process for final grades and for disciplinary action need to be revised to offer a more clear and concise set of instructions for students and faculty to follow. Also, the changes to the process represent the common practices of the dean and members of the Graduate Council.

Although the Graduate College does not have policies for other forms of appeal, the University does. As such, it is prudent useful to outline these potential remedies in the Graduate Catalog.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.
NOTE: all requests may not require all signatures.

Department/Division Chair David J. Pittenger Digitally signed by David J. Pittenger Date: 2018.04.03 14:02:28 -04'00' Date Fall 2018

Registrar _____ Date _____

College Curriculum Committee Chair _____ Date _____
(or Dean if no college curriculum committee)

Graduate Council Chair T Christofero Date 5/15/18

NOTE: please complete information required on the following pages before obtaining signatures above.

## Request for Graduate Non-Curricular Changes – Page 2

1. **Current Catalog Description (if applicable)**: Please insert the catalog description from the current catalog for entries you would like to change.

See attached.

2. **Edits to current description**: Attach or insert a PDF copy of the current catalog description prepared in MS WORD with strikethroughs to mark proposed deletions and use the highlight function to indicate proposed new text.

See attached.

3. **New Catalog Description**: Provide a "clean" copy of your proposed description without strikethroughs or highlighting. This should be what you are proposing for the new description.

See Attached.

## Request for Graduate Non-Curricular Changes – Page 5

Please insert below your proposed change information for the Graduate Council agenda.

Type of change request: Non-curricular changes to policies section of Graduate Catalog

Department: Graduate College

Degree program:

Effective date (fall/spring/summer, year): Fall 2018

Original Text

**Administrative Steps for Appealing a Course Grade or an Action Based on Academic Performance or Dishonesty**

This section presents the process for students wishing to appeal a course grade, dismissal or sanction based on academic performance or conduct, or charge of academic dishonesty. For other complaints, please see the Administrative Steps for Filing a Complaint section.

The following is a guide designed to help students and faculty follow the appeals process as specified in this section of the Graduate Catalog. Students and faculty should also review the policy to ensure understanding of the scope of the appeals, materials required, and rules governing the appeals process.

Course Grade Appeals:

Students may only appeal the final course grade, not grades for individual assignments. Moreover, course grades may be appealed only under the following conditions:

1) The grade assigned for a reflects an error in calculation or reporting (e.g., a computational error, oversight of submitted materials, or posting the wrong grade).

2) Standards different from those established in the written department or Graduate College policies, if specific policies exist, were used in assigning the grade.

3) The instructor departed from his or her previously articulated, written standards, without notifying graduate students, in determining the grade.

Step 1) Attempt to resolve the matter informally: Within ten (10) days of receiving a final grade the student should contact the instructor to review the grade. The instructor will respond in writing within ten (10) days of meeting with the student. The student may contact the director/coordinator of the graduate program should the instructor not be available, or extraordinary circumstances are require urgent action.

Step 2) Submit Course Grade Appeal (located online at www.marshall.edu/graduate/graduate-student-appeals) to the department/unit head of the department: Within 14 days of receiving notification from Step 1, submit Course Grade Appeal to the department/unit head in which the grade was issued and the instructor's response. Note that Course Grade Appeal lists all materials to be submitted by the student. If the department /unit head was the instructor, submit the materials to the director of graduate studies. The department/unit head will respond in writing within ten (10) of receiving Course Grade Appeal and required materials.

Step 3) Submit Course Grade Appeal to the Graduate College Dean: Submit Course Grade Appeal, required materials, and the responses of the instructor and department/unit head to the

Dean of the Graduate College. The Dean of the Graduate College will issue a final non-appealable decision within ten (10) days of receiving Course Grade Appeal and required materials.

**Action based on Academic Performance or Dishonesty Appeals:**
Students may appeal their dismissal from an academic program, sanction from an academic program based on the student's academic performance or conduct, or finding of academic dishonesty.

Step 1) Attempt to resolve the matter informally: Contact the director/coordinator of graduate studies or department/unit head to review the action taken.

Step 2) Submit the Performance Appeal form (located online at www.marshall.edu/graduate/graduate-student-appeals) to the Graduate College Dean: Within thirty (30) days of receiving notification of the action, submit the Performance Appeal form and relevant documents to the Dean of the Graduate College. The Dean of the Graduate College will respond within ten (10) days in writing to the student and official issuing the action.

Step 3) Request a hearing of the Graduate Council: Submit the response from Step 2, which will include the Graduate College Dean's Response, to the Graduate College Dean and request a hearing of the Graduate Council. The Graduate Dean will forward all materials to the to the chair of the Graduate Council who will then form a subcommittee of no fewer than three member of the Graduate Council. The subcommittee will schedule a hearing and give all parties ten (10) days written notice of the hearing time and location.

Step 4) Hearing of the facts: The members of the subcommittee will review all materials and allow the graduate student and the identified official the opportunity to review and respond to all evidence as described in official policy. Within ten (10) days of the hearing, the subcommittee will issue a written response within the Performance Appeal and send copies to the student, identified official, and the Provost.

Step 5) Request review of decision from Provost: Within ten (10) days of receiving the response from Step 4, send a written request to the Provost requesting review of the decision. The Provost's decision shall be final.

**Administrative Steps for Filing a Complaint regarding a student or student organization:**
Marshall University expects all members of its community to act in respectful and responsible ways toward one another. Marshall University is committed to providing programs, activities and an educational environment free from discrimination and harassment of any kind. To file a general complaint against a student or student organization complete the *General Complaint*

*Form* (http://www.marshall.edu/student-conduct/general-complaint-form/) or contact the Office of Student Conduct 2W29 Memorial Student Center, or call 304-696-2495.

**Sexual Misconduct:** According to Title IX the Education Amendments Act of 1972 "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." To file a complaint regarding sexual misconduct complete the *Title IX Sexual Misconduct Form* (http://www.marshall.edu/eeoaa/title-ix/) or contact the Office of Equity Programs 206 Old Main or call 304-696-2597.

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Please refer to the Administrative Steps for Appealing a Course Grade of an Action Based on Academic Performance or Dishonesty for the process to appeal a course grade, dismissal from a program, or charge of academic dishonesty.

Red Line Text

**Administrative Steps for Appealing a ~~Final~~ Course Grade or an Action Based on Academic Performance or Dishonesty**

This section presents the process for students wishing to appeal a course grade, dismissal or sanction based on academic performance or conduct, or charge of academic dishonesty. For other complaints, please see the Administrative Steps for Filing a Complaint section.

The following is a ~~an administrative~~ guide designed to help students and faculty follow the appeals process as specified in this section of the Graduate Catalog. Students and faculty should also review the policy to ensure understanding of the scope of the appeals, materials required, and rules governing the appeals process.

~~Final~~ Course Grade Appeals:

Students may only appeal the final course grade, not grades for individual assignments. Moreover, course grades may be appealed only under the following conditions:

1) The grade assigned for a reflects an error in calculation or reporting (e.g., a computational error, oversight of submitted materials, or posting the wrong grade).
2) Standards different from those established in the written department or Graduate College policies, if specific policies exist, were used in assigning the grade.
3) The instructor departed from his or her previously articulated, written standards, without notifying graduate students, in determining the grade.

Step 1) Attempt to resolve the matter informally: Within ten (10) days of receiving a final grade the student should contact the instructor to review the grade. The instructor will respond in writing within ten (10) days of meeting with the student. The student may contact the director/coordinator of the graduate program should the instructor not be available, or extraordinary circumstances are ~~there are extraordinary circumstances requir~~requireing urgent action.

Step 2) Submit ~~FORM A~~ Course Grade Appeal (located online at www.marshall.edu/graduate/graduate-student-appeals) to the department/-unit head of the department: Within 14 days of receiving notification from Step 1, submit Course Grade Appeal ~~FORM A~~ to the department/unit head in which the grade was issued and the instructor's response. Note that Course Grade Appeal ~~FORM A~~ lists all materials to be submitted by the student. If the department /unit head was the instructor, submit the materials to the director of graduate studies. The department/unit head will respond in writing within ten (10) of receiving Course Grade Appeal ~~FORM A~~ and required materials.

Step 3) Submit Course Grade Appeal ~~FORM A~~ to the Graduate College Dean: Submit Course Grade Appeal~~FORM A~~, required materials, and the responses of the instructor and department/unit head to the Dean of the Graduate College. The Dean of the Graduate College will issue a final non-appealable decision within ten (10) days of receiving Course Grade Appeal ~~FORM A~~ and required materials.

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Step 1) Attempt to resolve the matter informally: Contact the director/coordinator of graduate studies or department/unit head to review the action taken.

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Step 3) Request a hearing of the Graduate Council ~~Subcommittee on Graduate Student Rights and Responsibilities (the Subcommittee)~~: Submit the response from Step 2, which will include the Graduate College Dean's Response, to the Graduate College Dean and request a hearing ~~before the Subcommittee~~ of the Graduate Council. The Graduate Dean will forward all materials to the to the chair of the Graduate Council who will then form a ~~Subcommittee~~subcommittee of no fewer than three member of the Graduate Council. The ~~Subcommittee~~ subcommittee will schedule a hearing and give all parties ten (10) days written notice of the hearing time and location.

Step 4) Hearing of the facts: The members of the ~~Subcommittee~~ subcommittee will review all materials and allow the graduate student and the identified official the opportunity to review and respond to all evidence as described in official policy. Within ten (10) days of the hearing, the ~~Subcommittee~~ subcommittee will issue a written response within the Performance Appeal~~FORM B~~ and send copies to the student, identified official, and the Provost.

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Final Text

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Chair: Tracy Christofero | **GC#7: Course Change**

# Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Business | Dept/Division: Marketing, MIS and | Current Alpha Designator/Number: MGT 680

Contact Person: Liz Alexander | Phone: x2686

**CURRENT COURSE DATA:**

Course Title: Entrepreneurship

Alpha Designator/Number: E N T 6 8 0

Title Abbreviation: E n t r e p r e n e u r s h i p

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

| | |
|---|---|
| Dept. Chair/Division Head E Alexander | Date March 5 2018 |
| Registrar Sonya L C 521401 | Date 3-7-18 |
| College Curriculum Chair | Date 8 MAR 18 |
| Graduate Council Chair J Christofero | Date 5/15/18 |

# Request for Graduate Course Change - Page 2

College: Business Department/Division: Marketing, MIS and Entrepre Alpha Designator/Number: MGT680

Provide complete information regarding the course change for each topic listed below.

**Change in CATALOG TITLE:** ☐ YES ☒ NO

From (limited to 30 characters and spaces)

To

If Yes, Rationale

**Change in COURSE ALPHA DESIGNATOR:**

From: MGT To ENT ☒ YES ☐ NO

If Yes, Rationale

**Change in COURSE NUMBER:** ☐ YES ☒ NO

From: To:

If Yes, Rationale

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale

**Change in CATALOG DESCRIPTION:** ☐ YES ☒ NO IF YES, fill in below:

From

To

If Yes Rationale

# Request for Graduate Course Change - Page 3

**Change in COURSE CREDIT HOURS:** ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

**Change in COURSE CONTENT:** ☐ YES ☒ NO

From

To

Rationale

# Request for Graduate Course Change-Page 4

College: Business

Department: Marketing, MIS and Entrepreneurship

Course Number/Title MGT 680

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

N/A

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

N/A

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

N/A

# Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

| COURSE DESCRIPTION CHANGE | COURSE NUMBER CHANGE | COURSE TITLE CHANGE |
|---|---|---|
| Department: | Department: | Department: |
| Course Number and Title: | Current Course Number/Title: | Current Course Number/Title: |
| Rationale: | New Course Number: | New Course Title: |
| Course Description (old) | Rationale: | Rationale: |
| Course Description: (new) | Catalog Description: | Catalog Description: |
| Catalog Description: | Credit hours: | |

Department: Marketing, MIS and Entrepreneurship

Current Course Number/Title: MGT 680

New Course Number: ENT 680

Rationale: The Management, Marketing and MIS Division, which housed the Entrepreneurship program, has been partitioned into two divisions - 1 - Management and 2 - Marketing and MIS and Entrepreneurship.
In the negotiations that took place to determine how the Division would be divided, it was agreed that the Entrepreneurship major would become part of the Marketing/MIS area, that the Entrepreneurship faculty would move to the MKT/MIS area and that MGT 680 (Entrepreneurship) would move to a ENT designation. The details of the split were approved by then Dean Chen and forwarded to the Provost, who subsequently approved. The split became official Summer 2017.

Catalog Description: The management of small business emphasizes how they are started and financed, how they produce and market their products and services and how they manage their human resources. (PR: GSM Admission)

Credit Hours: 3

# Request for Graduate Non-Curricular Changes

PLEASE USE THIS FORM FOR ALL NON-CURRICULAR CHANGE REQUESTS (changes in admission requirements or requirements for graduation, changes in existing or new policies/procedures, changes in program descriptions in catalog, general language changes in catalog).

SIGNATURES may not be required, depending on the nature of the request and from where it originates. Consult Graduate Council Chair.

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair.
3. **The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.**

College: Medicine Dept/Division: Biomedical Research

Contact Person: Todd Green Phone: x6-3531

Rationale for Request:

There are several changes to the catalog that have been approved previously by Graduate Council over the last few months. The name of the program was changed from Biomedical Sciences (BMS) to Biomedical Research (BMR). Areas of Emphasis were added. Application deadlines were changed. Course alpha designators were changed. This form combines all of these changes into one document and corrects errors in the previous catalog description.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.
NOTE: all requests may not require all signatures.

Department/Division Chair _____ Date Summer 2018

Registrar _____ 260102 Date 3-30-18

College Curriculum Committee Chair _____ Date 3/28/18
(or Dean if no college curriculum committee)

Graduate Council Chair _____ Date 5/15/18

NOTE: please complete information required on the following pages before obtaining signatures above.

## Request for Graduate Non-Curricular Changes – Page 2

1. **Current Catalog Description (if applicable):** Please insert the catalog description from the current catalog for entries you would like to change.

Attached

## Request for Graduate Non-Curricular Changes – Page 3

2. **Edits to current description**: Attach or insert a PDF copy of the current catalog description prepared in MS WORD with strikethroughs to mark proposed deletions and use the highlight function to indicate proposed new text.

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Attached

## Request for Graduate Non-Curricular Changes – Page 5

Please insert below your proposed change information for the Graduate Council agenda.

Type of change request: Non-curricular catalog change

Department: Biomedical Research

Degree program: M.S., Ph.D.

Effective date (fall/spring/summer, year): Summer 2018

**1. Current catalog description - pages 217-226**

# School of Medicine

## Dr. Joseph Shapiro, Dean

***http://musom.marshall.edu***

## BIOMEDICAL SCIENCES, M.S., Ph.D., M.D./Ph.D.

### Areas of Emphasis

- Cancer Biology
- Cardiovascular Disease, Obesity, and Diabetes
- Infectious and Immunological Diseases
- Medical Sciences (M.S. only)
- Neuroscience and Developmental Biology
- Toxicology and Environmental Health Sciences

### Program Description

The basic science departments of the Joan C. Edwards School of Medicine offer an interdisciplinary program leading to the Master of Science and Doctor of Philosophy degrees in Biomedical Sciences. The primary aim of the Biomedical Sciences (BMS) program is to produce graduate students who are broadly based in the biomedical sciences with defined interests and special in-depth training in one of the following areas of emphasis: cancer biology; cardiovascular disease, obesity, and diabetes; infectious and immunological diseases; neuroscience and developmental biology; and toxicology and environmental health sciences. These areas are designed to be flexible and research oriented in order to develop the interests, capabilities and potential of all students pursuing careers in academic or industrial biomedical sciences.

In addition, the BMS program offers a non-thesis Master of Science degree in the medical sciences area of emphasis to improve the science foundation of students seeking admission into doctoral programs in medicine or other health-related professions.

Admission into this program does not guarantee admission into medical school. Students in this area of emphasis are required to pay the Health Professions Fee each semester while enrolled in the program. Because of the nature of the curriculum, applicants to the medical sciences area of emphasis will only be considered for admission for the fall semester.

The Biomedical Sciences Doctor of Philosophy degree program accepts a very limited number of students to study concurrently with the Doctor of Medicine degree.

### Admission Requirements

Applicants must meet the admissions requirements of the Graduate Studies Committee of Marshall University's Joan C. Edwards School of Medicine. Interested persons should contact the Biomedical Sciences Graduate Program at the Byrd Biotechnology Science Center, Marshall University School of Medicine, One John Marshall Drive, Huntington, WV 25755 or via the Internet at *www.marshall.edu/bms/future-students/contact-us, mubiomed@marshall.edu,* or 304-696-3365.

### Minimum Requirements for Admission into Master of Science or Doctor of Philosophy Program

All applicants must have baccalaureate degrees, with one year of general biology, physics, general chemistry, and organic chemistry, all with associated laboratories. Biochemistry is not currently a requirement, but it is highly recommended to take it.

- Graduate Record Examination (GRE) General Test scores (scores may not be more than three (3) years old at the application deadline for the Ph.D. program or at the start of the semester when matriculating for the M.S. program) or MCAT scores (Medical Sciences area of emphasis only, minimum of 22 total)
- Three letters of recommendation from references familiar with the applicant's relevant academic/professional performance
- A personal statement describing educational and career goals.

### Ph.D. Applications

The completed application, application fee, official transcripts and official GRE or MCAT scores should be received in the Graduate Admissions Office by January 15th for summer or fall applications in order for the application to be considered by the program.

Letters of recommendation and personal statements should be received in the BMS Office by January 15th in order for the application to be considered complete and for an admission decision to be rendered.

Applications completed very soon after the above stated deadlines may be considered at the discretion of the BMS Graduate Studies Committee.

New Ph.D. students will matriculate in July (Summer III term).

## M.S. Applications

The completed application, application fee, official transcripts, three letters of recommendation, written statement, and official GRE or MCAT scores (MCAT scores accepted for medical sciences area of emphasis only) should be received in the Graduate Admissions Office by June 1st for fall applications in order for the application to be considered by the program.

## Duration of Degree Programs

Students are expected to complete the requirements for the Master of Science degree within two years. Doctoral students are expected to complete the degree requirements within five year. Students who possess an M.S. degree in biomedical sciences or the equivalent when admitted into the doctoral degree program generally require three years to complete the Doctor of Philosophy degree.

## BIOMEDICAL SCIENCES, M.S. (Cancer Biology; Cardiovascular Disease, Obesity, and Diabetes; Infectious and Immunological Diseases; Neuroscience and Developmental Biology; Toxicology and Environmental Health Sciences Areas of Emphasis)

### Degree Requirements

A minimum of 36 credit hours is required for a non-thesis degree, while a minimum of 32 credit hours is required for the thesis degree. No more than six hours of thesis (BMS 681) may be credited toward the 32-hour requirement. Each student will specialize in one of the five areas of emphasis as defined in the program description. All students are required to successfully complete:

| | |
|---|---|
| BMS 601 | Introduction to Nucleic Acids and Proteins |
| BMS 602 | Introduction to Cell Structure and Metabolism |
| BMS 603 | Regulation of Cell Function |
| BMS 604 | Cellular Basis of Disease |
| BMS 617 | Statistical Techniques for the Biomedical Sciences |
| BMS 644 | Responsible Conduct of Research |
| BMS 660/661 | Communication Skills for Biomedical Sciences |
| BMS 680 | Seminar (minimum of 4 hrs.) |
| BMS 785 | Introduction to Research |

In addition, the student must successfully complete other courses required by his/her area of emphasis and advisory committee and pass an oral comprehensive examination.

### Advisory Committee for M.S. Students

The advisory commitlee should be formed no later than the end of the first year of graduate education. As soon as the committee has been identified, a Thesis Committee Formation form is completed and submitted to the Director of Graduate Studies.

The committee will be selected by the student and research advisor and approved by the Director of Graduate Studies. The advisory commitlee will be composed of at least three faculty members with appropriate expertise. One of the members may be from another institution. The student's research advisor will act as the chairperson of the committee.

In addition, after 12 hours of coursework has been completed, the student must submit to the Dean of the Graduate College a Plan of Study form.

# BIOMEDICAL SCIENCES, M.S. (Medical Sciences Area of Emphasis)

A minimum of 36 credit hours is required for the non-thes is degree. In addition, the student musr pass a writlen comprehensive examination covering BMS 601-604, MCB 631, MCB 632, and PHS 628. All students will also participate in laboratory-based research, and either present at a research conference or submit a peer-reviewed ublication. All students are required to successfully complete:

| | |
|---|---|
| BMS 601 | Introduction to Nucleic Acids and Proteins |
| BMS 602 | Introduction to Cell Structure and Metabolism |
| BMS 604 | Cellular Basis of Disease |
| BMS 603 | Regulation of Cell Function |
| BMS 617 | Statistical Techniques for the Biomedical Sciences (or MTH 518, BSC 517, PSY 517, EDF 517 or equivalent) |
| BMS 680 | Seminar (minimum of 4 hrs.) |
| BMS 785 | Introduction to Research |
| MCB 631 | Medical Microbiology I |
| MCB 632 | Medical Microbiology II |
| PHS 628 | Neurophysiology |

Elective classes include PHS 629 (Mammalian Physiology), PMC 621 (Medical Phamrncology I). and PMC 622 (Medical Pharmacology II).

In addition, after 12 hours of coursework has been completed, the student must submit to the Dean of the Graduate College a Plan of Study form.

## BIOMEDICAL SCIENCES, M.S., AND SCHOOL OF PHARMACY, PHARM.D.

Students can receive both an M.S. degree from the Biomedical Sciences Program and a Pharrn.D. degree from the School of Pharmacy. Prospective students must apply to and meet the admission requirements for both programs. The curriculum takes five years to complete. In the first year students take BMS courses; in years 2-5 students t.akc School of Pharmacy courses. All students are required to successfully complete:

### Year 1 Fall

| | | |
|---|---|---|
| BMS | 601 | Introduction to Nucleic Acids and Proteins |
| BMS | 602 | Introduction to Cell Structure and Metabolism |
| BMS | 680 | Seminar |
| PHS | 628 | Neurophysiology |

### Year I Spring

| | | |
|---|---|---|
| BMS | 603 | Regulation of Cell Function |
| BMS | 604 | Cellular Basis of Disease |
| BMS | 680 | Seminar |
| BMS | 785 | Introduction to Research |
| PHS | 629 | Mammalian Physiology |

### Year 2 Fall

| | | |
|---|---|---|
| PHAR | 511 | Clinical Immunology |
| PHAR | 531 | Biopharmaceutics I |
| PHAR | 541 | Pharmacy Practice I |
| PHAR | 542 | Immunology and Microbiology |
| PHAR | 551 | Biomedical Chemistry |
| PHAR | 811 | Introductory Pharmacy Practice Experiences in Community Settings |

## Year 2 Spring

| | | |
|---|---|---|
| PHAR | 521 | Integrated Laboratory I |
| PHAR | 532 | Biopharmaceutics I 1. |
| PHAR | 543 | Pharmacy Practice II |
| PHAR | 544 | Principles of Disease and Drug Action |
| PHAR | 545 | Therapeutics I |
| PHAR | 812 | Introductory Pharmacy Practice Experiences in Institutional Settings I |

## Year 3 Fall

| | | |
|---|---|---|
| PHAR | 611 | Integrated Laboratory II |
| PHAR | 621 | Pharmacy Law and Ethics |
| PHAR | 622 | Drug Information and Communication Skills |
| PHAR | 631 | Pharmacometrics |
| PHAR | 632 | Pharmacy Practice Management I |
| PHAR | 661 | Therapeutics II |
| PHAR | 813 | Introductory Pharmacy Practice Experiences in Community Settings II |

## Year 3 Spring

| | | |
|---|---|---|
| PHAR | 612 | Therapeutic Drug Dosing |
| PHAR | 633 | Patient Care Skills Lab |
| PHAR | 634 | Pharmacy Practice Management II |
| PHAR | 635 | Bridging Research Outcomes and Patient Care |
| PHAR | 671 | Therapeutics III |
| PHAR | 814 | Introductory Pharmacy Practice Experiences in Institutional Settings II |

## Year 4 Fall

| | | |
|---|---|---|
| PHAR | 711 | Medication Therapy Management |
| PHAR | 722 | Pharmacy Practice Management III |
| PHAR | 741 | Therapeutics V |
| PHAR | 751 | Therapeutics IV |
| PHAR | 815 | Ambulatory Care Skills |
| PHAR | 816 | Inpatient Practice Skills |
| | | Elective I |

## Year 4 Spring

| | | |
|---|---|---|
| PHAR | 721 | Therapeutics VII |
| PHAR | 731 | Case Studies in Pharmacy Practice |
| PHAR | 761 | Therapeutics VI |
| PHAR | 817 | Introductory Pharmacy Practice Experiences in Practice Management |
| PHAR | 818 | Introductory Pharmacy Practice Experiences in Education |
| | | Elective 2 |

## Year 5 Fall and Spring

| | | |
|---|---|---|
| PHAR | 881 | Advanced Pharmacy Practice Experiences in Practice Management |
| PHAR | 882 | Advanced Pharmacy Practice Experiences in Ambulatory Care/Primary Care |
| PHAR | 883 | Advanced Pharmacy Practice Experiences in Community Pharmacy |
| PHAR | 884 | Advanced Pharmacy Practice Experiences in Institutional Settings |
| PHAR | 885 | Advanced Pharmacy Practice Experiences in Geriatrics |
| PHAR | 886 | Advanced Pharmacy Practice Ex eriences in Diverse Popul ations |

Elective 3
Elective 4
Capstone 1
Capstone 2

PHAR 635 substitutes for MTH 518, Biostatistics, a BMS Program requirement.

PHAR 542 substitutes for the BMS course MCB 631, Medical Microbiology I.

PHAR 531 and PHAR 551 substitute for the BMS courses PMC 625, Drug Metabolism, and PMC 630, Chemical Aspects of Pharmacology.

PHAR 545 and PHAR 671 substitute for the BMS course BMS 680, Seminar. This will meet the 4 hr. minimum requirement for Seminar for the M.S. degree.

A minimum of 36 credit hours is required for a non-thesis degree in the BMS Program.

| | | |
|---|---|---|
| BMS | 601 | 3 hrs. |
| BMS | 602 | 3 hrs. |
| BMS | 680 | 1 hr. |
| PHS | 628 | 2 hrs. |
| BMS | 603 | 2 hrs. |
| BMS | 604 | 1 hr. |
| BMS | 680 | 1 hr. |
| BMS | 785 | 3 hrs. |
| PHS | 629 | 6 hrs. |
| PHAR | 531 | 3 hrs. |
| PHAR | 542 | 4 hrs. |
| PHAR | 545 | 4 hrs. |
| PHAR | 551 | 5 hrs. |
| PHAR | 635 | 3 hrs. |
| PHAR | 671 | 7 hrs. |

In addition. the student must pass a written and/or an oral comprehensive examination to receive the M.S. degree.

## BIOMEDICAL SCIENCES, Ph.D.

The doctorate is a research or performance degree and does not depend solely on the accumulation of credit hours. The degree requirements are admission to candidacy and successful completion and defense of a dissertation. The degree signifies that the holder has the competence to function independently at the highest professional level.

### Degree Requirements

To qualify for the Doctor of Philosophy degree, the student must pass (*C* or better or *CR*) the following courses:

| | | |
|---|---|---|
| BMS | 601 | Introduction to Nucleic Acids and Proteins |
| BMS | 602 | Introduction to Cell Structure and Metabolism |
| BMS | 603 | Regulation of Cell Function |
| BMS | 604 | Cellular Basis of Disease |
| BMS | 644 | Responsible Conduct of Research |
| BMS | 617 | Statistical Techniques for the Biomedical Sciences |
| BMS | 660/661 | Communication Skills for Biomedical Sciences |

| | | |
|---|---|---|
| BMS | 680 | Seminar (minimum of 6 hrs.) |
| BMS | 785 | Introduction to Research |

BMS 882 Research

In addition, the student must successfully complete other courses required by his/her area of emphasis and advisory committee. All courses will be defined in the student's Course of Study. The student must also pass a written and oral exam prior to becoming a Ph.D. candidate. These exams are set by the advisory committee and are outlined below under Admission to Candidacy.

Students are required to write and publish three peer-reviewed manuscripts, two of which must be as first author.

## BIOMEDICAL SCIENCES, M.D./Ph.D.

The Joan C. Edwards School of Medicine offers a combined M.D./Ph.D. degree in partnership with the Biomedical Sciences Graduate Program at Marshall University. The curriculum takes seven to eight years to complete. Students first take years one and two of medical school. During that time they complete the requirements for BMS 785 (Introduction to Research). After passing the USMLE Step I exam al the end of year two, students begin their Ph.D. coursework and research. This takes three to four years. After completing the Ph.D. requirements, students then complete years three and four of medical school. All of the requirements for both the M.D. and Ph.D. degrees must be met.

The medical student course Elements of Medicine (MDC 710) meets the requirements for BMS 601, 602, 603, and 604. Other medical school courses can meet area of emphasis requirements, as determined by the student's advisory committee and the Graduate Studies Committee.

**M.D./Ph.D. Applications**

Students interested in pursuing the combined degree should indicate this on their medical school AMCAS application. A separate M.D./Ph.D. admissions subcommittee consisting of members of the medical school and BMS graduate admission committees will review the applications.

All applicants must take the MCAT. A score of 30 or better on the MCAT taken between January 2013 and January 2015 is preferredd for considertion for admission. An MCAT score of 28 will be considered if the applicant has extensive research experience. A minimum score of 505 on the new MCAT is required for consideration for admission.

AMCAS applications must be submitted by November 1. Completed appl ications should be received by December 1. Completed applications received after December 1 may be reviewed for a position on a waiting list.

## Advisory Committee for Ph.D. and M.D./Ph.D. Students

The advisory committee should be formed no later than the end of the first year of graduate education or upon completion of 18 semester hours of credit. As soon as the committee has been identified, an Approval for Dissertation Topic and Committee Membership form is completed and submitted to the Director of Graduate Studies and the Dean of the Graduate College.

The committee will be selected by the student and research advisor and approved by the Director of Graduate Studies and the Dean of the Graduate College. The advisory committee will be composed of at least five faculty members with appropriate expertise. One of the members may be from another institution. The student's research advisor will act as the chairperson of the committee.

## Approval of Course of Study

It is essential for the student and advisory committee to carefully define a Course of Study by the end of the first year. This is considered a basic contract between the student and the program and includes:

- Proposed dissertation topic;
- All transfer credits;
2. Required and elective courses to be taken at Marshall University.;
3. All competencies to be achieved by the student during graduate study. These details must be recorded on a Course of Study form and submitted for approval by the Director of Graduate Studies and the Dean of the Graduate College.

## Graduate Assistantships for the Doctor of Philosophy Program

Research assistantships are available for students in the doctoral degree program on a competitive basis. The base stipend is renewable annually for up to six years. Priority consideration for the Ph.D. assistantships will be given to West Virginia residents.

## Academic Performance

- The student must maintain a Grade Point Average of 3.0, and no more than six hours of *C* and no grades below *C* may be applied toward the degree.
- If the GPA falls below 3.0, the student will be placed on academic probation. Following notification of probation, the student will be counseled by his/her advisor. At this time, the deficiency will be identified and a written plan will be prepared for removing it within the next semester. This plan, co-signed by the student and the advisor, must be approved by the Graduate Studies Committee and the Director of Graduate Studies before the student can register for additional coursework.
- If probationary status is not removed within the next semester hours, the student is dismissed from the program. The dismissal is automatically appealed to the Graduate Studies Committee, who will determine whether the student is retained or dismissed from the program. Retention must be recommended by the advisor and student's advisory committee and endorsed by the Graduate Studies Committee.

## Transfer Credit

The student may transfer credits completed at other regionally accredited graduate institutions. Approval of the Graduate Studies Committee and the Dean of the Graduate College is contingent on:

1. the grades earned were *B*'s or better;
2. the credits are appropriate to the student's program and acceptable to the advisory committee; and
3. the time limitations were not exceeded.

The number of transfer hours acceptable for the Ph.D. degree will be determined by the student's advisory committee. Approval must be received from both the Graduate Studies Committee and the Dean of the Graduate College. Transfer credit will not become part of the Marshall University Grade Point Average.

Transfer of credits should be accomplished as early as possible. This should be accomplished either when the student is admitted to candidacy or submits an approved Course of Study. Attempts to transfer credits during the last semester may delay graduation. Official transcripts must be on file in the Graduate College office by the date that grades are due in the Marshall University Registrar's Office.

## Validation of Outdated Coursework

The advisory committee has the option to require validation, by special examination, of courses which members deem to be outdated.

## Time Limitations

Students must meet all requirements for the Doctor of Philosophy degree within seven years from the date of enrollment in the first course to be used in the degree program. The Graduate Dean may grant an extension upon recommendation by the Graduate Studies Committee. Absence due to military obligations, long serious illnesses, or similar circumstanccs bcyond
the student's control may be considered valid reasons for an extension. It is the option of the advisory committee to require validation of outdated courses by special examination.

## Admission to Candidacy

Admission to graduate study and enrollment in graduate courses does not guarantee acceptance as a candidate for the Doctor of Philosophy degree. This is only accomplished by satisfactorily passing a comprehensive qualifying examination and meeting all other specified requirements. The qualifying examination assesses whether the student has attained sufficient knowledge to undertake independent research. The examination should be completed at the end of the second year of study. The examination consists of written and oral components covering all areas specified in the Course of Study. The examination is prepared, administered and graded by the advisory committee. The written portion includes all coursework and relevant topics determined by the advisory committee. The student will be given 2-3 days to complete the written component of
the examination. Upon passing the written examination, the student must submit a grant proposal on the topic of his/her dissertation research or a related topic approved by the advisory committee. The proposal must be in the style of an NIH Predoctoral grant proposal. Links to the instructions for the proposal format can be found on the BMS Graduate Program website. The grant proposal must be submitted within 2 months of completion of the written exam and given to the advisory committee members at least 2 weeks in advance of the oral defense. The oral examination consists of a defense of the grant proposal and, at the discretion of the advisory committee, may include topics from the written portion of the exam in which the student was deemed to be deficient. Successful completion of the qualifying examination is based on approval of the committee. Only one dissenting vote is permitted on each component. If necessary, a single portion of the examination may be repeated at the discretion of the advisory committee. The student must have the approval of the advisory committee

to repeat either the written or oral component of the qualifying examination. The committee assesses the deficiencies and determines the time required for the student to make corrections. A student may take a given component of the qualifying examination no more than three times. Failure to pass this examination on the third attempt will result in dismissal. The advisory committee must complete an Admission to Candidacy for Ph.D. form after the student completes the examinations and submit it for approval by the Director of Graduate Studies and the Dean of the Graduate College.

## Dissertation

All candidates must successfully complete a biomedical research project and prepare, submit, and defend a dissertation. The dissertation must present the results of the candidate's individual investigation and make a definite contribution to the current state of knowledge. While conducting research and writing a dissertation, the student must register for Research (BMS 882) at the beginning of each semester or summer term for which progress is to be earned. No more than 15 hours of doctoral research may be credited toward the degree.

Candidates are to follow the general guidelines outlined in *Publishing Your Dissertation: How to Prepare Your Manuscript for Publication* and *General Information About Dissertations*. Copies of these documents are on file in the Biomedical Sciences Graduate Program office.

## Oral Defense of the Dissertation

The oral defense of the dissertation is held during the semester or summer session in which all other degree requirements have been met. The advisory committee must read and tentatively approve the dissertation before the examination can be scheduled. The committee chairperson will complete an Approval to Schedule Dissertation Defense form and submit it for approval of the Director of Graduate Studies and the Dean of the Graduate College before the examination can be given. Such notification must occur at least two weeks before the proposed date of the defense. A portion of the defense is an open examination and sufficient time is required for adequate public notice.

The open examination usually takes the form of a one-hour seminar. This is followed by a thorough review of the dissertation by the advisory committee and the candidate. Successful completion of the defense requires the approval of all but one of the members of the advisory committee. The results (pass/fail) must be recorded on a Results of Dissertation Examination form, which is to be reported to the Office of Research and Graduate Education and forwarded to the Graduate College Office within 24 hours. Should the candidate fail the defense, reexamination may not be scheduled without the approval of the advisory committee, the Director of Graduate Studies, and the Dean of the Graduate College.

All advisory committee members are to be present for the defense. If this is not possible, the Dean of the Graduate College, or designee, may permit one substitute for any member of the committee except the chairperson. A request for a substitute must be submitted in writing to, and approved by, the Director of Graduate Studies and the Dean of the Graduate College. The committee chairperson, the student, and both the original member of the committee to be replaced, and the substitute must sign this request. The substitute must have the same, or higher, graduate faculty status as the original member and represent the same academic discipline or area of emphasis.

## Acceptance of Dissertation

Acceptance of the dissertation is a requirement for the doctoral degree. An accepted dissertation must bear the original signatures of at least all but one member of the advisory committee. If more than one member cannot approve the dissertation, the doctoral degree cannot be recommended. If the substitute member attends and approves the dissertation defense, he or she signs the dissertation. For complete information on the preparation and submission of electronic theses and dissertations see *www.marshall.edu/graduate/current-students/edt.*

## Survey of Earned Doctorates

Please complete and submit the online Survey of Earned Doctorates. Survey of Earned Doctorate information is used by a number of government agencies to assess the state of doctoral education in the U.S., and also to inform their decisions concerning funding of U.S. graduate institutions. The online survey is available at *http://survey.norc.uchicago.edu/ doctorate/index.jsp.*

## Publication

All doctoral dissertations and their abstracts will be microfilmed through University Microfilms, Ann Arbor, Michigan. This requirement cannot be satisfied by any other publication, but other publication of material in the dissertation is both permitted and encouraged.

## Process Summary

- Inquiry from prospective student to the Biomedical Sciences Graduate Program or Graduate Admissions Office.
- Submission of the application to the Biomedical Sciences Graduate Program, the Graduate Admissions Office, or online.

- Receipt of the following official application materials and required fee by the Graduate Admissions Office: application, GRE scores, and transcript(s). International students must apply through the Center for International Programs.
- Referral of application materials by the Graduate Admissions Office.
- The Biomedical Sciences Graduate Program notifies the Graduate Admissions Office and the prospective student of the admission decision of the Graduate Studies Committee.
- The accepted student arrives, reports to the Biomedical Sciences Graduate Program, is assigned an interim advisor, and registers for coursework.
- Selection of an area of emphasis/advisor must be achieved by the end of the first year. After a permanent advisor has been selected, an advisory committee is formed. A Course of Study should be developed by the end of the first year.
- The student completes requisite coursework and other program requirements.
- The student takes written and oral qualifying examinations for admission to candidacy to the Ph.D. These examinations should be scheduled within two months of each other.
- The student continues doctoral research under the guidance of his/her advisory committee. The dissertation phase begins with the approval of a dissertation prospectus by the advisory committee, the Biomedical Sciences Graduate Program and the Graduate College Dean.
- The student applies for graduation at the beginning of his or her last semester no later than the university deadline in the academic calendar. The diploma fee must be paid by this time.
- A copy of the preliminary draft of the dissertation is given to each member of the advisory committee no later than two weeks prior to the final defense of the dissertation.
- The chair of the advisory committee requests clearance for the defense from the Biomedical Sciences Graduate Program and the Graduate College for approval no later than two weeks before the scheduled date of the defense.
- The time and place of the defense of the dissertation are announced.
- The student defends the dissertation in an oral defense.
- The student follows the steps to prepare and submit the electronic thesis or dissertation at *www.marshall.edu/graduate/ current-students/edt.*

# CLINICAL AND TRANSLATIONAL SCIENCE, M.S.

## Program Description

The Clinical and Translational Science (CTS) Department in the Marshall University Joan C. Edwards School of Medicine offers a Master of Science (M.S.) degree in Clinical and Translational Science. The goal of this program is to equip physicians in-training and other biomedical scientists with the information and training they need to translate basic clinical advances into improved patient care that will enhance the quality of life for patients in the Appalachian region, particularly southern West Virginia.

Students will receive education in clinical trial design, epidemiology, statistics, informatics, and translational research. Graduates of this program will be able to lead clinical trials of new drugs and procedures in West Virginia, particularly in its rural regions. CTS graduates also will be strong applicants for positions in schools of medicine and medical centers that have clinical and translational science centers.

## Clinical and Translational Science M.S. Admission Policy

Applicants must meet both the requirements of Graduate Admissions and the Marshall University Joan C. Edwards School of Medicine Clinical and Translational Science Department Admissions Committee. Interested persons may contact the Office of Research and Graduate Education via e-mail at *mubiomed@marshall.edu* or learn more at *www.marshall.edu/bms/ future-students/application-information.*

Entrance into the Clinical and Translational Science, M.S. program is restricted to fall semester only. Applicant materials should be received by March 1 in the Graduate Admissions Office to have the best chance for admission.

The complete application process includes:

1. Submission of the Marshall University Graduate College Application available online at www.marshall.edu/graduate. Select "Degree Seeking."
2. Receipt of the application fee (submitted on line at the time of application).
3. Receipt of official transcript(s) from every institution attended documenting that the applicant has:
    a. Completed a bachelor's degree from an accredited institution of higher learning. The degree must be completed prior to matriculation.

b. Achieved an overall Grade Point Average of 3.0 or better.
c. Successfully completed one academic year of biology and its associated labs.
d. Successfully completed one academic year of general chemistry and its associated labs.
e. Successfully completed one academic year of organic chemistry and its associated labs.
f. Successfully completed one academic year of physics and its associated labs.
g. It should be noted that successful completion of undergraduate courses in biochemistry and cell biology are highly recommended, but not required.

4. Official letters
   a. Three letters of recommendation signed and on formal letterhead from individuals familiar with the applicant's relevant academic/professional performance (May be e-mailed as attachments)
   b. Written statement describing the applicant's educational and career goals, and why he or she should be admitted to the CTS, M.S. program. (May be e-mailed as an attachment)

Completed applications received in the Graduate Admissions Office by March 1 will be considered for admission. The CTS Admissions Committee will review completed applications, then interview the top applicants.

## Who Should Apply

- Undergraduates.
- Medical students at an LCME-accredited U.S. medical school with a current GPA of at least a 3.0.
- Postgraduate medical residents or fellows who have an M.D. or D.O. with a graduating GPA of 3.0 or better (equivalent GPA for foreign medical graduates).
- Ph.D.'s in biomedical sciences or Pharm.D.'s with graduating GPAs of 3.0 or better.

Medical students will apply to the program during their third year of training. After completing the requirements for the M.S. degree, students will finish the fourth year of medical school.

Medical residents and fellows who are admitted into this program will need to integrate coursework into a reduced clinical workload, thus extending their postgraduate medical education by two years.

## Duration of the Program

Students will attend full-time and complete the requirements for the Master of Science degree in two years. This indudes attending during the summer between years one and two.

## Degree Requirements

All students are required to meet the general requirements of the Graduate College for receipt of a master's degree. A minimum of 36 credit hours is required for a non-thesis degree. In addition, all students must pass a written and/or oral comprehensive exam.

All students will take the following courses.

*Fall Semester 1*

| | | |
|---|---|---|
| BMS | 660 | Communication Skills I |
| BMS | 680 | Biomedical Sciences Seminar |
| CTS | 600 | Epidemiology and Biostatistics Used in Medical Research |
| CTS | 620 | Basic Clinical Research Operations |
| CTS | 635 | Writing and Peer Review of Scientific Publications |
| CTS | 640 | Clinical Trials Journal Club |

Spring Semester 1

| | | |
|---|---|---|
| BMS | 661 | Communication Skills II |
| BMS | 680 | Biomedical Sciences Seminar |
| CTS | 610 | Study Design and Applied Statistics in Medical Research |
| CTS | 614 | Online Survey Tools, Relational and Data Warehousing, and Data Manipulation |
| CTS | 630 | Fundamentals of Team Science |

CTS 640 Clinical Trials Journal Club

*Summer Semester*

CTS 650 Rural Clinic Experience

*Fall Semester 2*

BMS 680 Biomedical Sciences Seminar
CTS 625 Clinical Research Operations Lab
CTS 640 Clinical Trials Journal Club
CTS 660 Molecular Phenotype of Appalachian Disorders

*Spring Semester 2*

BMS 680 Biomedical Sciences Seminar
CTS 625 Clinical Research Operations
CTS 640 Clinical Trials Journal Club



## BIOMEDICAL SCIENCE (BMS)

**601 Introduction to Nucleic Acids and Proteins. 3 hrs.**
A molecular and cell biological study of the structure and function of nucleic acids and proteins. (PR: Consent of instructor)

**602 Introduction to Cell Structure and Metabolism. 3 hrs.**
A molecular and cell biological study of the structure of cells and of cellular metabolism. (CR: BMS 601; PR: Consent of instructor)

**603 Regulation of Cell Function. 2 hrs.**
An advanced molecular and cell biological study of cell metabolism and the regulation of cell function. (PR: BMS 601, BMS 602, and consent of instructor

**604 Cellular Basis of Disease. 1 hr.**
A molecular and cell biological study of the basis of diseases prevalent in Appalachia. (PR: BMS 601, BMS 602, and consent of instructor)

**617 Statistical Techniques for the Biomedical Sciences. 3 hrs.**
An application-oriented course in statistical concepts and techniques aimed at prospective researchers in the biomedical sciences.

**628 Neuroscience I: Major Structures of the Brain, Neuron Function, and Spinal Cord. 3 hrs.**
To study and understand the structure and function of the nervous system and disorders of neuronal function. (PR: BMS 600 or permission of instructor)

**629 Neuroscience II: Structures and Functions of the Brain Stem and Forebrain. 3 hrs.**
To study and understand the structure and function of the nervous system and disorders of neuronal function. (BMS 628 or permission of instructor)

**631 Neuroscience and Developmental Biology Literature Review. 1 hr.**
A seminar course where published articles in the fields of neuroscience and developmental

biology will be presented by students and faculty. (PR: Permission of instructor)

**632 Neuroscience Research Techniques. 3 hrs.**
Class participants will be exposed to state-of-the-art neuroscience research techniques while in the laboratories of the neuroscience faculty. (PR: Permission of instructor)

**641 Molecular Developmental Biology. 3 hrs.**
An in-depth discussion of current literature in developmental biology with emphasis on early embryo development, morphogenesis, lineage determination and regulation of developmental processes. (PR: Permission of instructor)

**644 Responsible Conduct of Research. 1 hr. CR/NC.**
Responsible conduct of research, including human subjects, live vertebrate animals, conflict of interest, mentor/mentee responsibilities, collaborative research, peer review, data management, research misconduct, and responsible authorship, with case discussions.

**651 Cancer Biology. 4 hrs.**
An advanced graduate course on the core principles of initiation, progression, treatment and prevention of cancer, based on current literature. (PR: BMS 600, and permission of instructor)

**652 Cancer Biology Colloquium. 1 hr.**
This is a mentored journal club for graduate students covering selected areas of current interest in cancer biology research. (PR: Permission of instructor)

**660 Communication Skills for Biomedical Sciences I. 1 hr.**
Biomedical graduate students are trained to plan, prepare, and deliver effective scientific presentations.

**661 Communication Skills for Biomedical Sciences II. 1 hr.**
Biomedical graduate students are trained to plan, prepare, and deliver effective scientific presentations.

**665 Cardiovascular Disease, Obesity, Diabetes Research Colloquium. 1 hrs. CR/NC.**
A seminar-style series that will focus on recent advances in topics related to cardiovascular disease, diabetes and obesity.

**674 Teaching Practicum. 1 hr. CR/NC.**
Students gain experience in teaching using a variety of methods in a supervised setting.

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**679 Special Problems. I, II, S. CR/NC**
Intensive study of a selected topic or problem. Emphasizes independent study. (PR: Consent of advisor)

**680 Seminar. 1 hr. I, II. CR/NC**
Study and discussion of current topics related to the Biomedical Sciences.

**681 Thesis. 1-6 hrs. I, II, S. CR/NC.**

**785 Introduction to Research. 1-6 hrs. I, II, S. CR/NC**
Directed research activities requiring a completed prospectus for an advanced research project, a written report, or a research thesis. A minimum of three (3) hours required for all M.S. candidates. (PR: Consent of instructor)

**882 Research. 1-15 hrs. I, II, S. CR/NC**

2. Edits to current catalog description - pages 217-226

# School of Medicine

**Dr. Joseph Shapiro, Dean**
***http://musom.marshall.edu***

~~**BIOMEDICAL SCIENCES, M.S., Ph.D., M.D./Ph.D.**~~

~~**Areas of**~~
~~**Emphasis**~~
~~**Cancer**~~
~~**Biology**~~
~~**Cardiovascular Disease, Obesity, and Diabetes**~~
~~**Infectious and Immunological Diseases**~~
~~**Medical Sciences (M.S. only)**~~
~~**Neuroscience and Developmental Biology**~~
~~**Toxicology and Environmental Health Sciences**~~

**BIOMEDICAL RESEARCH, M.S. (THESIS), M.S. (NON-THESIS), Ph.D., M.D./Ph.D.**

**Areas of Emphasis**
**Cardiovascular Disease**
**Cell Biology**
**Medical Sciences (M.S. only)**
**Neurobiology and Addiction**
**Obesity and Related Diseases**
**Toxicology and Environmental Health**

~~**Program Description**~~

~~The basic science departments of the Joan C. Edwards School of Medicine offer an interdisciplinary program leading to the Master of Science and Doctor of Philosophy degrees in Biomedical Sciences. The primary aim of the Biomedical Sciences (BMS) program is to produce graduate students who are broadly based in the biomedical sciences with defined~~ interests
~~and special in-depth training in one of the following areas of emphasis: cancer biology; cardiovascular disease, obesity, and diabetes; infectious and immunological diseases; neuroscience and developmental biology; and toxicology and environmental health sciences. These areas are designed to be flexible and research oriented in order to develop the interests, capabilities and potential of all students pursuing careers in academic or industrial biomedical sciences.~~

~~In addition, the BMS program offers a non-thesis Master of Science degree in the medical sciences area of emphasis to improve the science foundation of students seeking admission into doctoral programs in medicine or other health-related professions.~~

~~Admission into this program does not guarantee admission into medical school. Students in this area of emphasis are required to pay the Health Professions Fee each semester while enrolled in the program. Because of the nature of the~~
~~curriculum, applicants to the medical sciences area of emphasis will only be considered for admission for the fall semester.~~

~~The Biomedical Sciences Doctor of Philosophy degree program accepts a very limited number of students to study concurrently with the Doctor of Medicine degree.~~

## Program Description

The Biomedical Sciences and Clinical and Translational Sciences departments of the Joan C. Edwards School of Medicine offer the following degrees: Doctor of Philosophy (Ph.D.), M.D./Ph.D., and Master of Science (M.S.), both thesis and non-thesis.

The primary goal of the Biomedical Research (BMR) program is to use biomedical and translational research approaches to help reduce the numerous health disparities and improve the health of the population in West Virginia and Central Appalachia. To do this, students will take an interdisciplinary approach with defined interests and special in-depth training in one of the following research areas of emphasis: Cardiovascular Disease; Cell Biology; Obesity and Related Diseases; Neurobiology and Addiction; and Toxicology and Environmental Health. These areas are designed to be flexible and research oriented in order to develop the interests, capabilities and potential of all students pursuing careers in academic, government, or industrial biomedical sciences.

In addition, the BMR program offers a non-thesis Master of Science degree with a medical sciences area of emphasis to improve the science foundation of students seeking admission into doctoral programs in medicine or other health-related professions. Admission into the BMR M.S. Medical Sciences program does not guarantee admission into medical school. Additionally, a research component to this emphasis is available, but not required. Students choosing the research component may work up to 19 hours per week while earning a minimum of $10/hour. Students are expected to stay in good academic standing.

Also offered is the combined M.D./Ph.D. Students in this program blend the discovery of new knowledge with clinical medicine at the intersection of science and medicine. M.D./Ph.D. Most graduates work as physician-scientists at medical schools, conducting disease-related research and applying the results to the treatment of patients. They have a unique perspective on both the basic science and clinical science behind disease. Further general information is available at the Association of American Medical Colleges website (aamc.org).

## ~~Admission Requirements~~

~~Applicants must meet the admissions requirements of the Graduate Studies Committee of Marshall University's Joan C. Edwards School of Medicine. Interested persons should contact the Biomedical Sciences Graduate Program at the Byrd Biotechnology Science Center, Marshall University School of Medicine, One John Marshall Drive, Huntington, WV 25755 or via the Internet at *www.marshall.edu/bms/future-students/contact-us, mubiomed@marshall.edu,* or 304-696-3365.~~

## Admission Requirements

Applicants must meet the admission requirements of both Marshall University Graduate Admissions as outlined on their website – *www.marshall.edu/graduate/admissions/how-to-apply-for-admission* – and the Biomedical Research Program of the Marshall University Joan C. Edwards School of Medicine. Interested persons should visit https://jcesom.marshall.edu/research, email mubiomed@marshall.edu and/or call 304-696-3365.

## ~~Minimum Requirements for Admission into Master of Science or Doctor of Philosophy Program~~

~~All applicants must have baccalaureate degrees, with one year of general biology, physics, general chemistry, and organic chemistry, all with associated laboratories. Biochemistry is not currently a requirement, but it is highly recommended to take it.~~

- ~~Graduate Record Examination (GRE) General Test scores (scores may not be more than three (3) years old at the application deadline for the Ph.D. program or at the start of the semester when matriculating for the M.S. program) or MCAT scores (Medical Sciences area of emphasis only, minimum of 22 total)~~
- ~~Three letters of recommendation from references familiar with the applicant's relevant academic/professional performance~~
- ~~A personal statement describing educational and career goals.~~

## ~~Ph.D. Applications~~

~~The completed application, application fee, official transcripts and official GRE or MCAT scores should be received in the Graduate Admissions Office by January 15th for summer or fall applications in order for the application to be considered by the program.~~

~~Letters of recommendation and personal statements should be received in the BMS Office by January 15th in order for the application to be considered complete and for an admission decision to be rendered.~~

~~Applications completed very soon after the above stated deadlines may be considered at the discretion of the BMS Graduate Studies Committee.~~

~~New Ph.D. students will matriculate in July (Summer III term).~~

## ~~M.S. Applications~~

~~The completed application, application fee, official transcripts, three letters of recommendation, written statement, and official GRE or MCAT scores (MCAT scores accepted for medical sciences area of emphasis only) should be received in the Graduate Admissions Office by June 1st for fall applications in order for the application to be considered by the program.~~

## ~~Duration of Degree Programs~~

~~Students are expected to complete the requirements for the Master of Science degree within two years. Doctoral students are expected to complete the degree requirements within five year. Students who possess an M.S. degree in biomedical sciences or the equivalent when admitted into the doctoral degree program generally require three years to complete the Doctor of Philosophy degree.~~

## Biomedical Research M.S. (Thesis and Non-Thesis) Applicants

## Minimum Admission Requirements

- A baccalaureate degree from a regionally accredited college or university
- Successfully completed, with a grade of C or better, one year of general biology, physics, general chemistry, and organic chemistry, all with associated laboratories. A semester of biochemistry or molecular biology with associated laboratory is also required.
- A recommended minimum Grade Point Average (GPA) of 3.0
- A recommended minimum GPA of 3.0 in combined science and math courses
- Graduate Record Examination (GRE) General Test scores - REQUIRED for M.S. THESIS ONLY
- Official transcript from degree granting institution/s and institutions where relevant post-baccalaureate or graduate coursework was taken
- Departmental materials: three recommendations, program online form, written statement addressing educational and career goals, CV/résumé

## PRIORITY Deadline – June 1 for best chance of admission

Applications are accepted on a rolling basis and are reviewed until the class is filled. Applications will be considered after the priority deadline until June 30, if openings are available. The completed application, application fee, official transcript(s), three recommendations, written statement, and official GRE scores should be received in the Graduate Admissions Office by June 1. *For the Medical Sciences area of emphasis only, no entrance exam is required.* The program online form should be received in the Office of Research and Graduate Education by June 1.

## Duration of Degree Program

Students are expected to complete the degree within two years. This includes the summer between years one and two for M.S. (thesis) students.

## Ph.D. Applicants

## Minimum Admission Requirements

- A baccalaureate degree from a regionally accredited college or university
- Successful completion, with a grade of C or better, of one year each of general biology, physics, general chemistry, and organic chemistry, all with associated laboratories. A semester of biochemistry or molecular biology with associated laboratory is also required.
- A recommended minimum Grade Point Average (GPA) of 3.0
- A recommended minimum GPA of 3.0 in combined science and math courses
- Graduate Record Examination (GRE) General Test scores
- Official transcript from degree granting institution/s and institutions where relevant post-baccalaureate or graduate coursework was taken
- Departmental materials: three recommendations, program online form, written statement addressing educational and career goals, CV/résumé

## PRIORITY Deadline – March 1 for best chance of admission

Applications are accepted on a rolling basis and are reviewed until the class is filled. Applications will be considered after the priority deadline until June 30, if openings are available. International applicants must meet the international application deadline of March 15. The completed application, application fee, official transcript(s), and official

GRE scores should be received in the Graduate Admissions Office by March 1. MCAT scores will be considered for admission on a case-by-case basis. For the application to be complete, the program online form, written statement addressing educational and career goals, and three recommendations should be received in the Office of Research and Graduate Education by March 1.

## Duration of Degree Program

Doctoral degree students are expected to complete the requirements within five years. Students who possess an M.S. degree in Biomedical Research or the equivalent when admitted into the doctoral degree program generally require three to four years to complete the Doctor of Philosophy degree.

## Entry Term

BMR Ph.D. students will matriculate in July (summer III term). The first week will be devoted to orientation and Preparation for Graduate Academics (PGA) Boot Camp. This allows students to learn more about research opportunities, get to know their cohort and current students, acclimate to a new environment, and get a head start on their research rotations.

## ~~BIOMEDICAL SCIENCES, M.S. (Cancer Biology; Cardiovascular Disease, Obesity, and Diabetes; Infectious and Immunological Diseases; Neuroscience and Developmental Biology; Toxicology and Environmental Health Sciences Areas of Emphasis)~~

### ~~Degree Requirements~~

~~A minimum of 36 credit hours is required for a non-thesis degree, while a minimum of 32 credit hours is required for the thesis degree. No more than six hours of thesis (BMS 681) may be credited toward the 32 hour requirement. Each student will specialize in one of the five areas of emphasis as defined in the program description. All students are required to successfully complete:~~

~~BMS 601 Introduction to Nucleic Acids and Proteins~~
~~BMS 602 Introduction to Cell Structure and Metabolism~~
~~BMS 603 Regulation of Cell Function~~
~~BMS 604 Cellular Basis of Disease~~
~~BMS 617 Statistical Techniques for the Biomedical Sciences~~
~~BMS 644 Responsible Conduct of Research~~
~~BMS 660/661 Communication Skills for Biomedical Sciences~~
~~BMS 680 Seminar (minimum of 4 hrs.)~~
~~BMS 785 Introduction to Research~~

~~In addition, the student must successfully complete other courses required by his/her area of emphasis and advisory committee and pass an oral comprehensive examination.~~

## BIOMEDICAL RESEARCH, M.S. (Thesis – Cardiovascular Disease; Cell Biology; Neurobiology and Addiction; Obesity and Related Diseases; Toxicology and Environmental Health)

### Degree Requirements

All students are required to meet the general requirements of the Graduate College for receipt of a master's degree. A minimum of 36 credit hours is required for a non-thesis degree, while a minimum of 32 credit hours is required for the thesis degree. No more than six hours of thesis (BMR 681) may be credited toward the 32 credit hour requirement. Each student will specialize in one of the five areas of emphasis as defined in the program description. All students are required to successfully complete the following core curriculum:

| | |
|---|---|
| BMR 601 | Introduction to Nucleic Acids and Proteins |
| BMR 602 | Introduction to Cell Structure and Metabolism |
| BMR 603 | Regulation of Cell Function |
| BMR 604 | Cellular Basis of Disease |
| BMR 617 | Statistical Techniques for Biomedical Sciences |
| BMR 644 | Responsible Conduct of Research |
| BMR 660/661 | Communication Skills for Biomedical Sciences |

| | |
|---|---|
| BMR 680 | Seminar (minimum of 4 hrs.) |
| BMR 785 | Introduction to Research |

In addition, the student must successfully complete other courses required by his/her area of emphasis and advisory committee, and pass a written and/or oral comprehensive examination.

To remain in good academic standing and to graduate, the student must have a minimum graduate GPA of 3.0.

~~**Advisory Committee for M.S. Students**~~

~~The advisory committee should be formed no later than the end of the first year of graduate education. As soon as the committee has been identified, a Thesis Committee Formation form is completed and submitted to the Director of Graduate Studies.~~

~~The committee will be selected by the student and research advisor and approved by the Director of Graduate Studies. The advisory committee will be composed of at least three faculty members with appropriate expertise. One of the members may be from another institution. The student's research advisor will act as the chairperson of the committee.~~

~~In addition, after 12 hours of coursework has been completed, the student must submit to the Dean of the Graduate College a Plan of Study form.~~

## Advisory Committee for M.S. (Thesis) Students

The advisory committee should be formed no later than the end of the first year of graduate education. As soon as the committee has been identified, a Thesis Committee Formation form is completed and submitted to the Director of Graduate Studies.

The committee will be selected by the student and research advisor and approved by the Director of Graduate Studies. The advisory committee will be composed of at least three faculty members with appropriate expertise. One of the members may be from another institution. The student's research advisor will act as the chairperson of the committee.

In addition, after 12 hours of coursework has been completed, the student must submit an M.S. Plan of Study form to the Dean of the Graduate College.

## ~~BIOMEDICAL SCIENCES, M.S. (Medical Sciences Area of Emphasis)~~

~~A minimum of 36 credit hours is required for the non-thesis degree. In addition, the student must pass a written comprehensive examination covering BMS 601-604, MCB 631, MCB 632, and PHS 628. All students will also participate in laboratory-based research, and either present at a research conference or submit a peer-reviewed publication. All students are required to successfully complete:~~

| | |
|---|---|
| ~~BMS 601~~ | ~~Introduction to Nucleic Acids and Proteins~~ |
| ~~BMS 602~~ | ~~Introduction to Cell Structure and Metabolism~~ |
| ~~BMS 604~~ | ~~Cellular Basis of Disease~~ |
| ~~BMS 603~~ | ~~Regulation of Cell Function~~ |
| ~~BMS 617~~ | ~~Statistical Techniques for the Biomedical Sciences (or MTH 518, BSC 517, PSY 517, EDF 517 or equivalent)~~ |
| ~~BMS 680~~ | ~~Seminar (minimum of 4 hrs.)~~ |
| ~~BMS 785~~ | ~~Introduction to Research~~ |
| ~~MCB 631~~ | ~~Medical Microbiology I~~ |
| ~~MCB 632~~ | ~~Medical Microbiology II~~ |
| ~~PHS 628~~ | ~~Neurophysiology~~ |

~~Elective classes include PHS 629 (Mammalian Physiology), PMC 621 (Medical Phamrnceology I). and PMC 622 (Medical Pharmacology II).~~

~~In addition, after 12 hours of coursework has been completed, the student must submit to the Dean of the Graduate College a Plan of Study form.~~

## BIOMEDICAL RESEARCH, M.S. (Non-Thesis Medical Sciences Area of Emphasis)

A minimum of 36 credit hours is required for the non-thesis degree. In addition, the student must pass a written comprehensive examination covering BMR 601-604, MCB 631, MCB 632, and PHS 628. All students are required to successfully complete the following core curriculum:

| | |
|---|---|
| BMR 601 | Introduction to Nucleic Acids and Proteins |
| BMR 602 | Introduction to Cell Structure and Metabolism |

| | |
|---|---|
| BMR 603 | Introduction to Cell Function |
| BMR 604 | Cellular Basis of Disease |
| BMR 617 | Statistical Techniques for Biomedical Sciences (or MTH 518, BSC 517, PSY 517, EDF 517 or equivalent) |
| BMR 680 | Seminar (minimum of 4 hrs.) |
| BMR 785 | Introduction to Research |
| MCB 631 | Medical Microbiology I |
| MCB 632 | Medical Microbiology II |
| PHS 628 | Neurophysiology |

Elective classes include PHS 629 (Mammalian Physiology), PMC 621 (Medical Pharmacology I), and PMC 622 (Medical Pharmacology II).

In addition, after 12 hours of coursework has been completed, the student must submit an M.S. Plan of Study form to the Dean of the Graduate College.

To remain in good academic standing and to graduate, the student must have a minimum graduate GPA of 3.0.

## Qualifying for Admission into Marshall University Joan C. Edwards School of Medicine without the MCAT (Pathway Program)

**Requirements:**

- Have a minimum 3.4 GPA in the BMR, M.S. Medical Sciences program at the time of the Marshall University Joan C. Edwards School of Medicine (MUJCESOM) interview
- Graduate from the program with a minimum of a 3.4 GPA
- Pass the M.S. comprehensive exam on the first attempt in May of the program's second year

**Benefits:**

- An MCAT score will not be required for admittance to MUJCESOM
- For interview purposes, out-of-state applicants will be considered the same as in-state students, regardless of residency. Marshall University JCESOM tuition cost will be based on residency status.
- With satisfactory standing, students will receive the mandatory program letter of support.

## BIOMEDICAL ~~SCIENCES~~ RESEARCH, M.S., AND SCHOOL OF PHARMACY, PHARM.D.

Students can receive both an M.S. degree from the Biomedical ~~Sciences~~ Research Program and a Pharrn.D. degree from the School of Pharmacy. Prospective students must apply to and meet the admission requirements for both programs. The curriculum takes five years to complete. In the first year students take ~~BMS~~ BMR courses; in years 2-5 students ~~t.ake~~ take School of Pharmacy courses. All students are required to successfully complete:

~~**Year 1 Fall**~~

| | | |
|---|---|---|
| ~~BMS~~ | ~~601~~ | ~~Introduction to Nucleic Acids and Proteins~~ |
| ~~BMS~~ | ~~602~~ | ~~Introduction to Cell Structure and Metabolism~~ |
| ~~BMS~~ | ~~680~~ | ~~Seminar~~ |
| ~~PHS~~ | ~~628~~ | ~~Neurophysiology~~ |

~~**Year I Spring**~~

| | | |
|---|---|---|
| ~~BMS~~ | ~~603~~ | ~~Regulation of Cell Function~~ |
| ~~BMS~~ | ~~604~~ | ~~Cellular Basis of Disease~~ |
| ~~BMS~~ | ~~680~~ | ~~Seminar~~ |
| ~~BMS~~ | ~~785~~ | ~~Introduction to Research~~ |
| ~~PHS~~ | ~~629~~ | ~~Mammalian Physiology~~ |

**Year 1 Fall**

| | | |
|---|---|---|
| BMR | 601 | Introduction to Nucleic Acids and Proteins |
| BMR | 602 | Introduction to Cell Structure and Metabolism |
| BMR | 680 | Seminar |
| PHS | 628 | Neurophysiology |

**Year 2 Spring**

| | |
|---|---|
| BMR 603 | Introduction to Cell Function |
| BMR 604 | Cellular Basis of Disease |
| BMR 680 | Seminar |
| BMR 785 | Introduction to Research |
| PHS 629 | Mammalian Physiology |

~~**Year 2 Fall**~~

| | | |
|---|---|---|
| PHAR | 511 | Clinical Immunology |
| PHAR | 531 | Biopharmaceutics I |
| PHAR | 541 | Pharmacy Practice I |
| PHAR | 542 | Immunology and Microbiology |
| PHAR | 551 | Biomedical Chemistry |
| ~~PHAR~~ | ~~811~~ | ~~Introductory Pharmacy Practice Experiences in Community Settings~~ |

PHAR 811 Introductory Pharmacy Practice Experiences in Community Settings I

**Year 2 Spring**

| | | |
|---|---|---|
| PHAR | 521 | Integrated Laboratory I |
| PHAR | 532 | Biopharmaceutics 11. |
| PHAR | 543 | Pharmacy Practice II |
| PHAR | 544 | Principles of Disease and Drug Action |
| PHAR | 545 | Therapeutics I |
| PHAR | 812 | Introductory Pharmacy Practice Experiences in Institutional Settings I |

**Year 3 Fall**

| | | |
|---|---|---|
| PHAR | 611 | Integrated Laboratory II |
| PHAR | 621 | Pharmacy Law and Ethics |
| PHAR | 622 | Drug Information and Communication Skills |
| PHAR | 631 | Pharmacometrics |
| ~~PHAR~~ | ~~632~~ | ~~Pharmacy Practice Management I~~ |
| PHAR | 661 | Therapeutics II |
| ~~PHAR~~ | ~~813~~ | ~~Introductory Pharmacy Practice Experiences in Community Settings II~~ |

PHAR 632 Pharmacy Practice Management I: Leadership

PHAR 813 Introductory Pharmacy Practice Experiences in Community Settings 2

## Year 3 Spring

PHAR 612 Therapeutic Drug Dosing
PHAR 633 Patient Care Skills Lab
~~PHAR 634 Pharmacy Practice Management II~~
PHAR 634 Pharmacy Practice Management II: Finance
PHAR 635 Bridging Research Outcomes and Patient Care
PHAR 671 Therapeutics III
~~PHAR 814 Introductory Pharmacy Practice Experiences in Institutional Settings II~~
PHAR 814 Introductory Pharmacy Practice Experiences in Institutional Settings 2

## Year 4 Fall

PHAR 711 Medication Therapy Management
~~PHAR 722 Pharmacy Practice Management III~~
PHAR 722 Pharmacy Practice Management III: Patient Safety
PHAR 741 Therapeutics V
PHAR 751 Therapeutics IV
PHAR 815 Ambulatory Care Skills
PHAR 816 Inpatient Practice Skills
Elective I

## ~~Year 4 Spring~~

~~PHAR 721 Therapeutics VII~~
PHAR 721 Therapeutics - Special Populations
~~PHAR 731 Case Studies in Pharmacy Practice~~
PHAR 731 Case Studies
~~PHAR 761 Therapeutics VI~~
PHAR 761 Therapeutics - Hematology, Oncology, Nutrition, Hepatic and Musculoskeletal Disorders
PHAR 817 Introductory Pharmacy Practice Experiences in Practice Management
PHAR 818 Introductory Pharmacy Practice Experiences in Education
Elective 2

## ~~Year 5 Fall and Spring~~

~~PHAR 881 Advanced Pharmacy Practice Experiences in Practice Management~~
PHAR 881 Advanced Pharmacy Practice Experiences in General Medicine
PHAR 882 Advanced Pharmacy Practice Experiences in Ambulatory Care/Primary Care
PHAR 883 Advanced Pharmacy Practice Experiences in Community Pharmacy
PHAR 884 Advanced Pharmacy Practice Experiences in Institutional Settings
PHAR 885 Advanced Pharmacy Practice Experiences in Geriatrics
~~PHAR 886 Advanced Pharmacy Practice Ex eriences in Diverse Popul ations~~
PHAR 886 Advanced Pharmacy Practice Experiences in Diverse Populations

Elective 3
Elective 4
Capstone 1
Capstone 2

~~PHAR 635 substitutes for MTH 518, Biostatistics, a BMS Program requirement.~~
PHAR 635 substitutes for BMR 617, Statistical Techniques for Biomedical Sciences, a BMR requirement.

~~PHAR 542 substitutes for the BMS course MCB 631, Medical Microbiology I.~~

PHAR 542 substitutes for MCB 631, Medical Microbiology I.

~~PHAR 531 and PHAR 551 substitute for the BMS courses PMC 625, Drug Metabolism, and PMC 630, Chemical Aspects of Pharmacology.~~

PHAR 531 and PHAR 551 substitute for PMC 625, Drug Metabolism, and PMC 630, Chemical Aspects of Pharmacology.

~~PHAR 545 and PHAR 671 substitute for the BMS course BMS 680, Seminar. This will meet the 4 hr. minimum requirement for Seminar for the M.S. degree.~~

PHAR 545 and PHAR 671substitute for BMR 680, Seminar. This will meet the 4-hour minimum requirement for Seminar for the M.S. degree.

A minimum of 36 credit hours is required for a non-thesis degree in the ~~BMS~~ BMR Program.

| | | |
|---|---|---|
| ~~BMS~~ | ~~601~~ | ~~3 hrs.~~ |
| ~~BMS~~ | ~~602~~ | ~~3 hrs.~~ |
| ~~BMS~~ | ~~680~~ | ~~1 hr.~~ |
| ~~PHS~~ | ~~628~~ | ~~2 hrs.~~ |
| ~~BMS~~ | ~~603~~ | ~~2 hrs.~~ |
| ~~BMS~~ | ~~604~~ | ~~1 hr.~~ |
| ~~BMS~~ | ~~680~~ | ~~1 hr.~~ |
| ~~BMS~~ | ~~785~~ | ~~3 hrs.~~ |
| PHS | 629 | 6 hrs. |
| PHAR | 531 | 3 hrs. |
| PHAR | 542 | 4 hrs. |
| PHAR | 545 | 4 hrs. |
| PHAR | 551 | 5 hrs. |
| PHAR | 635 | 3 hrs. |
| PHAR | 671 | 7 hrs. |

| | | |
|---|---|---|
| BMR | 601 | 3 hrs. |
| BMR | 602 | 3 hrs. |
| BMR | 680 | 1 hr. |
| PHS | 628 | 2 hrs. |
| BMR | 603 | 2 hrs. |
| BMR | 604 | 1 hr. |
| BMR | 680 | 1 hr. |
| BMR | 785 | 3 hrs. |

In addition. the student must pass a written and/or an oral comprehensive examination to receive the M.S. degree.

## ~~BIOMEDICAL SCIENCES, Ph.D.~~
## BIOMEDICAL RESEARCH, Ph.D.

The doctorate is a research or performance degree and does not depend solely on the accumulation of credit hours. The degree requirements are admission to candidacy and successful completion and defense of a dissertation. The degree signifies that the holder has the competence to function independently at the highest professional level.

### Degree Requirements

To qualify for the Doctor of Philosophy degree, the student must pass (*C* or better or *CR*) the following courses:

| | | |
|---|---|---|
| ~~BMS~~ | ~~601~~ | ~~Introduction to Nucleic Acids and Proteins~~ |
| ~~BMS~~ | ~~602~~ | ~~Introduction to Cell Structure and Metabolism~~ |

~~BMS 603 Regulation of Cell Function~~
~~BMS 604 Cellular Basis of Disease~~
~~BMS 644 Responsible Conduct of Research~~
~~BMS 617 Statistical Techniques for the Biomedical Sciences~~
~~BMS 660/661 Communication Skills for Biomedical Sciences~~

~~BMS 680 Seminar (minimum of 6 hrs.)~~
~~BMS 785 Introduction to Research~~
~~BMS 882 Research~~

| | |
|---|---|
| BMR 601 | Introduction to Nucleic Acids and Proteins |
| BMR 602 | Introduction to Cell Structure and Metabolism |
| BMR 603 | Regulation of Cell Function |
| BMR 604 | Cellular Basis of Disease |
| BMR 617 | Statistical Techniques for Biomedical Sciences |
| BMR 644 | Responsible Conduct of Research |
| BMR 660/661 | Communication Skills for Biomedical Sciences |
| BMR 680 | Seminar (minimum of 6 hrs.) |
| BMR 785 | Introduction to Research |
| BMR 882 | Research |

In addition, the student must successfully complete other courses required by his/her area of emphasis and advisory committee. All courses will be defined in the student's Ph.D. Course of Study form. The student must also pass a written and oral exam prior to becoming a Ph.D. candidate. These exams are set by the advisory committee and are outlined below under Admission to Candidacy.

Students are required to write and publish three peer-reviewed manuscripts, two of which must be as first author.

To remain in good academic standing and to graduate, the student must have a minimum graduate GPA of 3.0.

## ~~BIOMEDICAL SCIENCES, M.D./Ph.D.~~
## BIOMEDICAL RESEARCH, M.D./Ph.D.

The Joan C. Edwards School of Medicine offers a combined M.D./Ph.D. degree. ~~in partnership with the Biomedical Sciences Graduate Program at Marshall University.~~ The curriculum takes seven to eight years to complete. Students first take years one and two of medical school. During that time they complete the requirements for ~~BMS~~ BMR 785 (Introduction to Research). After passing the USMLE Step I exam al the end of year two, students begin their Ph.D. coursework and research. This takes three to four years. After completing the Ph.D. requirements, students then complete years three and four of medical school. All of the requirements for both the M.D. and Ph.D. degrees must be met.

The medical student course Elements of Medicine (MDC 710) meets the requirements for ~~BMS~~ BMR 601, 602, 603, and 604. Other medical school courses can meet area of emphasis requirements, as determined by the student's advisory committee and the Graduate Studies Committee.

~~M.D./Ph.D. Applications~~

~~Students interested in pursuing the combined degree should indicate this on their medical school AMCAS application. A separate M.D./Ph.D. admissions subcommittee consisting of members of the medical school and BMS graduate admission committees will review the applications.~~

~~All applicants must take the MCAT. A score of 30 or better on the MCAT taken between January 2013 and January 2015 is preferredd for consideration for admission. An MCAT score of 28 will be considered if the applicant has extensive research experience. A minimum score of 505 on the new MCAT is required for consideration for admission.~~

~~AMCAS applications must be submitted by November 1. Completed applications should be received by December 1. Completed applications received after December 1 may be reviewed for a position on a waiting list.~~

### Biomedical Research M.D./Ph.D. Applications

Applicants interested in pursuing the combined degree should indicate this on their medical school AMCAS application.

**The AMCAS application period is from June 1 to November 1, with supplemental material due by December 15.**

Applications are accepted on a rolling basis and reviewed November 1 through December 15. Final decisions will be made by January 31. Applications and supplemental material will not be accepted beyond the above deadlines. A separate M.D./Ph.D. admissions subcommittee will review the applications.

Consistent with JCESOM MD program admissions policy, all applicants are required to take the MCAT. An MCAT score of 498 or better is preferred. Provided they meet the requirements for not taking the MCAT, students from the JCESOM Medical Sciences Pathway Program who have fulfilled both the criteria for admittance to the MU JCESOM MD program and who have extensive research experience (e.g., co-authorship in multiple publications in peer reviewed journals) will be considered for interviews.

## ~~Advisory Committee for Ph.D. and M.D./Ph.D. Students~~
## Advisory Committee for Ph.D. Students

The advisory committee should be formed no later than the end of the first year of graduate education or upon completion of 18 semester hours of credit. As soon as the committee has been identified, an Approval for Dissertation Topic and Committee Membership form is completed and submitted to the Director of Graduate Studies and the Dean of the Graduate College.

The committee will be selected by the student and research advisor and approved by the Director of Graduate Studies and the Dean of the Graduate College. The advisory committee will be composed of at least five faculty members with appropriate expertise. One of the members may be from another institution. The student's research advisor will act as the chairperson of the committee.

## Approval of Course of Study

It is essential for the student and advisory committee to carefully define a Course of Study by the end of the first year. This is considered a basic contract between the student and the program and includes:

1. Proposed dissertation topic.
2. All transfer credits.
3. Required and elective courses to be taken at Marshall University.
4. All competencies to be achieved by the student during graduate study. These details must be recorded on ~~a~~ the Ph.D. Course of Study form and submitted for approval by the Director of Graduate Studies and the Dean of the Graduate College.

## Graduate Assistantships for the Doctor of Philosophy Program

~~Research assistantships are available for students in the doctoral degree program on a competitive basis. The base stipend is renewable annually for up to six years. Priority consideration for the Ph.D. assistantships will be given to West Virginia residents.~~

Accepted Ph.D. students receive tuition remission, an annual stipend, and health insurance, which are renewable for up to five years. Students also have access to Marshall University's Student Health Clinic. Students are required to pay some fees each term.

## ~~Academic Performance~~
## Academic Performance for all BMR Graduate Students

- The student must maintain a Grade Point Average of 3.0, and no more than six hours of *C* and no grades below *C* may be applied toward the degree.
- If the GPA falls below 3.0, the student will be placed on academic probation. Following notification of probation, the student will be counseled by his/her advisor. At this time, the deficiency will be identified and a written plan will be prepared for removing it within the next semester. This plan, co-signed by the student and the advisor, must be approved by the Graduate Studies Committee and the Director of Graduate Studies before the student can register for additional coursework.
- ~~If probationary status is not removed within the next semester hours, the student is dismissed from the program. The dismissal is automatically appealed to the Graduate Studies Committee, who will determine whether the student is retained or dismissed from the program. Retention must be recommended by the advisor and student's advisory committee and endorsed by the Graduate Studies Committee.~~
- If probationary status is not removed within nine semester hours, the Dean of the Graduate College, in consultation with the Vice Dean for Research and Graduate Education and the Graduate Studies Committee, will determine whether the student is retained or dismissed from the program. Retention must be recommended by the advisor and student's advisory committee and endorsed by the Graduate Studies Committee.

## Transfer Credit

The student may transfer credits completed at other regionally accredited graduate institutions. Approval of the Graduate Studies Committee and the Dean of the Graduate College is contingent on:

1. the grades earned were *B*'s or better;
2. the credits are appropriate to the student's program and acceptable to the advisory committee; and
3. the time limitations were not exceeded.

The number of transfer hours acceptable for the Ph.D. degree will be determined by the student's advisory committee and should not exceed 12 credit hours. Approval must be received from both the Graduate Studies Committee and the Dean of the Graduate College. Transfer credit will not become part of the Marshall University Grade Point Average.

Transfer of credits should be accomplished as early as possible. This should be accomplished ~~either~~ when the student ~~is admitted to candidacy or~~ submits an approved Course of Study form (Ph.D.) or an approved Plan of Study form (M.S.). Attempts to transfer credits during the last semester may delay graduation. Official transcripts must be on file in the Graduate College office by the date that grades are due in the Marshall University Registrar's Office.

## Validation of Outdated Coursework

The advisory committee has the option to require validation, by special examination, of courses ~~which~~ that members deem to be outdated.

## Time Limitations

Students must meet all requirements for the Doctor of Philosophy degree within seven years from the date of enrollment in the first course to be used in the degree program. The Graduate Dean may grant an extension upon recommendation by the Graduate Studies Committee. Absence due to military obligations, long serious illnesses, or similar circumstances beyond the student's control may be considered valid reasons for an extension. It is the option of the advisory committee to require validation of outdated courses by special examination.

## Admission to Candidacy

Admission to graduate study and enrollment in graduate courses does not guarantee acceptance as a candidate for the Doctor of Philosophy degree. This is only accomplished by satisfactorily passing a comprehensive qualifying examination and meeting all other specified requirements. The qualifying examination assesses whether the student has attained sufficient knowledge to undertake independent research. The examination should be completed at the end of the second year of study. The examination consists of written and oral components covering all areas specified in the Course of Study. The examination is prepared, administered and graded by the advisory committee. The written portion includes all coursework and relevant topics determined by the advisory committee. The student will be given 2-3 days to complete the written component of the examination. Upon passing the written examination, the student must submit a grant proposal on the topic of his/her dissertation research or a related topic approved by the advisory committee. The proposal must be in the style of an NIH Predoctoral grant proposal. Links to the instructions for the proposal format can be found on the ~~BMS~~ BMR Graduate Program website. The grant proposal must be submitted within 2 months of completion of the written exam and given to the advisory committee members at least 2 weeks in advance of the oral defense. The oral examination consists of a defense of the grant proposal and, at the discretion of the advisory committee, may include topics from the written portion of the exam in which the student was deemed to be deficient. Successful completion of the qualifying examination is based on approval of the committee. Only one dissenting vote is permitted on each component. If necessary, a single portion of the examination may be repeated at the discretion of the advisory committee. The student must have the approval of the advisory committee to repeat either the written or oral component of the qualifying examination. The committee assesses the deficiencies and determines the time required for the student to make corrections. A student may take a given component of the qualifying examination no more than three times. Failure to pass this examination on the third attempt will result in dismissal. The advisory committee must complete an Admission to Candidacy for Ph.D. form after the student completes the examinations and submit it for approval by the Director of Graduate Studies and the Dean of the Graduate College.

## Dissertation

All candidates must successfully complete a biomedical research project and prepare, submit, and defend a dissertation. The dissertation must present the results of the candidate's individual investigation and make a definite contribution to the current state of knowledge. While conducting research and writing a dissertation, the student must register for Research (~~BMS~~ BMR 882) at the beginning of each semester or summer term for which progress is to be earned. No more than 15 hours of doctoral research may be credited toward the degree.

Candidates are to follow the general guidelines outlined in *Publishing Your Dissertation: How to Prepare Your Manuscript for Publication* and *General Information About Dissertations*. Copies of these documents are on file in the ~~Biomedical Sciences Graduate Program office~~ Office of Research and Graduate Education. Candidates must also follow the current Graduate College Guide for Preparation and Submission of Electronic Theses and Dissertations, which can be

downloaded from the Graduate College website.

## Oral Defense of the Dissertation

The oral defense of the dissertation is held during the semester or summer session in which all other degree requirements have been met. The advisory committee must read and tentatively approve the dissertation before the examination can be scheduled. The committee chairperson will complete an Approval to Schedule Dissertation Defense form and submit it for approval of the Director of Graduate Studies and the Dean of the Graduate College before the examination can be given. Such notification must occur at least two weeks before the proposed date of the defense. A portion of the defense is an open examination and sufficient time is required for adequate public notice.

The open examination usually takes the form of a one-hour seminar. This is followed by a thorough review of the dissertation by the advisory committee and the candidate. Successful completion of the defense requires the approval of all but one of the members of the advisory committee. The results (pass/fail) must be recorded on a Results of Dissertation Examination form, which is to be reported to the Office of Research and Graduate Education and forwarded to the Graduate College Office within 24 hours. Should the candidate fail the defense, reexamination may not be scheduled without the approval of the advisory committee, the Director of Graduate Studies, and the Dean of the Graduate College.

All advisory committee members are to be present for the defense. If this is not possible, the Dean of the Graduate College, or designee, may permit one substitute for any member of the committee except the chairperson. A request for a substitute must be submitted in writing to, and approved by, the Director of Graduate Studies and the Dean of the Graduate College. The committee chairperson, the student, and both the original member of the committee to be replaced, and the substitute must sign this request. The substitute must have the same, or higher, graduate faculty status as the original member and represent the same academic discipline or area of emphasis.

## Acceptance of Dissertation

Acceptance of the dissertation is a requirement for the doctoral degree. An accepted dissertation must bear the original signatures of at least all but one member of the advisory committee. If more than one member cannot approve the dissertation, the doctoral degree cannot be recommended. If the substitute member attends and approves the dissertation defense, he or she signs the dissertation. For complete information on the preparation and submission of electronic theses and dissertations see *www.marshall.edu/graduate/current-students/edt.*

## Survey of Earned Doctorates

Please complete and submit the online Survey of Earned Doctorates. Survey of Earned Doctorate information is used by a number of government agencies to assess the state of doctoral education in the U.S., and also to inform their decisions concerning funding of U.S. graduate institutions. The online survey is available at ~~*http://survey.norc.uchicago.edu/~doctorate/index.jsp.*~~ *https://sed.norc.org.*

## Publication

All doctoral dissertations and their abstracts will be microfilmed through ~~University Microfilms, Ann Arbor, Michigan~~ ProQuest. This requirement cannot be satisfied by any other publication, but other publication of material in the dissertation is both permitted and encouraged.

## ~~Process Summary~~

- ~~Inquiry from prospective student to the Biomedical Sciences Graduate Program or Graduate Admissions Office.~~
- ~~Submission of the application to the Biomedical Sciences Graduate Program, the Graduate Admissions Office, or online.~~
- ~~Receipt of the following official application materials and required fee by the Graduate Admissions Office: application, GRE scores, and transcript(s). International students must apply through the Center for International Programs.~~
- ~~Referral of application materials by the Graduate Admissions Office.~~
- ~~The Biomedical Sciences Graduate Program notifies the Graduate Admissions Office and the prospective student of the admission decision of the Graduate Studies Committee.~~
- ~~The accepted student arrives, reports to the Biomedical Sciences Graduate Program, is assigned an interim advisor, and registers for coursework.~~
- ~~Selection of an area of emphasis/advisor must be achieved by the end of the first year. After a permanent advisor has been selected, an advisory committee is formed. A Course of Study should be developed by the end of the first year.~~
- ~~The student completes requisite coursework and other program requirements.~~
- ~~The student takes written and oral qualifying examinations for admission to candidacy to the Ph.D. These~~

~~examinations should be scheduled within two months of each other.~~

- ~~The student continues doctoral research under the guidance of his/her advisory committee. The dissertation phase begins with the approval of a dissertation prospectus by the advisory committee, the Biomedical Sciences Graduate Program and the Graduate College Dean.~~
- ~~The student applies for graduation at the beginning of his or her last semester no later than the university deadline in the academic calendar. The diploma fee must be paid by this time.~~
- ~~A copy of the preliminary draft of the dissertation is given to each member of the advisory committee no later than two weeks prior to the final defense of the dissertation.~~
- ~~The chair of the advisory committee requests clearance for the defense from the Biomedical Sciences Graduate Program and the Graduate College for approval no later than two weeks before the scheduled date of the defense.~~
- ~~The time and place of the defense of the dissertation are announced.~~
- ~~The student defends the dissertation in an oral defense.~~
- ~~The student follows the steps to prepare and submit the electronic thesis or dissertation at *www.marshall.edu/graduate/ current-students/edt.*~~

- **Process Summary**

1. Inquiry from prospective student to the Biomedical Research Graduate Program or Graduate Admissions Office.
2. Receipt of the following official application materials and required fee by the Graduate Admissions Office: application, GRE scores, and transcript(s). International applicants must meet the application requirements of the International Admissions Office.
3. Receipt of the program online form, written statement addressing educational and career goals, and three recommendations in the Office of Research and Graduate Education by March 1
4. The Ph.D. Admissions Committee will review completed applications, then interview the top applicants.
5. The Biomedical Research Graduate Program notifies the Graduate Admissions Office and the applicant of the decision of the Admissions Committee.
6. The accepted student arrives in July for boot camp, starts their first laboratory rotation, and registers for course work.
7. An advisor is selected by the end of the first year. After the dissertation advisor has been selected, an advisory committee is formed. A Ph.D. Course of Study should be completed by the start of the second year.
8. The student completes requisite coursework and other program requirements.
9. The student takes written and oral qualifying examinations for admission to candidacy to the Ph.D. These examinations should be scheduled within two months of each other.
10. The student continues doctoral research under the guidance of his/her advisory committee. The dissertation phase begins with the approval of a dissertation project by the advisory committee, the Biomedical Research Graduate Program, and the Graduate College Dean.
11. The student applies for graduation at the beginning of his or her last semester, no later than the Graduate College deadline. The diploma fee must be paid by this time.
12. A copy of the preliminary draft of the dissertation is given to each member of the advisory committee no later than two weeks prior to the final defense of the dissertation.
13. The chair of the advisory committee requests approval for the defense from the Biomedical Research Graduate Program and the Graduate College no later than two weeks before the scheduled date of the defense.
14. The time and place of the defense of the dissertation are announced.
15. The student defends the dissertation in an oral defense.
16. The student follows the steps to prepare and submit the electronic thesis or dissertation at *www.marshall.edu/graduate/current-students/edt.*

# CLINICAL AND TRANSLATIONAL SCIENCE, M.S.

## Program Description

The Clinical and Translational Science (CTS) Department in the Marshall University Joan C. Edwards School of Medicine offers a Master of Science (M.S.) degree in Clinical and Translational Science. The goal of this program is to equip physicians in-training and other biomedical scientists with the information and training they need to translate basic

clinical advances into improved patient care that will enhance the quality of life for patients in the Appalachian region, particularly southern West Virginia.

Students will receive education in clinical trial design, epidemiology, statistics, informatics, and translational research. Graduates of this program will be able to lead clinical trials of new drugs and procedures in West Virginia, particularly in its rural regions. CTS graduates also will be strong applicants for positions in schools of medicine and medical centers that have clinical and translational science centers.

## Clinical and Translational Science M.S. Admission Policy

~~Applicants must meet both the requirements of Graduate Admissions and the Marshall University Joan C. Edwards School of Medicine Clinical and Translational Science Department Admissions Committee. Interested persons may contact the Office of Research and Graduate Education via e-mail at *mubiomed@marshall.edu* or learn more at *www.marshall.edu/bms/ future-students/application-information.*~~

Applicants must meet the admission requirements of both Marshall University Graduate Admissions as outlined on their website – *www.marshall.edu/graduate/admissions/how-to-apply-for-admission* – and the Marshall University Joan C. Edwards School of Medicine Clinical and Translational Science Department Admissions Committee. Interested persons should visit https://jcesom.marshall.edu/research, email mubiomed@marshall.edu and/or call 304-696-3365.

**PRIORITY Deadline June 1 for best chance of admission**

Applications are accepted on a rolling basis and are reviewed until the class is filled. Applications will be considered after the priority deadline until June 30, if openings are available. The completed application, application fee, official transcript(s) from the degree-granting institution(s), three recommendations, and a written statement on educational and career goals should be received in the Graduate Admissions Office by June 1. For the application to be complete, the program online form should be received in the Office of Research and Graduate Education by June 1. The CTS Admissions Committee will review completed applications, then interview the top applicants.

## Minimum Admission Requirements

- A baccalaureate degree from a regionally accredited college or university
- Successful completion, with a grade of C or better, of one year of general biology, physics, general chemistry, and organic chemistry, all with associated laboratories. Successful completion of undergraduate courses in biochemistry and cell biology are highly recommended but not required.
- A recommended minimum Grade Point Average (GPA) of 3.0
- A recommended minimum GPA of 3.0 in combined science and math courses
- Official transcript from degree granting institution/s and institutions where relevant post-baccalaureate or graduate coursework was taken
- Departmental materials: three recommendations, program online form, written statement addressing educational and career goals, CV/résumé

Entrance into the Clinical and Translational Science, M.S. program is restricted to fall semester only.

~~Entrance into the Clinical and Translational Science, M.S. program is restricted to fall semester only. Applicant materials should be received by March 1 in the Graduate Admissions Office to have the best chance for admission.~~

~~The complete application process includes:~~

1. ~~Submission of the Marshall University Graduate College Application available online at www.marshall.edu/graduate. Select "Degree Seeking."~~
2. ~~Receipt of the application fee (submitted on line at the time of application).~~
3. ~~Receipt of official transcript(s) from every institution attended documenting that the applicant has:~~
    a. ~~Completed a bachelor's degree from an accredited institution of higher learning. The degree must be completed prior to matriculation.~~
    b. ~~Achieved an overall Grade Point Average of 3.0 or better.~~
    c. ~~Successfully completed one academic year of biology and its associated labs.~~
    d. ~~Successfully completed one academic year of general chemistry and its associated labs.~~
    e. ~~Successfully completed one academic year of organic chemistry and its associated labs.~~
    f. ~~Successfully completed one academic year of physics and its associated labs.~~
    g. ~~It should be noted that successful completion of undergraduate courses in biochemistry and cell biology are highly recommended, but not required.~~
4. ~~Official letters~~
    a. ~~Three letters of recommendation signed and on formal letterhead from individuals familiar with the applicant's relevant academic/professional performance (May be e-mailed as attachments)~~
    b. ~~Written statement describing the applicant's educational and career goals, and why he or she~~

~~should be admitted to the CTS, M.S. program. (May be e-mailed as an attachment)~~

~~Completed applications received in the Graduate Admissions Office by March 1 will be considered for admission. The CTS Admissions Committee will review completed applications, then interview the top applicants.~~

## Who Should Apply

- Undergraduates.
- Medical students at an LCME-accredited U.S. medical school with a current GPA of at least a 3.0.
- Postgraduate medical residents or fellows who have an M.D. or D.O. with a graduating GPA of 3.0 or better (equivalent GPA for foreign medical graduates).
- Ph.D.'s in biomedical sciences or Pharm.D.'s with graduating GPAs of 3.0 or better.

Medical students will apply to the program during their third year of training. After completing the requirements for the M.S. degree, students will finish the fourth year of medical school.

Medical residents and fellows who are admitted into this program will need to integrate coursework into a reduced clinical workload, thus extending their postgraduate medical education by two years.

## Duration of the Program

Students will attend full-time and complete the requirements for the Master of Science degree in two years. This ~~indudes~~ includes attending during the summer between years one and two.

## Degree Requirements

All students are required to meet the general requirements of the Graduate College for receipt of a master's degree. A minimum of 36 credit hours is required for a non-thesis degree. In addition, all students must pass a written and/or oral comprehensive exam.

All students will take the following courses.

*Fall Semester 1*

~~BMS 660 Communication Skills I~~
~~BMS 680 Biomedical Sciences Seminar~~

BMR 660 Communication Skills I
BMR 680 Seminar
CTS 600 Epidemiology and Biostatistics Used in Medical Research
CTS 620 Basic Clinical Research Operations
CTS 635 Writing and Peer Review of Scientific Publications
CTS 640 Clinical Trials Journal Club

~~Spring Semester 1~~
*Spring Semester 1*

BMR 661 Communications Skills II
BMR 680 Seminar

~~BMS 661 Communication Skills II~~
~~BMS 680 Biomedical Sciences Seminar~~
CTS 610 Study Design and Applied Statistics in Medical Research
CTS 614 Online Survey Tools, Relational and Data Warehousing, and Data Manipulation
CTS 630 Fundamentals of Team Science
CTS 640 Clinical Trials Journal Club

*Summer Semester*

CTS 650 Rural Clinic Experience

*Fall Semester 2*

| | | |
|---|---|---|
| BMR | 680 | Seminar |
| ~~BMS~~ | ~~680~~ | ~~Biomedical Sciences Seminar~~ |
| CTS | 625 | Clinical Research Operations Lab |
| CTS | 640 | Clinical Trials Journal Club |
| CTS | 660 | Molecular Phenotype of Appalachian Disorders |

*Spring Semester 2*

| | | |
|---|---|---|
| BMR | 680 | Seminar |
| ~~BMS~~ | ~~680~~ | ~~Biomedical Sciences Seminar~~ |
| CTS | 625 | Clinical Research Operations |
| CTS | 640 | Clinical Trials Journal Club |

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## ~~BIOMEDICAL SCIENCE (BMS)~~

## BIOMEDICAL RESEARCH (BMR)

**601 Introduction to Nucleic Acids and Proteins. 3 hrs.**
A molecular and cell biological study of the structure and function of nucleic acids and proteins. (PR: Consent of instructor)

**602 Introduction to Cell Structure and Metabolism. 3 hrs.**
A molecular and cell biological study of the structure of cells and of cellular metabolism. (CR: ~~BMS~~ BMR 601; PR: Consent of instructor)

**603 Regulation of Cell Function. 2 hrs.**
An advanced molecular and cell biological study of cell metabolism and the regulation of cell function. (PR: ~~BMS~~ BMR 601, ~~BMS~~ BMR 602, and consent of instructor

**604 Cellular Basis of Disease. 1 hr.**
A molecular and cell biological study of the basis of diseases prevalent in Appalachia. (CR: BMR 603; PR: ~~BMS~~ BMR 601, ~~BMS~~ BMR 602, and consent of instructor)

**617 Statistical Techniques for the Biomedical Sciences. 3 hrs.**
An application-oriented course in statistical concepts and techniques aimed at prospective researchers in the biomedical sciences.

**628 Neuroscience I: Major Structures of the Brain, Neuron Function, and Spinal Cord. 3 hrs.**
To study and understand the structure and function of the nervous system and disorders of neuronal function. (PR: BMS 600 or permission of instructor)

**629 Neuroscience II: Structures and Functions of the Brain Stem and Forebrain. 3 hrs.**
To study and understand the structure and function of the nervous system and disorders of neuronal function. (~~BMS~~ BMR 628 or permission of instructor)

**631 Neuroscience and Developmental Biology Literature Review. 1 hr.**
A seminar course where published articles in the fields of neuroscience and developmental biology will be presented by students and faculty. (PR: Permission of instructor)

~~632 Neuroscience Research Techniques. 3 hrs.~~
~~Class participants will be exposed to state-of-the-art neuroscience research techniques while in the laboratories of the neuroscience faculty. (PR: Permission of instructor)~~

641 **Molecular Developmental Biology. 3 hrs.**
An in-depth discussion of current literature in developmental biology with emphasis on early embryo development, morphogenesis, lineage determination and regulation of developmental processes. (PR: Permission of instructor)

644 **Responsible Conduct of Research. 1 hr. CR/NC.**
Responsible conduct of research, including human subjects, live vertebrate animals, conflict of interest, mentor/mentee responsibilities, collaborative research, peer review, data management, research misconduct, and responsible authorship, with case discussions.

651 **Cancer Biology. 4 hrs.**
An advanced graduate course on the core principles of initiation, progression, treatment and prevention of cancer, based on current literature. (PR: ~~BMS 600~~ BMR 601, 602, 603, 604, and permission of instructor)

652 **Cancer Biology Colloquium. 1 hr.**
This is a mentored journal club for graduate students covering selected areas of current interest in cancer biology research. (PR: Permission of instructor)

660 **Communication Skills for Biomedical Sciences I. 1 hr. CR/NC**
Biomedical graduate students are trained to plan, prepare, and deliver effective scientific presentations.

661 **Communication Skills for Biomedical Sciences II. 1 hr. CR/NC**
Biomedical graduate students are trained to plan, prepare, and deliver effective scientific presentations.

664 **Obesity and Related Diseases Journal Club. 1 hr. CR/NC**
A seminar course where published articles in the field of obesity and obesity-related diseases are presented and discussed.

~~665 Cardiovascular Disease, Obesity, Diabetes Research Colloquium. 1 hrs. CR/NC.~~
~~A seminar-style series that will focus on recent advances in topics related to cardiovascular disease, diabetes and obesity.~~

665 **Cardiovascular Disease Research Colloquium. 1 hr. CR/NC.**
A seminar-style series that will focus on recent advances in topics related to cardiovascular disease.

674 **Teaching Practicum. 1 hr. CR/NC.**
Students gain experience in teaching using a variety of methods in a supervised setting.

679 **Special Problems. I, II, S. CR/NC**
Intensive study of a selected topic or problem. Emphasizes independent study. (PR: Consent of advisor)

680 **Seminar. 1 hr. I, II. CR/NC**
Study and discussion of current topics related to the Biomedical Sciences.

681 **Thesis. 1-6 hrs. I, II, S. CR/NC.**

785 **Introduction to Research. 1-6 hrs. I, II, S. CR/NC**
Directed research activities requiring a completed prospectus for an advanced research

project, a written report, or a research thesis. A minimum of three (3) hours required for all M.S. candidates. (PR: Consent of instructor)

**882 Research. 1-15 hrs. I, II, S. CR/NC**

**3. New catalog description**

# School of Medicine

**Dr. Joseph Shapiro, Dean**
***http://musom.marshall.edu***

## BIOMEDICAL RESEARCH, M.S. (THESIS), M.S. (NON-THESIS), Ph.D., M.D./Ph.D.

### Areas of Emphasis

- Cardiovascular Disease
- Cell Biology
- Medical Sciences (M.S. only)
- Neurobiology and Addiction
- Obesity and Related Diseases
- Toxicology and Environmental Health

### Program Description

The Biomedical Sciences and Clinical and Translational Sciences departments of the Joan C. Edwards School of Medicine offer the following degrees: Doctor of Philosophy (Ph.D.), M.D./Ph.D., and Master of Science (M.S.), both thesis and non-thesis.

The primary goal of the Biomedical Research (BMR) program is to use biomedical and translational research approaches to help reduce the numerous health disparities and improve the health of the population in West Virginia and Central Appalachia. To do this, students will take an interdisciplinary approach with defined interests and special in-depth training in one of the following research areas of emphasis: Cardiovascular Disease; Cell Biology; Obesity and Related Diseases; Neurobiology and Addiction; and Toxicology and Environmental Health. These areas are designed to be flexible and research oriented in order to develop the interests, capabilities and potential of all students pursuing careers in academic, government, or industrial biomedical sciences.

In addition, the BMR program offers a non-thesis Master of Science degree with a medical sciences area of emphasis to improve the science foundation of students seeking admission into doctoral programs in medicine or other health-related professions. Admission into the BMR M.S. Medical Sciences program does not guarantee admission into medical school. Additionally, a research component to this emphasis is available, but not required. Students choosing the research component may work up to 19 hours per week while earning a minimum of $10/hour. Students are expected to stay in good academic standing.

Also offered is the combined M.D./Ph.D. Students in this program blend the discovery of new knowledge with clinical medicine at the intersection of science and medicine. M.D./Ph.D. Most graduates work as physician-scientists at medical schools, conducting disease-related research and applying the results to the treatment of patients. They have a unique perspective on both the basic science and clinical science behind disease. Further general information is available at the Association of American Medical Colleges website (aamc.org).

### Admission Requirements

Applicants must meet the admission requirements of both Marshall University Graduate Admissions as outlined on their website – *www.marshall.edu/graduate/admissions/how-to-apply-for-admission* – and the Biomedical Research Program of the Marshall University Joan C. Edwards School of Medicine. Interested persons should visit https://jcesom.marshall.edu/research, email mubiomed@marshall.edu and/or call 304-696-3365.

### Biomedical Research M.S. (Thesis and Non-Thesis) Applicants

### Minimum Admission Requirements

- A baccalaureate degree from a regionally accredited college or university
- Successfully completed, with a grade of C or better, one year of general biology, physics, general chemistry, and organic chemistry, all with associated laboratories. A semester of biochemistry or molecular biology with associated laboratory is also required.
- A recommended minimum Grade Point Average (GPA) of 3.0
- A recommended minimum GPA of 3.0 in combined science and math courses

- Graduate Record Examination (GRE) General Test scores - REQUIRED for M.S. THESIS ONLY
- Official transcript from degree granting institution/s and institutions where relevant post-baccalaureate or graduate coursework was taken
- Departmental materials: three recommendations, program online form, written statement addressing educational and career goals, CV/résumé

## PRIORITY Deadline – June 1 for best chance of admission

Applications are accepted on a rolling basis and are reviewed until the class is filled. Applications will be considered after the priority deadline until June 30, if openings are available. The completed application, application fee, official transcript(s), three recommendations, written statement, and official GRE scores should be received in the Graduate Admissions Office by June 1. *For the Medical Sciences area of emphasis only, no entrance exam is required.* The program online form should be received in the Office of Research and Graduate Education by June 1.

## Duration of Degree Program

Students are expected to complete the degree within two years. This includes the summer between years one and two for M.S. (thesis) students.

## Entry Term

BMR M.S. (thesis) students may matriculate in July (summer III term) or in August (fall term). BMR M.S. (non-thesis) students with an area of emphasis in Medical Sciences must matriculate in the fall term only.

## Ph.D. Applicants

## Minimum Admission Requirements

- A baccalaureate degree from a regionally accredited college or university
- Successful completion, with a grade of C or better, of one year each of general biology, physics, general chemistry, and organic chemistry, all with associated laboratories. A semester of biochemistry or molecular biology with associated laboratory is also required.
- A recommended minimum Grade Point Average (GPA) of 3.0
- A recommended minimum GPA of 3.0 in combined science and math courses
- Graduate Record Examination (GRE) General Test scores
- Official transcript from degree granting institution/s and institutions where relevant post-baccalaureate or graduate coursework was taken
- Departmental materials: three recommendations, program online form, written statement addressing educational and career goals, CV/résumé

## PRIORITY Deadline – March 1 for best chance of admission

Applications are accepted on a rolling basis and are reviewed until the class is filled. Applications will be considered after the priority deadline until June 30, if openings are available. International applicants must meet the international application deadline of March 15. The completed application, application fee, official transcript(s), and official GRE scores should be received in the Graduate Admissions Office by March 1. MCAT scores will be considered for admission on a case-by-case basis. For the application to be complete, the program online form, written statement addressing educational and career goals, and three recommendations should be received in the Office of Research and Graduate Education by March 1.

## Duration of Degree Program

Doctoral degree students are expected to complete the requirements within five years. Students who possess an M.S. degree in Biomedical Research or the equivalent when admitted into the doctoral degree program generally require three to four years to complete the Doctor of Philosophy degree.

## Entry Term

BMR Ph.D. students will matriculate in July (summer III term). The first week will be devoted to orientation and Preparation for Graduate Academics (PGA) Boot Camp. This allows students to learn more about research opportunities, get to know their cohort and current students, acclimate to a new environment, and get a head start on their research rotations.

## BIOMEDICAL RESEARCH, M.S. (Thesis – Cardiovascular Disease; Cell Biology; Neurobiology and Addiction; Obesity and Related Diseases; Toxicology and Environmental Health)

### Degree Requirements

All students are required to meet the general requirements of the Graduate College for receipt of a master's degree. A minimum of 36 credit hours is required for a non-thesis degree, while a minimum of 32 credit hours is required for the thesis degree. No more than six hours of thesis (BMR 681) may be credited toward the 32 credit hour requirement. Each student will specialize in one of the five areas of emphasis as defined in the program description. All students are required to successfully complete the following core curriculum:

| | |
|---|---|
| BMR 601 | Introduction to Nucleic Acids and Proteins |
| BMR 602 | Introduction to Cell Structure and Metabolism |
| BMR 603 | Regulation of Cell Function |
| BMR 604 | Cellular Basis of Disease |
| BMR 617 | Statistical Techniques for Biomedical Sciences |
| BMR 644 | Responsible Conduct of Research |
| BMR 660/661 | Communication Skills for Biomedical Sciences |
| BMR 680 | Seminar (minimum of 4 hrs.) |
| BMR 785 | Introduction to Research |

In addition, the student must successfully complete other courses required by his/her area of emphasis and advisory committee, and pass a written and/or oral comprehensive examination.

To remain in good academic standing and to graduate, the student must have a minimum graduate GPA of 3.0.

### Advisory Committee for M.S. (Thesis) Students

The advisory committee should be formed no later than the end of the first year of graduate education. As soon as the committee has been identified, a Thesis Committee Formation form is completed and submitted to the Director of Graduate Studies.

The committee will be selected by the student and research advisor and approved by the Director of Graduate Studies. The advisory committee will be composed of at least three faculty members with appropriate expertise. One of the members may be from another institution. The student's research advisor will act as the chairperson of the committee.

In addition, after 12 hours of coursework has been completed, the student must submit an M.S. Plan of Study form to the Dean of the Graduate College.

## BIOMEDICAL RESEARCH, M.S. (Non-Thesis Medical Sciences Area of Emphasis)

A minimum of 36 credit hours is required for the non-thesis degree. In addition, the student must pass a written comprehensive examination covering BMR 601-604, MCB 631, MCB 632, and PHS 628. All students are required to successfully complete the following core curriculum:

| | |
|---|---|
| BMR 601 | Introduction to Nucleic Acids and Proteins |
| BMR 602 | Introduction to Cell Structure and Metabolism |
| BMR 603 | Introduction to Cell Function |
| BMR 604 | Cellular Basis of Disease |
| BMR 617 | Statistical Techniques for Biomedical Sciences<br>(or MTH 518, BSC 517, PSY 517, EDF 517 or equivalent) |
| BMR 680 | Seminar (minimum of 4 hrs.) |
| BMR 785 | Introduction to Research |
| MCB 631 | Medical Microbiology I |
| MCB 632 | Medical Microbiology II |
| PHS 628 | Neurophysiology |

Elective classes include PHS 629 (Mammalian Physiology), PMC 621 (Medical Pharmacology I), and PMC 622 (Medical Pharmacology II).

In addition, after 12 hours of coursework has been completed, the student must submit an M.S. Plan of Study form to the Dean of the Graduate College.

To remain in good academic standing and to graduate, the student must have a minimum graduate GPA of 3.0.

## Qualifying for Admission into Marshall University Joan C. Edwards School of Medicine without the MCAT (Pathway Program)

**Requirements:**

- Have a minimum 3.4 GPA in the BMR, M.S. Medical Sciences program at the time of the Marshall University Joan C. Edwards School of Medicine (MUJCESOM) interview
- Graduate from the program with a minimum of a 3.4 GPA
- Pass the M.S. comprehensive exam on the first attempt in May of the program's second year

**Benefits:**

- An MCAT score will not be required for admittance to MUJCESOM
- For interview purposes, out-of-state applicants will be considered the same as in-state students, regardless of residency. Marshall University JCESOM tuition cost will be based on residency status.
- With satisfactory standing, students will receive the mandatory program letter of support.

## BIOMEDICAL RESEARCH, M.S., AND SCHOOL OF PHARMACY, PHARM.D.

Students can receive both an M.S. degree from the Biomedical Research Program and a Pharm.D. degree from the School of Pharmacy. Prospective students must apply to and meet the admission requirements for both programs. The curriculum takes five years to complete. In the first year students take BMR courses; in years 2-5 students take School of Pharmacy courses. All students are required to successfully complete:

**Year 1 Fall**

| | | |
|---|---|---|
| BMR | 601 | Introduction to Nucleic Acids and Proteins |
| BMR | 602 | Introduction to Cell Structure and Metabolism |
| BMR | 680 | Seminar |
| PHS | 628 | Neurophysiology |

**Year 1 Spring**

| | |
|---|---|
| BMR 603 | Introduction to Cell Function |
| BMR 604 | Cellular Basis of Disease |
| BMR 680 | Seminar |
| BMR 785 | Introduction to Research |
| PHS 629 | Mammalian Physiology |

**Year 2 Fall**

| | |
|---|---|
| PHAR 511 | Clinical Immunology |
| PHAR 531 | Biopharmaceutics I |
| PHAR 541 | Pharmacy Practice I |
| PHAR 542 | Immunology and Microbiology |
| PHAR 551 | Biomedical Chemistry |
| PHAR 811 | Introductory Pharmacy Practice Experiences in Community Settings I |

**Year 2 Spring**

| | |
|---|---|
| PHAR 521 | Integrated Laboratory I |
| PHAR 532 | Biopharmaccutics II |
| PHAR 543 | Pharmacy Practice II |
| PHAR 544 | Principles of Disease and Drug Action |
| PHAR 545 | Therapeutics I |
| PHAR 812 | Introductory Pharmacy Practice Experiences in Institutional Settings I |

**Year 3 Fall**

| | |
|---|---|
| PHAR 611 | Integrated Laboratory II |
| PHAR 621 | Pharmacy Law and Ethics |

| | |
|---|---|
| PHAR 622 | Drug Information and Communication Skills |
| PHAR 631 | Pharmacometrics |
| PHAR 632 | Pharmacy Practice Management I: Leadership |
| PHAR 661 | Therapeutics II |
| PHAR 813 | Introductory Pharmacy Practice Experiences in Community Settings 2 |

**Year 3 Spring**

| | |
|---|---|
| PHAR 612 | Therapeutic Drug Dosing |
| PHAR 633 | Patient Care Skills Lab |
| PHAR 634 | Pharmacy Practice Management II: Finance |
| PHAR 635 | Bridging Research Outcomes and Patient Care |
| PHAR 671 | Therapeutics III |
| PHAR 814 | Introductory Pharmacy Practice Experiences in Institutional Settings 2 |

**Year 4 Fall**

| | |
|---|---|
| PHAR 711 | Medication Therapy Management |
| PHAR 722 | Pharmacy Practice Management III: Patient Safety |
| PHAR 741 | Therapeutics V |
| PHAR 751 | Therapeutics IV |
| PHAR 815 | Ambulatory Care Skills |
| PHAR 816 | Inpatient Practice Skills |
| | Elective 1 |

**Year 4 Spring**

| | |
|---|---|
| PHAR 721 | Therapeutics - Special Populations |
| PHAR 731 | Case Studies |
| PHAR 761 | Therapeutics - Hematology, Oncology, Nutrition, Hepatic and Musculoskeletal Disorders |
| PHAR 817 | Introductory Pharmacy Practice Experiences in Practice Management |
| PHAR 818 | Introductory Pharmacy Practice Experiences in Education |
| | Elective 2 |

**Year 5 Fall and Spring**

| | |
|---|---|
| PHAR 881 | Advanced Pharmacy Practice Experiences in General Medicine |
| PHAR 882 | Advanced Pharmacy Practice Experiences in Ambulatory Care/Primary Care |
| PHAR 883 | Advanced Pharmacy Practice Experiences in Community Pharmacy |
| PHAR 884 | Advanced Pharmacy Practice Experiences in Institutional Settings |
| PHAR 885 | Advanced Pharmacy Practice Experiences in Geriatrics |
| PHAR 886 | Advanced Pharmacy Practice Experiences in Diverse Populations |
| | Elective 3 |
| | Elective 4 |
| | Capstone 1 |
| | Capstone 2 |

PHAR 635 substitutes for BMR 617, Statistical Techniques for Biomedical Sciences, a BMR requirement.

PHAR 542 substitutes for MCB 631, Medical Microbiology I.

PHAR 531 and PHAR 551 substitute for PMC 625, Drug Metabolism, and PMC 630, Chemical Aspects of Pharmacology.

PHAR 545 and PHAR 671substitute for BMR 680, Seminar. This will meet the 4-hour minimum requirement for Seminar for the M.S. degree.

A minimum of 36 credit hours is required for a non-thesis degree in the BMR Program.

| | |
|---|---|
| BMR 601 | 3 hrs. |
| BMR 602 | 3 hrs. |
| BMR 680 | 1 hr. |
| PHS 628 | 2 hrs. |
| BMR 603 | 2 hrs. |
| BMR 604 | 1 hr. |
| BMR 680 | 1 hr. |
| BMR 785 | 3 hrs. |
| PHS 629 | 6 hrs. |
| PHAR 531 | 3 hrs. |
| PHAR 542 | 4 hrs. |
| PHAR 545 | 4 hrs. |

| | |
|---|---|
| PHAR 551 | 5 hrs. |
| PHAR 635 | 3 hrs. |
| PHAR 671 | 7 hrs. |

In addition, the student must pass a written and/or an oral comprehensive examination to receive the M.S. degree.

## BIOMEDICAL RESEARCH, Ph.D.

The doctorate is a research or performance degree and does not depend solely on the accumulation of credit hours. The degree requirements are admission to candidacy, and successful completion and defense of a dissertation. The degree signifies that the holder has the competence to function independently at the highest professional level.

### Degree Requirements

To qualify for the Doctor of Philosophy degree, the student must pass (*C* or better or *CR*) the following courses:

| | |
|---|---|
| BMR 601 | Introduction to Nucleic Acids and Proteins |
| BMR 602 | Introduction to Cell Structure and Metabolism |
| BMR 603 | Regulation of Cell Function |
| BMR 604 | Cellular Basis of Disease |
| BMR 617 | Statistical Techniques for Biomedical Sciences |
| BMR 644 | Responsible Conduct of Research |
| BMR 660/661 | Communication Skills for Biomedical Sciences |
| BMR 680 | Seminar (minimum of 6 hrs.) |
| BMR 785 | Introduction to Research |
| BMR 882 | Research |

In addition, the student must successfully complete other courses required by his/her area of emphasis and advisory committee. All courses will be defined in the student's Ph.D. Course of Study form. The student must also pass a written and oral exam prior to becoming a Ph.D. candidate. These exams are set by the advisory committee and are outlined below under Admission to Candidacy.

Before graduating, students are required to write and publish three peer-reviewed manuscripts, two of which must be as first author.

To remain in good academic standing and to graduate, the student must have a minimum graduate GPA of 3.0.

## BIOMEDICAL RESEARCH, M.D./Ph.D.

The Joan C. Edwards School of Medicine offers a combined M.D./Ph.D. degree. The curriculum takes seven to eight years to complete. Students first take years one and two of medical school. During that time they complete the requirements for BMR 785 (Introduction to Research). After passing the USMLE Step I exam at the end of year two, students begin their Ph.D. coursework and research. This takes three to four years. After completing the Ph.D. requirements, students then complete years three and four of medical school. All of the requirements for both the M.D. and Ph.D. degrees must be met.

The medical student course Elements of Medicine (MDC 710) meets the requirements for BMR 601, 602, 603, and 604. Other medical school courses can meet area of emphasis requirements, as determined by the student's advisory committee and the Graduate Studies Committee.

### Biomedical Research M.D./Ph.D. Applications

Applicants interested in pursuing the combined degree should indicate this on their medical school AMCAS application.

**The AMCAS application period is from June 1 to November 1, with supplemental material due by December 15.**

Applications are accepted on a rolling basis and reviewed November 1 through December 15. Final decisions will be made by January 31. Applications and supplemental material will not be accepted beyond the above deadlines. A separate M.D./Ph.D. admissions subcommittee will review the applications.

Consistent with JCESOM MD program admissions policy, all applicants are required to take the MCAT. An MCAT score of 498 or better is preferred. Provided they meet the requirements for not taking the MCAT,

students from the JCESOM Medical Sciences Pathway Program who have fulfilled both the criteria for admittance to the MU JCESOM MD program and who have extensive research experience (e.g., co-authorship in multiple publications in peer reviewed journals) will be considered for interviews.

## Advisory Committee for Ph.D. Students

The advisory committee should be formed no later than the end of the first year of graduate education or upon completion of 18 semester hours of credit. As soon as the committee has been identified, an Approval for Dissertation Topic and Committee Membership form is completed and submitted to the Director of Graduate Studies and the Dean of the Graduate College.

The committee will be selected by the student and research advisor and approved by the Director of Graduate Studies and the Dean of the Graduate College. The advisory committee will be composed of at least five faculty members with appropriate expertise. One of the members may be from another institution. The student's research advisor will act as the chairperson of the committee.

## Approval of Course of Study

It is essential for the student and advisory committee to carefully define a Course of Study by the end of the first year. This is considered a basic contract between the student and the program and includes:

1. Proposed dissertation topic.
2. All transfer credits.
3. Required and elective courses to be taken at Marshall University.
4. All competencies to be achieved by the student during graduate study. These details must be recorded on the Ph.D. Course of Study form and submitted for approval by the Director of Graduate Studies and the Dean of the Graduate College.

## Graduate Assistantships for the Doctor of Philosophy Program

Accepted Ph.D. students receive tuition remission, an annual stipend, and health insurance, which are renewable for up to five years. Students also have access to Marshall University's Student Health Clinic. Students are required to pay some fees each term.

## Academic Performance for all BMR Graduate Students

- Maintain a minimum of a 3.0 Grade Point Average (GPA). No more than six hours of C and no grades below C may be applied toward the degree.
- If the GPA falls below 3.0, the student will be placed on academic probation. Following notification of probation, the student will be counseled by his/her advisor. At this time, the deficiency will be identified and a written plan will be prepared for removing it within the next nine semester hours. This plan, co-signed by the student and the advisor, must be approved by the Dean of the Graduate College before the student can register for additional coursework.
- If probationary status is not removed within nine semester hours, the Dean of the Graduate College, in consultation with the Vice Dean for Research and Graduate Education and the Graduate Studies Committee, will determine whether the student is retained or dismissed from the program. Retention must be recommended by the advisor and student's advisory committee and endorsed by the Graduate Studies Committee.

## Transfer Credit

The student may transfer credits completed at other regionally accredited graduate institutions. Approval of the Graduate Studies Committee and the Dean of the Graduate College is contingent on:

1. the grades earned were B's or better;
2. the credits are appropriate to the student's program and acceptable to the advisory committee; and
3. the time limitations were not exceeded.

The number of transfer hours acceptable for the Ph.D. degree will be determined by the student's advisory committee and should not exceed 12 credit hours. Approval must be received from both the Graduate Studies Committee and the Dean of the Graduate College. Transfer credit will not become part of the Marshall University Grade Point Average.

Transfer of credits should be accomplished as early as possible. This should be accomplished when the student submits an approved Course of Study form (Ph.D.) or an approved Plan of Study form (M.S.). Attempts to

transfer credits during the last semester may delay graduation. Official transcripts must be on file in the Graduate College office by the date that grades are due in the Marshall University Registrar's Office.

## Validation of Outdated Coursework

The student's advisory committee has the option to require validation, by special examination, of courses that members deem to be outdated.

## Time Limitations

Students must meet all requirements for the Doctor of Philosophy degree within seven years from the date of enrollment in the first course to be used in the degree program. The Graduate Dean may grant an extension upon recommendation by the Graduate Studies Committee. Absence due to military obligations, long serious illnesses, or similar circumstances beyond the student's control may be considered valid reasons for an extension. It is the option of the student's advisory committee to require validation of outdated courses by special examination.

## Admission to Candidacy

Admission to graduate study and enrollment in graduate courses does not guarantee acceptance as a candidate for the Doctor of Philosophy degree. This is only accomplished by satisfactorily passing a comprehensive qualifying examination and meeting all other specified requirements. The qualifying examination assesses whether the student has attained sufficient knowledge to undertake independent research. The examination should be completed at the end of the second year of study. The examination consists of written and oral components covering all areas specified in the Course of Study. The examination is prepared, administered and graded by the student's advisory committee. The written portion includes all coursework and relevant topics determined by the advisory committee. The student will be given two to three days to complete the written component of the examination.

Upon passing the written examination, the student must submit a grant proposal on the topic of his/her dissertation research or a related topic approved by the advisory committee. The proposal must be in the style of a National Institutes of Health (NIH) Predoctoral grant proposal. Links to the instructions for the proposal format can be found on the BMR Graduate Program website. The grant proposal must be submitted within two months of completion of the written exam and given to the advisory committee members at least two weeks in advance of the oral defense. The oral examination consists of a defense of the grant proposal and, at the discretion of the advisory committee, may include topics from the written portion of the exam in which the student was deemed to be deficient. Successful completion of the qualifying examination is based on approval of the advisory committee. Only one dissenting vote is permitted on each component. If necessary, a single portion of the examination may be repeated at the discretion of the advisory committee. The student must have the approval of the advisory committee to repeat either the written or oral component of the qualifying examination. The committee assesses the deficiencies and determines the time required for the student to make corrections. A student may take a given component of the qualifying examination no more than three times. Failure to pass this examination on the third attempt will result in dismissal. The advisory committee must complete an Admission to Candidacy for Ph.D. form after the student completes the examinations and submit it for approval by the Director of Graduate Studies and the Dean of the Graduate College.

## Dissertation

All candidates must successfully complete a biomedical research project and prepare, submit, and defend a dissertation. The dissertation must present the results of the candidate's individual investigation and make a definite contribution to the current state of knowledge. While conducting research and writing a dissertation, the student must register for Research (BMR 882) at the beginning of each semester or summer term for which progress is to be earned. No more than 15 hours of Research may be credited toward the Ph.D. degree.

Candidates are to follow the general guidelines outlined in Publishing Your Dissertation: How to Prepare Your Manuscript for Publication and General Information about Dissertations. Copies of these documents are on file in the Office of Research and Graduate Education. Candidates must also follow the current Graduate College Guide for Preparation and Submission of Electronic Theses and Dissertations, which can be downloaded from the Graduate College website.

## Oral Defense of the Dissertation

The oral defense of the dissertation is held during the semester or summer session in which all other degree requirements have been met. The advisory committee must read and tentatively approve the dissertation before the

examination can be scheduled. The committee chairperson will complete an Approval to Schedule Dissertation Defense form and submit it for approval of the Director of Graduate Studies and the Dean of the Graduate College before the examination can be given. Such notification must occur at least two weeks before the proposed date of the defense. A portion of the defense is an open examination and sufficient time is required for adequate public notice.

The open examination usually takes the form of a one-hour seminar. This is followed by a thorough review of the dissertation by the advisory committee and the candidate. Successful completion of the defense requires the approval of all but one of the members of the advisory committee. The results (pass/fail) must be recorded on a Results of Dissertation Examination form, which is to be reported to the Office of Research and Graduate Education and forwarded to the Graduate College Office within 24 hours. Should the candidate fail the defense, reexamination may not be scheduled without the approval of the advisory committee, the Director of Graduate Studies, and the Dean of the Graduate College.

All advisory committee members are to be present for the defense. If this is not possible, the Dean of the Graduate College, or designee, may permit one substitute for any member of the committee except the chairperson. A request for a substitute must be submitted in writing to, and approved by, the Director of Graduate Studies and the Dean of the Graduate College. The committee chairperson, the student, the original member of the committee to be replaced, and the substitute must sign this request. The substitute must have the same, or higher, graduate faculty status as the original member and represent the same academic discipline or area of emphasis.

## Acceptance of Dissertation

Acceptance of the dissertation is a requirement for the doctoral degree. An accepted dissertation must bear the original signatures of at least all but one member of the student's advisory committee. If more than one member cannot approve the dissertation, the doctoral degree cannot be recommended. If the substitute member attends and approves the dissertation defense, he or she signs the dissertation. For complete information on the preparation and submission of electronic theses and dissertations, see *www.marshall.edu/graduate/current-students/edt.*

## Survey of Earned Doctorates

Students are asked to complete and submit the online Survey of Earned Doctorates. Survey of Earned Doctorate information is used by a number of government agencies to assess the state of doctoral education in the U.S., and also to inform their decisions concerning funding of U.S. graduate institutions. The online survey is available at *https://sed.norc.org.*

## Publication

All doctoral dissertations and their abstracts will be microfilmed through ProQuest. This requirement cannot be satisfied by any other publication, but other publication of material in the dissertation is both permitted and encouraged.

## Process Summary

1. Inquiry from prospective student to the Biomedical Research Graduate Program or Graduate Admissions Office.
2. Receipt of the following official application materials and required fee by the Graduate Admissions Office: application, GRE scores, and transcript(s). International applicants must meet the application requirements of the International Admissions Office.
3. Receipt of the program online form, written statement addressing educational and career goals, and three recommendations in the Office of Research and Graduate Education by March 1
4. The Ph.D. Admissions Committee will review completed applications, then interview the top applicants.
5. The Biomedical Research Graduate Program notifies the Graduate Admissions Office and the applicant of the decision of the Admissions Committee.
6. The accepted student arrives in July for boot camp, starts their first laboratory rotation, and registers for course work.
7. An advisor is selected by the end of the first year. After the dissertation advisor has been selected, an advisory committee is formed. A Ph.D. Course of Study should be completed by the start of the second year.
8. The student completes requisite coursework and other program requirements.
9. The student takes written and oral qualifying examinations for admission to candidacy to the Ph.D. These examinations should be scheduled within two months of each other.
10. The student continues doctoral research under the guidance of his/her advisory committee. The dissertation phase begins with the approval of a dissertation project by the advisory committee, the Biomedical Research Graduate Program, and the Graduate College Dean.

11. The student applies for graduation at the beginning of his or her last semester, no later than the Graduate College deadline. The diploma fee must be paid by this time.
12. A copy of the preliminary draft of the dissertation is given to each member of the advisory committee no later than two weeks prior to the final defense of the dissertation.
13. The chair of the advisory committee requests approval for the defense from the Biomedical Research Graduate Program and the Graduate College no later than two weeks before the scheduled date of the defense.
14. The time and place of the defense of the dissertation are announced.
15. The student defends the dissertation in an oral defense.
16. The student follows the steps to prepare and submit the electronic thesis or dissertation at *www.marshall.edu/graduate/current-students/edt.*

# CLINICAL AND TRANSLATIONAL SCIENCE, M.S.

## Program Description

The Clinical and Translational Science (CTS) Department in the Marshall University Joan C. Edwards School of Medicine offers a Master of Science (M.S.) degree in Clinical and Translational Science. The goal of this program is to equip physicians in-training and other biomedi
need to translate basic clinical advances into improved patient care that will enhance the quality of life for patients in the Appalachian region, particularly southern West Virginia.

Students will receive education in clinical trial design, epidemiology, statistics, informatics, and translational research. Graduates of this program will be able to lead clinical trials of new drugs and procedures in West Virginia, particularly in its rural regions. CTS graduates also will be strong applicants for positions in schools of medicine and medical centers that have clinical and translational science centers.

## Clinical and Translational Science M.S. Admission Policy

Applicants must meet the admission requirements of both Marshall University Graduate Admissions as outlined on their website – *www.marshall.edu/graduate/admissions/how-to-apply-for-admission* – and the Marshall University Joan C. Edwards School of Medicine Clinical and Translational Science Department Admissions Committee. Interested persons should visit https://jcesom.marshall.edu/research, email mubiomed@marshall.edu and/or call 304-696-3365.

**PRIORITY Deadline June 1 for best chance of admission**

Applications are accepted on a rolling basis and are reviewed until the class is filled. Applications will be considered after the priority deadline until June 30, if openings are available. The completed application, application fee, official transcript(s) from the degree-granting institution(s), three recommendations, and a written statement on educational and career goals should be received in the Graduate Admissions Office by June 1. For the application to be complete, the program online form should be received in the Office of Research and Graduate Education by June 1. The CTS Admissions Committee will review completed applications, then interview the top applicants.

### Minimum Admission Requirements

- A baccalaureate degree from a regionally accredited college or university
- Successful completion, with a grade of C or better, of one year of general biology, physics, general chemistry, and organic chemistry, all with associated laboratories. Successful completion of undergraduate courses in biochemistry and cell biology are highly recommended but not required.
- A recommended minimum Grade Point Average (GPA) of 3.0
- A recommended minimum GPA of 3.0 in combined science and math courses
- Official transcript from degree granting institution/s and institutions where relevant post-baccalaureate or graduate coursework was taken
- Departmental materials: three recommendations, program online form, written statement addressing educational and career goals, CV/résumé

Entrance into the Clinical and Translational Science, M.S. program is restricted to fall semester only.

## Who Should Apply

- Undergraduates
- Medical students at an LCME-accredited U.S. medical school with a current GPA of at least a 3.0

- Postgraduate medical residents or fellows who have an M.D. or D.O. with a graduating GPA of 3.0 or better (equivalent GPA for foreign medical graduates)
- Ph.D.'s in biomedical sciences or Pharm.D.'s with graduating GPAs of 3.0 or better

Medical students will apply to the program during their third year of training. After completing the requirements for the M.S. degree, students will finish the fourth year of medical school.

Medical residents and fellows who are admitted into this program will need to integrate coursework into a reduced clinical workload, thus extending their postgraduate medical education by two years.

## Duration of the Program

Students will attend full-time and complete the requirements for the Master of Science degree in two years. This includes attending during the summer between years one and two.

## Degree Requirements

All students are required to meet the general requirements of the Graduate College for receipt of a master's degree. A minimum of 36 credit hours is required for a non-thesis degree. In addition, all students must pass a written and oral comprehensive exam.

All students will take the following courses.

*Fall Semester 1*

| | | |
|---|---|---|
| BMR | 660 | Communication Skills I |
| BMR | 680 | Seminar |
| CTS | 600 | Epidemiology and Biostatistics Used in Medical Research |
| CTS | 620 | Basic Clinical Research Operations |
| CTS | 635 | Writing and Peer Review of Scientific Publications |
| CTS | 640 | Clinical Trials Journal Club |

*Spring Semester 1*

| | | |
|---|---|---|
| BMR | 661 | Communications Skills II |
| BMR | 680 | Seminar |
| CTS | 610 | Study Design and Applied Statistics in Medical Research |
| CTS | 614 | Online Survey Tools, Relational and Data Warehousing, and Data Manipulation |
| CTS | 630 | Fundamentals of Team Science |
| CTS | 640 | Clinical Trials Journal Club |

*Summer Semester*

| | | |
|---|---|---|
| CTS | 650 | Rural Clinic Experience |

*Fall Semester 2*

| | | |
|---|---|---|
| BMR | 680 | Seminar |
| CTS | 625 | Clinical Research Operations Lab |
| CTS | 640 | Clinical Trials Journal Club |
| CTS | 660 | Molecular Phenotype of Appalachian Disorders |

*Spring Semester 2*

| | | |
|---|---|---|
| BMR | 680 | Seminar |
| CTS | 625 | Clinical Research Operations Lab |
| CTS | 640 | Clinical Trials Journal Club |

## BIOMEDICAL RESEARCH (BMR)

**601 Introduction to Nucleic Acids and Proteins. 3 hrs.**
A molecular and cell biological study of the structure and function of nucleic acids and proteins. (PR: Consent of instructor)

**602 Introduction to Cell Structure and Metabolism. 3 hrs.**
A molecular and cell biological study of the structure of cells and of cellular metabolism. (CR: BMR 601; PR: Consent of instructor)

**603 Regulation of Cell Function. 2 hrs.**
An advanced molecular and cell biological study of cell metabolism and the regulation of cell function. (PR: BMR 601, BMR 602, and consent of instructor

**604 Cellular Basis of Disease. 1 hr.**
A molecular and cell biological study of the basis of diseases prevalent in Appalachia. (CR: BMR 603; PR: BMR 601, BMR 602, and consent of instructor)

**617 Statistical Techniques for the Biomedical Sciences. 3 hrs.**
An application-oriented course in statistical concepts and techniques aimed at prospective researchers in the biomedical sciences.

**628 Neuroscience I: Major Structures of the Brain, Neuron Function, and Spinal Cord. 3 hrs.**
To study and understand the structure and function of the nervous system and disorders of neuronal function. (PR: BMR 601, 602, 603, 604, or consent of instructor)

**629 Neuroscience II: Structures and Functions of the Brain Stem and Forebrain. 3 hrs.**
To study and understand the structure and function of the nervous system and disorders of neuronal function. (BMR 628 or consent of instructor)

**631 Neuroscience and Developmental Biology Literature Review. 1 hr.**
A seminar course where published articles in the fields of neuroscience and developmental biology will be presented by students and faculty. (PR: Consent of instructor)

**641 Molecular Developmental Biology. 3 hrs.**
An in-depth discussion of current literature in developmental biology with emphasis on early embryo development, morphogenesis, lineage determination and regulation of developmental processes. (PR: Consent of instructor)

**644 Responsible Conduct of Research. 1 hr. CR/NC.**
Responsible conduct of research, including human subjects, live vertebrate animals, conflict of interest, mentor/mentee responsibilities, collaborative research, peer review, data management, research misconduct, and responsible authorship, with case discussions.

**651 Cancer Biology. 4 hrs.**
An advanced graduate course on the core principles of initiation, progression, treatment and prevention of cancer, based on current literature. (PR: BMR 601, 602, 603, 604, and consent of instructor)

**652 Cancer Biology Colloquium. 1 hr.**
This is a mentored journal club for graduate students covering selected areas of current interest in cancer biology research.

660 **Communication Skills for Biomedical Sciences I. 1 hr. CR/NC**
Biomedical graduate students are trained to plan, prepare, and deliver effective scientific presentations.

661 **Communication Skills for Biomedical Sciences II. 1 hr. CR/NC**
Biomedical graduate students are trained to plan, prepare, and deliver effective scientific presentations.

664 **Obesity and Related Diseases Journal Club. 1 hr. CR/NC**
A seminar course where published articles in the field of obesity and obesity-related diseases are presented and discussed.

665 **Cardiovascular Disease Research Colloquium. 1 hr. CR/NC.**
A seminar-style series that will focus on recent advances in topics related to cardiovascular disease.

674 **Teaching Practicum. 1 hr. CR/NC.**
Students gain experience in teaching using a variety of methods in a supervised setting.

679 **Special Problems. I, II, S. CR/NC**
Intensive study of a selected topic or problem. Emphasizes independent study. (PR: Consent of advisor)

680 **Seminar. 1 hr. I, II. CR/NC**
Study and discussion of current topics related to the Biomedical Sciences.

681 **Thesis. 1-6 hrs. I, II, S. CR/NC.**

785 **Introduction to Research. 1-6 hrs. I, II, S. CR/NC**
Directed research activities requiring a completed prospectus for an advanced research project, a written report, or a research thesis. A minimum of three (3) hours required for all students. (PR: Consent of instructor)

882 **Research. 1-15 hrs. I, II, S. CR/NC**